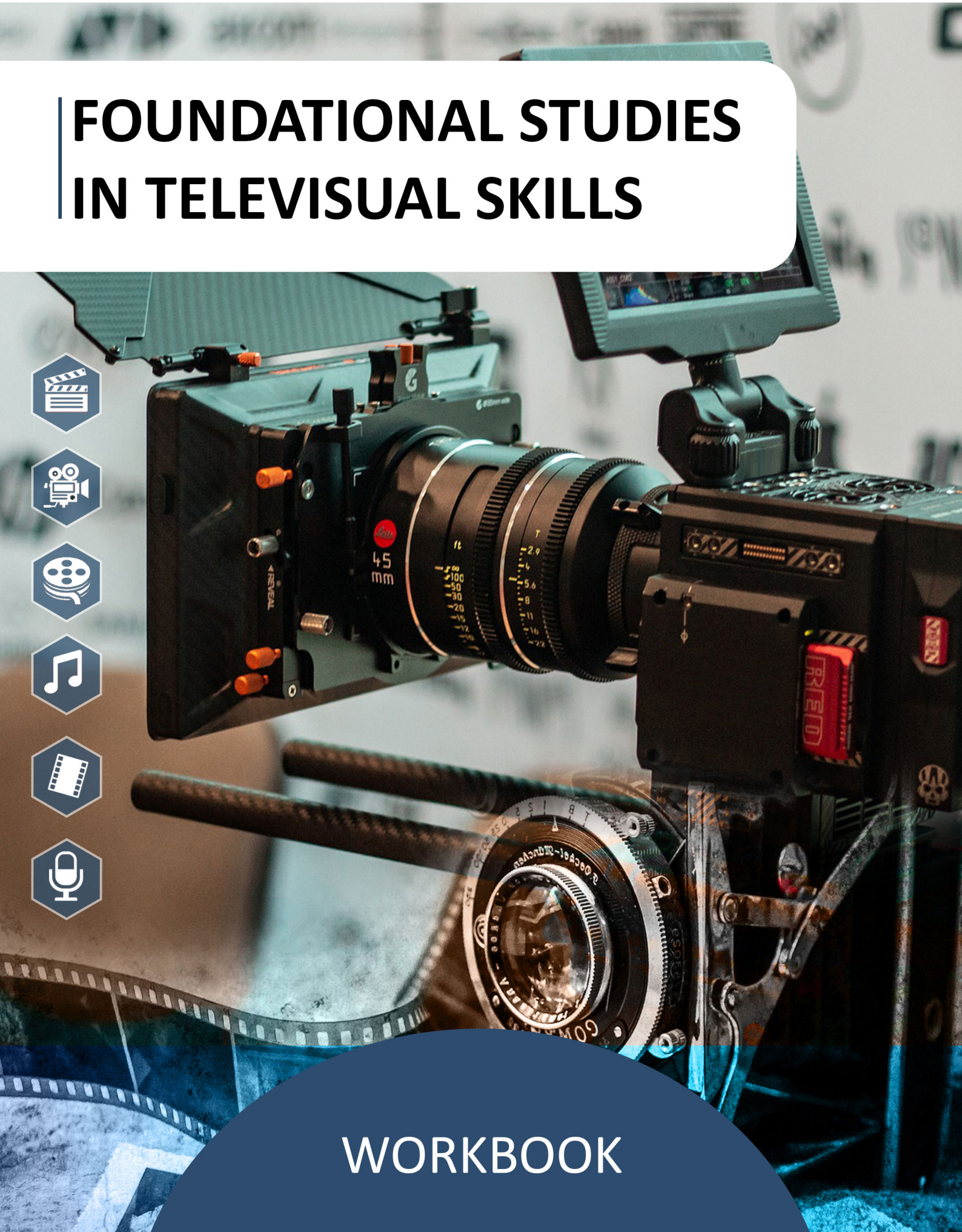
Australian Aid

Skills for Inclusive Growth

FOUNDATIONAL STUDIES IN TELEVISUAL SKILLS



WORKBOOK

Contact Person

Farheen Khurrum- Contract Representatve
Scope Global
Level 5, 12 Pirie Street, Adelaide, SA, 5000, Australia
Tel: +61 8 7082 1431
Farheen.Khurrum@scopeglobal.com

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ACKNOWLEDGEMENT

This course was first conceived as the solution to a specific problem but quickly became something with wider benefit.

The specific problem was the need to train dedicated but inexperienced media teams in how to produce a professional standard reality TV show focussed on the Sri Lankan hospitality sector (Supreme Chef Youth Edition). The media teams typically had experience limited to producing content using a single camera, possibly a light and a microphone for social media content. A reality TV show requires knowledge and experience of multi-camera set ups, using multiple lights, sophisticated sound engineering, episode structure and production management. Therefore, bringing teams up to standard would take a well-prepared course which contained plenty of on-set experience with monitoring and feedback.

The narrow expertise of TV & Film media teams in Sri Lanka has been the status-quo in the industry. When international productions come to Sri Lanka, they tend to bring their own experts with locals relegated to assistant positions.

It doesn't have to be this way.

In creating this course, the aim is to give Sri Lankan media trainees the breadth of knowledge and skill which will give them historical context and practical knowledge on a par with their international contemporaries. Before deciding on which area to specialise, knowing about the industry in general will lead to more confidence and quality in overall production. The course will also be useful for those already in the industry who wish to broaden their knowledge and skill set.

Whether the trainee wishes to work in film, TV or social media creation having a strong foundation in their knowledge and experience can only be an asset to their career.

The theoretical and practical aspects of this course have been created and organised by Mr. Chathura Jayathilleka - Film & TV Critic, Jury Member, Television Director & Chairman and Managing Director of Creative Network, Sri Lanka. He has been reviewed and edited by other Sri Lankan film and television experts: Mr.Aruna Lokuliyana – Senior Lecturer, Department of Mass Communication University of Kelaniya (The History and Technical Development of Cinema and Television, Cinema and Film Aesthetics), Mr.Stanley Hettiarchchi - Specialist Engineer, Formar Head of Engineering - Swarinawahini Media Networks Pvt. Ltd.Former Deputy General Manager - ITN Media Networks, Former Director - Media and Information Services / Librarian - University of Vocational Technology (Fundamentals of Camera and Lighting Techniques, Sound and Audio Technology, Fundamentals and Techniques of Video / Film Editing), Mr.Channa Deshapriya – Award winning master Director of Film & Television Photography, Jury Member (Fundamentals of Camera and Lighting Techniques), Mr.Ravindra Guruge (Award Winning Master Film & Television Editor, Jury Member (Fundamentals and Techniques of Video / Film Editing).

Vocational training technical advice and financial support to create the course was provide by the Australian Government via their Sri Lanka based Skills for Inclusive Growth project.

This course, worksheets, trainer notes and assessment can be adapted by training institutes as fits their requirements. Advice on how to run the course can be sought from Mr. Jayathilleka at Creative Network.

FOREWORD

On behalf of Skills for Inclusive Growth, a project of the Australian Government in Sri Lanka, I am delighted to share this brand-new course, *Foundational Studies in Televisual Skills*, with the Sri Lankan vocational training sector.

The course was developed to support the *Supreme Chef Youth Edition* reality TV show but has utility within the wider media studies field. I am excited that Sri Lankan film and television professionals have looked to address a serious skills gap with this foundational course and that S4IG have been able to support them on this mission.

The course is as broad as you would expect a foundational one to be. It covers the industry context and evolution of the televisual industry and introduces the trainee to the technical skills used in the workplace including film aesthetics and shot design, the use of a camera, lighting effects, sound, editing and production management. This training course builds up the skills of those interested in TV, film or social media video making techniques with a blending of both theory and practice. It has been designed to be delivered by industry professionals and encourages the delivery of training on the job.

I think the vocational training market will appreciate the flexibility of this course. It is project based so could be used with a focus on short-film, documentary, advertising, reality TV, studio production or setting up of a social media channel. An employer and training institution can pick and choose which parts of the course it thinks will be most applicable to its students/trainees.

I really look forward to seeing the output of this course in terms of the projects and content produced by trainees in Sri Lanka. This training course is a gateway for Sri Lankan youth to gain the required skills and knowledge to enter the growing Sri Lankan media and creative industries workforce. This growing workforce will be multi-disciplinary and able to not only produce good quality entertainment content but also support local industries as they market themselves at home and abroad.

I would like to thank Chathura Jayathilleka of Creative Network for his dedication and commitment in leading the development of this course and to the other experts who contributed and supported this venture. With people like Chathura and others S4IG has worked with in video creation, I am confident that the future for the Sri Lankan film and TV industry and for content creation is going to be vibrant and something that Sri Lankans will soon be celebrating – better skills, better jobs, better futures!.

David Ablett
Team Leader
Skills for Inclusive Growth Program

CONTENTS

The Current State of the Film & Television Industry in Sri Lanka and Career Paths & Job opportunities

In Sri Lanka, film is a famous art and popular entertainment medium. As of late 2021, television is still the most popular medium of mass communication.

“Kadawunu Poronduwa,” the first Sinhala movie, was screened on the 21st of January, 1947.

The first television channel was launched when the Independent Television Network (ITN) was established on the 13th of April, 1979.

“Kadawunu Poronduwa”- (1947)
The first Sinhala movie
which was screend

Indipendent Telivision Network (ITN)
The first television channel in Sri Lanka (1979)

Since then, numerous films have been produced in Sri Lanka and our filmmakers have gained international recognition and won international awards.

Since 1979, many television channels have been created and provide their services tri-lingually in Sinhala, Tamil, and English.

The Television market in Sri Lanka

The increasing impact of television on society can be comprehended through how today’s “societal thinking” is shaped by what is shown on television. In simpler terms, the Sri Lankan television industry has been able to influence the thoughts of its viewers in social, political, and cultural terms.

According to advertising agencies’ assumptions, the following are some forecasts on current TV viewership and market.

TOTAL TV POPULATION
19.2 million

TERRESTRIAL POPULATION
11.89 million

CABLE SATELLITE POPULATION
7.3 million

SINHALA SPEAKING TV POPULATION
14.75 million

TAMIL SPEAKING TV POPULATION
4.66 million

Sri Lanka as a Location for International Films

Sri Lanka has become a popular film location for foreign films. Hundreds of foreign-language movies, including international award-winning ones, have been shot in Sri Lanka.

These internationally recognized productions have given opportunities to Sri Lankans, especially the youth, to engage in various parts of its production process.

English, French, Italian, Hindi, Tamil, and German are a few of the many languages that have been utilized in these productions. A few of those movies that got internationally acclaimed are listed below:

- The Bridge on the River Kwai (1957)- Director: David Lean
- Tarzan the Ape Man(1981)- Director: John Derek
- Indiana Jones and the Temple of Doom(1984)- Director: Steven Spielberg
- Lord Mountbatten: The Last Viceroy(1986) – Director: Tom Clegg
- Mother Thresa in the name of the gods poor (1997)- Director: Kevin Connor
- Sleeping Dictionary (2003)- Director: Guy Jenkin
- Mother Thresa (2003)- Director: Fabrizio Costa
- Water(2005)- Director: Deepa Mehta
- Midnight's children (2012)- Director: Deepa Mehta

The Bridge on the River Kwai (1957)

Indiana Jones and the Temple of Doom (1984)

Mother Thresa
(2003)

Midnight's Children
(2012)

The Job Market in Film & TV industry in Sri Lanka

Looking back at the history of Sri Lanka, its youth have been limited in their choices of profession. Careers in the medical, engineering and educational fields were highly prized while most other options seen as a poor second best.

This limited outlook on professions was challenged to some extent in the 1970s with the emergence of the open economy and the international technological revolution.

The fields of marketing, banking, and textile manufacturing were among the most influential in providing career opportunities that newly arose.

More opportunities are being created today with the relentless developments in technology. Film and especially television hold top positions among these opportunity providers.

Television is advancing as a media form and industry. It can be divided into government and private terrestrial TV channels, cable satellite channels and IPTV channels, and digital TV.

Besides the above, several television production houses also produce content for local and foreign television markets.

Therefore there are multiple avenues through which you can look into a job in the film & TV industry.

Most of the jobs in the private sector or government-owned TV professions are either executive or management grade.

Freelance film or TV professionals also earn a handsome income compared to other industries in Sri Lanka.

The scope and future for you in the industry will depend on your knowledge, experience and especially the talent and creativity you can bring to the job you choose.

The following are among some of the openings for top jobs in film & TV industry:

- Director
- Producer
- Assistant Director
- Assistant Producer
- Director of Photography / Lighting
- Editor
- Music Director
- Art Director
- Makeup artist
- Script Writer
- Vision Mixer
- Recordist
- Camera crew member / Technician

Making Videos for Social Media

Making videos for social media platforms such as YouTube, Facebook and Instagram is as popular in Sri Lanka as anywhere else in the world.

Trainees undertaking this course will be familiar with local content uploaded to social media. From inexperienced individuals to long established media companies, there really is no barrier to getting content on-line. All you need is a device capable of recording video and an internet connection.

Just as you will be familiar with local content you will also know if something has been produced with quality or not, even if only subconsciously. For example, compare the production values of a teledrama episode uploaded to YouTube versus a video made on a smartphone.

The higher the quality of the production the more likelihood of a larger audience. In general, viewers like content with good composition, good narrative structure, good image, good lighting and good sound.

Therefore, the skills you learn through completing this course are just as relevant if you want to work in a traditional media organisation or create a YouTube channel. Indeed, by doing the course you will have a distinct advantage over any social media competition!

The Workbook

This workbook provides fundamental knowledge and practical activities. The content has been carefully selected to assist those who are planning to join the industry anew as well as those who are already a part of it.

However, you as a media student must also navigate this field in your own way, deviating from its fundamentals and traditions when needed.

These fundamentals are guidelines which you can examine, follow, or develop with your own creativity.

Creativity is key to your understanding these types of media. Your purpose is to see the world, life, and society through a creative eye and then recreate it.

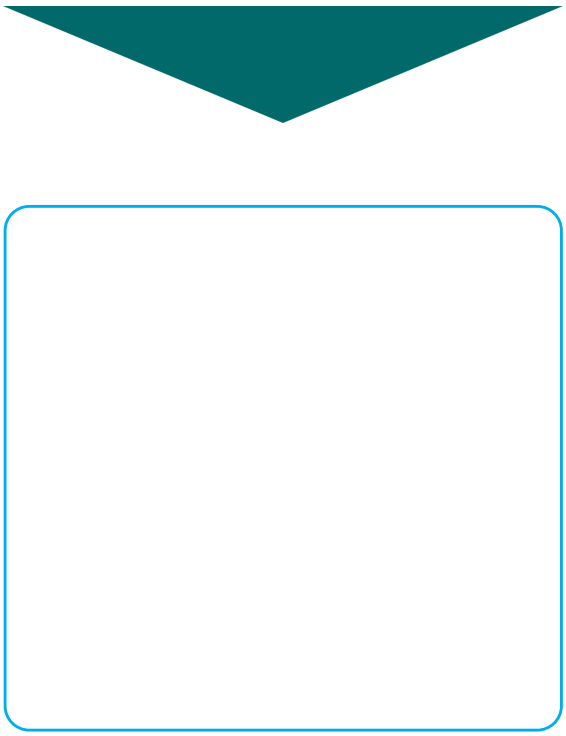
Links for further study

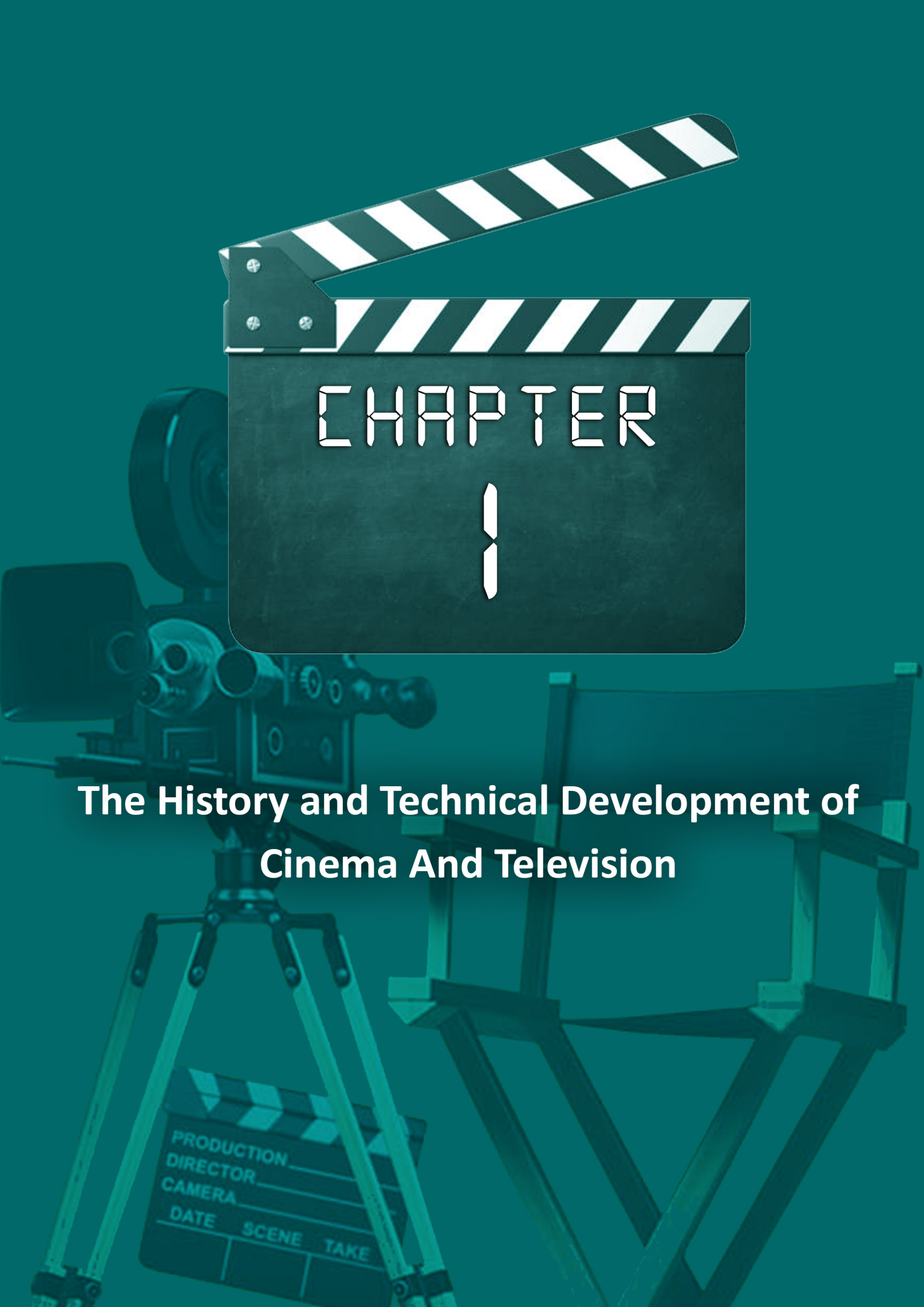
Many opportunities exist both within Sri Lanka and abroad to conduct further research and study of film or television.

Most of the Universities in Sri Lanka provide extensive degrees in film and media studies.

Similarly, government-funded organizations and institutes such as the University of Vocational Technology, National Youth Services Council, Sri Lanka Foundation Institute, and the Sri Lanka Television Training Institute also provide diploma-level qualifications in film and media studies.

Scan the QR code on your smart device to quickly access the links on this page.





The History and Technical Development of Cinema And Television

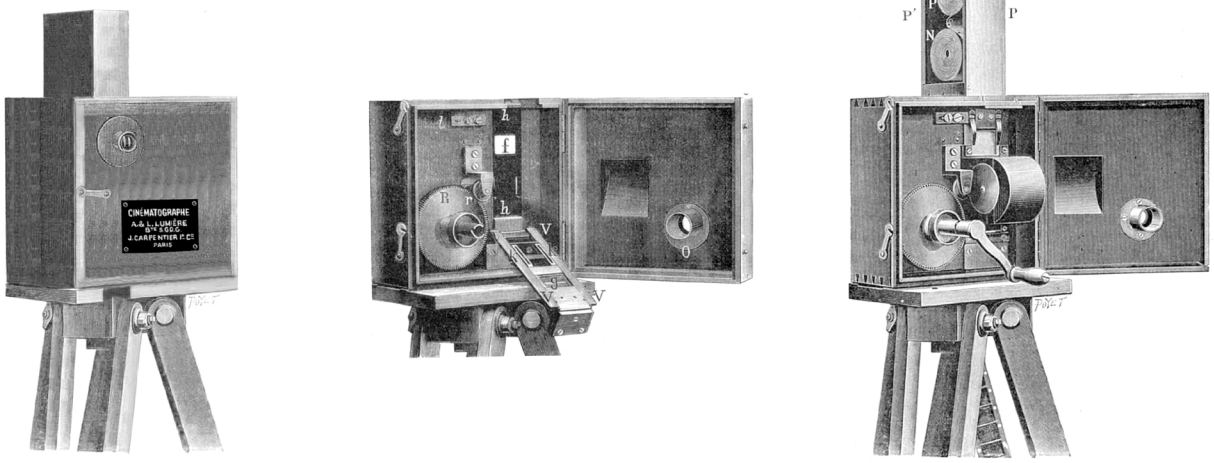
The History and Technical Development of Cinema and Television

Audiovisual history begins with cinema.

Film is considered to have officially originated on the 28th of December in 1895, when brothers Auguste and Louis Lumiere screened the world's first ever movie at Grande Café, in Paris. A onereel motion picture titled "Workers Leaving the Lumiere Factory" projected through their selfbuilt "Cinematographe." The word "cinema" derives from this device.

"Workers Leaving the Lumiere Factory" (1895)

Auguste and Louis Lumiere

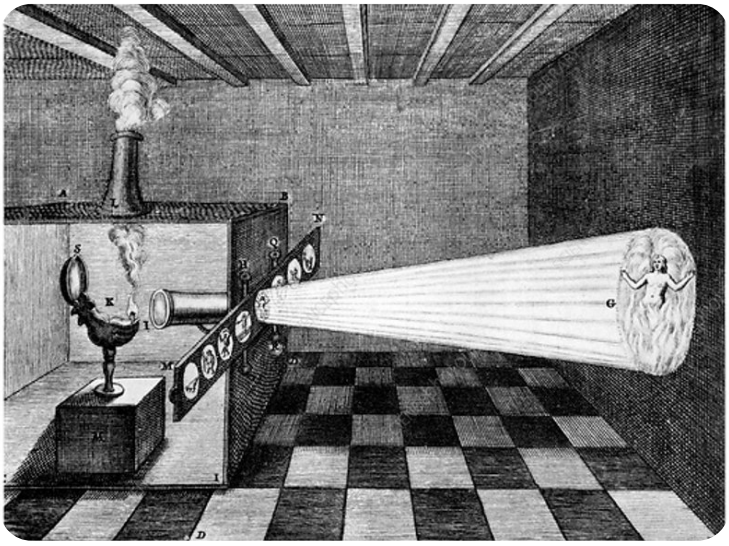


"Cinematographe" – The first projector of Cinema

Even though this date marks an important milestone in the history of cinema, the ideology, and technology behind cinematic inventions run further back in history. More than other art mediums, cinema has largely evolved with developments in science and technology over the years.

The concept of "persistence of vision" acted as the most fundamental and primary scientific theory in the creation of cinema. The priest Athanasius Kircher was the first individual to look at this concept from a scientific point of view in his book "Ars Magna Lucis et Umbrae" and later use the same theory to invent the magic lantern.

Priest Athanasius Kircher



Magic Lantern

PERSISTENCE OF VISION

Persistence of vision is the ability of the human brain to retain images perceived by the eye for a brief period of time after they disappear from the field of vision. Persistence of vision was known since the time of the ancient Egyptians but it was not until the mid 19th century when entrepreneurs exploited this phenomenon for its optical entertainment value. Toys of various quality and complexity were produced, providing viewers with the illusion of movement.

“Persistence of vision” is a theory that explains that although a motion may not happen continually, the fragmentation or sectioning of that motion at a given moment cannot be perecived by the human mind. This means that the fragmented motion which occurs within an allocated period registers in the human mind as a continuous motion. Image information in the environment hits the retina, which transfers it through electrical signals to the area of the brain that processes visual information, where it can then be interpreted.

This theory applies to cinema because motion that occurs in film is not continuous. Instead, fragmented motions can be noted in both shooting and projecting a cinematic piece. This fragmentation occurs in both the camera and projector as (1/48) seconds. This means that the camera shutter opens, closes and re-opens 24 frames a second upon detecting light on the film strip. Similarly, a projector’s lens shutter also opens, closes, and re-opens at the same pace 24 frames a second when light falls on a picture frame and is projected through the projection lens. The brain retains the impression of illumination for about one-tenth of a second after the source of light is removed from the eye. If, therefore, the process of image synthesis takes less than onetenth of a second, the mind will be unaware.

As our mind cannot detect these fragmentations in vision and motion, they are perceived as continuous motion pictures in cinema.

In reality there are fragmentations and moments of darkness in between two frames that go undetected by our minds. This means that when watching a 2-hour movie, we spend almost an hour staring at complete darkness!

It is an illusion created through the “persistence of vision” that effectively prevents our brains from registering this darkness. Sound and motion, that occurs in Cinema at 24 frames per second, registers in the mind only when two picture frames have combined, not during the period of transition from one frame to the other. The transitionary stage is what goes undetected due to “persistence of vision”.

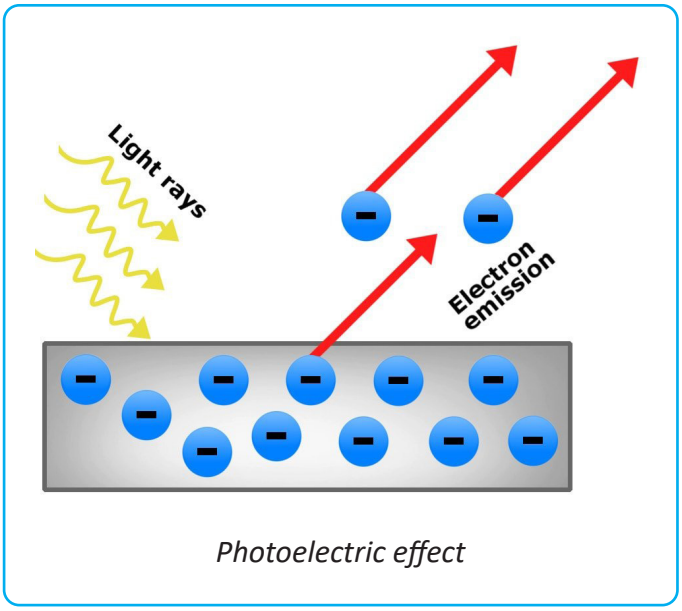
Question 1

Until 1895, people had only ever seen depictions of reality via still images such as paintings and then photographs. How do you imagine they would have felt when they saw a moving image for the first time?

1.1 The History & Technical Development of Television

Cinema is older than television in terms of the projection of the moving image. However, the scientific and technological experiments that led to the creation of television started in the second half of the 19 th century.

The discovery of the photoelectric effect is an example of such experimentation. It was discovered in 1873 in Ireland by a young telegraph operator called Joseph May. The photoelectric effect is when selenium bars show a variation in resistance when exposed to sunlight, this proved that variations in light intensity can be transformed into electrical signals. This effect showed the world that light can be transmitted.



Photoelectric effect

The French word “télévision” was used for the first time in 1900 by the Russian physicist Constantin Perskyi who delivered a speech on the subject during the Great Paris Exhibition. “Télévision” caught on, and it became “television” in English, Spanish, and Dutch and “televisione” in Italian.

On January 26, 1926, John Logie Baird, a Scottish inventor, gave the first public demonstration of a proper television system in London, launching a revolution in communication and entertainment. Various inventors worked to develop this idea. Baird was the first to achieve
easily discernible images. John Logie Baird (1888-1946) achieved many ‘firsts’ in television technology. He started experimenting with television in 1922 and took out his first television
patent in 1923. He demonstrated the prototype television in 1925.

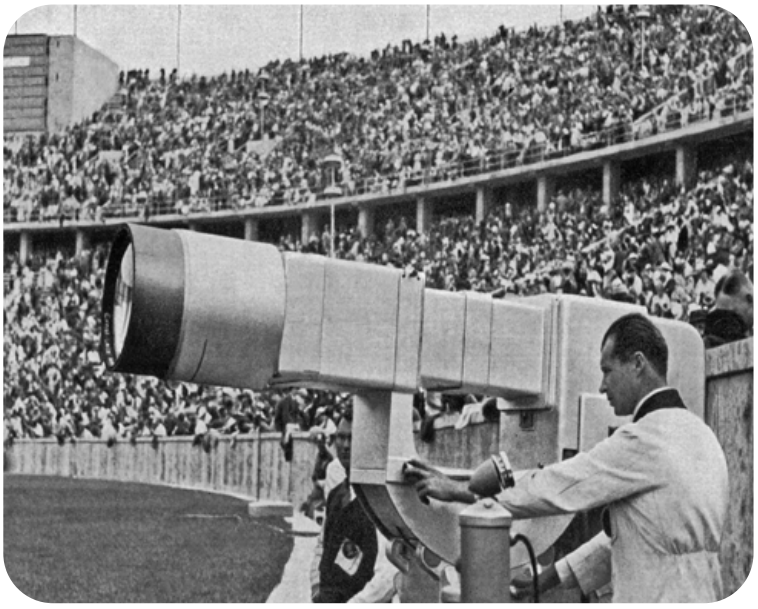
Electronic television was successfully demonstrated in San Francisco on the 7th of September in 1927. The system was designed by Philo Taylor Farnsworth, a 21-year-old inventor who had lived in a house without electricity until he was 14.

In 1928 the Baird Television Development Company achieved the first transatlantic television transmission. Baird's early technological successes and his role in the practical introduction of broadcast television for home entertainment have earned him a prominent place in television history.

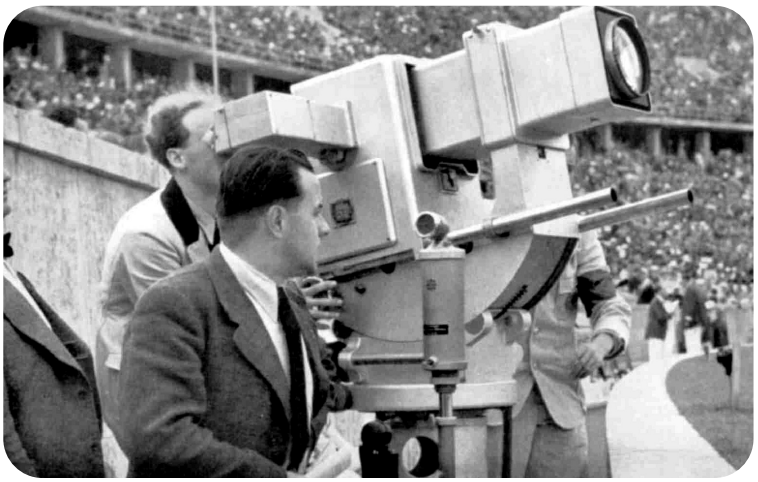
In March 1935, a television service commenced in Berlin (180 lines/frame, 25 frames/second). Pictures were produced on film and then scanned using a rotating disk.

Likewise, in November of 1935, television broadcasting began in Paris, using a mechanical system for picture analysis (180 lines/frame, 25 frames/second).

Electronic cameras were developed in 1936, in time for the Berlin Olympic Games.



Telefuken camera at the Olympic Stadium (1936)



A closed-circuit television system and radio network that reached 41 countries, with many other forms of expensive high-tech electronic equipment were set up at 1936 Olympics

1.2 What is Television / What is video ?

The two words “television and “video” may appear to be close or equal in meaning. However, they are, in fact, quite different from each other.

Television is a piece of electronic equipment which converts light signals into electronic signals.

Video recorders such as tapes, disks, or chips are used to save or store those signals. A television set is required to convert the electronic signal into a light signal that can be viewed by an audience.

The word “video” describes a programme that is not broadcast.

Video is a sequence of images with audio. Video signals only can be stored on magnetic tapes, hard disks or electronic chips. Film footage can store on chemical-based negative or positive.

Being produced on video is not a guarantee of quality in terms of the equipment used to make, edit or broadcast the image. For example, videos that can be seen on social media are often amateur in style and substance.

In contrast “television” has to broadcast programmes that are produced to an expected quality standard.

Despite this, videos on social media are gaining an increasing amount of attention and fame. Consequently their quality is evolving in general terms. This theme will be addressed as we progress through the course.

Question 2

How would you describe the difference between “television” and “video” in its simplest terms?

1.3 The Differences between the Cinema and Television Mediums

Although there are similarities between Cinema and Television, it is essential to understand that the differences are more pronounced.

The fact that films are produced to be screened, most commonly at cinemas, is the most significant difference. They are projected onto a screen to be viewed by an audience who have made a special effort to come to the venue. Television programmes, in contrast, are produced to be broadcast or televised for the general public in their households.

Broadcasting

Broadcasting means the electronic transmission of radio and television signals intended for general public reception, distinguished from private signals directed to specific receivers.

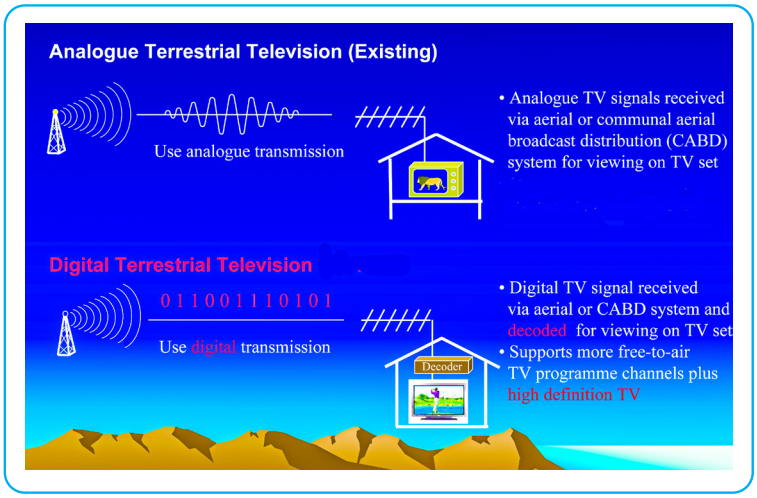
“Broadcasting” is the final stage in the chain of the video path. It is the transmission of the audiovisual signals to the final user. Despite the continued use of old analog transmission systems, digital transmission is becoming the most common form of transmission around the world. Currently, in Sri Lanka, TV programmes are produced digitally although transmission can still be received through analog means. It is to be expected that digital transmission will completely replace analog in the future.

Digital transmission has revolutionized the concept of television by introducing new digital models that pave the way for optimized sound and image broadcasting, thereby improving the quality of the end product.

Digital Television can be accessed through different technologies such as Direct Digital TV (DTTV), cables, satellites, Asymmetric Digital Subscriber Lines (ADSL), and mobile devices.

Digital Terrestrial Television Broadcasting (DTTB)

In the case of DTTB, transmission is made using space waves. These waves can be transmitted through the atmosphere without cables or satellites and are received through developed versions of UHF antennas.

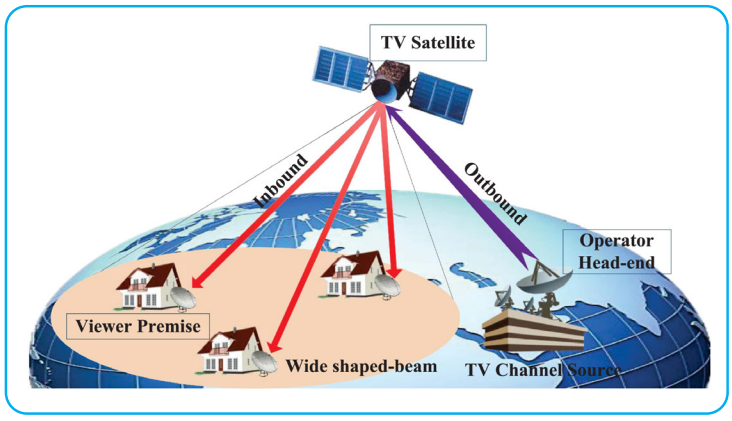


Satellite Digital Television

In Satellite Digital Television, the signal is broadcast to a wide geographic area through communications satellites. This is in opposition to terrestrial television, whose waves do not reach the atmosphere, and cable television, whose broadcasting occurs through fiber-optic and coaxial cables.

There are two different stretches in satellite television broadcasting: the uplink, through which the information is sent from the broadcasting center to the satellite, and the downlink, which broadcasts this information from the communications satellite towards the area it illuminates on the surface of the earth. Each of the links uses a different frequency band to avoid interference.

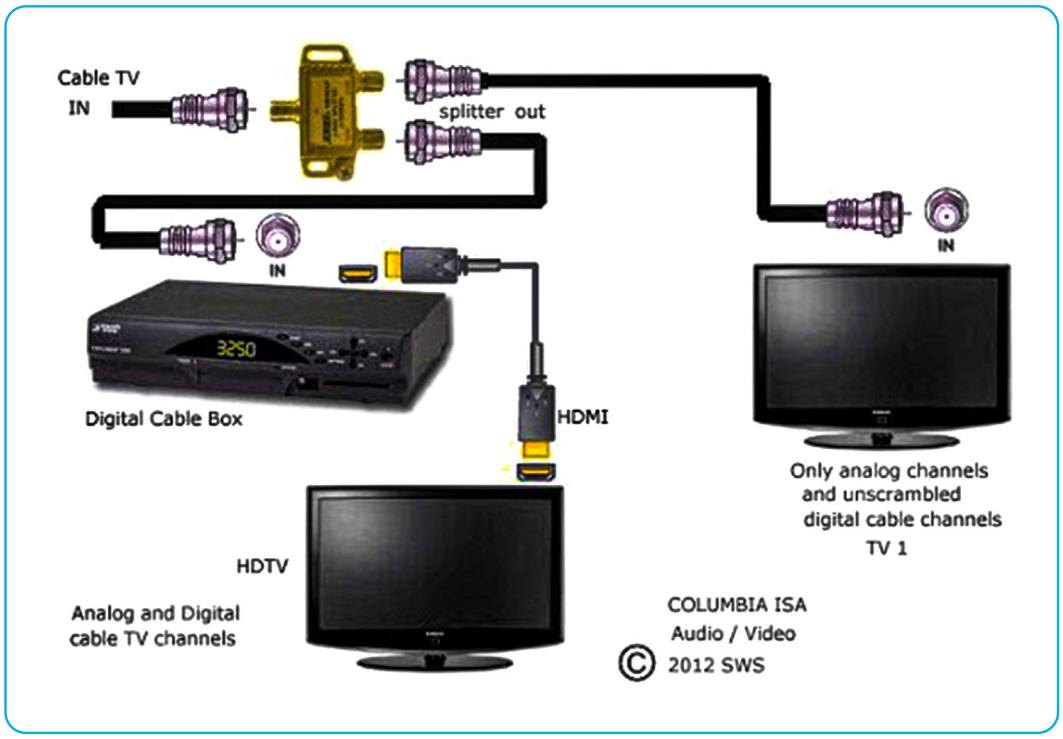
Among the advantages of using satellite television systems, the ease in reaching significant coverage areas is a substantial benefit. It facilitates signal reception in remote or isolated locations that is difficult or impossible through other systems such as ground-wave or cable television. Despite these benefits, satellite communications are identified to show significant delays in transmitting the signal due to the distance it has to cover.



Digital Cable Television

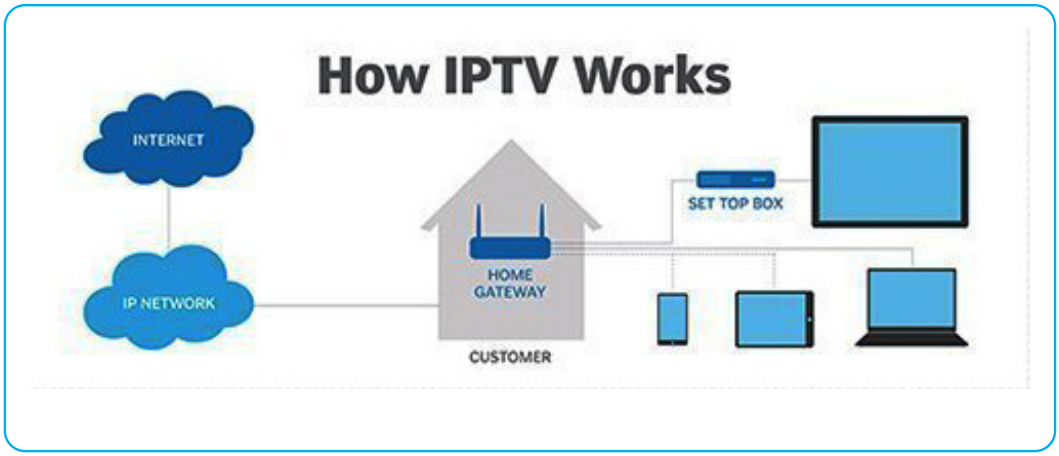
As the name suggests, signals are distributed through cable networks (fiber optic and coaxial cable) in Digital Cable Televisions.

The standard used in Europe for Digital Cable Television broadcasting is the DVB-C (Digital Video Broadcasting – Cable). DVB-C uses a QAM modulation; its signal is strong against noise, the broadcast is immune to interference, and minimal delays.



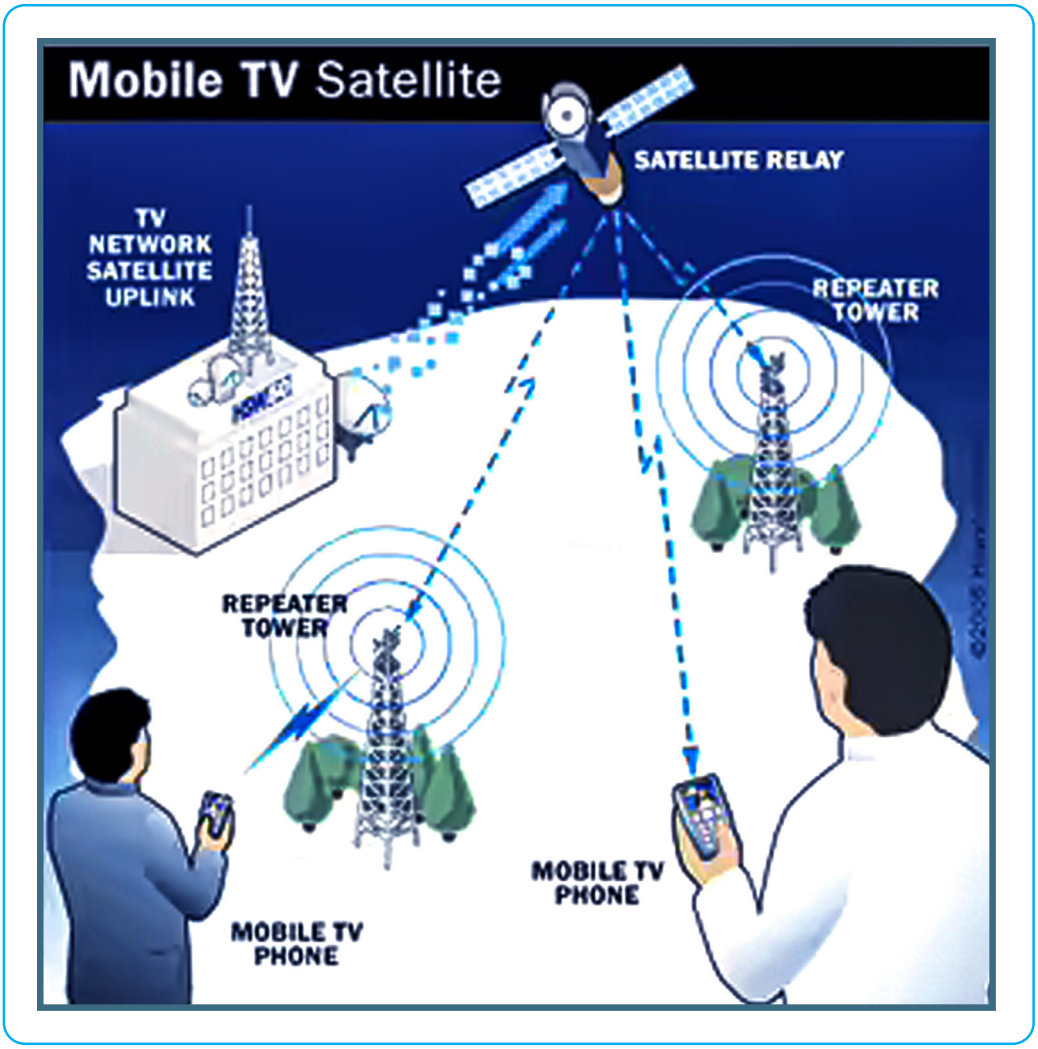
Internet Protocol Television (IPTV)

In Internet Protocol Televisions, the signal is distributed through network protocols to the final user. This is generally done through high-speed ADSL data connections. The main distinguishing factor compared to other Digital Television access technologies is itssolid interactive component: Video on Demand (VoD). With VoD, the viewer can choose what they want to watch and are free to decide when to see it.



Mobile TV

Mobile Digital Television is a television broadcasting service with digital technology that receives signals in mobile or portable devices or equipment (mobile phone, laptop, PDA, etc.).



Question 3

In your experience, what is the most common way for people to receive video content in Sri Lanka?

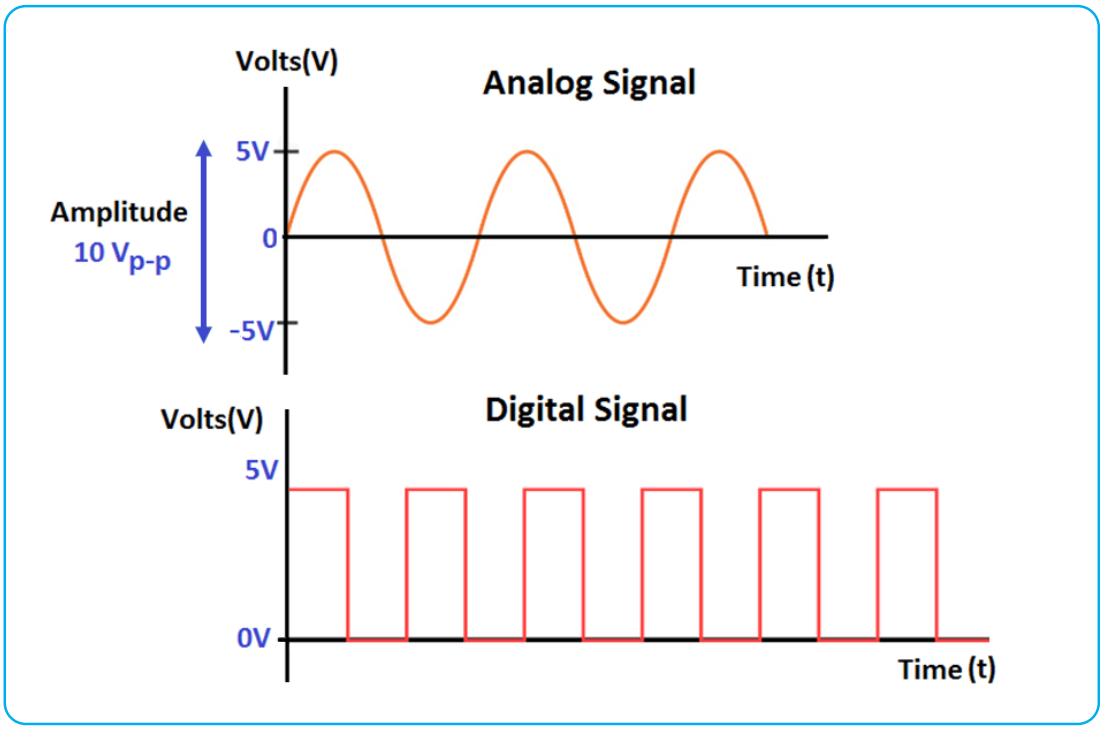
1.4 What is the Difference Between Analog and Digital ?

A signal is an electromagnetic or electrical current used to carry data from one system or network.

In electronics and telecommunications, it refers to any time-varying voltage that is an information carrying electromagnetic wave. A signal can also be defined as an observable change in quality, such as quantity. There are two main types of signals: analog signals and digital signals.

An Analog signal is a continuous signal in which one time-varying quantity represents another time-based variable.

Digital signals are time-separated signals which are generated using digital modulation. It uses a continuous range of values that help you to represent information. Digital signal uses discrete 0 and 1 to convey information.



When the first television broadcasts hit the airwaves in the 1920's, television shows were transmitted using an analog signal. But in 1996, digital technology changed the way TV signals were transmitted through the air.

The biggest difference between analog and digital is how the signal is transmitted from the source to the TV in your home. Analog TVs transmit audio and video signals over the airwaves like a radio signal. Each station has a single frequency over which to broadcast its analog television signal. You know these frequencies as channel numbers on your TV. Like radio signals, an analog TV signal can experience interference with its frequencies.

1.5 The Differences between the Viewers of Cinema and Television

Investigating what makes television and film viewers different from each other is likely to shed more light on the differences between the two mediums of film and television.

The film viewer is often a single spectator, isolated in a dark room. Thus, there is less interference from the outside world.

They watch the film alone and typically do not share the experience with the person seated next to them.

Traditionally their undivided attention is allocated for the entire duration of the movie although with the proliferation of digital platforms this is becoming a less observed rule.

In contrast to them, the television viewer watches their programmes amidst interference, often seated in a living room or other room in their home. Thus, they are unable to be as focused as the film viewer.

As Television is frequently watched in groups, there is a higher tendency for viewers to converse and share their thoughts and opinions on what they are watching.

Since both these mediums are audience-centered, it is necessary to keep the above facts in mind when catering the best products to their respective audiences in the best possible way. It should be clear that the means of grabbing the audiences' attention will have to be executed differently and carefully as per the type of viewer.

"Goluhadawatha" film by Lester James Peiris - 1969

"Goluhadawatha" teledrama by Lester James Peiris & Sumithra Peiris

“Babaru Awith” film by Dharmasena Pathiraja - 1977

“Kadulla” Tele Drama by Dharmasena Pathiraja - 1992

Question 4

Do you have a preference for watching video content on a personal device, TV screen or at the cinema? Why?

1.6 Is television an art?

The question of whether or not television is an art medium is an ongoing debate that shows no sign of being settled anytime soon.

The mainstream view is that television is not an art medium but a medium of mass communication. However, there have recently been critically acclaimed TV shows (among them The Wire and Game of Thrones (both on HBO) that have pushed this definition to the limit).

This shows there are opportunities for television to use artistic features which should be utilized when possible. However, it is essential to understand that its purpose is tied to mass communication.

1.6.1 The main characteristics of television can be listed as follows

- Audiovisual medium
- Domestic medium
- Live medium
- Mass medium
- Transitory medium

1.6.2 The main functions of television are as follows

- Education
- Information
- Entertainment
- Persuasion

1.6.3 Main programmes of television

- Educational
- News
- Documentary
- Teledramas & films
- Musical
- Sports
- Children
- Reality shows
- Tv game shows
- Cultural

Cinema & Film Aesthetics

Cinema & Film Aesthetics

Although the first screening of cinema happened on the 28th of December 1895, it does not mean that “film art” was born on the same day.

The word “Cinema” and the word “Film” are very much different concepts. Much like the word “Television,” the word “Cinema” is an umbrella term used to refer to a general platform of audio-visual media.

What is the difference between a film, a movie, or a cinema?

The word “movie” is a shortened form of the term “moving picture” or “motion picture”. Film is the material on which motion pictures are stored. Cinema is from the French cinématographe, which comes in part from the Greek kinema, meaning movement. So, cinema is just another word meaning moving picture. It has come to mean more generally the filmmaking process and the as well as the building where films are shown.

A movie is more concerned with the plot and easily resolved outcomes. A film attempts to convey or explore something more significant than itself.

“Film” is, on the other hand, a word that is used in art to identify the film as a medium of art.

Film Art developed long after the origin of cinema. Aesthetic ideologies and cinematic theories have influenced its development. To understand the above concepts, it is necessary to study the history of cinema and the evolution of film.

During the early stages of cinema, it was considered a powerful medium that could recreate the natural world.

Before the arrival of cinema, still-photography was the closest we could come to re-create the natural world. But with the cinema, there was a possibility of bringing motion into the images and creating more realistic and natural pictures. This quality of cinema made it interesting and almost magical in the viewers’ eyes.

Masses of people came to theatres to experience this novelty. More than enjoying the depths of the creation, the audience’s priority was pure amusement.

Question 1

Do you think most people want to experience amusement or art when they watch audio-visual content? Why?

2.1 The Early Period of the Cinema (1893-1903)

The simple presentation of day-to-day life was the theme of many of the earliest motion pictures. A camera was placed in one location and remained there throughout the movie. It captured everything from afar. These films were not rich in structure or content. Cameras were operated by technicians not specialist cameramen.

When discussing the early period of the film, we should give special attention to four filmmakers, namely:

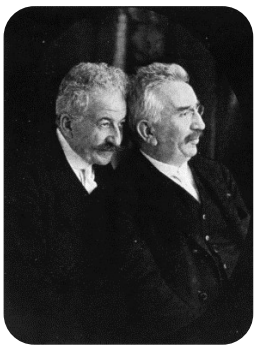
- Auguste Marie Louis Nicolas Lumière and Louis Jean Lumière
- Thomas A. Edison
- Georges Méliès

2.1.1 Lumière Brothers

By profession, the Lumière brothers Auguste Marie Louis Nicolas Lumière (1862 –1954) and Louis Jean Lumière (1864 –1948) were manufacturers of photography equipment. But they are better known for their Cinématographe motion picture system and the short films they produced between 1895 and 1905, which places them among the earliest filmmakers.

They screened their first project of films to a group of 200 members at the "Society for the Development of Film" on the 22nd of March 1895.

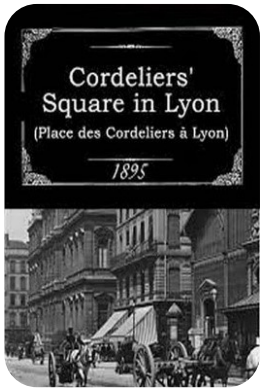
Their first commercial screening (on the 28th of December 1895 for around 40 paying visitors and invited relations) has traditionally been regarded as the birth of cinema. Either the techniques or the business models of earlier filmmakers proved to be less viable than the breakthrough presentations of the Lumières."



Lumière Brothers

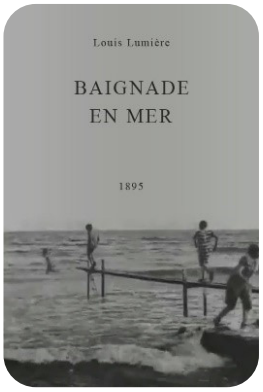
"The disembarkment of the Congress of Photographers in Lyon" - 1895

"Baby's Breakfast" - 1895



"Cordeliers Square in Lyon" - 1895

"Blacksmiths" - 1895



"Bathing in the sea" - 1895

The following ten short films, lasting 50 seconds each, were screened at that first screening:

La Sortie de l'usine Lumière à Lyon (literally, "the exit from the Lumière factory in Lyon", or, under its more common English title, Workers Leaving the Lumiere Factory), 46 seconds

Le Jardinier (l'Arroseur Arrosé) ("The Gardener," or "The Sprinkler Sprinkled"), 49 seconds

Le Débarquement du congrès de photographie à Lyon ("the disembarkment of the Congress of Photographers in Lyon"), 48 seconds

La Voltige ("Horse Trick Riders"), 46 seconds

La Pêche aux poissons rouges ("fishing for goldfish"), 42 seconds

Les Forgerons ("Blacksmiths"), 49 seconds

Repas de bébé ("Baby's Breakfast" (lit. "baby's meal")), 41 seconds

Le Saut à la couverture ("Jumping onto the Blanket"), 41 seconds

La Places des Cordeliers à Lyon ("Cordeliers Square in Lyon"—a street scene), 44 seconds

La Mer (Baignade en mer) ("the sea [bathing in the sea]"), 38 seconds

Each film is 17 meters long, which, when hand cranked through a projector, runs approximately 50 seconds

This screening and the cinématographe that helped them project it brought international fame, and they toured around the world in 1896, showing off their creation.

The Lumières went on tour with the cinématographe in 1896, visiting cities including Brussels, Bombay, London, Montreal, New York City, and Buenos Aires.

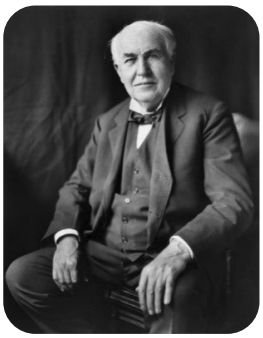
As the cinema grew popular, the brothers began to turn their attention to new projects. They focused their ever-present curiosity on tackling another technical challenge: color photography.

Effectively, they created a process called the "Autochrome Lumière," which only involved a glass plate, emulsion, potato starch, and dyes of red, green, and blue colors. These elements improved the quality and added transparency to the picture when exposed to light.

2.1.2 Thomas Alva Edison

Thomas Alva Edison (1847 – 1931) is best known for his discovery of the light bulb. But he invented many more devices that later earned him the title of America's greatest inventor. Among his other inventions are the phonograph and the motion picture camera. Though he contributed to mass communication, electric power generation, and sound recording, we focus on his involvement in film in this chapter.

His motion picture camera, or the "Kinetograph," is a patented device developed in unison with William Kennedy Dickinson, a photographer. Edison worked on its electromechanical design while Dickinson looked into its photographic and optical progress. The "Kinetoscope," also known as the peep-hole viewer, was another of Edison's inventions exhibited alongside the Kinetograph on the 20th of May, 1891. This device allowed people to watch short film clips that could be easily accessed at penny arcades. Apart from his inventions, he owned a film studio that made numerous short films of daily life.



Thomas Alva Edison

"Blacksmith Scene" - 1893

"The Kiss" - 1896

The following are some of Edison‘s production company’s notable fims:

Blacksmith Scene (1893).

Fred Ott’s Sneeze (1894).

Annie Oakley shooting glass balls, 1894.

Leonard-Cushing fight (1894), the first boxing match on film.

The Kiss (1896), the first love scene on film.

What Happened on Twenty-third Street in New York Cty (1901).

The Messenger Boys Mistake (1903).

Nervy Nat Kisses the Bride (1904).

Battle of Chemulpo Bay (1904), a re-enactment of the Battle of Chemulpo Bay.

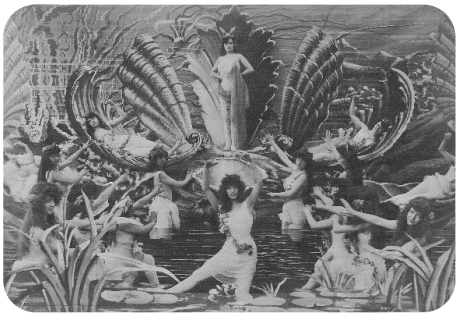
The Night Before Christmas (1905), an early film adaptation of the 1823 poem, “A Visit from St. Nicholas.”

The climax of Frankenstein (1910), the first film adaptation of the 1818 novel Frankenstein..

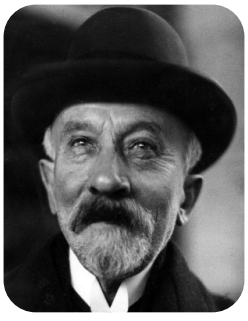
2.1.3 Georges Méliès

Marie-Georges-Jean Méliès (1861 – 1938) may be a lesser-known character (out of the four discussed) but he can be termed one of the most influential individuals in the history of film. As a French illusionist (he was a magician before he entered the film industry), actor, and film director who actively engaged in developing techniques and narratives in film, he was connected to the Lumière brothers and Edison.

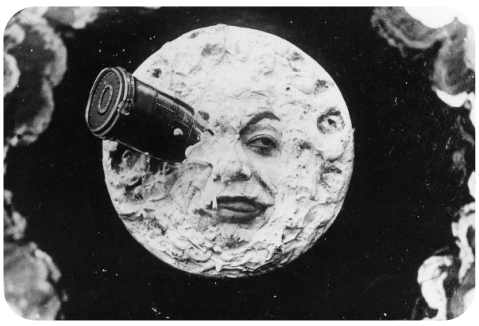
He was among the audience of the Lumière brother’s demonstration on the 28th of December, 1895. The 10,000₣ he offered for a cinématographe was naturally rejected by the brothers. However, he realized that inventors were keen on creating machines similar to the cinématographe. Thus, he changed his original plan to find a film projector and bought an Animatograph instead. He started showing short films through this device, which he purchased from the Edison Manufacturing company at the Théâtre RobertHoudin.



“The Kingdom of the Fairies” - 1903



Georges Méliès



“A Trip to the Moon” – 1902

Méliès's creativity and eye for modifications led him him to upgrade the animatograph into a film camera. Due to the lack of film processing labs in Paris, he developed and printed his movies on unperforated films from London. This dedication to innovation paid off in no time as he made 78 films in 1896 and 52 in 1897. These films ranged from documentaries, comedies, historical reconstructions, dramas, and magic tricks. Fairytales were his specialty.

His films A Trip to the Moon (1902) and The Impossible Voyage (1904) were surreal, fantastic and can be considered as some of the earliest science fiction. These show that his creative eye covered all aspects of the film, be it the mechanics of film or its production. Georges Méliès directed, produced, edited, and starred in over 500 films between 1896 and 1913.

Though both the Lumière brothers and Thomas Edison used simple structures in their early creations, a narrative form was introduced into their later work. For instance, the humorous film of a drunkard and a policeman created by Edison in 1892 and "Arroseur Arrosé" (The Waterer Watered) created by the Lumière brothers in 1895 both hint at narrative-like features.

"L'Arroseur Arrosé" - 1895

"L'Arroseur Arrosé" – Main titel

In contrast to these filmmakers, Méliès seems to have traveled in a different direction. Though he initially used film to recreate reality like them, he later created fantasies and illusions by experimenting with different cinema techniques. This resulted in him being famously known as the magician of the cinema. For instance, he was the first to bring historical accounts into film, deviating from contemporary scenes (example: Cinderella (1899)).

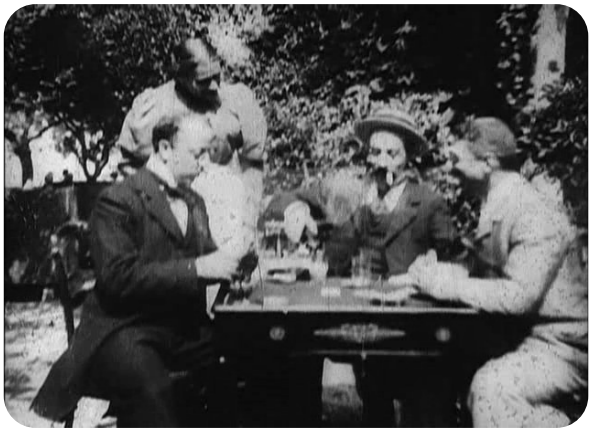
His most influential contribution to the art of film-making is the "shot break down". It was discovered by mistake when Méliès was shooting a film at "place de l'opera." His shots were interrupted by a bus and a mini car, which prevented him from using a continuous uncut shot as was custom.

At the edit, he soon discovered that pleasingly unexpected results could be contrived when connecting these cut scenes. This was the origin of the "edited scene," which later paved the way for long shots, mid shots, and close-ups in cinema.

Once more, by mistake, he realized the “substitution trick/ stop trick,” where the camera, stopped in midtake, made a bus turn into a hearse and women into men. He could also achieve what we today call a “reverse shot.”

The above shows us that he had a unique eye for special effects. This is why he is considered the father of the ‘special effect’. Substitution splices, hand-painted color, time-lapse photography, dissolves, and multiple exposures are a few of them. His thirst for new things did not stop with inventions. He was also one of the first filmmakers to use storyboards.

place de l’opera - France



“playing cards” (Une partie de cartes) – a film by Melies - 1896

In these earliest films, Méliès began to experiment with (and often invent) special effects that were unique to filmmaking. According to his memoirs, this started by accident when his camera jammed in the aforementioned take when “a Madeleine-Bastille bus changed into a hearse and women changed into men. The substitution trick, called the stop trick, had been discovered.” This same stop trick effect had already been used by Thomas Edison when depicting a decapitation in The Execution of Mary Stuart; however, Méliès’ film effects and unique style of film magic were his own.

He continued to experiment with his in-camera special effects, such as a reverse shot in A Dinner Under Difficulties, where he hand-cranked a strip of film backward through his camera to achieve the effect.

The first 30 years of the cinema mark a large part of its growth. Not only did it develop as an industry, but the narrative form was established, and technology related to filmmaking evolved all within this span of 30 years.

Question 2

After reading about the Lumière brothers, Thomas Edison and Georges Méliès, who do you think had the biggest influence on developing film as an artform? Why?

2.2 Some milestones in cinema technology in early stages

2.2.1 Adding colour

Early movies were black-and-white for a considerable period of time. But slowly, with experimentation color was added using different techniques like hand coloring, tinting, toning, and stenciling

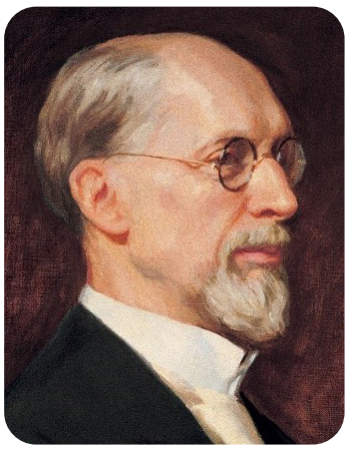
Frames from a stencil color film

Advertisment for K kinemacolor 1911

"Colour separation" was first discovered in 1906 through the British Kinemacolor process.

This added what we call a 'natural color' to moving images. It was presented to the public two years later, in 1908.

The first motion picture using Kinemacolor was "A Visit to the Seaside". It was a film produced by George Albert Smith.



George Albert Smith (1864-1959)

"A Visit to the Seaside" 1908

The earliest films focused on recreating reality so the Kinemacolor was used in documentary films that attempted to imitate reality. They were called “actualities.” An example of this type of movie is the 2- hour long film “With Our King and Queen Through India” (also known as The Delhi Durbar) of 1912. The Technicolor processes that followed in 1915 were expensive, and therefore color was not widely used until 1932. With the three-color process introduction, color films started to emerge again both in the US and UK. Some big hits that used the three-color process are “Gone with the Wind” (1939), “The Wizard of Oz“ (1939), and “A Matter of Life and Death” (1946).

2.2.2 Adding sound

The Warner Brothers’ Vitaphone system is among the first sound systems used in the film. With each film reel, it used a separate record disc for the sound. Synchronized dialogues were incorporated into movies through this system. The first movie to utilize this system was “The Jazz Singer” (1927).

However, the Vitaphone system was deemed unreliable. Optical variable density soundtracks replaced it. These tracks could be photographically recorded along the edge of the film. Though developed originally for newsreels such as Movietone, they effectively added dialogues to movies.

Synchronized sound was used in almost all feature-length movies by the 1930s. By this time, especially near the mid-30s, most films were in full color too. The film industry that had already reached a peak with the advent of color excelled with sound.

Sound was the sole support behind the Golden Age of Hollywood, and thereby it helped further secure the place of the American film industry. The British film industry rose equally well, with a record of over 31 million weekly cinema visits in 1946.

2.2.3 What is aspect ratio?

Thomas Edison’s perforated 35mm film in the Kinetoscope became the industry standard in 1909. Aspect ratio is the width-to-height relationship of the picture. The ratio was as 4:3 or 1.33:1. While the first number indicates the width, the second shows the height. To exemplify, every 4 centimeters of width in a picture was followed by a 3-centimeter length.

However, the aspect ratio was soon overtaken by the “academy ratio” indicated as 1.37: 1. This adjustment took place with the advent of optical sound. It was named the “academy ratio” because it was officially approved by Motion Picture Arts and Sciences in 1932.

Many more small changes took place from one format to another with no major leaps in dimension until the 1950s.

Question 3

Which of the early innovations you have learned about do you think has had the most profound impact on modern film?

2.3 The classical era of cinema

The filmmakers and theorists who influenced the early period of film all belonged to different film traditions. These traditions are most commonly delineated as:

1. Hollywood Golden Cinema
2. Early Soviet Cinema
3. The French New Wave
4. Italian Neo-Realistic Cinema
5. German Expressionist Cinema
6. Avant-Garde Cinema

2.3.1 Hollywood Golden Cinema

The golden era of Hollywood cinema largely contributed to the development of language and structure in films. Edwin S. Porter and D.W. Griffith are two of the leading film directors of the era.

2.3.1.1 Edwin S. Porter

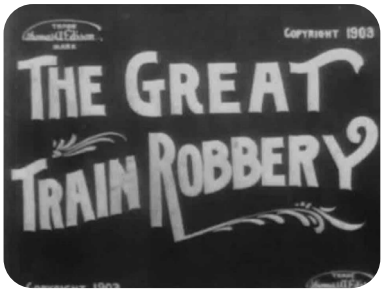
Edwin Stanton Porter (April 21, 1870 – April 30, 1941) was an American film pioneer, most famous as a producer, director, studio manager, and cinematographer with the Edison Manufacturing Company and the Famous Players Film Company.

In the late 1890s, Porter worked as a projectionist and mechanic, eventually becoming director and cameraman for the Edison Manufacturing Company. Influenced by both the “Brighton School” and the story films of Georges Méliès, Porter went on to make essential shorts such as Life of an American Fireman (1903) and The Great Train Robbery (1903).

Porter created over 250 films & his most notable films include “What Happened on Twenty-third Street, New York City” (1901) (the 72-seconds long footage depicting the skirt-raising scene later used in The Seven Year Itch), “Jack and the Beanstalk” (1902), “Life of an American Fireman” (1903), ”The Great Train Robbery” (1903), “The European Rest Cure” (1904), “The Kleptomaniac “(1905), “Life of a Cowboy”(1906), “Rescued from an Eagle’s Nest” (1908), “The lonely villa” (1909), and “The Prisoner of Zenda” (1913).

"Life of an American Fireman" (1903)

Edwin S. Porter



"The Great Train Robbery" (1903) – Main title

The Great Train Robbery"- 1903

"The lonely villa" - 1909

E. S. Porter was a pioneer in the development of film art. His influence was such that the film language and structure used in his films were later transcribed into workbooks.

Porter is responsible for developing the narrative style of storytelling into a very high standard. His knowledge of American literature is believed to have influenced this advancement. His first production, the Life of an American Fireman (1903) and The Great Train Robbery (1903), showed considerable developments in their story, plot, and narration compared to other movies of the time.

A few of his contributions to film art are listed below:

- In films such as Life of an "American Fireman" (1903) and "The Great Train Robbery" (1903). Porter used the modern concept of continuity editing, paving the way for D.W. Griffith, who would expand on Porter's discovery that the unit of film structure was the shot rather than the scene

- In "In the Seven Ages" (1905), he used side lighting, close-ups, and changed shots within a scene, one of the earliest examples of a filmmaker departing from the theatrical analogy of a single shot for each scene.

- Porter created dissolves, gradual transitions from one image to another. In particular, in Life of an "American Fireman," the technique helped audiences follow the complex outdoor movement.

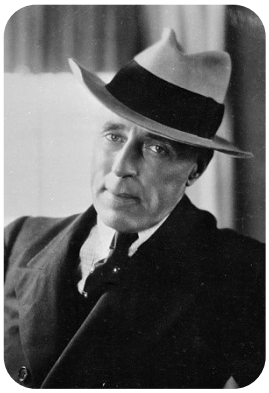
Porter went on to make essential shorts. In an attempt to resist the new industrial system born out of the popularity of nickelodeons, Porter left Edison in 1909 to form his own production company, which he eventually sold in 1912.

2.3.1.2 D.W. Griffith

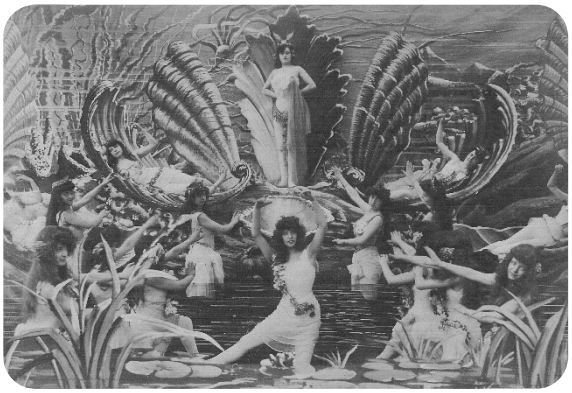
David Wark Griffith (1875 – 1948) was an American film director. Considered one of the most influential figures in motion picture history, he pioneered the art of narrative film. Griffith's maiden film "The Birth of a Nation" (1915) made investors a profit and attracted much controversy, as it depicted African Americans negatively. Griffith made "intolerance" (1916) as an answer to his critics.

Several of Griffith's later films were also successful, including "Broken Blossoms" (1919), "Way Down East" (1920), and "Orphans of the Storm" (1921). Still, the high costs he incurred for production and promotion often led to commercial failure. He had made roughly 500 films by his final feature, "The Struggle" (1931).

Together with Charlie Chaplin, Mary Pickford, and Douglas Fairbanks, Griffith founded United Artists, enabling them to control their interests rather than depending on commercial studios.



D.W. Griffith



D.W. Griffith's Intolarance

D.W. Griffith in Intolorance location

E. W. Griffith succeeded Porter with his additions to the film language. His introduction to the film industry are as follows:

1. Meaningful usage of the long shot, mid-shot, and close-up shots.

2. The ability to change the distance between the camera and the object and camera movement.

3. Primary usage of film editing.

4. Changing the natural order of a scene and erasing parts that bear no filmic value. Meaningful usage of the camera's point of view.

2.3.2 Early Soviet Cinema

The Soviet cinema has influenced the development of film languages, but it was also the first film tradition to have a theoretical influence on cinema.

Film theory is an essential portion of the study that needs investigation to get a wholesome picture of film art.

The early period of the Soviet cinema and the French new wave are two periods in film that intensely studied, analysed, and created a dialog around film aesthetics.

The concept of montage was an outcome of Soviet cinema. Its introduction largely influenced both areas of film editing and film language.

2.3.2.1 Montage theory

Montage theory suggests that film art depends on the editing of shots. In a way, this is another of many explanations as to why everything about the cinema revolves around the “shot.”

Two central teachings of montage can be recognized when looking at Soviet cinema. These are the ideas of Lev Kuleshov & Sergei Einstein.

Kuleshov’s teaching falls under the school of traditional film of Soviet cinema.

According to Kuleshov, the addition of one image after another is what creates the film language. He has compared this to a building that rises one brick after another.

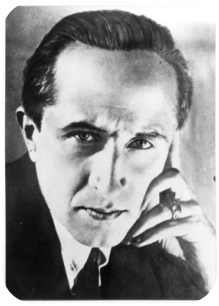
So his montage theory suggests that:
Shot A + Shot B = AB

The Kuleshov Effect is the idea that two shots in a sequence are more impactful than a single shot by itself. This effect is a cognitive event that allows viewers to derive meaning from the interaction of two shots in sequence. Kuleshov believed that shots’ interaction in filmmaking differentiated cinema from photography, as photographs are single shots in isolation that don’t allow viewers to derive the same meaning.

Sergei Einstein’s theory differs from Kuleshov’s because he does not believe that film is made by placing one image upon another. Instead, his idea is that the conflict of two shots creates a third idea, a new result:
Shot A + Shot B = C

This developed into the "part-whole film" theory which became part of the lexicon of film theory.

Einstein published two books on the theory that namely "Film Form" and "Film Sense."



Lev Kuleshov

Sergei Einstein

"Film Form" and "Film Sense" by Sergei Einstein

Among the many influential filmmakers of Soviet cinema the following are considered to be the greatest. Their impact has been so deep that their texts on cinema became foundational in the earliest stages of the school of film.

2.3.2.2 Sergei Eisenstein (1898-1948)

Sergei Mikhailovich Eisenstein was a Soviet film director and film theorist, a pioneer in the theory and practice of montage. Academics regard Eisenstein as the "father of montage" and a leading film director of the early soviet film tradition.

Born in 1989, by 1918, he had dropped out of school to serve in the Red Army. There he was tasked with creating entertainment for the troops.

During this time, Eisenstein formed a true passion for all things theater and joined Moscow's Proletkult Theater (translated: People's Theater) as assistant director in 1920. While exploring his new passion and harnessing his academic background, Eisenstein published a 1923 article for LEF (Left Front of the Arts) entitled The Montage of Attractions, thus starting his career in theory. In the article, he wrote: "...the audience is moved emotionally, psychically, and politically by sudden bursts of aggressive movement."

As a director, Eisenstein is noted in Film history in particular for his silent films Strike (1925), Battleship Potemkin (1925), and October (1928), as well as the historical epics Alexander Nevsky (1938) and Ivan the Terrible (1944, 1958). Film critics regard these films as masterpieces of film art.

Eisenstein was often iconoclastic in his creative choices and is most famously known as the first filmmaker to utilise montage in film. In 2012 Sight & Sound magazine named his Battleship Potemkin the 11th most excellent film of all time.

- Eisenstein felt that montage should proceed from rhythm, not story. Shots should be cut to lead up to a point and should not linger because of personal interest in individual characters.
  E.g., Battleship Potemkin.

- Eisenstein argued that dramaturgy of the moving image, facilitated through conflicting montage sequences, can deliver the task of revolutionary art, bringing the viewer into a desired psycho-emotional state that would make one susceptible to the right ideological messages.

  E.g., The technique of montage used in Battleship Potemkin Odesa steps sequence. Odessa Steps sequence is unquestionably the most famous sequence of its kind in film history, and Eisenstein displays his legendary ability to convey large-scale action scenes.

- Having developed the theory of montage, which is characterised as a process of assembling words and images to establish specific meanings, five specific categorized levels of montage were developed by Eisenstein:

  1. Metric montage
  2. Rhythmic montage
  3. Tonal montage
  4. Over tonal montage

  All of the above could be described as purely physiological, however the fifth, 'intellectual montage', was to direct emotions and the whole thought process.

2.3.2.3 V.I Pudovkin (1893-1953)

Vsevolod Pudovkin was best known for visually interpreting the inner motivations and emotions of his characters.

Wounded and imprisoned for three years in World War I, Pudovkin returned to study chemistry but was attracted to theatre. After seeing D.W. Griffith's film Intolerance (1916), he applied to Moscow's State Institute of Cinematography. There he worked with the Russian film theorist and director Lev Kuleshov.

His first notable work was a comedy short "Chess Fever" (1925) co-directed with Nikolai Shpikovsky. In 1926 he directed one of the masterpieces of silent movies: "Mother," where he developed several montage theories that would make him famous.

His first feature was followed by "The End of St. Petersburg" (1927) and "Storm Over Asia"(1928) also known as "The Heir of Genghis Khan," titles which became part of Pudovkin's "revolutionary trilogy," alongside "Mother" (1926).

In 1928, with the advent of sound film, Pudovkin, Sergei Eisenstein, and Grigori Aleksandrov signed the “Manifest of Sound”. Sound possibilities are debated and always understood as being in a state of tension and nonsynchronization with the image.

Pudovkin put this concept into action in his following pictures: A Simple Case (1932) and The Deserter (1933). In 1935 he was awarded the Order of Lenin.

After an interruption caused by health concerns, Pudovkin returned to movie making again, with several historical epics: “Victory “(1938), “Minin and Pozharsky” (1939), and “Suvorov” (1941). Critics often praised the last two as some of the best movies based on Russian history.

Pudovkin was awarded a Stalin Prize along with Sergei Eisenstein in 1941. Pudovkin developed his montage theory slightly differently to Eisenstein’s, forming the foundation of the classic Hollywood editing style used in almost every film today.

Pudovkin’s five editing techniques are:

1. contrast
2. parallelism
3. symbolism
4. simultaneity
5. leitmotif

Each of these techniques is in every editor’s arsenal and used in virtually every film made around the world.

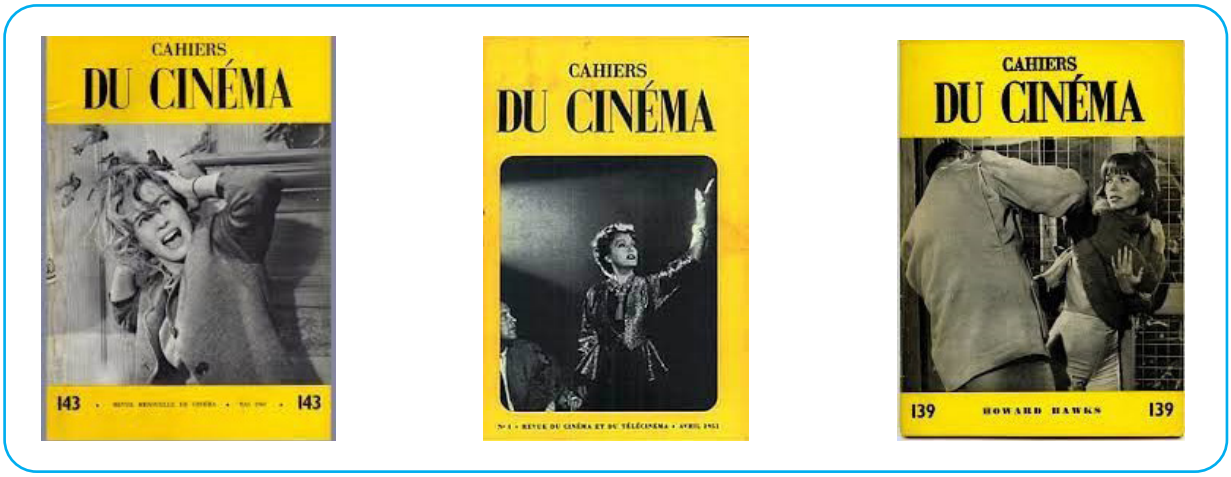
V.I Pudovkin

2.3.3 The French New Wave

The New Wave (French: La Nouvelle Vague) is a French art film movement that emerged in the late 1950s. The movement was characterized by its rejection of traditional filmmaking conventions in favor of experimentation and a spirit of iconoclasm.

New Wave filmmakers explored new approaches to editing, visual style, narrative, and engagement with the social and political upheavals of the era, often making use of irony or exploring existential themes. The New Wave is often considered one of the most influential movements in the history of cinema.

The term (La Nouvelle Vague) was first used by French film critics and cinephiles associated with Cahiers du cinéma in the late 1950s and 1960s.



These critics rejected mainstream French cinema's Tradition de Qualité ("Tradition of Quality"), emphasizing craft over innovation and old works over experimentation. This was apparent in a manifesto-like 1954 essay by François Truffaut, Cahiers du Cinéma, where he denounced the adaptation of safe literary works into unimaginative films.

Along with Truffaut, several writers for "Cahiers du Cinema" became leading New Wave filmmakers, including Jean-Luc Godard, Éric Rohmer, Jacques Rivette, and Claude Chabrol. The associated Left Bank film community included Alain Resnais, Agnès Varda, and Chris Marker.

The French new wave provided creative and theoretical support to the history of cinema when cinema was slowly developing its way towards being aesthetic. André Bazin was the pioneer of the film theory of this movement.

Bazin believed in the traditional definition of cinema and thought that cinema's essence is based in reality. He opposed the theory of montage as it obstructs the re-creation of reality.

He once declared that Lev Kuleshov and Sergei Einstein did not show "situation" through their montage theories but weakened it instead. For him, importance did not lie with the nature of each image in narration but with editing that happened at the point of putting the images together.

He suggested that the characteristics of concrete elements are not included in abstract results at the end of each montage. Having made such declarations against montage theory, he entrusted in "long takes" and "invisible editing" techniques. These theoretical opinions by Bazin were embraced and put into action by several leading filmmakers of the French new wave.

The following filmmakers can be identified as the pioneers among them:

Truffaut

2.3.3.1 Jean-Luc Godard

Jean-Luc Godard was a pioneer film critic, film theoretician & film director of the French New Wave film movement. He first received global acclaim for his 1960 feature film "Breathless."

Other notable films include "My Life to Live" (1962), "The Little Soldier" (1963), "Les Carabiniers" (1963), "Contempt" (1963), "Band of Outsiders" (1964) & "Weekend" (1964). In a 2002 Sight and Sound poll, Godard ranked third in the critics' top ten directors of all time

He and his work have been central to narrative theory and have challenged both commercial narrative cinema norms and film criticism's vocabulary

- Goddard's work "revolutionized the motion picture form" through narrative, continuity, sound, and camerawork experimentation.
- "Breathless" is most commonly known for Godard's editing style, making the jump cut popular and acceptable. Up to this, films were expected to follow a smooth digression of editing, with every cut following a "logical" pattern. Godard ultimately did away with this generic formula for storytelling and instead relied on unexpected, quick jumps in editing.
- Godard's films are examples to study the technics of 'Realistic Film' theories such as long take & camera style

"My Life to Live" - 1962

Jean-Luc Godard

"Breathless" – 1960

2.3.3.2 François Truffaut

François Truffaut was a film director, screenwriter, producer, actor, and film critic who was also widely regarded as one of the founders of the French New Wave.

In a career lasting over a quarter of a century, he remains an icon of the French film industry, working on over 25 films.

He left school at 14 and started working. In 1947, aged 15, he founded a film club and met André Bazin, a French critic, who became his protector. In 1953 Truffaut published his first movie critiques in "Les Cahiers du Cinema" about "Auteur theory".

Auteur theory or Auteurism originated from the French New Wave and stood for 'Authorship' in French. The term came about in the 1950s. The chief pioneer in this new field of study was Truffaut.

Truffaut wrote more than 500 film articles for "Les Cahiers du Cinema" over the next four years In 1954, as a test, Truffaut directed his first short film. Two years afterward, he assisted Roberto Rossellini with some later abandoned projects.

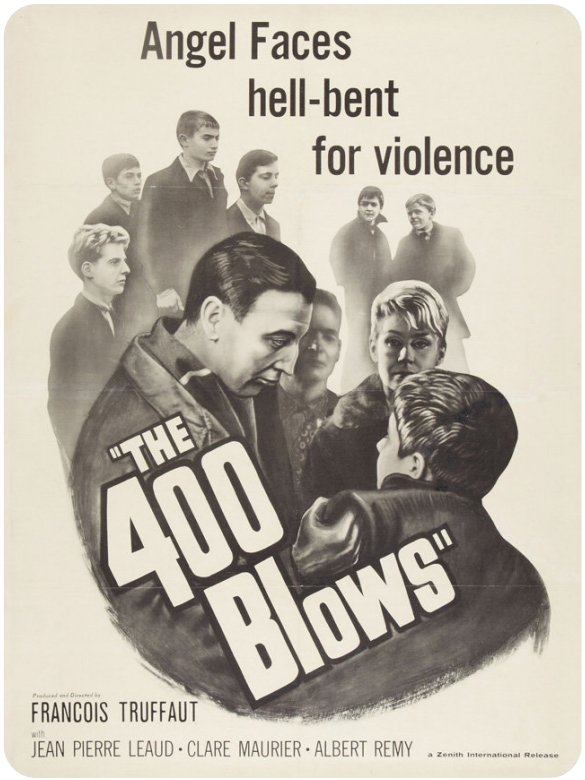
Truffaut's film "The 400 Blows"(1959) is a defining film of the French New Wave movement and has four sequels, "Antoine et Colette," "Stolen Kisses," "Bed and Board," and "Love on the Run," made between 1958 and 1979.

Truffaut's 1973 film Day for Night earned him critical acclaim and several accolades, including the BAFTA Award for Best Film and the Academy Award for Best Foreign Language Film.

His other notable films include Shoot the Piano Player (1960), Jules and Jim (1962), The Soft Skin (1964), The Wild Child (1970), Two English Girls (1971), The Last Metro (1980), and The Woman Next Door (1981).

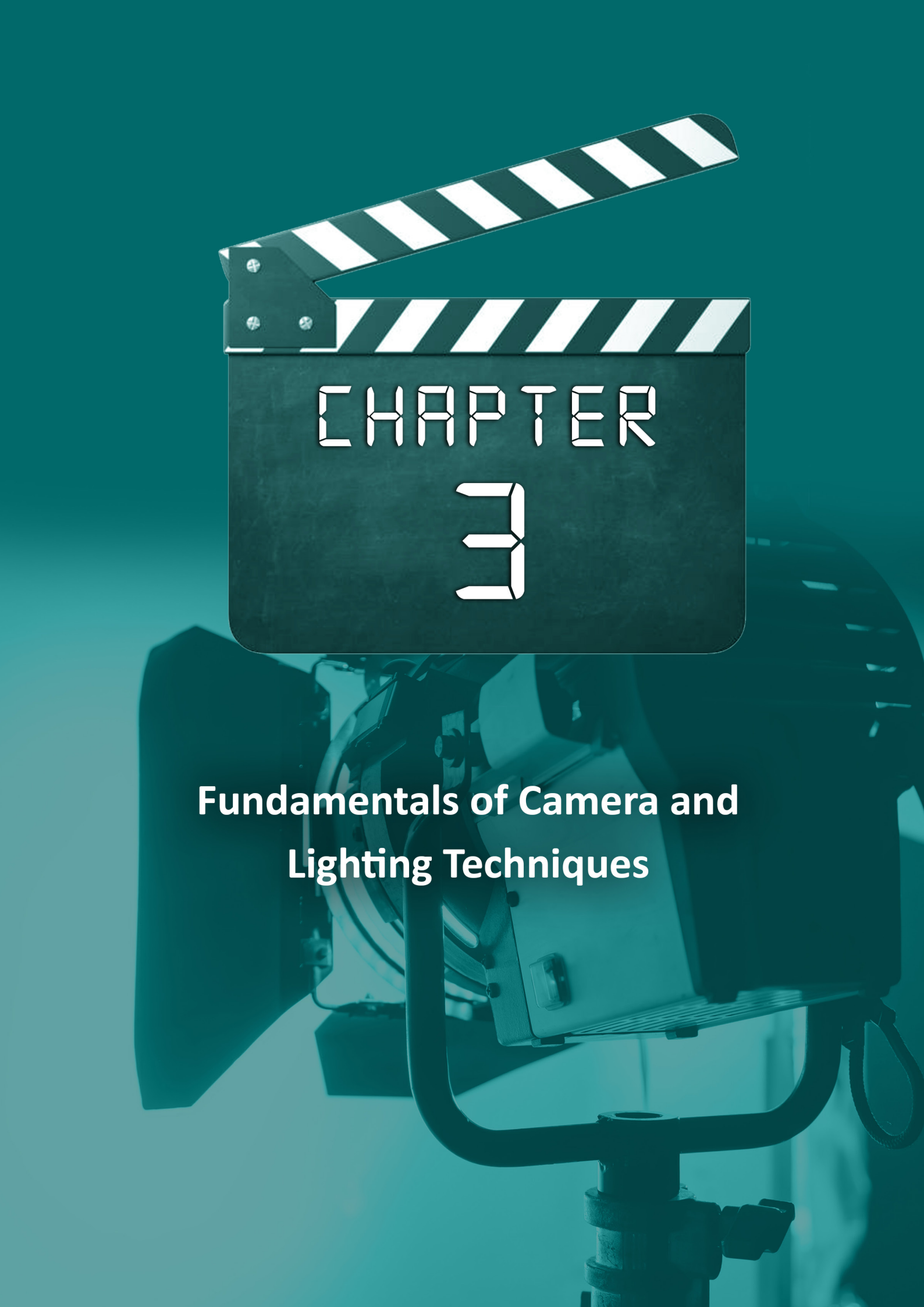
- Truffaut incorporated disjunctive editing and seemingly random voiceovers in his films. E.g., “The 400 Blows” “Shoot the Piano Player.” Unlike continuity or invisible editing, disjunctive editing makes the editing process very apparent; it ignores the basic rules of continuity film editing established to create a seamless experience.

- Critics regard Truffaut’s films as examples of film language and film techniques of French New Wave and realistic cinema.



Question 4

In your opinion, based on your reading above, do you think the effects of Soviet Cinema or French New Wave are most apparent in modern filmmaking?



Fundamentals of Camera and Lighting Techniques

Fundamentals of Camera and Lighting Techniques

In Chapters One and Two, we discussed the early stages and development of television and cinema.

Well over a century has passed, and both television and the cinema have undergone numerous changes in terms of technology and usage. It continues to change and evolve. Therefore, it is necessary to continually update our knowledge on the status of both mediums.

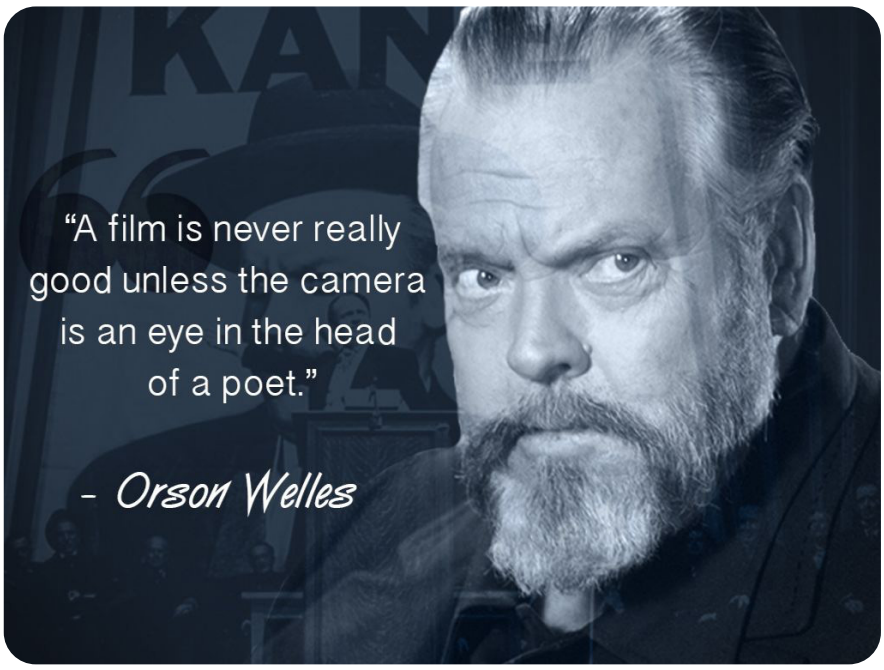
However, although technology and usage are always changing the fundamentals of theories and concepts have not. We can say they have evolved. The historical foundations of television and film will continue to exist into the future. It follows that contemporary art and media should be an extension of its history, not a concept born upon itself.

3.1 The Camera

Film Cameras

Orson Welles once declared that "...a film is never really good unless the camera is an eye in the head of a poet."

This applies not only to the camera but also to cinema and the television. Therefore, the importance given to the creative eye should always be considered in cinema or television analysis.



Though the moving camera was invented in the early 1800s, motion pictures were shot mainly through the Kinetograph developed by Thomas Edison and his assistant William Dickson in 1890.

The moving camera has undergone many changes since, which can be concisely listed as below: The Aeroscope was built and patented in England in 1909–1911 by Polish inventor Kazimierz Prószyński. Aeroscope was the first successful handheld operated film camera. The cameraman did not have to turn the crank to advance the film, as in all cameras of that time, so he could handle the camera with both hands, holding the camera and controlling the focus.

The first all-metal cine camera was the Bell & Howell Standard of 1911-12. One of the most complicated models was the Mitchell-Technicolor Beam Splitting Three-Strip Camera of 1932. This camera captured separate colour records onto three strips of film. Light entered the camera through the lens and was divided by the beam-splitting prism into two paths. One strip of film recorded the green record onto black-and-white film, while the other two records were exposed onto two black-and-white film strips in “bipack” (sandwiched together); the front film was blue-sensitive only, while the back film was sensitive to red.

In 1923, Eastman Kodak introduced a 16mm film stock, principally a lower-cost alternative to 35 mm. Several camera makers launched models to take advantage of the new market of amateur movie-makers. Though initially inferior to 35 mm, 16 mm cameras continued to be manufactured until the 2000s by Bolex, Arri, and Aaton.

Digital Movie Cameras

Digital movie cameras do not use analog film stock to capture images, as has been the standard since the 1890s. Instead, an electronic image sensor is employed, and the images are typically recorded on hard drives or flash memory—using a variety of acquisition formats.

Since the 2010s, digital movie cameras have become the dominant type of camera in the motion picture industry, being employed in film, television productions, and even (to a lesser extent) video games.

Red, Arri Alexa, Sony & Canon are the most popular movie cameras.

RED Camera

ARRI Camera

SONY Venice

CANON C500

Professional and broadcasting video cameras, such as those used in television production, maybe television studio-based or mobile in the case of an electronic field production (EFP). Such cameras generally offer extremely fine-grained manual control for the camera operator, often excluding automated operation. They usually use three sensors to record red, green, and blue separately.

Camcorders combine a camera and a VCR or other recording device in one unit; these are mobile and were widely used for television production, home movies, electronic newsgathering (ENG) (including citizen journalism), and similar applications. Since the transition to digital video cameras, most cameras have in-built recording media and, as such, are also camcorders. Action cameras often have 360° recording capabilities.

Closed-circuit television (CCTV) generally uses pan–tilt–zoom cameras (PTZ) for security, surveillance, and/or monitoring purposes. Such cameras are designed to be minor, easily hidden, and able to operate unattended; those used in industrial or scientific settings are often meant for use in environments that are usually inaccessible or uncomfortable for humans and are therefore hardened for such hostile environments (e.g., radiation, high heat, or toxic chemical exposure).

Webcams are video cameras that stream a live video feed to a computer.

Many smartphones have built-in video cameras, and high-end smartphones can capture video in 4K resolution.

Unique camera systems are used for scientific research, e.g., onboard a satellite or a space probe, artificial intelligence and robotics research, and medical use. Such cameras are often tuned for non-visible radiation for infrared (for night vision and heat sensing) or X-ray (for medical and video astronomy use).

DSLR Cameras

DSLR cameras have become popular EFP in television shooting for several reasons. They are small in size, lightweight & easy to move and handle.

The DSLR's picture quality (resolution) is in the range of 1080p,2K,2.5k,4K,5K, and up to 6K for different models.

The following cameras are the most popular in this category in Sri Lanka.

Sony : F3, Alfa 7 (R, mark 3), Alfa 7(Mark 2 / Mark 3/ Mark S3)

Cannon: 5D (Mark 3 & Mark 4) Cannon C series (7R,7R5)

Black Magic: Mini pro, Pocket 6

SONY F3

Black Magic

Canon 5D Mark 4

Question 1

What is your experience of making movies with a video camera? Have you ever tried to do something creative with a smart phone camera? Have you used something more advanced than a smartphone camera?

3.1.1 Different Popular Video Cameras & Classifications

Since the invention of the motion camera, its technology has evolved day by day and various types of cameras have emerged. The same is true of television cameras.

The technology of these cameras is constantly evolving and in comparison, cameras with different capabilities are constantly being launched in the market.

Digital Movie Camera

A digital movie camera for digital cinematography is a video camera that captures footage digitally rather than the historically used movie camera, which shoots on film stock. Different digital movie cameras output a variety of different acquisition formats. Since the 2010s, digital movie cameras have become the dominant type of camera in the motion picture industry.

Spatial Resolution

The visual quality of a digital photograph can be evaluated in several ways. The pixel count of an image is related to its spatial resolution and is often used as a figure of merit. The quantity of picture elements (pixels) in the image sensor is usually counted in millions and called “megapixels”. Sensor pixel density sets a limit on the final output resolution of images captured with that sensor.

Other factors, such as the effect of a Bayer pattern or other filter on the digital sensor and the image processing algorithm used to interpolate raw sensor data to image pixels. Most digital sensors are arranged in a rectangular grid pattern, making certain images (for example of parallel lines) susceptible to moiré pattern artifacts. Film is not affected by moiré because of the random orientation of the silver salts in its emulsion, however the pattern of these silver salts may become visible upon enlargement, creating the patterns called “grain” in the final output.

The resolution of film images depends upon the area of film used to record the image (35 mm, medium format or large format) and the film speed

Many professional-quality film cameras use medium-format or large-format films. Because of the relatively large size of the imaging area these media provide, they can record higher resolution images than most consumer digital cameras. Based upon the above pixel density, a medium-format film image can record an equivalent resolution of approximately 83 million pixels in the case of a 60 x 60 mm frame, to 125 million pixels in the case of a 60 x 90 mm frame. In the case of large format, 4 x 5 inch films can record approximately 298.7 million pixels, and 1,200 million pixels in the case of 8 x 10 inch film. However, as with a digital system, poor optical quality of lenses will decrease the resolving potential of a film emulsion.

Noise and Grain

Shot noise, produced by spontaneous fluctuations in detected photocurrents, degrades darker areas of electronic images with random variations of pixel colour and brightness. Film grain becomes obvious in areas of even and delicate tone. Grain and film sensitivity are linked, with more sensitive films having more obvious grain. Likewise, with digital cameras, images taken at higher sensitivity settings show more image noise than those taken at lower sensitivities.

However, even if both techniques have inherent noise, it is widely appreciated that for colour, digital photography has much less noise/grain than film at equivalent sensitivity, leading to an edge in image quality. For black-and-white photography, grain takes a more positive role in image quality, and such comparisons are less valid.

Noise in digital cameras can produce colour distortion or confetti-like patterns, in indoor lighting typically occurring most severely on the blue component and least severely on the red component. Nearly all digital cameras apply noise reduction to long-exposure photographs to counteract noise due to pixel leakage. For very long exposures, the image sensor must be operated at low temperatures to prevent noise affecting the final image. Film grain is not affected by exposure time, although the marginal sensitivity of the film changes with lengthy exposures, a phenomenon known as reciprocity failure.

White Balance

Film typically assumes using separate films to account for white balance of scene (typically in two variants: for sunlight or tungsten lamps), or usage of filters. Many film cameras had a dial to help user keep track of type of film that was loaded in the camera.

Professional Movie Cameras

There are a number of video cameras on the market designed specifically for high-end digital cinematography use. These cameras typically offer relatively large sensors, selectable frame rates, recording options with low compression ratios or in some cases with no compression, and the ability to use high-quality optics. Some of the cameras are expensive and some are only available to rent. Some of the most used professional digital movie cameras include: Arri Alexa, Blackmagic URSA, Blackmagic Pocket Cinema Cameras, Canon Cinema EOS, Panavision, Genesis, Red Epic, Red Scarlet, Red One, Sony CineAlta.

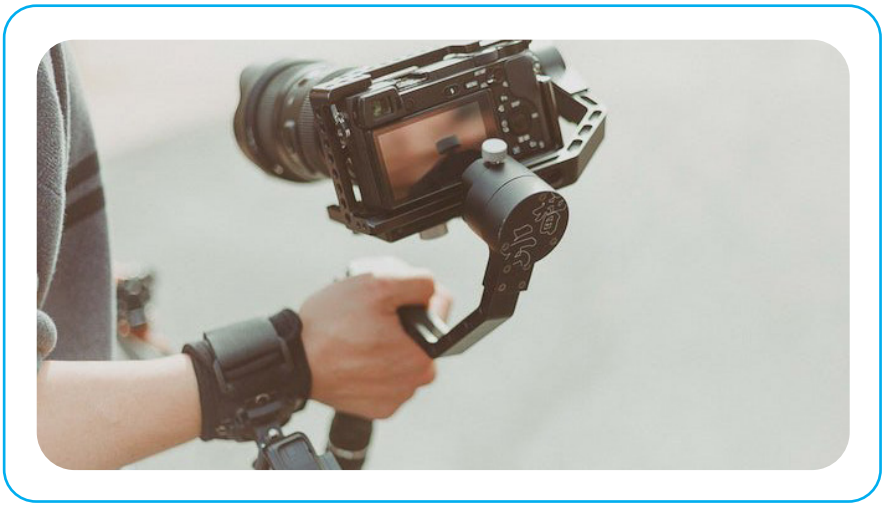
3.1.2 DSLR cameras & Mirrorless cameras

From the classifications of video cameras, two of the most popular types of cameras used in Television today are the DSLR cameras & Mirrorless cameras.

DSLR Camera

DSLR is the abbreviation for Digital Single Lens Reflex. Digital means that the camera operates with a fixed, digital sensor. Single-lens means the camera uses the same lens for framing, focusing, and taking the photograph. This is different from rangefinder and twin-lens-reflex constructions. With those types, you can't see the exact view from the lens that will take the shot. Instead, you need to rely on other methods for setting up the shot.

Reflex refers to a system where a mirror splits or directs the incoming light towards the optical viewfinder. It allows you to see an exact, optical view of the scene. This mirror can be fixed and semi-transparent (in SLT-type cameras). Or, it can flip up during exposure (in SLRs and DSLR).



Mirrorless cameras

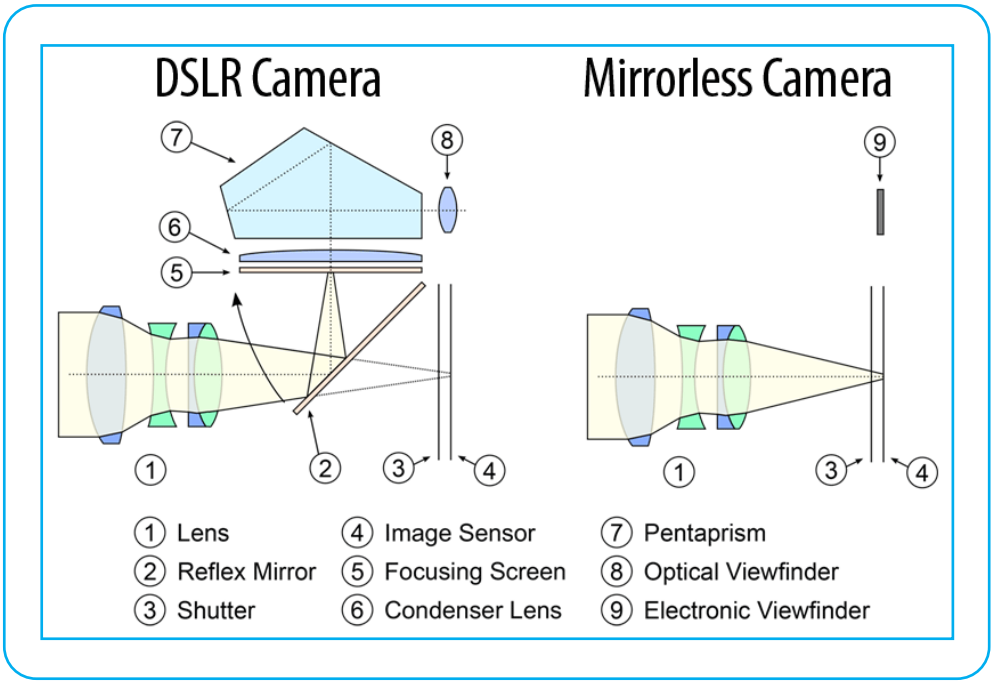
As the name suggests, mirrorless cameras have no mirror. This is unlike digital single reflex cameras, better known as DSLRs.

The mirror has been in use since the 1950s, so why change it?

There are at least three good reasons to remove the mirror:

- Simplified mechanism
- Reduced camera shaking
- More compact and light camera body

An electronic viewfinder replaces the mirror system, this is a small, high-resolution LCD screen.



3.1.3 DSLR Vs. Mirrorless Cameras

These the two types of cameras have many similarities, they also have some big differences.

Both allow you to swap out lenses and accessories, which makes them more versatile than point-and-shoot, bridge, or instant cameras. In terms of differences, mirrorless cameras tend to be smaller and lighter on account of not having a bulky mirror inside, while DSLRs typically have more lenses to pick from.

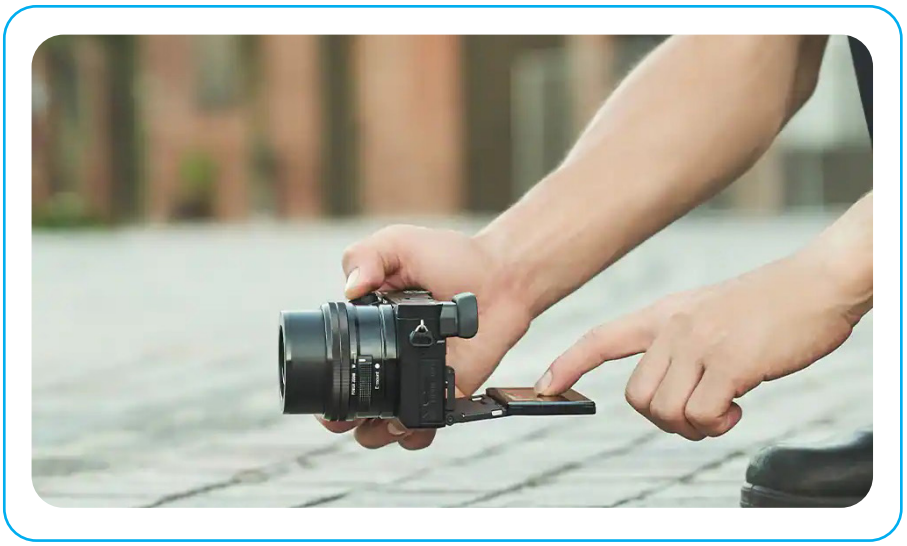
DSLRs use the same design as the 35mm film cameras of days gone by, with an image sensor occupying the place where film would have resided. A mirror inside the camera body reflects light coming in through the lens up to a prism (or additional mirrors) and into the viewfinder so you can preview your shot. When you press the shutter button, the mirror flips up, the shutter opens and the light hits the image sensor, which captures the final image.

In a mirrorless camera, light passes through the lens and right onto the image sensor, which captures a preview of the image to display on the rear screen — just as a smartphone camera does. Some models also offer a second screen via an electronic viewfinder (EVF) that you can hold up to your eye for a better view when you're in bright sunlight. Our example of a mirrorless camera, one of our favorites, is the Sony a6100.

DSLR Vs. Mirrorless: Size and Weight

DSLR camera bodies are comparatively larger, as they need to fit in a mirror and optical viewfinder mechanism. The body of the Nikon D5600, for example, is a rather bulky 2.8 inches deep before you put the lens on the front. With the 18-55mm kit lens, the camera weighs about 1.4 pounds.

A mirrorless camera body can be smaller than a DSLR, with simpler construction. The Sony a6100 has a body just 1.6 inches thick and weighs 1.3 pounds with its 16-50mm kit lens. That's compact enough to fit in a coat pocket or a small purse. It should be noted, though, that some of the newer mirrorless cameras — especially those that have full-frame sensors — are nearly as large and heavy as some DSLR cameras, so the savings in size and weight is negligible. You can carry a mirrorless camera more easily and fit more gear, such as extra lenses, into a camera bag.



DSLR Vs. Mirrorless: Autofocus Speed

DSLRs used to have the advantage here, they use a technology called phase detection, which quickly measures the convergence of two beams of light.

Mirrorless cameras were restricted to a technology called contrast detection, which uses the image sensor to detect the highest contrast, which coincides with focus. Contrast detection is slower — especially in low light — than phase detection.
Those distinctions are essentially over now. Nearly all mirrorless cameras (as well as the best camera phones) now have both phase- and contrast-detection sensors built into the image sensor.

DSLR Vs. Mirrorless: Previewing Images

With a DSLR, the through-the-lens optical viewfinder shows you exactly what the camera will capture.

With a mirrorless camera, you get a digital preview of the image on-screen. Some mirrorless cameras offer an electronic viewfinder (EVF) — a small, high-resolution screen in an eyepiece that simulates the optical viewfinder of a DSLR.

DSLR Vs. Mirrorless: Video Quality

Autofocus is the key differentiator for video. Typically, mirrorless cameras have had the advantage since they were more likely to have on-chip phase-detection focus sensors.

Most DSLRs still can't use phase detection with the mirror up while recording video, so they have to use the slower, less accurate, contrast-detection focus method.. However, Canon began changing the dynamic a few years ago by adding on-sensor phase detection, starting with the Canon 80D and the Canon EOS Rebel T7i. Nikon has just started introducing on-sensor phase detection in its higher end of cameras.

Both camera types have also been making the move to 4K, or Ultra HD, video with four times the resolution of HD footage. Sony, for instance, now has 4K in its base mirrorless model, the a6100, and Canon has equipped its beginner-oriented Rebel T8i with 4K capture. With superior autofocus in more models, mirrorless cameras provide the best results for most filmmakers.

DSLR Vs. Mirrorless: Image Quality

Both types of cameras can take high-quality pictures, with similar resolutions and amounts of graininess, known as noise. Mirrorless cameras traditionally had smaller image sensors, which used to mean lower quality (as they couldn't capture as much light), but that is no longer the case. Camera manufacturers have learned to produce more sensitive chips and to better suppress noise from small sensors.

Furthermore, several mirrorless camera makers now use larger image sensors. Sony and Canon, for instance, make mirrorless cameras with the same APS-C size sensors found in the majority of DSLRs. With equivalent sensors and image processors, both camera types can take great photos.

DSLR Vs. Mirrorless: Shooting Speed

Both camera technologies can shoot at very fast shutter speeds and capture a burst of images quickly. With the exception of high-end DSLRs, mirrorless cameras have an edge, though: the lack of a mirror makes it easier to take image after image. Although they don't have mirrors, most mirrorless cameras still use a mechanical shutter that lifts to expose the image, as it produces better results. They also have the option of using an electronic shutter (just setting how long the sensor reads the light), which means they can shoot more quickly and silently. The simpler mechanics of mirrorless cameras allow them to shoot more photos per second.

DSLR Vs. Mirrorless: Lenses and Accessories

Choosing a DSLR gives you access to a plethora of lenses from a number of manufacturers, ranging from cheap and satisfactory to professional and wildly expensive. Mirrorless models are more restricted, offering access to a small number of lenses from the camera maker, though the selection is growing. As they have been around longer, DSLRs tend to have a better selection of other accessories, such as speedlights (flashes).

The difference is especially stark among traditional camera makers. Canon has hundreds of lenses available for its DSLR cameras (as does Nikon). However, right now, Canon has only eight M-series lenses available for its line-up of mirrorless cameras; Nikon has 16 lenses for its Z series of mirrorless models. Third-party lens makers such as Sigma and Tamron have also been making lenses for Canon and Nikon SRLs and DLSRs for many years. Keep in mind, though, that some of these SLR lens models are quite old and may not be ideal for a modern DSLR. Some may not support autofocus, for instance.

The mirrorless lens selection is better for companies that focus on the technology. Sony, for instance, now has about 50 E-mount lenses for its mirrorless models. Panasonic and Olympus, which share the Micro Four Thirds sensor format, each make about 40 lenses that can be used on cameras from either maker, and Fujifilm has about 30 lenses for its X-system of mirrorless cameras. Third-party lens makers also produce a good selection for the Sony and the Olympus/Panasonic lens mounts.

In addition, you can generally purchase adapters to use DSLR-size lenses on a mirrorless camera that's made by the same manufacturer (such as for Canon or Sony). But that often comes at a price of altering the focal length and zoom characteristics and sometimes disabling or slowing functions such as autofocus. DSLRs still offer access to a wider range of lenses, but the gap between the two types is narrowing quickly as more mirrorless lenses become available.

DSLR Vs. Mirrorless: Battery Life

Generally, DSLRs offer longer battery life, as they can shoot without having to provide live view on an LCD screen or an electronic viewfinder, both of which consume a lot of power.

	DSLR	Mirrorless
Size & Weight		✓
Autofocus Speed	✓	✓
Previewing Images	✓	✓
Image Stabilization		✓
Image Quality	✓	✓
Video Quality		✓
Shooting Speed		✓
Battery Life	✓	
Lenses & Accessories	✓	
Durability	✓	✓
Total	**6**	**8**

3.1.2 Sports and Action Cameras

An action camera is a compact, rugged, handheld or mountable digital camera that is designed for capture what you see when you are immersing in a trip, sport or event. The action camera is usually mounted to your helmets, chest, handle bars of a bike or motorcycle, tripod to record life.

The best action cameras listed 2020 are as follows.

GoPro HERO 10 Black.

GoPro HERO 9 Black

GoPro HERO 8 Black.

GoPro HERO 7 Black. ...

OCLU action camera

DJI Action 2

GoPro Max

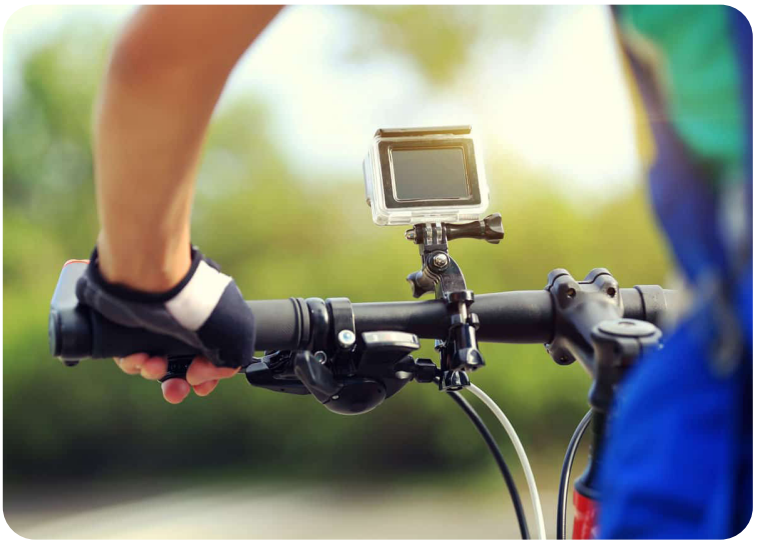
DJI Osmo Action.

An action camera or action cam is a digital camera designed for recording action while being immersed in it. Action cameras are therefore typically compact and rugged, and waterproof at surface-level. They typically use CMOS image sensors, and can take photos in burst mode and time-lapse mode as well as record high-definition video. Slow-motion video recording at 120 or 240 fps is also a common feature.

The camera is typically worn or mounted in such a way that it can shoot from the point of view of the shooter. Some examples of common places to mount an action camera are on a hat or helmet, on the chest, or on the handlebars of a bike or similar vehicle. They may also be mounted on a tripod or on a monopod for handheld use. An action camera is usually designed to require minimal interaction once recording has begun, as this allows continuous capture of the action without having to interact with the camera. A typical action camera records onto a micro SD card, and has either a Micro-USB or a USB-C connector.

Action cameras are associated with outdoor sports, and, often attached to helmets, surfboards or handlebars, are an integral part of many extreme sports such as base jumping and wingsuit flying. Sometimes several cameras are used to capture specific perspectives, such as a helmet camera that sees the perspective of the actor in combination with a second camera attached to the environment of the rider, such as a board, wing, handlebar or wrist, that looks back onto the rider and records their reactions.

The category commonly is associated with the GoPro range of cameras, and many action cameras come with a GoPro mount adapter to take advantage of the accessories available for these cameras. However, there are many GoPro alternatives which are entering the market of action cameras in recent times.



In 2014, worldwide action camera sales increased by 44 percent from the previous year and half of them have the capability to shoot Ultra High Definition at 4K resolution.
By 2022, the Ultra HD category of the action camera market is expected to reach $3.3 billion. The Full HD category, meanwhile, is expected to reach $2.2 billion, with the surveillance/security industry driving growth.

8ten action camera, low budget HD camera

In 2018 Sony launched a shock and waterproof camera with a 1” sensor in a body size similar to an action camera. However, Sony is not marketing it as an action camera; rather, as a video professional camera with the capability to shoot with up to 15 cameras at the same time.

3.1.3 Alternative Televisual Culture - Mobile Phone Cameras

In the traditional sense, mobile phone cameras are not included in the subject of television but as the subject of television is now moving away from its traditional meanings, we should start to change our attitude on this.

Mobile phones are often used to create content on YouTube and other social media. An alternative film culture is burgeoning in the world with the use of mobile phones.

Various cameras are emerging, and phone cameras are likely to be a new beginning in the world of the television. Our televisual future will most probably be mobile based.

Although it cannot be compared to the cameras used in traditional television at present, new dimensional camera cameras, technology and other related equipment and devices are emerging day by day to challenge the traditional technology and teachings.

The top rated mobile phone video cameras 2022

- Samsung Galaxy S21 Ultra.
- Xiaomi Mi 10.
- OPPO Find X2 Pro
- Apple iPhone 13 Pro Max

Question 2

We are living through a time of great technological innovation, what is modern today can be old tomorrow. As it is impossible for most of us to continually buy the latest equipment, how would you recommend dealing with the ever evolving technology?

3.2 Film Stock

Filmstock was used for cine camera.

The elemental composition of film stock is celluloid. When unexposed film stock is exposed to light, a chemical reaction takes place on the celluloid, resulting in the recreation of the image that has been shot. Small infinitesimal grains within film stock have the most significant influence on this recreation process. They acquire a dark colour when exposed to light. Therefore, film stock that goes through these chemical reactions in a negative state turn positive when the picture is recreated through various lab treatments.

Film stock is of two primary colours, namely black & white and colour. Colour film stock first came into being in the 1930s.

Film stock can be categorized based on their characteristics as “slow stock” and “fast stock.”

The slow stock are not as light-sensitive as fast stock. Their outcomes vary based on the category they belong to. For instance, the result of a slow, black and white film stock is as follows: the range of ash colour is more prominent, its contrast is soft, and its texture is very detailed.

In contrast, the range of ash colour in a fast film stock is more limited. Its contrast is high, and the texture is not as detailed.

Similarly, the characteristics of colour film stock also vary according to each type. Therefore, different colour film stocks like Technicolor, Agfa, Kodak, Eastmancolor, and Truecolor have features that are unique to each of them.

The laboratory process is equally important because it molds most “visual qualities” in film productions. The film director and the camera director will only access the pictures they shot after being washed in the laboratory. Before this process they are only able to view the image through the camera, never a recreated image on film.

However, in contrast, the television director and the television camera director have a better chance of accessing the recreated images on location through a monitor screen.

3.3 Analogue Technology

What Does Analog Mean?

Analog refers to signals derived from physical phenomena that may also be interpreted as signals representing physical measurements. Light or visual input, for example, is an analog signal, so to capture video, its analog signal must be scanned and then translated into fluctuating electronic pulses.

Record players, VCRs, and cassette players are analog devices because they linearly record information and read physical data from a media device by scanning it. An analog signal is characterized by standard sinusoidal curves or sharp, irregular spikes, while digital signals are generally constant in amplitude and characterized by flat signal waves, like plateaus.

Techopedia Explains Analog

Analog was the only mainstream device choice until recently when digital device technology became cheaper and easier to manufacture. Although inexpensive and easy to use, analog technology's downside is its limited data holding capability.

Computers can only read digital data, but it is more efficient to transmit analog signals. Thus, analog-to-digital conversion and vice versa has become very common. Most people are not aware of the process as it occurs. For example, your DSL modem receives and sends analog signals to and from your residence, then converts those signals into digital signals sent to your router or computer.

Analogue Tape Recording

When television first took off in the 1950s, the only means of preserving video footage was through kinescope, a process in which a particular motion picture camera photographed a television monitor. Kinescope film took hours to develop and made for poor-quality broadcasts. There was a pressing need for new recording technology.

The giant electronic companies of the day raced to develop the technology, working on recorders that used magnetic tape. However, the Ampex Corporation worked in secrecy and based its research on a rotating head design, which an Italian inventor had patented in 1938 for audio recordings. After several failed attempts and having abandoned the project altogether at one point, Ampex released the world's first magnetic tape video recorder, the VRX-1000, in April 1956.

The other companies abandoned their research and followed Ampex's lead. RCA pooled patents with Ampex and was licensed in the Ampex technology. The new goal was to develop a video machine for home use. It had to be solid, low-cost, and easy to operate.

Competition between companies led to the release of three different, mutually incompatible VCR formats: Sony's Betamax in 1975, JVC's VHS in 1976, and the Philips V2000 in 1978.

As mentioned above, it is essential to know that all the television recording formats used analog signals to record the magnetic tape in a videocassette.

The recorder and the camera functioned separately back then, and the videocassette tape worked inside the recorder.

A few different types of videocassette recorders used in the analog era of television are:

Professional Video tape recorder

A few different types of videocassettes used in the analog era of television can be listed as follows:

U-Matic Low Band / High Band (1971 – 1990)

U-Matic was an analog video cassette format introduced by Sony in 1971, using ¾-inch tape and a helical video head drum. It was the first videocassette format, all videotape formats had been open-reel before this.

It was initially intended for domestic use; hence the first model that could record had a built-in TV tuner and wood on the sides of the cabinet (although it had no built-in timer, a separate timer was available in 1972). However, perhaps because of the high price, it instead became the standard for industrial, educational, and demonstration purposes, continuing to be used for more than 25 years. It was also widely used in television production, particularly for on-location newsgathering.

U-Matic S (1986 – 1990)

U-Matic S (for 'Small') was a smaller U-Matic videotape cassette, first introduced in 1974 in compact recording decks by television news crews. U-Matic S tapes generally had recording times of no more than 20 minutes, though 30-minute S tapes were also available using thinner tape.

U-Matic SP (Superior Performance) was a variant of the U-Matic videocassette format and was introduced by Sony in 1986. This was also made available in the S size format. SP used chrome tape and improved performance over previous generations of U-Matic (low-band and high-band) with a horizontal resolution of 330 lines, a better signal-to-noise ratio, and Dolby C noise reduction.

Like previous generations of U-Matic, the SP variant was analog and used ¾-inch tape. SP tapes of either size can be played on a standard U-Matic deck, albeit with a loss in quality.

The U-Matic tape was replaced in broadcast applications by Sony's own Betacam family of video cassette formats in the 1980s and other applications in the 1990s.

Betacam SP (1986 – 2001)

Betacam SP (Superior Performance) was an analog broadcast videocassette format introduced in 1986 to improve the original Betacam.

It used metal-formulated tape and offered an increased horizontal resolution of 340 lines. Betacam SP became the industry standard for most TV stations and high-end production houses until the late 1990s.

Betacam SP came in two sizes, with the S-size based on the original Betacam shell intended for use in camcorders and the new L-size designed for video editing machines. Betacam was limited to 30 minutes recording time on the S-size cassettes; the L-size Betacam SP cassette allowed for up to 90 minutes.

3.4 Digital Technology

What is the purpose of digital technology?

Improved efficiency and increased productivity. To achieve business success, efficiency and productivity are vital. Digital technology can help improve communication, collaboration, content management, access to analytics data and social networking, and staff and customer experience.

3.4.1 Digital Tape Recording

Digital Betacam- 1993

Digital Betacam was launched in 1993, and subsequently, Betacam SX was launched in 1996 as a cheaper digital alternative. Though Betacam was the preferred format for broadcast television and was used in professional post-production into the 2000s, the format is quickly becoming obsolete. The original Betacam and Betacam SP are no longer used, with Digital Betacam losing its relevance.

Digital SD / 9 (1995 – 2000)

Digital-S (or D-9) was a professional digital videotape cassette format introduced by JVC in 1995.

The cassette shell was very similar to JVC's VHS format. Still, this Digital-S is not compatible with the later consumer D-VHS format as the tape formulation and data format are different.

Digital-S competed with other professional formats such as DVCAM, DVCPRO, and Digital Betacam and was a commercial failure. However, it saw some use in the US, Asia, and Europe, including the BBC.

The SMPTE gave Digital-S the designation D-9 in 1999. A high-definition version, D-9 HD, was announced but didn't appear to have been launched.

D-9 doesn't appear to have lasted much beyond the early 2000s.

Betacam SX (1996 – 2007)

Betacam SX was a digital version of Betacam SP and was introduced in 1996 by Sony. It was positioned as a cheaper alternative to Digital Betacam.

All Betacam SX equipment was compatible with Betacam SP tapes. S-size tapes have a recording time of up to 62 minutes and L-size tapes up to 194 minutes. Betacam SX tape shells were bright yellow.

Tapeless

In 2006, digital recording became the norm, with tape replaced by storage media such as mini-HD, micro DVD, internal flash memory, and SD cards.

Sony introduced the XDCAM tapeless video format in 2003, introducing the Professional Disc (PFD). Panasonic followed in 2004 with its P2 solid-state memory cards as a recording medium for DVCPRO-HD video. In 2006 Panasonic and Sony introduced AVCHD as an inexpensive, tapeless, high-definition video format. AVCHD camcorders are produced by Sony, Panasonic, Canon, JVC, and Hitachi. About this time, some consumer-grade camcorders with hard disk and/or memory card recording used MOD and TOD file formats, accessible by USB from a PC.

3.4.1 Video formats

Unlike other video formats, which are specified in terms of vertical resolution (for example, 1080p, which is 1920×1080 pixels), digital cinema formats are usually specified in terms of horizontal resolution. As a shorthand, these resolutions are often given in "nK" notation, where n is the multiplier of 1024 such that the horizontal resolution of a corresponding full-aperture, digitized film frame is exactly 1024n pixels. Here the "K" has a customary meaning corresponding to the binary prefix "kibi" (ki).

For instance, a 2K image is 2048 pixels wide, and a 4K image is 4096 pixels wide. Vertical resolutions vary with aspect ratios though; so a 2K image with an HDTV (16:9) aspect ratio is 2048×1152 pixels, while a 2K image with a SDTV or Academy ratio (4:3) is 2048×1536 pixels, and one with a Panavision ratio (2.39:1) would be 2048×856 pixels, and so on. Due to the "nK" notation not corresponding to specific horizontal resolutions per format a 2K image lacking, for example, the typical 35mm film soundtrack space, is only 1828 pixels wide, with vertical resolutions rescaling accordingly. This led to a plethora of motion-picture related video resolutions, which is quite confusing and often redundant with respect to the relatively few available projection standards.

The DCI standard for cinema usually relies on a 1.89:1 aspect ratio, thus defining the maximum container size for 4K as 4096×2160 pixels and for 2K as 2048×1080 pixels. When distributed in the form of a Digital Cinema Package (DCP), content is letter boxed or pillar boxed as appropriate to fit within one of these container formats. In the early years of digital cinematography, 2K was the most common format for digitally acquired major motion pictures however, as new camera systems gain acceptance, 4K is becoming more prominent.

Data storage

Broadly, two workflow paradigms are used for data acquisition and storage in digital cinematography.

File-based workflows

Digital cinematography has mostly shifted towards “tapeless” or “file-based” workflows. This trend has accelerated with increased capacity and reduced cost of non-linear storage solutions such as hard disk drives, optical discs, and solid-state memory. With tapeless workflows digital video is recorded as digital files onto random-access media like optical discs, hard disk drives or flash memory-based digital “magazines”. These files can be easily copied to another storage device, typically to a large RAID (array of computer disks) connected to an editing system. Once data is copied from the on-set media to the storage array, they are erased and returned to the set for more shooting.

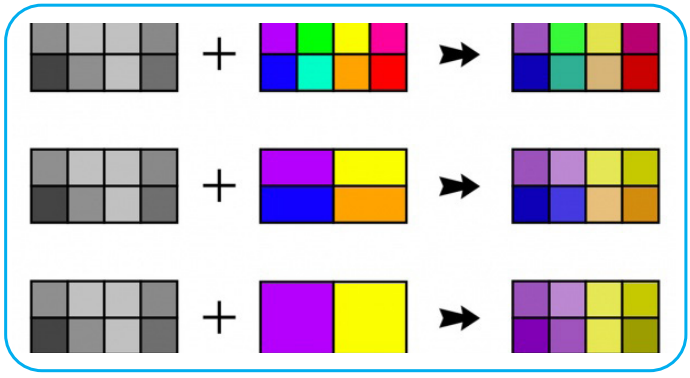
Such RAID arrays, both of “managed” (for example, SANs and NASs) and “unmanaged” (for example, JBoDs on a single computer workstation), are necessary due to the throughput required for real-time (320 MB/s for 2K @ 24fps) or near-real-time playback in post-production, compared to throughput available from a single, yet fast, hard disk drive. Such requirements are often termed as “on-line” storage. Post-production not requiring real-time playback performances (typically for lettering, subtitling, versioning and other similar visual effects) can be migrated to slightly slower RAID stores.

Short-term archiving, “if ever”, is accomplished by moving the digital files into “slower” RAID arrays (still of either managed and unmanaged type, but with lower performances), where playback capability is poor to non-existent (unless via proxy images), but minimal editing and metadata harvesting is still feasible. Such intermediate requirements easily fall into the “mid-line” storage category.

Long-term archiving is accomplished by backing up the digital files from the RAID, using standard practices and equipment for data backup from the IT industry, often to data tapes (like LTOs).

Chroma subsampling

Most digital cinematography systems further reduce data rate by subsampling colour information. Because the human visual system is much more sensitive to luminance than to colour, lower resolution colour information can be overlaid with higher resolution luma (brightness) information, to create an image that looks very similar to one in which both colour and luma information are sampled at full resolution. This scheme may cause pixelation or colour bleeding under some circumstances. High quality digital cinematography systems are capable of recording full resolution colour data (4:4:4) or raw sensor data.



Intra-frame vs. Inter-frame compression

Most compression systems used for acquisition in the digital cinematography world compress footage one frame at a time, as if a video stream is a series of still images. This is called intra-frame compression. Inter-frame compression systems can further compress data by examining and eliminating redundancy between frames. This leads to higher compression ratios but displaying a single frame will usually require the playback system to decompress a number of frames from before & after it. In normal playback this is not a problem, as each successive frame is played in order, so the preceding frames have already been decompressed. In editing, however, it is common to jump around to specific frames and to play footage backwards or at different speeds. Because of the need to decompress extra frames in these situations, inter-frame compression can cause performance problems for editing systems. Inter-frame compression is also disadvantageous because the loss of a single frame (say, due to a flaw writing data to a tape) will typically ruin all the frames until the next keyframe occurs. In the case of the HDV format, for instance, this may result in as many as 6 frames being lost with 720p recording, or 15 with 1080i. An inter-frame compressed video stream consists of groups of pictures (GOPs), each of which has only one full frame, and a handful of other frames referring to this frame. If the full frame, called I-frame, is lost due to transmission or media error, none of the P-frames or B-frames (the referenced images) can be displayed. In this case, the whole GOP is lost.

DCT Vs. DWT compression

Discrete cosine transform (DCT) coding is the most common data compression process used in digital film recording and editing, including the JPEG image compression standard and various video coding standards such as DV, DigiBeta, HDCAM, Apple ProRes, Avid DNxHD, MPEG, Advanced Video Coding (AVC) and AVCHD. An alternative to DCT coding is JPEG 2000 discrete wavelet transform (DWT) coding, used in the Redcode and DCI XYZ video codecs as well as digital cinema distribution.

DCP format

A Digital Cinema Package (DCP) is a collection of digital files used to store and convey digital cinema (DC) audio, image, and data streams. The term was popularized by Digital Cinema Initiatives, LLC in its original recommendation for packaging DC contents.

A DCP has two parts – a series of software files and the hard drive that stores everything. A DCP is actually a collection of hundreds of thousands of small files. These files are like jigsaw puzzle pieces – each file has a little piece of the whole movie. Special “instruction” files explain what each piece is and how to reassemble the film. DCPs allow movie theatre equipment to process massive amounts of information. Digital Cinema Packages have 8 times more data than a Blu-ray and 27 times more than a DVD!

Digital Cinema Packages support secure encryption to prevent illegal screenings. Encrypted DCPs are “locked” and cannot be played without a special “key” to unlock them. These are called Key Delivery Messages (or “KDMs”) and can be programmed to only work for a specific theatre projector and at a specific date and time.

3.4.2 Video File Formats

A video file format is a type of file format for storing digital video data on a computer system. Video is almost always stored using lossy compression to reduce the file size. A video file normally consists of a container (e.g. in the Matroska format) containing video data in a video coding format (e.g. VP9) alongside audio data in an audio coding format (e.g. Opus). The container can also contain synchronization information, subtitles, and metadata such as title. A standardized (or in some cases de facto standard) video file type such as . webm is a profile specified by a restriction on which container format and which video and audio compression formats are allowed.

The coded video and audio inside a video file container (i.e. not headers, footers, and metadata) is called the essence. A program (or hardware) which can decode compressed video or audio is called a codec; playing or encoding a video file will sometimes require the user to install a codec library corresponding to the type of video and audio coding used in the file.

Good design normally dictates that a file extension enables the user to derive which program will open the file from the file extension. That is the case with some video file formats, such as WebM (.webm), Windows Media Video (.wmv), Flash Video (.flv), and Ogg Video (.ogv), each of which can only contain a few well-defined subtypes of video and audio coding formats, making it relatively easy to know which codec will play the file. In contrast to that, some very general-purpose container types like AVI (.avi) and QuickTime (.mov) can contain video and audio in almost any format, and have file extensions named after the container type, making it very hard for the end user to use the file extension to derive which codec or program to use to play the files.

The free software FFmpeg project's libraries have very wide support for encoding and decoding video file formats. For example, Google uses ffmpeg to support a wide range of upload video formats for YouTube. One widely used media player using the ffmpeg libraries is the free software VLC media player, which can play most video files that end users will encounter.

List of video file formats

Name	File extension(s)	Container format	Video coding format(s)	Audio coding format(s)	Notes
WebM	.webm	Matroska	VP8, VP9, AV1	Vorbis, Opus	Royalty-free format created for HTML5 video.
Matroska	.mkv	Matroska	any	any	
Flash Video (FLV)	.flv	FLV	VP6, Sorenson Spark, Screen video, Screen video 2, H.264	MP3, ADPCM, Nellymoser, Speex, AAC	Use of the H.264 and AAC compression formats in the FLV file format has some limitations and authors of Flash Player strongly encourage everyone to embrace the new standard F4V file format[2] de facto standard for web-based streaming video (over RTMP).
F4V	.flv	MPEG-4 Part 12	H.264	MP3, AAC	Replacement for FLV.
Vob	.vob	VOB	H.262/MPEG-2 Part 2 or MPEG-1 Part 2	PCM, DTS, MPEG-1, Audio Layer II (MP2), or Dolby Digital (AC-3)	Files in VOB format have .vob filename extension and are typically stored in the VIDEO_TS folder at the root of a DVD. The VOB format is based on the MPEG program stream format.
Ogg Video	.ogv, .ogg	Ogg	Theora, Dirac	Vorbis, FLAC	
Dirac	.drc	?	Dirac	?	
GIF	.gif	N/A	N/A	none	Simple animation, inefficient compression, no sound, widely supported

Name	File extension(s)	Container format	Video coding format(s)	Audio coding format(s)	Notes
Video alternative to GIF	.gifv	HTML	any	none	Not standardized, and not a real video file in the classical meaning since it merely references the real video file (e.g. a .webm file), which has to exist separately elsewhere. A .gifv "file" is simply a HTML webpage which includes a HTML5 video tag, where the video has no sound. As there were large communities online which create art using the medium of short soundless videos in GIF format, GIFV was created as a functionally similar replacement with vastly smaller filesizes than the inefficient GIF format.
Multiple-image Network Graphics	.mng	N/A	N/A	none	Inefficient, not widely used.
AVI	.avi	AVI	any	any	Uses RIFF
MPEG Transport Stream	.MTS, .M2TS, .TS	AVCHD	AVCHD (MPEG-4 / H.264)	Dolby AC-3 or uncompressed linear PCM	The standard video format used by many Sony and Panasonic HD camcorders. It is also used for storing high definition video on Blu-ray discs.
Quick-Time File Format	.mov, .qt	Quick-Time	many[3]	AAC, MP3, others[3]	

Name	File extension(s)	Container format	Video coding format(s)	Audio coding format(s)	Notes
Windows Media Video	.wmv	ASF	Windows Media Video, Windows Media Video Screen, Win-dows Media Video Image	Windows Media Au-dio, Sipro ACELP. net	
Raw video format	.yuv	Further docu-menta-tion needed	Doesn't apply	Doesn't apply	Supports all resolutions, sampling structures, and frame rates
RealMedia (RM)	.rm	RealMedia	RealVideo	RealAudio	Made for RealPlayer
RealMedia Variable Bitrate (RMVB)	.rmvb	RealMedia Variable Bitrate	RealVideo	RealAudio	Made for RealPlayer
VivoActive (VIV)	.viv	VIV	based upon H.263 video	G.723 ADPCM audio (not the G.723.1 speech codec)	Made for VivoActive Player
Advanced Systems Format (ASF)	.asf	ASF	any	any	
AMV video format	.amv	Modified version of AVI[4]	Variant of Motion JPEG	Variant of IMA, ADPCM	Proprietary video file format produced for MP4 players and S1 MP3 players with video playback

Name	File extension(s)	Container format	Video coding format(s)	Audio coding format(s)	Notes
MPEG-4 Part 14 (MP4)	.mp4, .m4p (with DRM), .m4v	MPEG-4 Part 12	H.264, H.265, MPEG-4 Part 2, MPEG-2, MPEG-1	Advanced Audio Coding, MP3, others	
MPEG-1	.mpg, .mp2, .mpeg, .mpe, .mpv	MPEG-1 part 1	MPEG-1 part 2	MPEG-1 Audio Layer I, MPEG-1 Audio Layer I, MPEG-1 Audio Layer III (MP3)	Old, but very widely used due to installed base.
MPEG-2 – Video	.mpg, .mpeg, .m2v	?	H.262	AAC, MP3, MPEG-2 Part 3, others	
M4V	.m4v	MPEG-4 Part 12	H.264	AAC, Dolby Digital	Developed by Apple, used in iTunes. Very similar to MP4 format, but may optionally have DRM.
SVI	.svi	MPEG-4 utilising a special header	?	?	Samsung video format for portable players
3GPP	.3gp	MPEG-4 Part 12	MPEG-4 Part 2, H.263, H.264	AMR-NB, AMR-WB, AMR-WB+, AAC-LC, HE-AAC v1 or Enhanced aacPlus (HE-AAC v2)	Common video format for cell phones

Name	File extension(s)	Container format	Video coding format(s)	Audio coding format(s)	Notes
3GPP2	.3g2	MPEG-4 Part 12	MPEG-4 Part 2, H.263, H.264	AMR-NB, AMR-WB, AMR-WB+, AAC-LC, HE-AAC v1 or Enhanced aacPlus (HE-AAC v2), EVRC, SMV or VMR-WB	Common video format for cell phones
Material Exchange Format (MXF)	.mxf	MXF	?	?	
ROQ	.roq	?	?	?	used by Quake 3[5]
Nullsoft Streaming Video (NSV)	.nsv	NSV	?	?	For streaming video content over the Internet
Flash Video (FLV)	.flv .f4v .f4p .f4a .f4b	Audio, video, text, data	Adobe Flash Platform	SWF, F4V, ISO base media file format	Developed by the Adobe Flash Platform

Question 3

Keeping all of your media safe and backed up can be expensive and time consuming but is very important. What backup solution do you use or would you like to use?

3.5 Camera Lenses

A film lens, also known as a cine lens or cinema lens, is a high-end camera lens for cinema cameras or video camcorders that filmmakers, cinematographers, and videographers use to make film and digital projects.

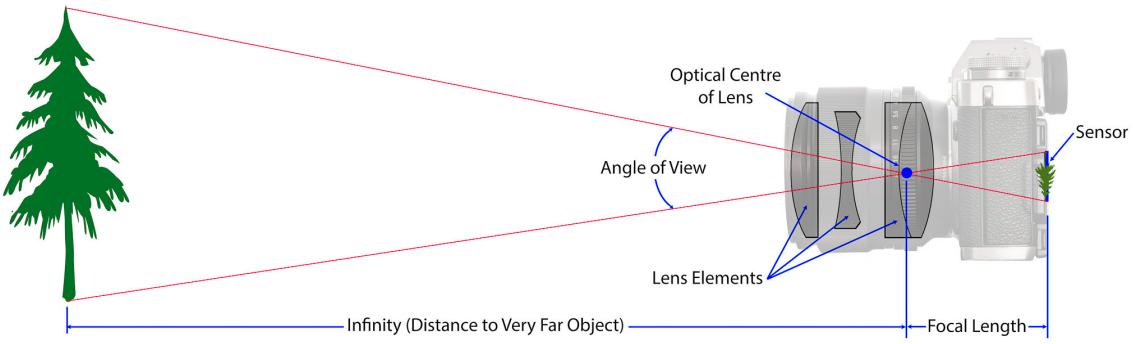
Like DSLRs and other still photography lenses, a film lens contains a series of glass plates that bring exterior light to a film strip or digital sensor through the camera's viewfinder.

3.5.1 Characteristics of a Film Lens

All lenses filter and focus light so that it hits the sensor or film strip correctly, but other factors determine the look and quality of an image captured by a film lens, including:

Focal length

Focal length is the distance, measured in millimeters, between the camera lens and the camera's digital sensor, or film plane, which records the image. Cine lenses with smaller focal lengths have wider angles of view, which is how the human eye perceives the size of the objects in the scene, while larger focal lengths have a narrower angle of view and show less of the scene.



T-stops

The amount of light that passes through the cine lens is measured in increments called transmission stops, or t-stops, which is a more accurate unit of measurement than the f-stop (the camera setting that specifies the aperture of the lens) used for still lenses.

Aperture

The aperture, or size of the opening in the lens, or iris (continuous aperture), also affects the image that the cine lens can capture. As with focal length, large apertures create a shallow depth of field, which is the amount of focus in the image, while smaller apertures result in greater depth of field and more focus. The widest aperture setting on a lens is called maximum aperture and is ideal for low light situations.

3.5.2 Types of Lenses

There are many lens options for filmmaking within the two primary types of prime and zoom lenses.

Prime Lens

A prime lens is a fixed focal length lens that does not allow you to zoom in or out. In short, the determined focal length of the lens is the distance between the point of convergence in your lens to the sensor or film in your camera.

Prime lenses allow a handful of benefits compared to their zoom counterparts. The first and most desirable is the availability of fast apertures. With a fast aperture, a lens can maximize the amount of available light by opening its aperture to an f/2 – f/1.2 or even f/.95 range, most zoom lenses do not shoot any faster than an f/2.8

Being able to shoot at a fast/wide-open aperture also allows the shooter a more shallow depth of field. Depth of field (DOF) is the in focus distance between the foreground, subject, and background. Shooting wide-open gives a narrow DOF, isolating the subject from its surroundings in sharpness and clarity. The closer the lens is to the subject, the softer the foreground/background will become.

The three most popular and widely used standard primes lenses are the 24mm,35mm, 50mm, and 85mm. They are available in an array of aperture speeds, and their value is dependent on their maximum aperture and overall build quality.

The 24mm for wide-angle lenses and the 105mm micro/macro for close-up work round out the category.

Anamorphic Lens

A favorite among filmmakers for its wide aspect ratio (2:39:1) and its ability to produce epic images, anamorphic lenses generate a wide field of view (how much of an image the lens can cover) with only slight distortion and plenty of warmth in the frame. Cooke and ARRI are among the many anamorphic lens manufacturers.

Wide-angle Lens

The wide-angle lens is a prime lens with a focal length typically between 5mm – 18mm, ideal for fitting a large object into the frame or drawing attention to an object in the image's foreground. Wide-angle lenses can show more significant movement and scope within a scene and exaggerate and distort the foreground image. Specific lenses can produce an ultrawide-angle or even fish-eye effect if their focal length is larger than the camera's sensor size. There are many wide-angle prime and zoom lenses from which to choose: Canon, Zeiss, Sigma, and Fujinon are standard options.

Telephoto / Narrow-Angle Lens

The 75mm telephoto, or long lens, is a zoom lens with multiple focal points that compresses and magnifies details in an image's foreground, middle ground, and background. The telephoto lens is less frequently used in filmmaking, save for extensive sets, locations, or documentaries. Panasonic, Tamron, and Sigma are known for telephoto lenses.

Narrow-Angle Lenses

Zoom Lenses

A zoom lens is a type of camera lens that offers the photographer a good range of different focal lengths in a single lens. This is in comparison to a prime lens, which only provides a single focal length. A zoom lens allows cinematographers to change the focal length and angle of view by zooming in and out with the zoom ring on the lens body. Zooming enable the cinematographer to achieve everything from a wide-angle shot to an extreme close-up. A popular choice for filmmaking is the cine zoom lens, a parfocal lens that allows filmmakers to change the zoom range without losing focus or image quality. Zoom lenses typically contain more glass than prime lenses, making them heavier, allowing for greater versatility.

Zoom lenses also come in two main varieties

- Constant-Aperture
- Variable-Aperture.

Each type has its strengths and purposes, depending on what is most critical to the photographer. When you look at the name of a zoom lens, if there is only a single aperture given, this is a constant aperture zoom lens. If two F-stops are named with a dash in between, this is a variable aperture zoom lens.

Constant-Aperture zoom lenses keep the same maximum aperture throughout the entire focal range. So, for example, the 120mm-300mm F2.8 and the 24mm-105mm F4 are both constant aperture zoom lenses. The critical advantage of constant aperture zoom lenses is that you do not lose any light-gathering power as the focal length increases. This helps challenge lighting situations, where the extra F-stops allow for faster shutter speeds. And the autofocus operations inside a camera's body also depend on the amount of light coming through the lens.

Following are few popular Zoom lenses that are used:

24mm – 240 mm, 24mm-105 mm.

70mm – 300 mm,24mm-105 mm ,

150 mm- 600 mm. 25mm- 250mm Cine- servo

24mm-240mm Zoom Lens

70mm-300mm Zoom Lens

150mm-600mm Zoom Lens

Canon Cine – Servo 25mm- 250mm

Question 4

Based on what you have read above or on your own experience, do you think you would prefer to shoot with prime lenses or zoom lenses? Why?

3.6 Basic Settings of a Television Camera

The television camera changes light into an electronic signal that can be stored (using videotape, optical disks, or computer memory, transmitted, and displayed on a television receiver or monitor.)

Television cameras are probably easier to operate well than film or still cameras because you can watch and control the camera output as you record.

There are few electronic controls, and the manual controls on the lens will be familiar to anyone who has used a good still or motion picture camera. Since video cameras can, as a rule, produce sharper, more explicit pictures than the recording media they were designed to work with, the quality of your camera is seldom an excuse for fuzzy images. Understanding how to use the camera correctly will help you avoid poor results.

Lens Controls

The modern television lens has three controls: iris, focus, and zoom. You may not have to adjust the focus or iris on a fully automatic camera except under unusual conditions. Still, you should know what's going on so you can use manual settings with confidence.

Iris Control

The ring closest to the camera body controls the amount of light passing through the lens to the light-sensitive surface of the pickup tube or chip. It is called the aperture or f-stop control and is marked off in f-numbers. The continuous aperture is the iris. The lowest f-stop lets in the most light, and the highest f-stop lets in the least. Some lenses have a "C" setting after the highest f-stop which means the lens is entirely closed, letting no light through at all.

More light---------- Less light

1 1.4 2 2.8 4 5.6 8 11 16 22 32

Each standard f-stop lets half as much light through the lens as the f-stop below it.

If the camera gets too little light, the image will look fuzzy and drab, even though it may focus. The camera image may lag behind quick changes, and the picture will be grayish, with little contrast.

Too much light will produce too much contrast. Details in both the very bright and the very dark parts of the picture will be lost. Bright spots may grow "halos" or "bloom." So-called "point sources" of light may cause light vertical stripes on CCD cameras.

The correct setting is between these extremes, generally about one f-stop higher than the f-stop at which the bright parts of the picture lose details and grow halos or "bloom." To find this point, begin with the lens in the closed or highest f-stop position and open it slowly until you start losing details in the brightest parts of the picture. Then reduce the amount of light coming through by going down to the next highest f-stop.

Indoors it's often necessary to add light to get a good picture. Outdoors on bright sunny days, it may be required to reduce the light reaching the pickup tube even more than the lens will allow. This is done by adding a neutral density filter between the lens and lens hood. A two-power (2X) filter has the same effect as using the next highest f-stop, while a four-power (4X) filter gives the effect of going up two f-stops.

Zoom Control

The center ring on most lenses is the zoom control. Most cameras use a rocker switch beside the lens. This allows you to change the lens's focal length through a range from wide-angle (short focal length) to telephoto (long focal length). It's common for inexpensive zoom lenses to have a range of about six to one. That is, the most extended focal length is about six times the shortest. Zoom lenses for television cameras with two-thirds-inch pickup tubes or chips range from about 12mm to 75mm, with a standard focal length of about 33mm.

A wide-angle setting makes the subject smaller as the angle of view is increased. Distances from the camera are exaggerated, with objects nearer the camera appearing abnormally large. This is especially true of people who are too close to a wide-angle lens. Straight lines near the edges of the picture are often bent with an effect known as barrel distortion.

A telephoto setting makes the subject more significant as the angle of view is reduced. Distances from the camera are compressed. More than one feature film director has used this effect to make an action (like running toward the camera) seem to take much longer than it should.

The standard lens settings offer the most realistic perspective to the viewer.

It's possible to change the focal length of a zoom lens during a shot by "zooming" in or out. Inexperienced camera operators often over-use this capability. The primary value of the lens is in controlling the field of view of the camera when it's inconvenient or impossible to change the distance from the subject to the camera.

Focus Control

The focus control is the ring farthest from the camera body, on the front of the lens. Distance settings are marked in meters and feet. While a non-zoom (fixed focal length) lens is focused simply by turning the ring until the image is sharp, the zoom lens must be zoomed in to the smallest angle of view and the largest image size to adjust focus. The lens should then be zoomed out to the widest angle of view and the smallest image size to ensure the image stays in focus through the entire zoom range. If the image stays sharp, the lens will remain focused at any focal length as long as the distance from the subject does not change.

Depth of field is the range of distances in front of the lens where objects appear to be in acceptable focus. It's longer for short (wide angle) lenses than for long (telephoto) lenses, and it increases as you use higher f-stops. When lighting conditions permit, it is often wise to use a higher f-stop if you expect the distance between the camera and the subject to change often while you're taping since you'll have less trouble keeping the subject sharply focused with greater depth of field.

While all cameras with zoom lenses must control the iris, focal length, and focus, the functions of the three rings described here may be automated or provided by remote control.

Most lenses also have a "macro" setting on the zoom ring. This changes the characteristics of the lens to let you focus on objects right up to the front of the lens.

Electronic Controls

Some or all of the following controls may be automatic or preset and thus not adjustable by the user.

Pedestal Level

Also called the "set-up" control, it sets the level of the darkest parts of the picture. On portable cameras, it's generally automatic or absent.

Gain Control

Also called "level," this control sets the level of the brightest parts of the picture. It can reduce the level when too much light is striking the pickup tube, but it will not make the picture brighter without making it grainy or snowy if the pickup tube or chip isn't getting enough light. Automatic gain controls can be extremely sensitive to even small bright parts of the picture, driving medium and darker parts into black. They may also bring dark parts up into the medium range if there's not enough light for a good picture.

White Balance

If you use outdoor film with standard indoor lighting (no additional electric lighting), everything comes out orange. The colour temperature of sunlight is very different from an incandescent light bulb. Most consumer cameras now sense the overall colour temperature and adjust it electronically. In older or professional cameras, each change in location or lighting may be necessary to "tell" the camera how to interpret colour. This is done by showing the camera a white card, which represents the total absence of colour. Controls on the camera are then used to minimize the colour output of the camera.

Viewfinder

There are often controls to adjust a camera viewfinder. These controls have nothing to do with the actual output of the camera. It's helpful to adjust the viewfinder under controlled conditions, showing a faithful representation of the actual camera output. Otherwise, if you want viewfinders to tell you the truth, they should not be adjusted to make a "pretty" picture.

3.7 Shot and Shot Composition

There are different shots used in film or television to capture other visuals and emotions.

There are three basic camera shots: close-up, medium shot, and long shot.

Close Up Shots

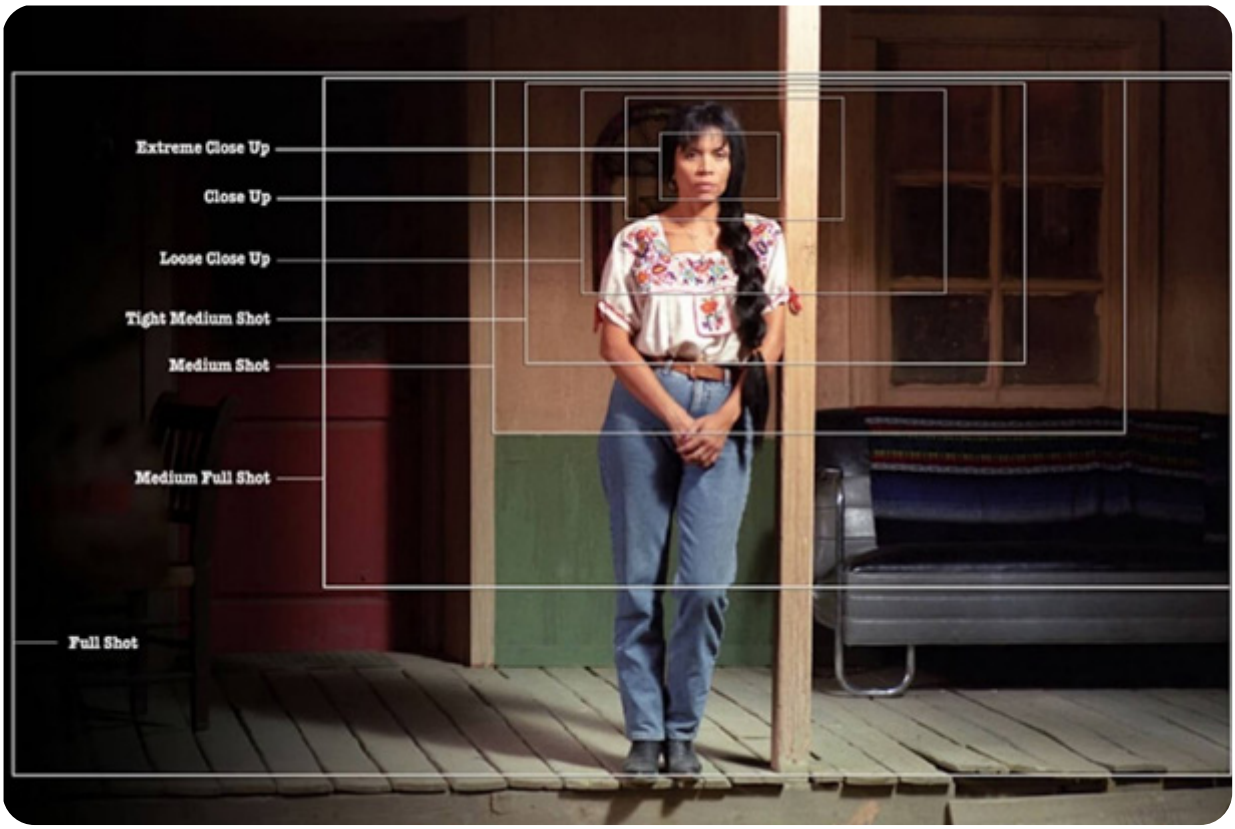
- Extreme close-up shot (ECU)
- Big Close- up shot (BCU)
- Close-up shot (CU)
- Medium Close-up Shot (MCU)

Medium Shots

- Medium Shot (MS)
- Medium Long Shot (MS)

Long Shot

- Long Shot (LS)
- Very Long Shot (VLS)
- Extreme Long Shot (ELU)



Extreme Close Up (ECU)

The extreme close-up is used to reveal tiny details in a scene.

Why is an extreme close-up shot used?

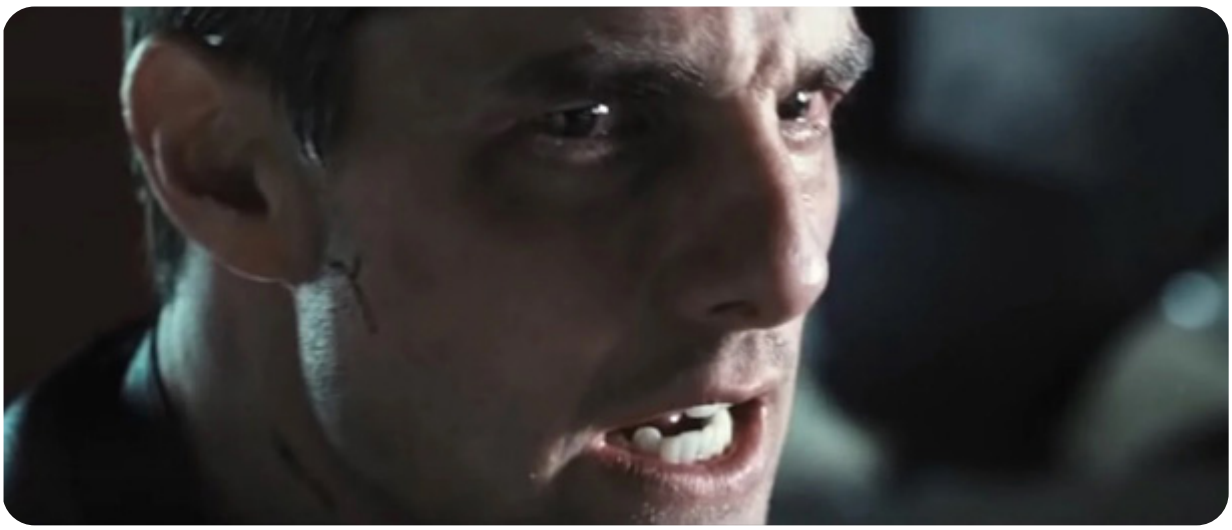
The extreme close-up shot is generally used to allow the viewer to enter the character's personal space, revealing traits and emotions that might otherwise go unnoticed. The frame is so tight that using an extreme close-up shot gives the viewer no choice but to experience the character's feelings alongside them.

Big Close Up (BCU)

The Big close-up is the head and chin of a subject.

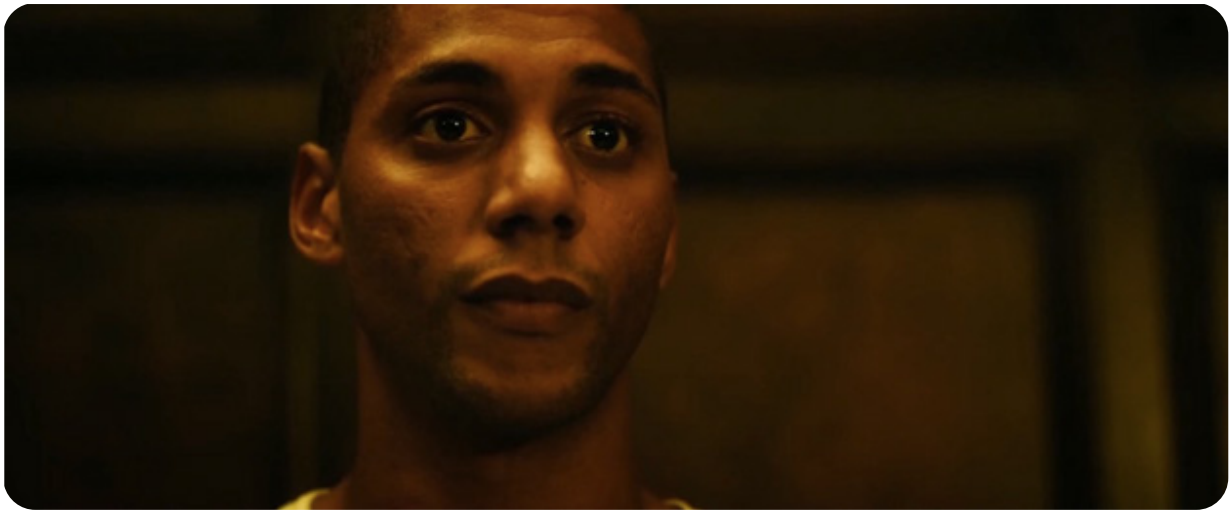
In photography, film, and television, a standard shot size shows a detail of a foreground subject filling the entirety of the screen. A BCU of a person would show their face from forehead to chin. This mimics the extreme proximity of the intimate zone in face-to-face interaction.

If you need to shoot a big close-up or an extreme close-up of a human face or hands, be very clear with your talent exactly how tight the framing is. This enables them to judge better the limitations of their possible on-camera movements for such a tight shot. A big close-up will be achieved either through very close camera proximity to talent or via a relatively long focal length lens on a camera slightly farther away. In either case, the resulting frame represents a magnification of the person's face or hands, and therefore the entire screen will be filled with that information.



Close up Shot (CU)

A close-up or close-up in filmmaking, television production, still photography, and the comic strip medium is a type of shot that tightly frames a person or object. Close-ups display the most detail, but they do not include the broader scene. Moving toward or away from a close-up is a common type of zooming. A close-up is taken from head to neck. So it gives us a detailed vision of the character's face.



Medium Close Up Shot (MCU)

A medium close-up shot (or MCU) is a shot that frames the subject from just above their head down to about midway on their torso. The idea of a medium close-up shot is that you can still easily register the actor's emotions and facial expressions while also retaining some of the backgrounds.

Medium Shot (MS)

A medium shot also called a mid-shot or waist shot, is a type of camera shot in film and television that shows an actor approximately from the waist up. A medium shot emphasizes both the actor and their surroundings by giving them an equal presence on screen. The director of photography uses a medium shot to clearly show the actor's face and emotions while still informing the audience of what's happening in the world around them.

Medium-long Shot (MLS) / Cowboy Shot

A medium-long shot also called a medium-full shot, is a shot that frames a character around the knees and up. A medium-full shot falls between a normal medium shot and a full shot. The medium-full shot is also referred to as a medium-long shot, ¾ shot, or a cowboy shot.

The medium-long shot meaning derives from the use of a normal medium shot and a long shot. Medium shots are one of the most commonly used shot sizes in film because of their ability to capture the character and other scene elements. The medium-long shot is a medium shot that allows filmmakers to create a slightly wider frame.

Long Shot (LS)

The wide shot also lets us see the beautiful background imagery and the onlookers, which will make any big moment more cinematic.

A long shot of the many camera shots gives us a better idea of the scene-setting and gives us a better idea of how the character fits into the area.

Very Long Shot (VLS) / Establish shot

A Very long shot, also referred to as a wide shot (WS), is a camera angle that shows the entire object or person and their relation to what surrounds them.

The wide shot lets the audience absorb all the information at once. That's a lot of pressure! But let's keep going with this dissection.

Extreme Long Shot (ELS)

An extreme long shot (or extreme wide shot) makes your subject appear small against their location. You can use an extreme long shot to make your subject feel distant or unfamiliar.

It can also make your subject feel overwhelmed by its location. Of all the various camera shots out there, consider using the extreme long shot when you need to emphasize the location or isolation.

Two Shot / 2 Shot

A two-shot is a camera shot with two characters featured in the frame

Two shots are often beneficial for allowing performances to play out in a single take, especially comedy.

Over-The-Shoulder Shot (OTS)

Another element of camera shots to consider is the perspective of the shot. An over-the-shoulder shot shows your subject from behind the shoulder of another character. Because it emulates perspective, it's common in conversation scenes.

The over-shoulder shot reveals one subject as seen from over the shoulder of another subject.

Other than the above, there are shots like the following used to capture different emotions of the subject creatively.

Eye Level Shot

First, consider the most common height: the eye-level shot. When your subject is at eye level, they're in a neutral perspective (not superior or inferior). This mimics how we see people in real life-- our eye line connecting with theirs.

High Angle Shot

In a high-angle shot, the camera points down at your subject. It usually creates a feeling of inferiority or "looking down" on your subject.

But, as the video below shows, this type of angle has creative expressions that can vary depending on its context.

A high-angle shot is a cinematography technique where the camera points down on the subject from above. High-angle shots are used to make the subject or object seem vulnerable, powerless, or weak.

Low Angle Shot

It's pretty obviously a shot in which the cinematographer captures the subject from below. It requires the camera to be positioned low on the vertical axis, below the eye line. A low-angle shot frames the subject from a low camera height looking up at them. These camera shots most often emphasize power dynamics between characters.

The shot gives the psychological effect of making the subject look powerful... imposing.

3.8 Shot Composition

Shot composition is the way a scene is arranged within the camera frame. The shot composition is all about how the visual elements are arranged to convey a specific message.

When we refer to the elements on the screen, we talk about the props, the scenery, and the actors themselves. Now that there are better techniques and technology available, filmmakers realise that they can influence the audience far better if they can seamlessly move the camera and the characters into a three-dimensional depth.

This is why shot composition is a vital element in creating a movie, as it can grab the audience's attention by directing their attention to a specific person or object. As well as help to develop beautiful-looking imagery.

Finally, it also allows filmmakers and directors to get across important information and subtext successfully. Through the elements of composition in film, more profound meaning can be successfully conveyed without telling the audience exactly what is happening. Though rules such as shot composition are given, we should understand that we should not be limited to regulations in our imaginary and artistic outputs. These should be treated as areas of study in traditional teaching of film language.

3.8.1 The Rules of Composition In Film

First, just like any "rules" in photography or cinematography, the rules of composition are made to be broken. As much as we rely on these rules in most cases, the elements of composition are most exciting when they go against the grain. Before we learn the rules of shot composition, it might be better to understand what composition means.

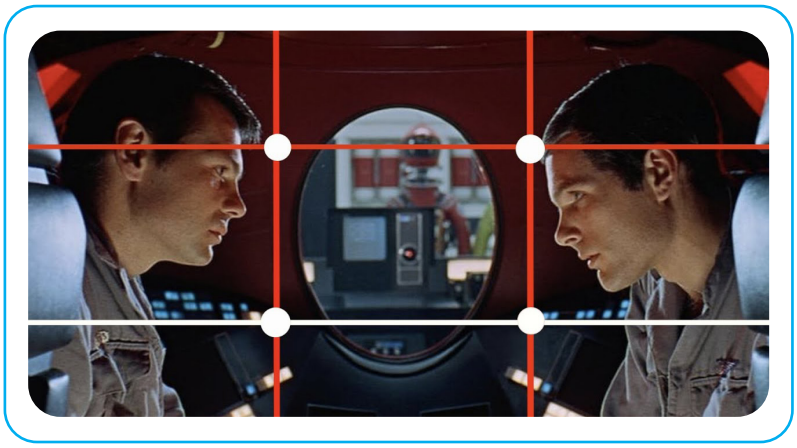
The first assessment should always be, "what am I trying to visualize?" What feeling, thematic message, or experience do I need to create to make my point clear and productive.

Once we have this essential context, we can use shot composition to arrange all of our scene elements in the best possible way to drive our intention home. Knowing how to arrange specific shots for specific reasons will significantly impact the audience, keeping them engaged for longer. And engaging your audience is a requirement of filmmaking.

But lasting engagement can be challenging when the film deals with unlikeable characters. Complicated protagonists, such as anti-heroes, need camera framing and composition techniques to be relatable enough, so the audience sticks around.

The Rule of Thirds

The rule of thirds is one of the most common camera framing techniques used in film or photography. It's about positioning a character to show their relation to other elements in the scene. You need to break up your frame into six sections – three horizontal and three vertical. Then all you need to do is place your subject at one of the interconnecting points.

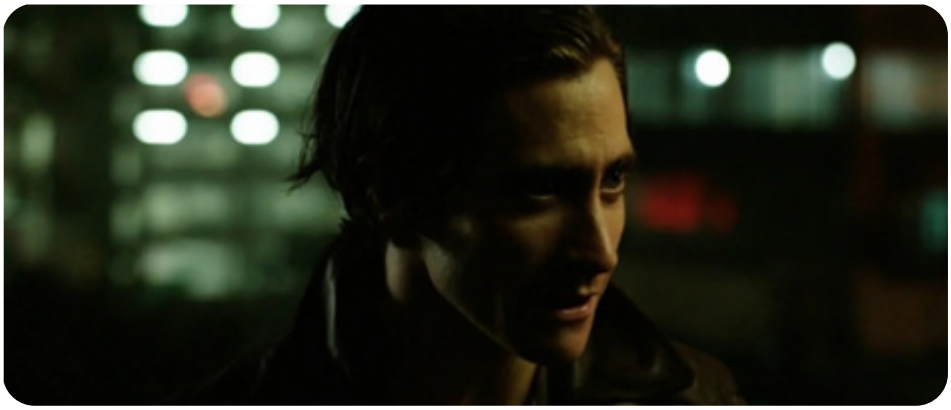


As the camera frames your shot, keep the image on the intersecting lines. It's more pleasing to the eye. But also, different camera framing will tell a different story. It is an easy way to determine the character's place in the world.

Remember to draw that imaginary tic-tac-toe board. Put a character on either side of the intersecting lines

Understanding frame composition rules is invaluable knowledge for directors and cinematographers.

And so is knowing when to break them. Shooting a perfectly symmetrical shot, breaking the rule of thirds, is used for very specific reasons.



Breaking the Rule of Thirds

Symmetry and Balance

The subject looking to the opposite side of the frame is also a rule of consumption in film. You see, in general, the framing rule sees the subject on the left side of the frame with them looking to the right.

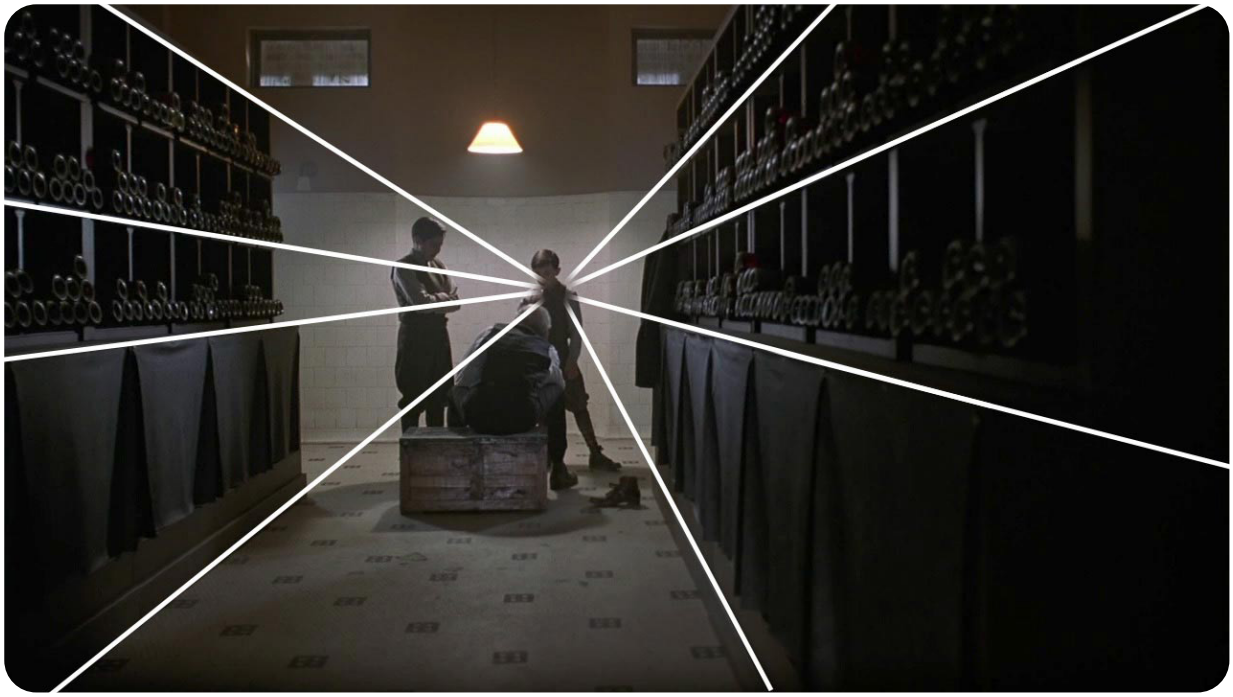
On the other side, it is very similar to symmetry as these images show reflection or mirroring in a photograph. Combining both, balancing objects or equal sections and the mirror effect of symmetry forms symmetrical balance.

Symmetrical balance is the most common way to photograph an image. In symmetrically balanced photos, both sides of the frame have equal weight and may even mirror each other.

Leading Lines

Leading lines are actual lines (or sometimes imaginary ones) in a shot that lead the eye to key elements in the scene.

Directors use this technique to direct the viewer's eye and connect the character to essential objects, situations, or secondary subjects. Whatever your eye is being drawn to in a scene, leading lines probably have something to do with it.



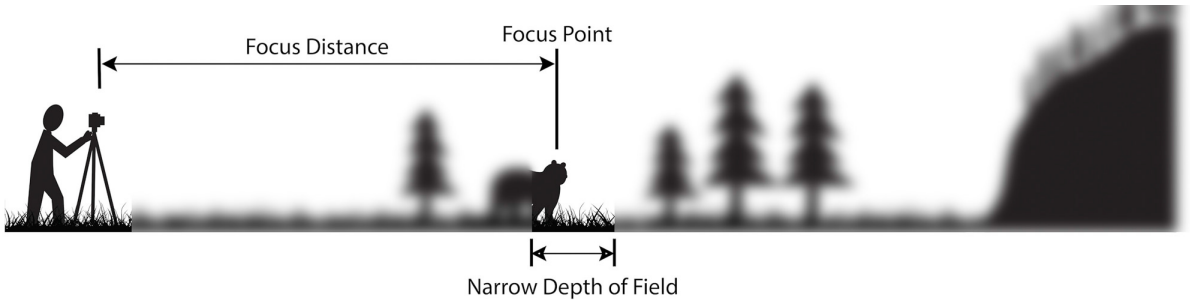
Framing at Eye Level

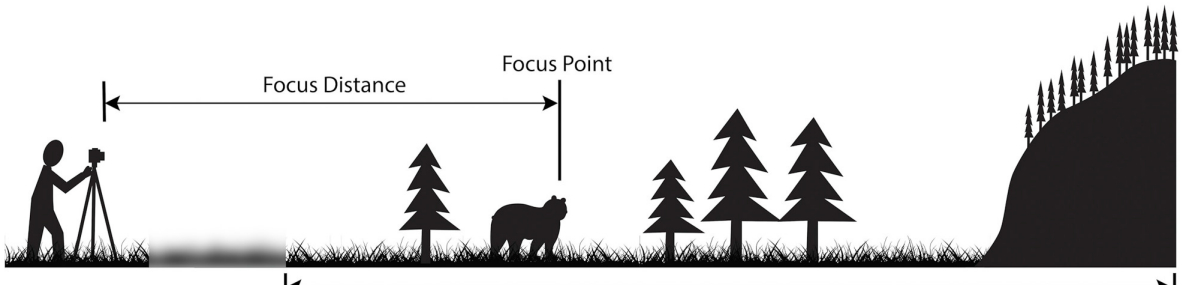
Eye-level framing positions the audience at eye-level with the characters, which plants the idea that we are equal with the character. We are leading the eye and the mind to consider how we would feel if we were there because it almost feels like we already are.

Depth of field

To understand cinematography is to understand the depth of field. Mastering spatial composition in the frame is one of the hallmarks of compelling visual storytelling.

Depth of field describes the size of the area in your image where objects appear acceptably sharp. That area is called the field, and the size of that area is the depth of that field.





Similarly, if you make that zone shorter or smaller, you will have less focus on a shallow depth of field. One way to achieve this adjustment is by using the lens aperture

Depth of field is essentially your zone of sharpness. If you make that zone longer, bringing more objects into focus, you will have a deep depth of field.

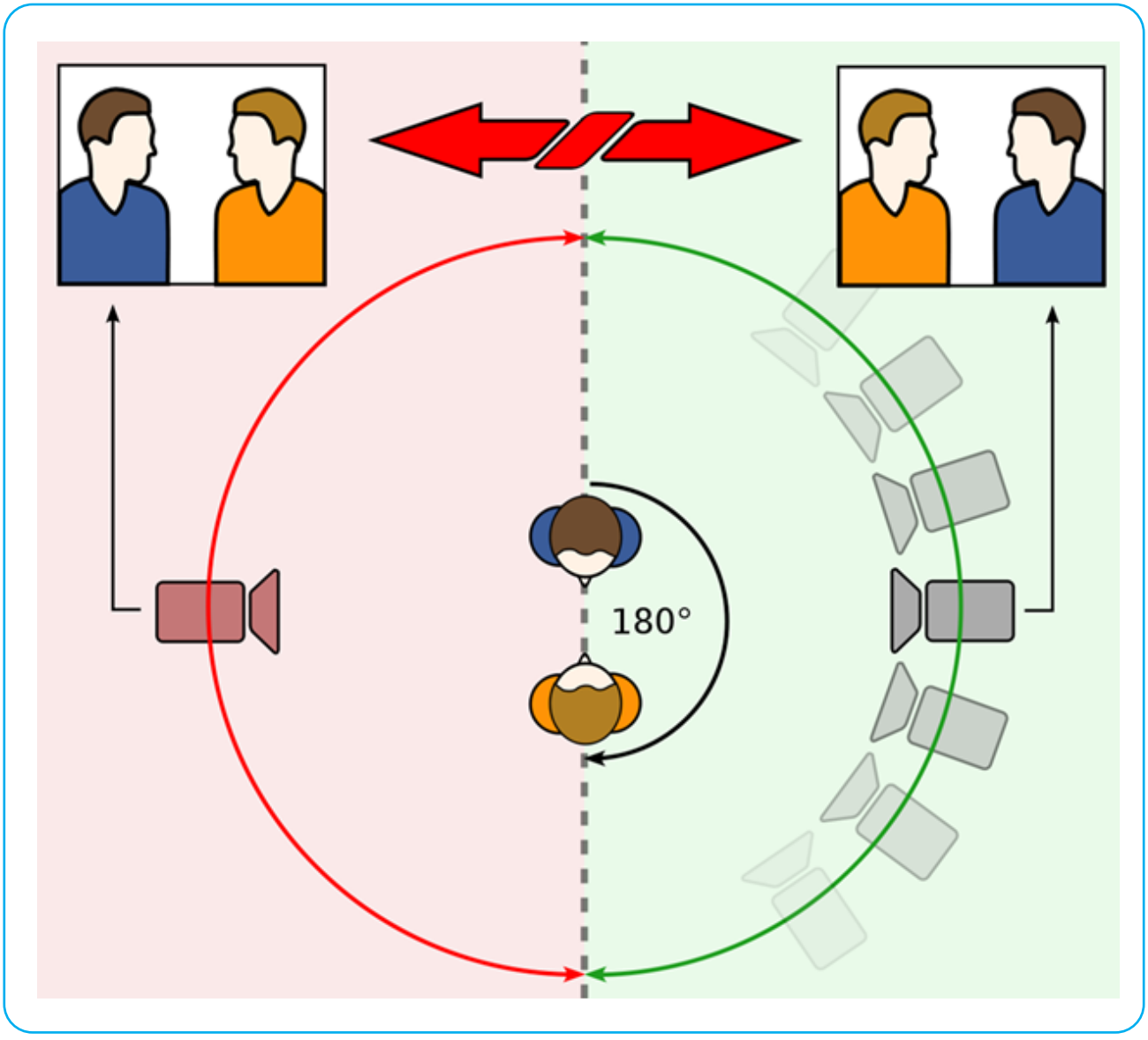
Now that we know a little more about this, we can manipulate our depths of field to convey different feelings, tones, and relationships between objects.

3.9 180 Degree Rule

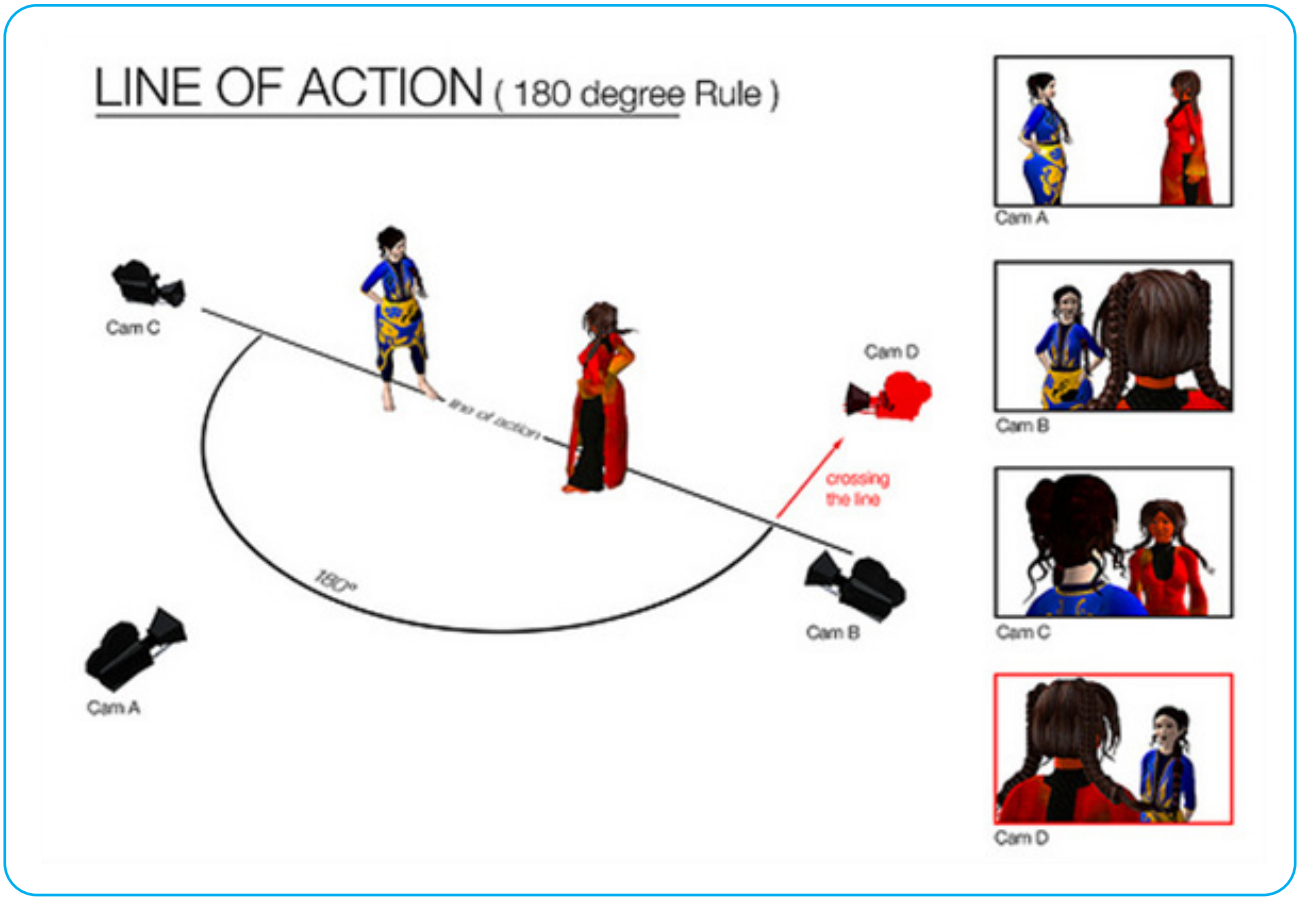
When cutting between single shots in a dialogue scene, you want both characters to appear as if they're facing each other. If both characters seem to be looking in the same screen direction in their single shots, it means you've broken the 180-degree rule, and your eyelines won't match.

It is a rule that dictates that when you change the viewer's viewpoint by changing the angle from which something is shot, you have to maintain that same viewpoint. If you don't do that, the audience must mentally adjust for a second to re-orient themselves to the new angle.

What is the 180 degrees rule? The 180 rule is a filmmaking technique that helps the audience track their characters in a scene. When you have two people or two groups facing each other in the same shot, you have to establish a 180-degree angle, or a straight line, between them.



In filmmaking, the 180-degree rule is a basic guideline regarding the on-screen spatial relationship between a character and another character or object within a scene. Keeping the camera on one side of an imaginary axis between two characters, the first character is always framed right of the second character.



It's a helpful jumping-off point because it introduces you to a practical rule of cinema and invites you to think visually.

This is one of the most important rules to know for any type of video production.

Some television and filmmakers have elected to keep a consistent line throughout their entire production. This level of consistency is fantastic, and those films indeed benefit from such ruthless attention to detail, but it isn't necessary for every story.

There are moments where you can benefit from breaking or bending the 180-degree rule, and while they are open to interpretation, the feeling a line break generates should inform your decision. If it doesn't, you may be wasting cinematic energy.

3.10 Camera Movement

Camera movement is a powerful filmmaking tool employed to modify the relationship between the subject and the camera frame to alter the viewer's perspective of space and time for a more impactful and visceral visual storytelling. Moving a camera a certain way can also change the narrative you are trying to tell and the content you are presenting.

When there is no movement (e.g., locked camera aim), it iscalled a static shot. These camera shots emphasize the appearance and movement of your subject against its environment. They are predominantly captured by being placed on a tripod or a dolly that remains static during the shot.

Static shots work well in every genre, but they're excellent for comedy because the actor's performance and dialogue are often the focus.

Zoom Lens Shot

Zoom shots are camera shots that change the focal length of the lens during the shot. This action can be a zoom out or a zoom in, but they are different from a push in (or dolly in) because the camera is rarely changing positions but simply altering the focal length of the zoom lens.

An excellent way to remember this is that the camera does not zoom, but rather the lens zooms. Now, your smart phone might be able to do a "digital zoom" that reduces the image quality by moving in on an already captured image, which is a regarded as a big mistake in pro filmmaking.

Pan Shot

Pan shots, sometimes referred to as 'panning', are a basic yet highly effective camera technique in which you move the camera horizontally from a fixed point to capture a panorama. You change the camera to the left or right to create a pan shot without altering its position. There's no such thing as panning up or down, which is a tilt, or in or out, which can be done with shots like a dolly shot or by zooming. Because of panning's ability to be used for a wide range of situations and scenarios, it's an essential move for any aspiring photographer or cinematographer to master.
Pan shots are often used to:

- **Reveal the setting:** You can pan to give an audience a better idea of the scene's setting. This is especially effective if you're hoping to set a specific tone or explore unusual surroundings.
- **Shift point of view:** Panning can be used to switch from one subject's viewpoint to another's.
- **The transition between scenes:** Instead of simply cutting to the next scene, you can use panning to transition. This is often used to indicate a jump through time and/or space. For example, a pan could be used to transport the audience to a past or future event, another location, or even into an imagined scenario.

- **Reset a scene and its actors:** Pan shots are sometimes used to change around a scene's orientation. This technique is beneficial if you want to simulate the existence of a doppelganger, twin, or clone. To accomplish this, the camera quickly pans away from the actor in their original position and then land back on them after they are repositioned.
- **Show speed or action:** Just like with photography, panning is a great way to communicate movement. That is why filmmakers often use this technique in action sequences or give a static scene some energy. You can pan to follow a character or object (like debris or a prop) that zooms past the screen or even to give the impression that something is moving way faster than it is.
- **Interact with characters and their surroundings:** You can use pan shots during a back and forth interaction to create tension or, more commonly, humor. Filmmakers frequently use this technique during comedic conversations or show an actor's reaction to something they have seen or heard off-screen.

Creating a pan shot as a filmmaker is not so difficult to master. Follow these steps to start panning:

- Mount your camera on a tripod. It is possible to pan with a handheld camera, but a tripod offers more stability for your shot. If you're using a handheld, hold the camera close to your body for the best results.
- Choose a beginning and ending frame. These frames serve as your pan shot's bookends, so choose them wisely. When you are first starting, practicing with still frames can be helpful.
- Swivel the camera. The tripod's handle, also known as a pan bar or a pan arm, moves the camera from one side to another. Ensure that the tripod works without sticking or jerking and maintain a consistent movement and speed throughout the pan.
- Practice the pan. Before filming, rehearse the movements a few times to ensure nothing is blocking or shaking your shot. This is especially useful if you are filming with actors, as it gives everyone a chance to check their positioning and run through the shot.
- Get several takes. Unexpected interruptions happen, some of which you may not notice immediately while filming. Make sure to get a few safety takes before wrapping up.

Tilt Shot

Tilting is a cinematographic technique in which the camera stays in a fixed position but rotates up/down in a vertical plane. Tilting the camera results in a motion similar to someone raising or lowering their head to look up or down. Tilting the camera down from one character's perspective to another visually indicates superiority from the higher angle point of view. It is a great tool to show power vs. vulnerability in the film.

Tilting helps establish shots that contain tall vertical scenery or dramatically introducing a character. A downward tilt shot is used to observe action over a large area such as a football field; to create a kaleidoscope effect, such as that achieved when looking down at the movements of a water ballet; or to create a psychological impression of inferiority or weakness-for example, by looking down at a small child.

If we start with a character and tilt-up, often, our location is established. Conversely, if we begin by tilting the camera down, we can gradually reveal the location. Depending on what your narrative demands, you can use them to reveal much more than character and geography. This is often useful in comedy or even horror.

The effect of the pan and tilt is most often to guide our eyes and attention towards a specific aspect of the scene. Another common way these two movements are used is to follow characters moving through a scene. This can also be achieved by tracking, which we'll talk more about later.

The speed of the pan or tilt of the camera also affects how we feel about a scene. For example, a slow tilt up from a character's face towards the sky can give us a sense of relief, especially after an intense scene has been resolved. Conversely, a quick pan left or right (commonly known as a whip-pan) can give us a sense of urgency or excitement, kind of like when we hear a loud noise in real life and quickly snap our gaze towards the direction of the noise.

Tracking, Dolly, and Crane shots

These are shots where you physically move the camera through the scene.

Tracking shots typically move the camera side to side, following the movement of characters through a scene. Dolly shots move the camera front and back, while crane shots move the camera up and down.

There are only a handful of equipment options when it comes to camera movement. For the most part, camera movement is achieved with one of the following mechanisms: a handheld shot, a steadicam shot, a crane shot, or a dolly shot. With a tracking shot, you can maintain the same shot size as you laterally follow the character.

Dolly shots typically move us toward or away from a character, most commonly when they are stationary during a dialogue scene. Occasionally dolly shots can also move around a character.

What Is the Difference Between a Dolly Shot and a Tracking Shot?

A dolly shot is a specific kind of tracking shot where we follow a subject on an apparatus called a dolly. A dolly is a cart that the camera is mounted on, which rolls along the dolly track or on its wheels. Dolly shots are designed to be smooth and controlled camera movements. Dolly shots can be combined with other camera movements like a pan or tilt to accentuate the theme or message of the scene. While some dolly shots are tracking shots, not all tracking shots are shot on a dolly.

A camera dolly can be as simple as this

Crane Shots

Crane shots are often used to help us understand the setting better. Its best coupled with excellent production design to tell a story. For example, if the camera is craned upwards right after a car crash, the incredible impact of the scene is greatly magnified as the collision is brought into frame.

A crane shot is taken by a camera mounted on a jib or crane that moves up and down. The terms 'jib' and 'cranes' are used interchangeably. The primary function of a jib is to extend your camera out over a tripod, moving the camera up, down, left, right, or in any of those combinations. Certain jibs can keep the camera level and parallel to the ground no matter how you move them.

A jib sits on a tripod, and it can also pan from left to right. The fulcrum or center point of gravity on the jib allows the up and down movement. Every jib has a counter-weight system where a weight is placed on the end of the jib to balance its movement. This allows for smoother motion and less manual input by the camera's operator. Some more giant cranes operate by remote control.

Crane

On the other hand, we could start with the camera up high above the exact crash site and have the camera crane down onto a paramedic fresh out of college looking in disbelief at the horror of the scene, which in turn will tune us into what they may be feeling at that point.

End Scenes: Because these shots typically give the audience a higher point of view, they're helpful when ending a film. This height does well during happy endings, showing the happily-ever-after shot, highlighting their new status quo/surroundings.

It can also do the opposite in a scene that has a sad or tragic ending. The crane's movement and placement of the character in that world can highlight their loneliness or final fate, like in the iconic moment from High Noon when Marshal Kane realizes he'll have to face his enemies alone.

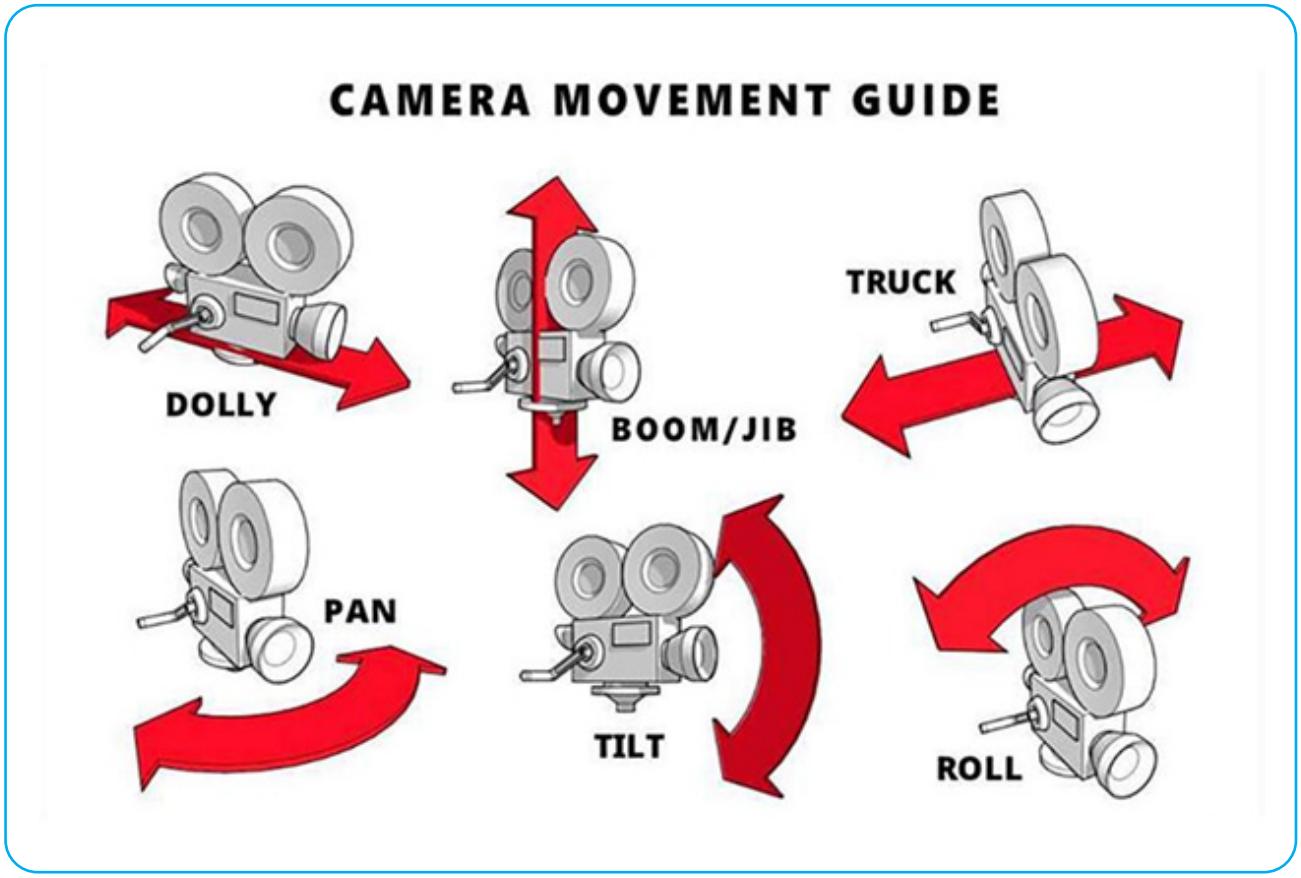
How to shoot a scene in one long take? Using a gimbal to track a foot chase scene can be an option. However, the result will be smooth footage in what is otherwise supposed to be an intense scene.

Depending on the story, it might be a good idea to ditch the gimbal and go handheld with the camera instead. The added shake to the camera will help to magnify the intensity of the scene and thus heighten the audience's sense of excitement and danger. Of course, it might be too shaky, in which case a gimbal or a steadicam should be used.

gimbal

Each of these tools gives a different feel to the scene. They are like paintbrushes. The one you use is a matter of taste as much as function.

In addition to the tools you use, the speed of the camera movement will have a massive impact on the feeling of the scene. Slowly tracking a character through woodland on a sunny day will give us the feeling that the character is exploring the environment, thus giving us a sense of wonder and curiosity.



Question 5

Some directors like to shoot with multiple cameras, others will make an entire film with only one. What might be the advantage of using one approach ahead of the other?

3.10.1 Drone Camera Movement

An unmanned aerial vehicle (UAV), commonly known as a drone, is an aircraft without any human pilot, crew or passengers on board. UAVs are a component of an unmanned aircraft system (UAS), which include additionally a ground-based controller and a system of communications with the UAV. The flight of UAVs may operate under remote control by a human operator, as remotely-piloted aircraft (RPA), or with various degrees of autonomy, such as autopilot assistance, up to fully autonomous aircraft that have no provision for human intervention.

UAVs were originally developed through the twentieth century for military missions too "dull, dirty or dangerous" for humans, and by the twenty-first they had become essential assets to most militaries. As control technologies improved and costs fell, their use expanded to many non-military applications. These include aerial photography, product deliveries, agriculture, policing and surveillance, infrastructure inspections, science, smuggling and drone racing.

Drone photography is the capture of still images and video by a remotely-operated or autonomous unmanned aerial vehicle (UAV), also known as an unmanned aircraft system (UAS) or, more commonly, as a drone. Wingspans range from a few centimetres to about 60 metres (200 ft), the size of regular, manned aircraft. Photographers mount cameras on drones for aerial photography.

Quadcopter drone cameras maintain stability, direction, and motion using four rotors; two rotate clockwise and the other two counter-clockwise. A mounted camera sits at the center to take photos and record videos.

They are Tricopter (3 rotors), Quadcopter (4 rotors), Hexacopter (6 rotors) and Octocopter (8 rotors). Out of these, Quadcopters are the most popular and widely used variant. Although easy to manufacture and relatively cheap, multi-rotor drones have many downsides.

Tricopter

Quadcopter

Hexacopter

Octocopter

5 Essential Drone Cinematography Techniques

- Aerial Pan Shot. Pan shots are typically captured while the camera is mounted on a tripod.
- Tracking Shot. Usually used while moving parallel with the subject, tracking shots are choreographed in synchrony
- Pedestal Shot
- Fly Over
- Reveal Shot

Drones are getting less expensive by the day, allowing filmmakers and aerial videography enthusiasts to really get creative with new products.

1. Aerial Pan Shot

Pan shots are typically captured while the camera is mounted on a tripod. In the case of drones, the tripod is replaced by the gimbal, in addition to the moving drone, away from your position. It's quite a bit more complicated than a simple pan, but the visual effect you can achieve is that much better.

2. Bird's Eye view

This classic movie shot gives audiences the perspective of looking down on a subject from above. Although commonly called "aerial views" the incorporation of the drone into video production has increased the number of aerial shots. In terms of drone usage, the bird's eye view is more now primarily associated with shots taken from directly overhead. By positioning the UAV so the camera points straight down, the shot can pan out by gaining altitude or spin by rotating the device. Drone manipulation allows for a great deal of bird's eye interpretation.

3. Tracking Shot

Usually used while moving parallel with the subject, tracking shots are choreographed in synchrony. The whole essence of this technique is matching the speed and being able to maintain focus on your subject at the needed composition point. We see these types of shots in motion pictures all the time, as well as at sports events and in car commercials. The trick here is to coordinate and rehearse as many times as needed. The easy way is to strafe your drone with the controls, with the camera at the same height, distance, and focal length, but you can add more movement if you feel comfortable or if it's necessary.

4. Replacing the Crane

Movie directors love the use of cranes because of the variety of angles and movement they can capture. But drones are proving to be substantially more effective and simpler to operate. Key cinematography techniques drones are stepping into include moving the camera to different high and lows. Also, side-to-side pans are now achieved by maintaining a static altitude, working the drone in a straight line and allowing the subject of the shot to flow through the screen width. Drones have also become the key to establishing shots, which are mainstays in filmmaking transitions and storyline information.

5. Pedestal Shot

This is a type of shot where the drone is flying up or down without moving the camera/gimbal at all, and it's strictly relying on flying. This technique of camera movement can be also achieved through a crane or jib arm, but obviously the range we can get through drones for how far up or down we can go is tremendous and gives us way more freedom. Pedestal shots are used a lot to show statues, monuments, and even views above the clouds. This can be as easy as adjusting your altitude control and going straight up and down, without having to worry about camera movement or focal distance.

6. Fly Over

We see these shots all the time, everywhere from commercials to music videos to TV shows — you name it. An easy way to go about filming a good fly-over shot is to choose one object or specific landscape and focus the whole camera movement around that one subject, while the drone is continuously flying and covering the distance until it passes the object from above. Fly-over shots are used for various purposes, but you can mainly think of it as a type of shot that helps you place the subject in a geographical perspective and show the scale of it.

7. Orbit shots

Because drones are small and easily maneuverable, they've opened up videography to more orbit shots. One of the prominent ones is done by slowly moving toward a subject. Then the drone flies steadily past but the camera remains fixed on the subject.
The shot continues trailing away from the subject but the lens stays fixed. It gives the audience a sense of movement around a subject. Orbit shots can be done in a variety of ways at high or low altitudes. One of the advantages drones provide is that they can be manipulated from a great distance.

8. Reveal Shot

A reveal shot pretty much does exactly what the name suggests. It serves as a technique to reveal the point of our interest or what we want the audience to focus on. It can create a big "WOW" effects and show a specific time of the day, as well as serving as an intro and outro for a specific scene. Start your drone in a spot that's out of view of your subject, then move it until your subject is in view — it's as easy as that! Some classic motion pictures employed a reveal shot to create memorable scenes, such as the opening sequence of Stanley Kubrick's The Shining, which uses these types of shots to introduce us to the infamous Overlook Hotel.

9. Fly-through

Fly-through filming is one of the unique elements that drones have brought to video production. Picture the camera moving through an open window into a home or through the broken rubble of a building. These have dramatic effects and take a considerable deftness at controlling the drone in tight areas. Fly-through shots can also take on the perspective of a diving creature. The UAV can dip to low levels and fly through an area and back up. It's like a hawk swooping down.

3.11 Basic Lighting Techniques in Television

Lighting is essential to enhance the quality of visuals and emotions of any television production. There are differences between studio lighting and ENG or EFP shooting. Studio shooting happens in a set light condition in a studio, and single camera, ENG, or EFP shooting happens outdoor. Therefore the camera / lighting director has to adjust lighting conditions accordingly.

3.11.1 Lighting sources can be divided into two group

1. Hard Light source
2. Soft Light source

Hard and soft light are different types of lighting that are commonly used in photography and filmmaking. Soft light is light that tends to "wrap" around objects, projecting diffused shadows with soft edges, whereas hard light is more focused and produces harsher shadows.

The hardness or softness of light depends mainly on three features of the source: the size of its surface, its distance from the object, and the thickness of its diffusion material. A significant, distant light source with thick diffusion material will produce softer lighting than one smaller and closer to the subject, with thinner diffusion material.

Hard Light source

Hard light comes from a single, usually bright, source, which is relatively small compared to the subject. Photographs taken in such lighting have high contrast and sharply defined shadows. The appearance of the shadow depends on the lighting instrument. For example, fresnel lights can be focused such that their shadows can be "cut" with crisp shadows. The shadows produced will have 'harder' edges with less transition between illumination and shadow. The focused light will create harder-edged shadows. Focusing on a fresnel makes the rays of emitted light more parallel.

The parallelism of these rays determines the quality of the shadows. For shadows with no transitional edge/gradient, a point light source is required. Hard light casts solid and well-defined shadows.

When hitting a textured surface at an angle, hard light will accentuate the textures and details in an object. This will also increase the 3D appearance of the object

Soft Light source

Soft light tends to "wrap" around subjects, producing shadows with smooth, fuzzy edges. The light's softness increases with the light source's size, as the emitted light rays will travel in many directions as they move toward the subject. Light sources can also produce softer light by using diffusion material (like in a softbox) or by bouncing the light off a surface (like with a reflector).

Soft light use is popular in photography and cinematography. By diffusing hard shadows, softening dark areas, and removing sharp edges, soft light produces more flattering images of the human form. Colours may also appear more affluent and more realistic.

3.11.2 Lighting Methods

Though there are differences between different shooting methods of lighting, they can be categorized in the following ways:

Three-Point Lighting

Three-point lighting is a popular method of lighting that utilizes bright lights pointing at the subject from three different angles. By taking advantage of these three angles, you can make your subject look more visually appealing. You can achieve this level of visual quality quickly by using the lighting to take control of shadows being cast on set, thus maximizing depth and detail within the frame. Three-point lighting requires three distinct lights to work; the Key light, the Backlight, and the Fill light.

Key Light (Hard Light source)

The key light is usually the primary source of light on set. Key lights shine directly onto the subject head-on or slightly to the side to create an illuminated shape that will produce shadows. Key lights for three-point lighting need to be set where shadows are cast across the subject from the angle opposite of the key light. This gives you creative control over the lighting aesthetic of the entire image.

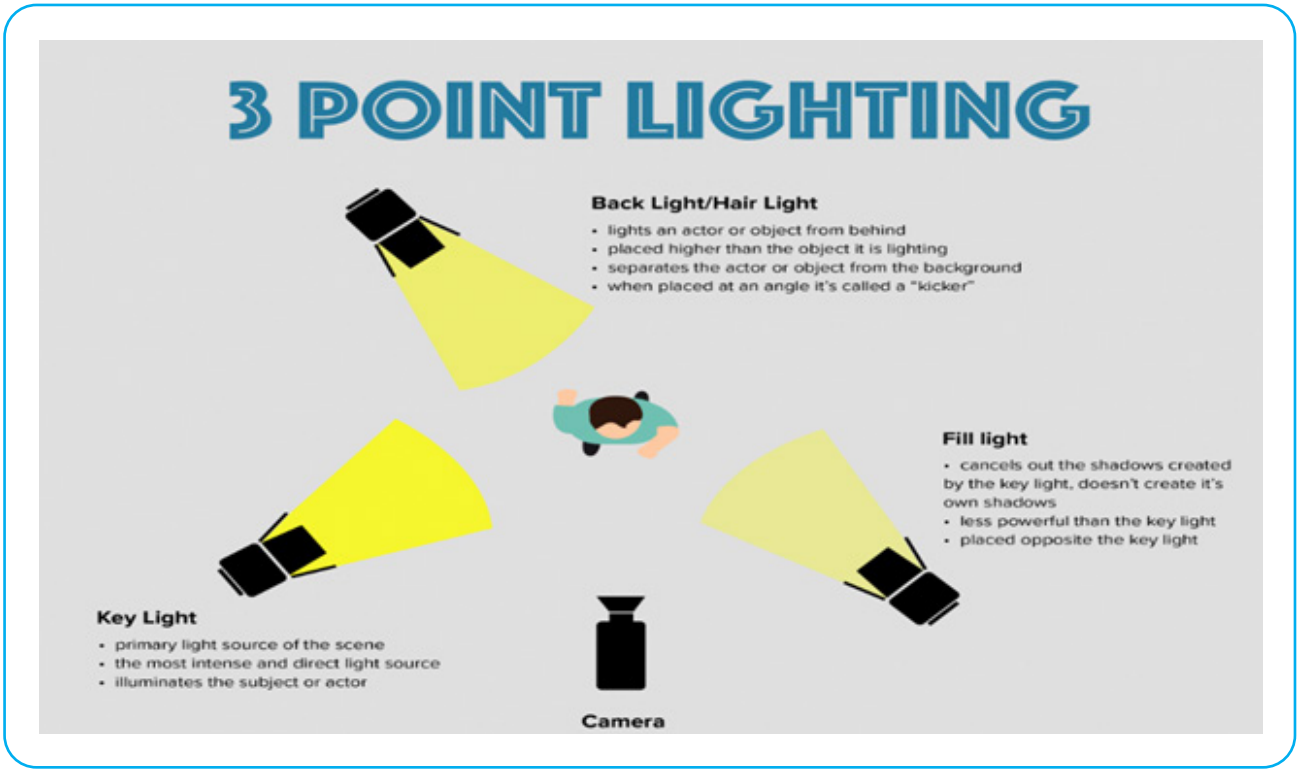
Back Light (Hard Light source)

As the name suggests, the backlight is found behind the subject in-frame to establish a strong outline around them while enhancing their cast shadows. This will give your shot depth, which is an essential factor of three-point lighting. To achieve this, your backlight must have the same intensity of brightness as your key light. A good rule of thumb is to always position lights 45 degrees from both the camera and the subject when angling your lights. This will help you achieve the best lighting quality to support your image detail and depth.

Fill Light / Filler (Soft light source)

For your fill light to properly do its job, the level of brightness it emits should be about half the brightness of the other two lights. Fill lights are soft lights that are not meant to produce harsh shadows like the key and backlights. The point of having a fill light is to illuminate the darker areas in the frame by filling it with light.

This effect will help balance the contrast in the image to produce a more detailed shot of the subject. Ensuring your image has good detail and depth throughout the broadcast is a pivotal aspect of achieving good three-point lighting, and fill lights are undoubtedly integral in providing these qualities.



Four-Point Lighting

Another form of lightning is four-point lighting, which provides an additional light source for the image. This fourth light is a background light, which lives up to its name by illuminating the area behind your subject. This lighting method highlights background scenery and also gives the frame more depth. Whereas the lights in three-point lighting have necessary brightness levels to match, the level of brightness you use in four-point lighting will depend on the specific subject in the frame.

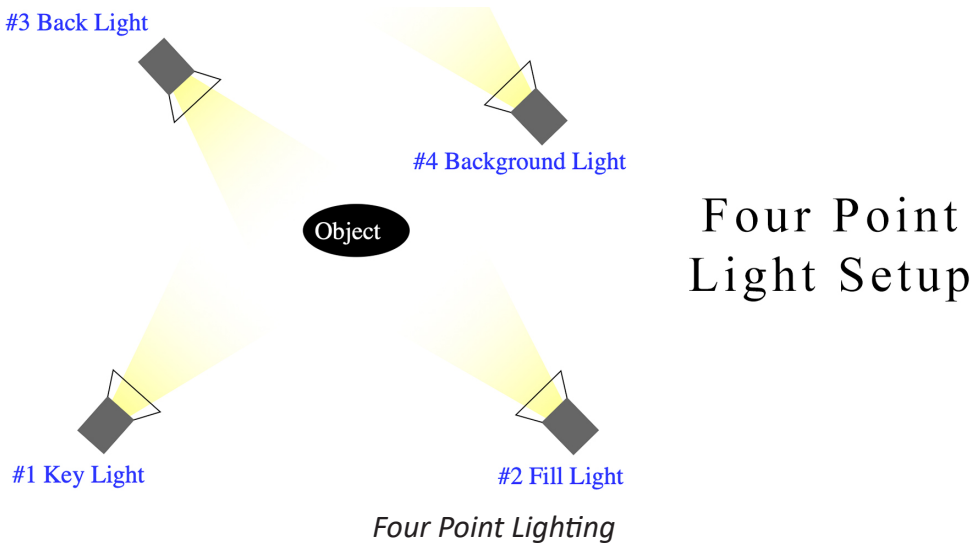
Additionally, if objects in your foreground cast unwanted shadows on your subject, four-point lighting can eliminate that. For instance, you may run into such an issue with the lighting equipment itself. In some cases, lighting equipment itself can cast shadows on the subject, which can be an annoying distraction to your audience. With the help of background light, you can maintain a quality detailed image throughout your shoot.

Background Light

The background light is used to illuminate the background area of a set. The background light will also provide separation between the subject and the background. By adding a background light to a set, filmmakers can add a sense of depth to shots. In film, the background light is usually of lower intensity.

Place your subject at least three inches in front of your backdrop, possibly more depending on if the backdrop is dark, and keep your main light at a higher angle. Evenly illuminate the backdrop by ensuring that the light is at least three stops more elevated than the light pointed at your subject.

Backlight is simply “illumination from behind.” Whatever the subject is, it’s literally taking light and pointing it at the subject from behind. Having a powerful backlight can result in creating a silhouette. Background lighting is using light to illuminate your background.



Four Point Lighting

3.11.3 Lighting Subjects in Motion

If you use either of these methods to light a subject moving across the set during a broadcast, you will need to make some adjustments. If you know exactly where your subject will be moving on the set, you can prepare your lights so that they layer over each other to prevent light dropping from the subject mid-movement. By properly layering the lights, you can keep your subject brightly and consistently lit in front of an audience.

In some cases, your subject might be moving randomly. This is a situation in which a base light can be helpful. You can create a base light by using a floodlight to provide diffused illumination to the entire set. While this can provide more light, it can also, unfortunately, ruin your video quality. In some cases, this method can result in a loss of depth to the shot, so it is not the ideal way to go about lighting your subject.

Some of the key lights used in television lighting are as follows.

HMI lights

Hydrargyrum Medium-Arc Iodide (HMI) lights are the most used type of light on set. HMI lights emit an ultraviolet light with a blue hue. To power up, HMI lights require an electrical ballast. The ballast ignites the metal-halide gas and mercury vapor mix in the bulb.

Tungsram Lights

Tungsten lights have been used to make movies for as long as movies have been made. Tungsten lights are easily recognizable as “movie making lights.”

LED lights

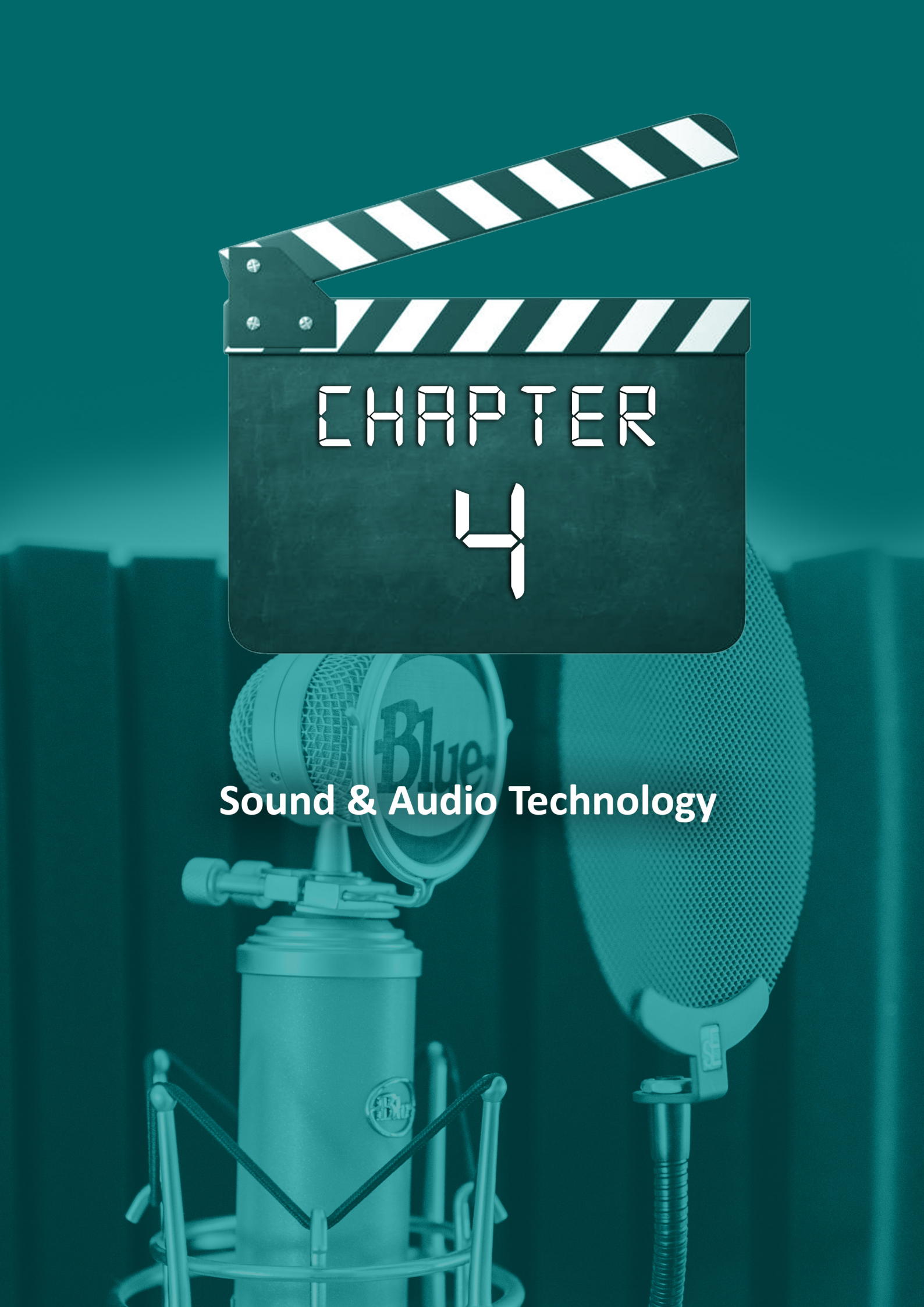
LED, or light emitting diodes, are incredibly simple devices that, as the name implies emit light when an electric current is applied. The idea of emitting light from a solid-state substance has been around since 1907 when British scientist H. J. Round was messing around in his laboratory with silicon carbide which is a crystal.

Kino Flo florescent lights

Kino Flo lighting systems are simply the best fluorescent and led lighting solutions. ... Kino Flo was a game changer in Hollywood when they introduced a flicker free fluorescent that was colour correct in both daylight or tungsten colour temperature.

Question 6

What do you imagine some of the issues could be with using lights on location in a country such as Sri Lanka?



Sound & Audio Technology

Sound & Audio Technology

What is the difference between sound and audio?

The key difference between sound and audio is their form of energy. Sound is mechanical wave energy, longitudinal sound waves, that propagate through a medium causing variations in pressure within the medium. Audio is made of electrical energy, analogue or digital signals, that represent sound electrically.

Question 1

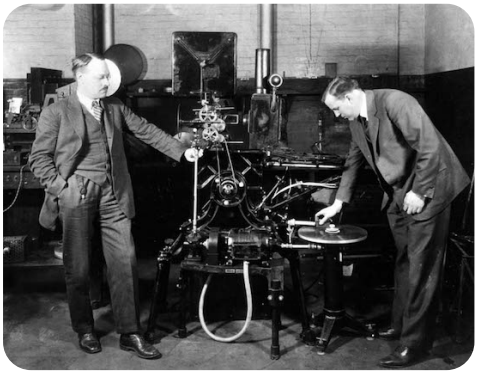
Most people under the age of 40 have only ever experienced audio via digital signals (movies, CDs, MP3 etc). Have you ever head audio presented in analogue (vinyl records, audio tape)? If you have, how would you describe the difference in quality?

4.1 History of Audio Technology in Film and Television

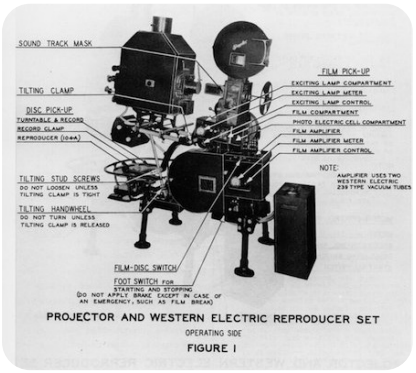
Audio is as important as visuals when it comes to film and television. The early stages of film were silent, and the sound was eventually added with advancements in technology. The importance of sound was felt even during the time of silent films. However, its use was limited due to lack of technology. In the early years of cinema, orchestras played live music in film theatres to compensate for this issue.

Unlike a silent film, a film with sound possesses synchronized sound, or sound technologically coupled to the image. The first known public exhibition of projected sound film tracks can be dated to the early 1900s in France. However, the inclusion of sound only became commercialized decades later. Premiering on the 6th of October, 1927, “The Jazz Singer” was the first feature film initially presented as a talkie. Its production used a “Vitaphone” to add sound, a leading brand of sound-on-disc technology during that era.

The age of sound films moved from the vitaphones to optical sound, marking a revolutionary step forward. An optical sound recording system called “Movietone” was the first to be used for commercial purposes. These optical sound recording systems projected films and also included the audiotape in the film reel. This was a massive transformation from earlier times when sound had to be played on a separate disk.

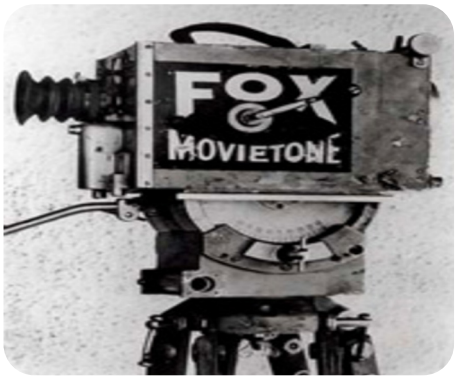


Vitaphone
Sound on disk Technology



Parts of Vitaphone
Sound on disk Projector

Vitaphone
Sound on disk Technology

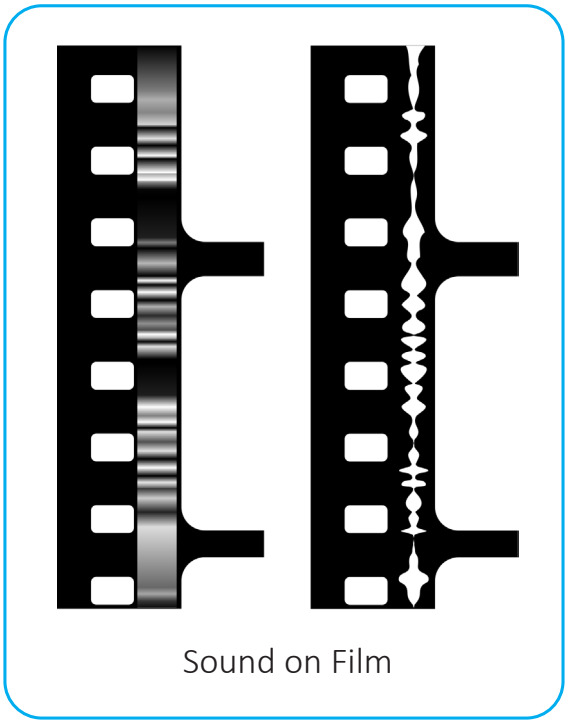


Vitaphone
Sound on disk Technology

4.2 Sound Technology in Film

Two technologies were used to produce sound-on-film:

- Optical sound on film
- Magnetic sound on film



Sound on Film

Optical Sound on Film

The most common method was an optical process whereby a transparent line is recorded along one side of the film.

Magnetic Sound on Film

In the 1950s, magnetic recording became popular. Magnetic sound-on-film had a couple of advantages over optical at the time. Magnetic was stereo, while optical was mono. Magnetic had better sound quality.

4.3 Trends and Developments of Sound Technology

Several milestones can be identified from the time of the Movietone to the present. A few of them are listed below:

- Surround Sound first used with Walt Disney's "Fantasia" in 1941

- Dolby Laboratories introduced Dolby A in 1965 . A significant breakthrough in surround sound came when Dolby Stereo was created. Using a fantastic process called matrixing, Dolby devised a way to use the two optical lines on the film to develop four distinct channels of sound tracks: Left-Right-Center-Rear

- The first commercial use of digital sound on a large scale debuted with " Jurassic Park" in 1993. It is called DTS. DTS uses six tracks: Center-Left-Right-Left surround-Right surround-LFE (low-frequency effects)

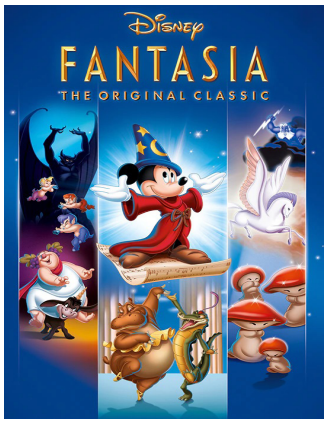
- Quite possibly the most popular of the digital formats are Dolby Digital, which is also known by several other names :

  - Dolby Digital 5.1 (more on 5.1 below)
  - Dolby AC-3 (Dolby's third audio-coding design)
  - Dolby SR-D (Spectral Recording Digital)

  Just like DTS, Dolby Digital uses six tracks: Center-Left-Right-Left surround-Right surround LFE (low-frequency effects)

- The latest entry in cinema digital sound comes from Sony. Sony Dynamic Digital Sound (SDDS) supports increased surround-sound options by offering eight channels of sound:

  - Center-Left – Right-Left center-Right center
  - Left surround- Right surround
  - LFE(low-frequency effects)



Fantasia (1941)
Surround Introduced

Jurassic Park (1993)
First commercial use of DTS

4.4 Main Types of Audio recording Equipment

Human voices, music, and sound effects are the three main types of sound used in films and TV programs. They can be further categorized to be understood in detail: music, dialogue, sound effects, ambient noise, and/or background noise and soundtracks.

Currently, only dialogue is recorded on location, while the other sounds mentioned above are added during post-production/editing. Even then, most films dub dialogue after the scenes have been shot to acquire a better quality in voice delivery.

Audio Recording Equipment

Two main types of equipment are used to record audio on location; the recorder and microphones. But in studio recordings and multi-camera productions, much more equipment is used, including audio mixers and audio video mixers.

During the early stages of sound recording, video and audio were recorded on two separate machines. The camera was connected to the video recording machine through a cable, while the audio cable attached to the microphones was connected to an audio recording machine. Later, technology was developed to have one recording machine recording both videos and audio onto the same video recorder.

When the analog era moved on to the digital age, this technology was further developed. As a result, today, audio recorders can easily transmit the audio clips to the camera without cables, and they are digitally recorded on to video.

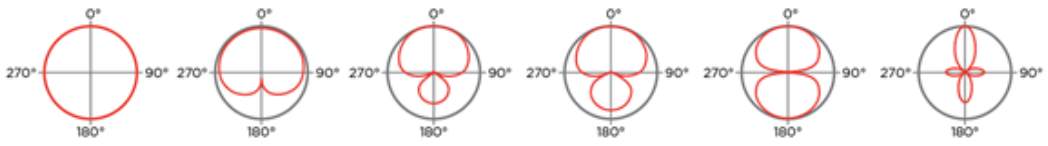
4.5 Categories of Microphones

4.5.1 Six Types of Microphone Pickup Patterns

A microphone's directionality or polar pattern indicates how sensitive it is to sounds arriving at different angles about its central axis. The polar patterns illustrated below represent the locus of points that produce the same signal level output in the microphone if a given sound pressure level (SPL) is generated from that point. How the physical body of the microphone is oriented relative to the diagrams depends on the microphone design.

It is important to choose the correct microphone for your purpose. Learn when to use certain microphones by studying these six essential microphone pickup patterns.

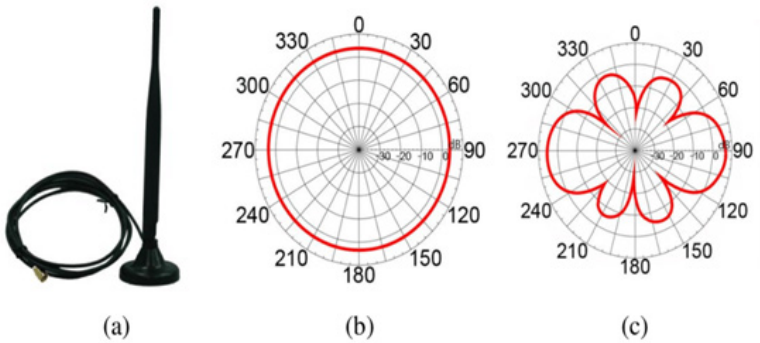
- Omnidirectional
- Cardioid
- Hypercardioid
- Supercardioid
- Bidirectional (Figure 8 Pattern)
- Lobar (Unidirectional)



Pattern	Omnidirectional	Cardioid	Supercardioid	Hypercardioid	Bidirectional	Lobar (Shotgun)
Acceptance Angle [4]	n/a	130°	115°	105°	90°	35°
Maximum Rejection	n/a	180°	125°	110°	90°	30°
Distance Factor [5]	1.0	1.7	1.9	2.0	1.7	3.0

Each and every microphone made today has what is known as a polar pattern, but what exactly is this? Though it may sound a little complicated, a polar pattern simply describes a microphone's inherent directionality. In more specific terms, polar patterns refer to the sensitivity of any given microphone to sounds arriving from different angles, to its central axis.

Omnidirectional Polar Pattern



An omnidirectional microphone has an omnidirectional polar pattern and is equally sensitive to sound from every direction. Unlike their directional counterparts, omni microphone capsules have only one side of their diaphragms open to external sound pressure.

The ideal omnidirectional polar pattern (shown by the darker outer ring of the above(b)diagram) is equally sensitive to sound from every direction. In other words, it has an acceptance angle of 360° about its primary axis, which is shown about the 0° point in the above diagram.

General characteristics and typical truths of omnidirectional microphones

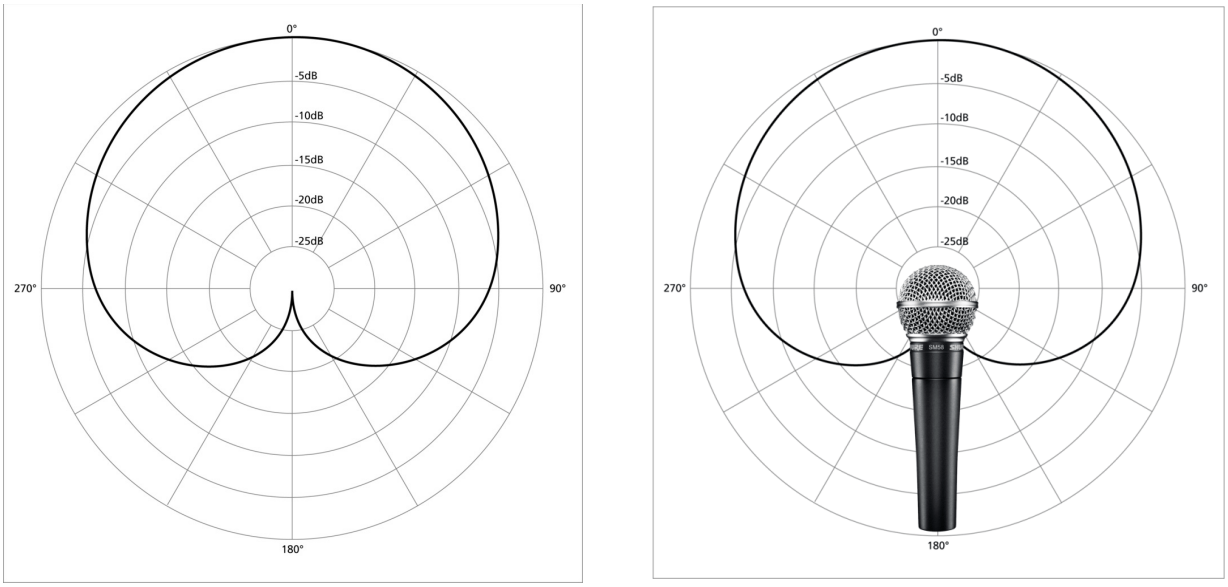
They are equally sensitive to sound from all directions. This is achieved with the pressure principle in single-diaphragm microphones:

- No null points
- No lobes of sensitivity
- Does not exhibit proximity effect
- Resistant to vocal plosives
- Resistant to wind noise
- Most natural-sounding polar pattern
- Prone to feedback (low gain-before-feedback)
- Becomes more directional at higher frequencies (becoming more subcardioid or even supercardioid)
- The larger the microphone body, the more difficult it is to achieve the ideal omnidirectional polar pattern
- Common pattern in top-address pencil, lavalier, handheld, and conference microphones

Best Applications For Omnidirectional Microphones

- When a natural recording is preferred
- On single sources in isobooths to eliminate proximity effect issues
- On single sources in isobooths to rid of vocal plosive issues
- Overhead stereo and surround sound techniques for larger rooms and larger ensembles
- Mono of stereo pair miking techniques to capture more room sound
- Natural pick up for lavalier recordings
- When recording a moving target
- For conference calls
- In intercom systems
- To reduce wind in outdoor ambience recordings
- To help reduce the amount of handling noise

Cardiode Polar Patten



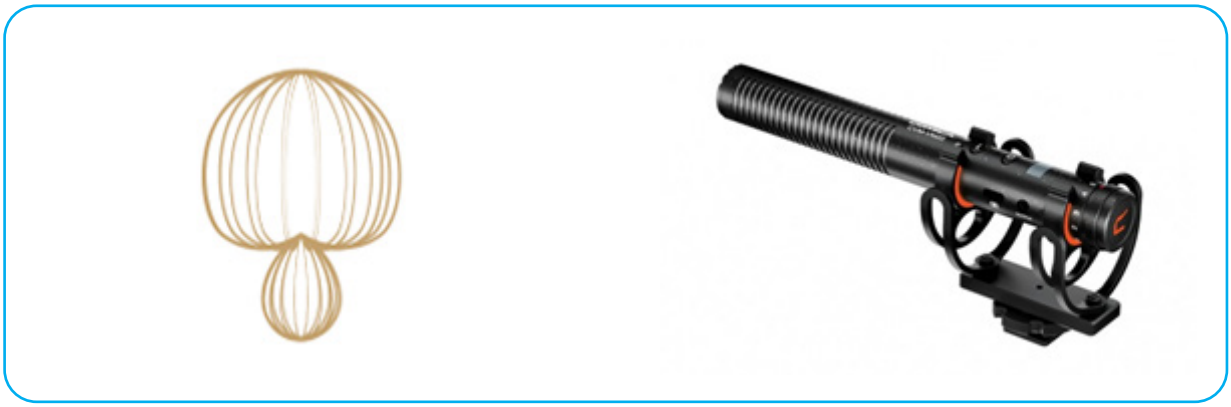
Cardioid Polar Pattern in 3D

Cardioid Microphones are microphones that pick up sounds with high gain from the front and sides but poorly from the rear. Cardioid microphones are named for the fact that their directional sound pick-up is roughly heart-shaped in nature.

The image to the right shows a typical polar plot response of a cardioid microphone. Polar plots show the gain of a microphone for all the various directions that it points to in relation a fixed sound source. The sound source stays in the same position but the microphone is rotated around from 0° to 360°. By doing this test, we can know what gain the microphone records at all of the various directions that it points. A cardioid microphone basically has a polar plot response that is heart-shaped in nature. It picks up sound with high gain, or sensitivity, from the front and sides, but steeply lower when sounds are from the rear.

Cardioid microphones are used in applications where sound needs to be picked up from the front and sides but not the rear. An example of this may be a musical performance where a singer is singing in the front, a band playing instruments on the sides, with an audience of viewers in the back. In a scenario, it may be desired only to record the music, the singer in front and band on the sides, but not the audience in the rear. For this type of scenario, cardioid microphones have great use and applicaton.

Hypercardioid Polar Pattern

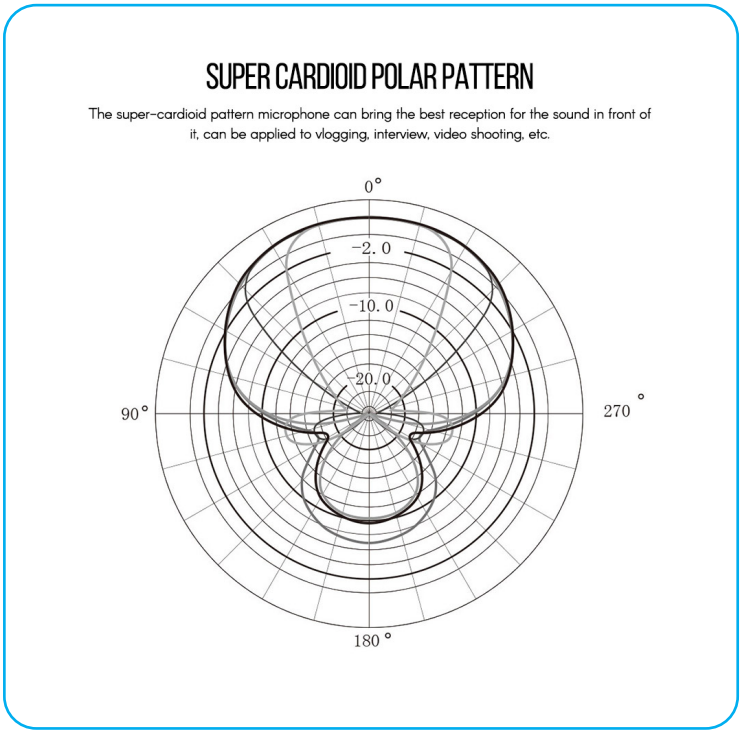


The hypercardioid is an often misunderstood relative of the well-known cardioid microphone polar pattern and is often confused with the supercardioid pattern. Understanding hypercardioid polar patterns and their ideal applications will improve your efficiency both on stage and in the studio.

What is a hypercardioid microphone? A hypercardioid microphone has a very directional hypercardioid polar/pickup pattern. It is most sensitive to on-axis sounds (where the mic “points”) with null points at 110° and 250° and a rear lobe of sensitivity. Hypercardioid mics are popular in film due to their high directionality.

Hyper-cardioid pencil mics are considered the best choice for small indoor spaces. The have better rear axis rejection. They have a smaller profile on the boom pole, which makes them more mobile and able to maneuver into tighter spaces. Best of all they sound better in small reflective rooms because they don’t use interference tubes.

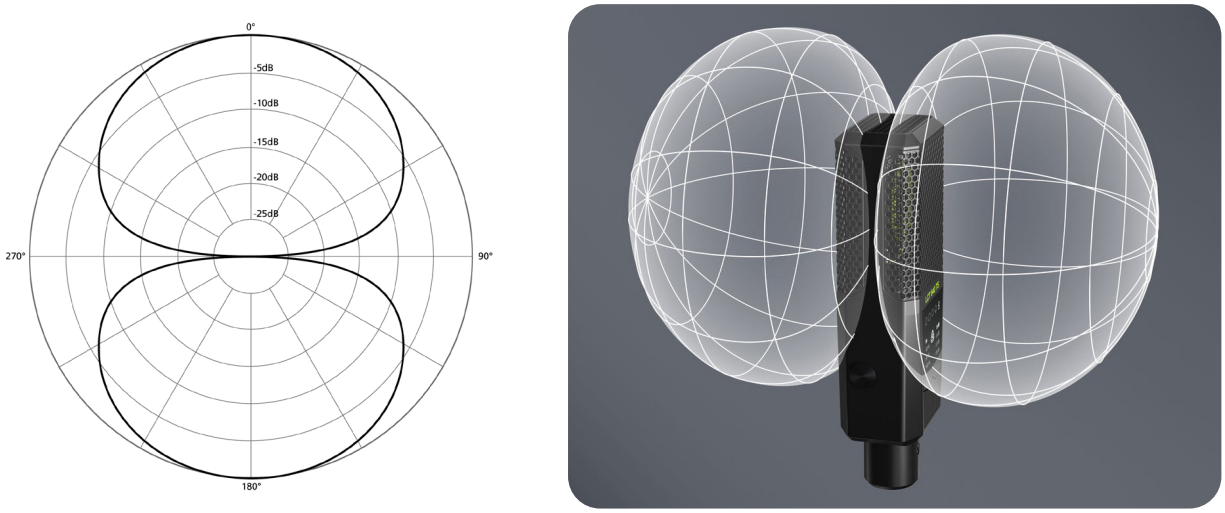
Supercardioid Polar Pattern



A super-cardioid microphone is similar to a hypercardioid, except there is more front pickup and less rear pickup. A supercardioid microphone has a very directional supercardioid polar/pickup pattern. It is most sensitive to on-axis sounds (where the mic "points") with null points at 127° and 233° and a rear lobe of sensitivity. Supercardioid mics are popular in film due to their high directionality.

Shotgun microphones are the most highly directional of simple first-order unidirectional types. At low frequencies, they have the classic polar response of a hypercardioid but at medium and higher frequencies an interference tube gives them an increased forward response. This is achieved by a process of cancellation of off-axis waves entering the longitudinal array of slots. A consequence of this technique is the presence of some rear lobes that vary in level and angle with frequency and can cause some coloration effects. Due to the narrowness of their forward sensitivity, shotgun microphones are commonly used on television and film sets, in stadiums, and for field recording of wildlife.

Bidirectional (Figure 8 Pattern)



A bidirectional microphone has a figure-8 polar/pickup pattern. It is equally sensitive to sounds from the front and back while rejecting sounds from its sides (ring of silence). The sound captured from the front side capture is opposite in polarity to the sound captured to the rear side.

The bidirectional polar pattern (often referred to as figure-8) is symmetrically sensitive to sounds from the front and back while rejecting sounds to the sides. As we can see above, the polar response pattern graph looks like a figure-8.

The bidirectional polar pattern is based on the truest form of the pressure-gradient principle. This basically means that both sides of the microphone diaphragm are equally exposed to external sound pressure.

So a sound wave from the front of the mic would hit the front and then back of the diaphragm the same way an equal sound wave from the rear or mic would hit the back and then the front of the diaphragm.

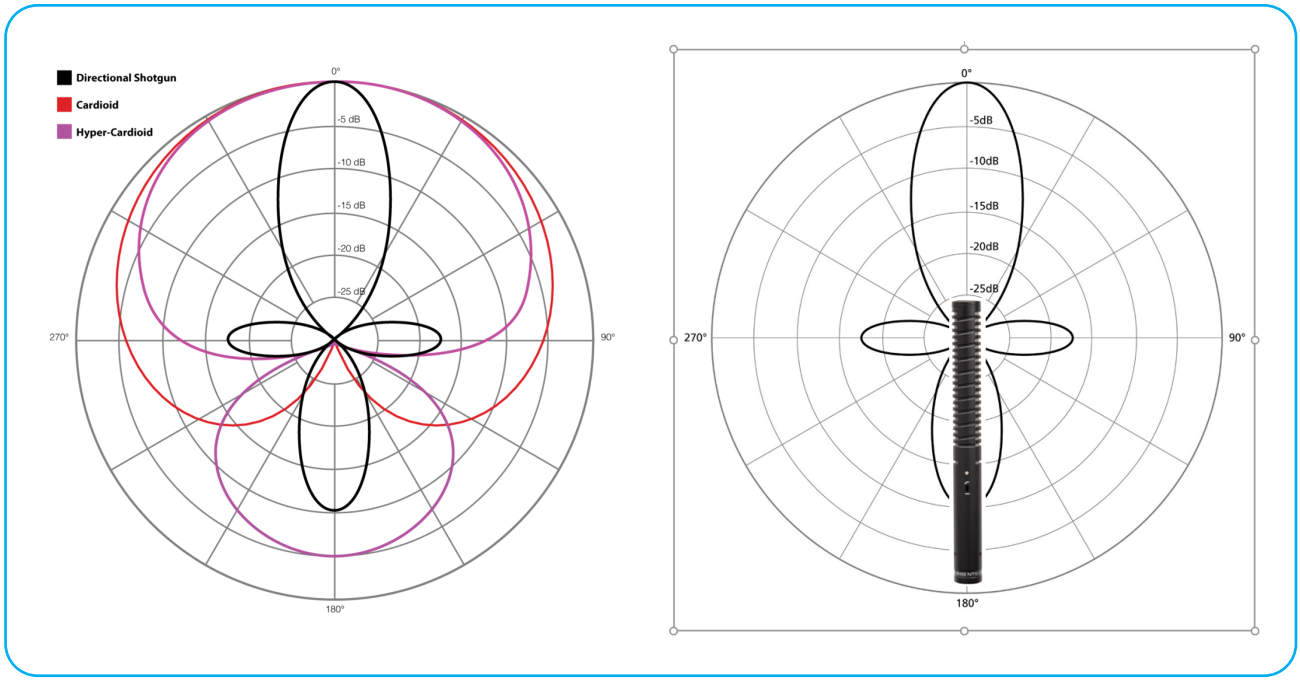
The only difference between the front and back of the bidirectional diaphragm is the polarity of the eventual mic signal. Sounds react with the front of the diaphragm in positive polarity while reacting with the rear of the diaphragm in negative polarity.

Sounds coming from the direct sides of a bidirectional mic (90° and 270° on the polar pattern graph) hit both sides of the diaphragm with equal amplitude and opposite polarity and cancel each other out. This explains the null points and “ring of silence” around the side of a bidirectional mic.

The ideal bidirectional pattern has an acceptance angle of about 120° directly on-axis in the front and back. This means that, ideally, sound will only start dropping off (by about 6 dB) once a sound source is 60° off-axis. This is also where off-axis coloration becomes apparent, and the mic’s frequency response specification becomes compromised.

Lobar (Unidirectional)

“Unidirectional” is just another way to say directional. Like omni, the prefix “uni-” comes from Latin, but it means “one”.



A shotgun microphone has a lobar polar/pickup pattern (an extension of the supercardioid or hypercardioid polar patterns). Interference tubes are placed in front of the diaphragm to achieve extreme directionality. These unidirectional mics generally have small side and rear lobes of sensitivity.

A microphone with a lobar polar pattern has the highest possible directivity. This type of microphone, also named as directional microphone, picks up sound from the top of the microphone. It is an approach to pick up sound from only one direction, very little from the sides, and almost none from the back.

In many situations, a unidirectional mic is actually preferable to an omnidirectional mic, because it blocks out unwanted sound. If you're recording a single person's voice and that is the sole focus, a unidirectional mic will allow you to capture it more clearly. However, if another person on the other side of the room started talking, you wouldn't be able to hear them unless you repositioned the mic. Neither microphone is "better" than the other—they just have different features that perform better in certain situations.

By now you've probably noticed that 'Omnidirectional, Cardioid, Hypercardioid, Supercardioid, Bidirectional (Figure 8 Pattern), Lobar (Unidirectional) ' are not a type of microphone. Rather, these are types of polar pattern utilized by different microphones; that is, the directionality of how a mic picks up sound.

4.5.2 Ten Types of Microphones

There are many different types of microphones. Sound is an amazing thing. All of the different noises we hear are caused by minute pressure differences in the air around us. What's great about it is that the air transmits those pressure changes so well — and so accurately — over relatively long distances.

A microphone wants to take varying pressure waves in the air and convert them into varying electrical signals. There are several different technologies commonly used to accomplish this conversion:

- Liquid Microphone
- Carbon Microphone
- Fiber Optic Microphone
- Dynamic Microphone
- Electret Microphone
- Ribbon Microphone
- Laser Microphone
- Condensor Microphone
- Microelectromechanical Microphone
- Crystal Microphone

Liquid Microphone

Liquid microphones, invented by Alexander Graham Bell and Thomas Watson, were among the first working microphones to be developed, and they were a precursor to what would later become the condenser microphone. Early liquid microphones used a metal cup filled with water and sulfuric acid. A diaphragm was placed over the cup with a needle on the receiving side of the diaphragm. Sound waves would cause the needle to move in the water. A small electrical current ran to the needle, which was modulated by sound vibrations. The liquid microphone was never a particularly functional device, but it makes a great science experiment.

Carbon Microphone

Carbon microphones are some of the oldest microphones. The oldest and simplest microphone uses carbon dust. This is the technology used in the first telephones and is still used in some telephones today. The carbon dust has a thin metal or plastic diaphragm on one side. As sound waves hit the diaphragm, they compress the carbon dust, which changes its resistance. By running a current through the carbon, the changing resistance changes the amount of current that flows. They are still used in mining and chemical manufacturing because higher line voltages might cause explosions.

Fiber Optic Microphone

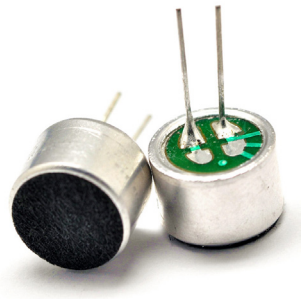
Fiber-optic systems, which use super-thin strands of glass to transmit information instead of traditional metal wires, have been revolutionizing the field of telecommunications in recent years, including microphone technology. Unlike conventional mics, which are often big and send an electrical signal, fiber optic microphones can be extremely small, and they can be used in electrically sensitive environments. They can also be produced with no metal, which makes them very useful in magnetic resonance imaging (MRI) applications and other situations where radio frequency interference is an issue.

Dynamic Microphone

Dynamic microphones are common at live shows. A dynamic microphone takes advantage of electromagnet effects. When a magnet moves past a wire (or coil of wire), the magnet induces current to flow in the wire. In a dynamic microphone, the diaphragm moves either a magnet or a coil when sound waves hit the diaphragm, and the movement creates a small current. This type is best placed close to a vocalist or instrument and doesn't typically pick up sound from more than a foot away.

The modern dynamic mic is what most people probably picture when they think of a microphone, with a slender tubular body and a round recording head on top. They're an extremely common sight at live music shows and karaoke because they bring a balance of reliability, portability and sound quality.

Electret Microphone



Electret microphones are among the most widely used microphones on Earth. Because they're cheap and relatively simple, electret mics are used in cell phones, computers and hands-free headsets. An electret microphone is a type of condenser microphone in which the external charge is replaced with an electret material, which by definition is in a permanent state of electric polarization. They are also useful in documentary and news production, as tiny "lapel" mics which can be discreetly placed on an interview subject's clothing.

Ribbon Microphone

Ribbon microphones sometimes used today when audio engineers want a "vintage" sound. In a ribbon microphone, a thin ribbon — usually aluminum, duraluminum or nanofilm — is suspended in a magnetic field. Sound waves move the ribbon, which changes the current flowing through it. Ribbon microphones are bidirectional meaning they pick up sounds from both sides of the mic.

The RCA PB-31 was one of the first ribbon microphones. It was produced in 1931 and changed the audio and broadcasting industries because it set a new standard when it came to clarity. Several other microphone makers made comparable models, including the BBC-Marconi Type A and ST&C Coles 4038.

These mics fell out of fashion after the early radio days, and were usurped by dynamic and condenser models, because the chintzy ribbon inside made them exceedingly fragile. One of these can easily require repair after one unfortunate bump from a technician. Modern sound studios will still occasionally use ribbon mics when they're looking to record a track with an authentic "vintage" sound.

Laser Microphone

A laser microphone works by capturing vibrations off a plane, like a windowpane, for example, and transmitting the signal back to a photo detector, which converts the reflected laser beam into an audio signal. When sound hits the windowpane, it bends and causes the laser beam to bend, which can be translated to sound using a photocell. In recent years, scientists have been developing a new type of laser microphone that works by streaming smoke across a laser beam that's aimed at photocell, which is then converted to

an audio signal. This type isn't suited for general sound recording, like music, but is great for espionage, as the laser can secretly track sound over extreme distances.

Condensor Microphone

Condenser microphones are mainly used in recording studios. A condenser microphone is essentially a capacitor, with one plate of the capacitor moving in response to sound waves. The movement changes the voltage of the capacitor, and these changes are amplified to create a measurable signal. Condenser microphones usually need a small battery to provide a voltage across the capacitor. Many modern consumer-grade condenser mics can also get their power from a USB connection to your PC.

Condenser mics are often used in recording studios. There are two varieties of condenser microphone: large diaphragm, and small diaphragm. Large diaphragm devices are popular for vocals and instruments with a lot of bass or mid-range sound. While small diaphragm mics are more compact, and pick up higher frequency sounds such as string instruments or cymbals.

Microelectromechanical Microphone

The microelectromechanical microphone (MEMS for short) is an evolution of the electret design, and is beginning to replace it in some cell phones and headsets. The MEMS mic can be made even smaller than electret, at just a few millimeters wide. Within that tiny space is a microchip containing the mechanical sound diaphragm, a capacitor to transfer sound gathered as electrical current, an amplifier to boost that current's signal, and a digital converter to turn it into audio data which can be used by smartphones and computers.

Crystal Microphone

Crystal microphones are used for monitoring and for automotive transmitters and sensors. Certain crystals change their electrical properties as they change shape (see How Quartz Watches Work for one example of this phenomenon). By attaching a diaphragm to a crystal, the crystal will create a signal when sound waves hit the diaphragm. These mics were very cheap to produce, and so found use in budget-friendly applications throughout the 20th century. Their sound quality left a lot to be desired, however, causing them to be replaced by modern condenser and dynamic microphones.

Nowadays, crystal microphones are used mainly for monitoring and for automotive transmitters and sensors. As you can see, just about every technology imaginable has been harnessed to convert sound waves into electrical signals. The one thing most have in common is the diaphragm, which gathers the sound waves and creates movement in whatever technology is being used to create the signal.

Dynamic Microphones

Used for: loud sounds, live instruments/ amps, drums

Pros: cheap, durable, doesn't need a power source

Cons: not very sensitive to quiet or high-frequency sounds

Dynamic microphones are the most versatile and durable. With a dynamic mic, sound waves in the air move a small cone inside of a tight coil of wire surrounded by a magnetic field. It takes a relatively powerful sound wave to move the coil, making dynamic mics less sensitive than condenser or ribbon microphones, but harder to break.

Dynamic mics are good for miking drums, where the microphone is most likely to get hit with a stick, or miking very loud audio like the screaming lead singer of a hard rock band.

4.5.3 Frequently used Microphones in the Field

With a condenser mic, sound waves cause a thin plastic diaphragm to vibrate, and the vibrations are measured by their distance from an electrified back plate. The diaphragm of a condenser mic is much more sensitive than the coil of the dynamic mic, making them ideal for vocals or for capturing a larger frequency range, like the low bass thump of a kick drum. Condenser mics provide clean, clear, accurate sound reproduction, but also some of the durability of dynamic mics, making them highly versatile for professional recording.

There are a number of different directional patterns available. The three most common patterns are omnidirectional, unidirectional, and bidirectional. Omnidirectional microphones have equal response at all angles. Other variants on the unidirectional polar pattern include supercardioid and hypercardioid options. Both patterns offer narrower front pickup angles than the cardioid – 115 degrees for the supercardioid and 105 degrees for the hypercardioid – alongside greater rejection of ambient sound. Additionally, while the cardioid is least sensitive at the rear (180 degrees off-axis), the supercardioid is least sensitive at 125 degrees and the hypercardioid at 110 degrees. When

placed properly they can provide more 'focused' pickup than the cardioid pattern, but they also have less rejection at the rear. If you're using either of these polar patterns on stage with wedge monitors, it's important make sure you avoid placing the wedges directly behind the mic in this instance. Instead, place them either side at the mics least sensitive angle.

Dynamic mics are excellent for recording vocals – everything from podcasting to voiceovers to singing – and work exceptionally well when you're recording multiple people in the same room.
Dynamic mics have a comprehensive, unidirectional pattern of pickup, which means they work almost like a spotlight — point them in a direction to capture sound there, as well as to either side, but not directly behind the mic (which can also work well on interior or action sets).

Condenser Microphones

Used for: quieter more complex sounds with a greater range of frequencies
Pros: sensitive, accurate
Cons: more expensive, more delicate, don't deal well with very loud sounds

The polar pattern of a microphone describes how well the microphone picks up sound coming at it from different directions. In describing microphones by polar pattern we can lump them into three general classes; omnidirectional, unidirectional and bidirectional. Higher end condenser microphones often have switchable polar patterns for various recording purposes, including cardioid, bi-directional, and omni.

Omnidirectional Electret Condenser Microphones: An omnidirectional electret condenser microphone is one in which only one side of the diaphragm responds to changes in sound pressure. In this scenario such microphones pick up sound equally from all directions. The polar pattern then closely approximates a perfect circle. Imagine a group of people sitting around a table and if the omnidirectional electret condenser microphone is placed in the middle of the table, the microphone will pick up the sound equally from each talker.

Unidirectional Electret Condenser Microphones: A unidirectional electret condenser microphone is one which picks up sound waves with high gain from a specific direction. There are several types of unidirectional electret condenser microphones each with a unique polar pattern, with the most common type being Cardioid. Other types of unidirectional electret condenser microphones include sub-cardioid, supercardioid and hyper-cardioid, each with a unique polar pattern. An example of a possible application of a unidirectional electret condenser microphone would be where someone is giving a public lecture and the microphone needs to pick up sound waves received directly in-front of it while rejecting sound waves received from the back or sides of the microphone.

Bidirectional Electret Condenser Microphones: As the name suggests a bidirectional electret condenser microphone picks up sound waves well from either the back or the front and rejects sounds coming at it from the sides. A useful application for a bidirectional electret microphone would be in a situation where two talkers are on either side of the microphone and someone is recording the conversation.

Due to its shallow mass, the diaphragm of a condenser microphone can follow the sound waves more accurately than that of a dynamic microphone with a (relatively) heavy moving coil attached. Also, condenser microphones usually offer much higher sensitivity (i.e., output) and lower noise than dynamic microphones.

If you're primarily interested in high-quality studio mics for podcasts or voiceover work, you'll want to check out condenser mics. Everything about them is similar to dynamic mics, except they're more expensive and deliver more precise single-source audio recordings.

What is the difference between dynamic and condenser microphones?

Put very simply. The difference between a dynamic and a condenser microphone is a dynamic microphone is better for capturing loud, strong sounds (drums or loud vocals), particularly in a live setting, whereas a condenser microphone is used to capture more delicate sounds and higher frequencies (studio vocals for example), particularly in a studio setting. A dynamic microphone also doesn't require power whereas a condenser microphone does.

Lavalier / Lapel Microphones (Dynamic / Condenser)

Lavalier microphones – also known as lapel mics or clip-on mics – are small wired microphones widely used in filmmaking and broadcasting. They are ideal for recording dialogue as they are discreet and unobtrusive and can be positioned close to the mouth while remaining out of sight.

Under normal circumstances, when recording someone's voice in an outside setting the sound quality will not be perfect, so you will only want to rely on getting good audio from the person wearing the mic. That's a significant tradeoff, especially if you can only afford one mic to get and aren't sure how you might use it in the future.

Lavalier / Lapel Microphones

First and foremost, the biggest advantage of using a lavalier mic is that you can place it much closer to the person that you're recording which in most cases is an essential prerequisite for capturing clear and quality sound. Plus, your talent could be moving around freely with a wireless mic attached to his/her clothing while filming without compromising on the captured sound quality. This setup is ideal for shooting walk-and-talk scenes or instructional videos with a small and compact crew when working under tight deadlines.

The main shortcoming of using a wireless lavalier mic, though, is the possibility of wireless interferences that might interrupt your recording, most likely when you're shooting in a dense city environment. Some wireless audio systems employ automatic frequency control to counteract this issue, but it's still a good idea to do a quick sound check before start shooting. Also, bear in mind that most lavalier mics are omnidirectional, which means that even if you mount a lav mic as close as possible to your subject, you could still be picking up distracting and unwanted background or clothes rustling sounds.

Shotgun Microphones (Dynamic / Condenser)

Shotgun mics are the things you see on film sets. The most helpful quality about them is that they can be mounted in various ways (including on a camera), which is a big reason why these are go-to mics for a lot of people.

A shotgun is commonly used in applications where only the sound in front of the microphone is expected to be captured and all other noises to be reduced.

Such scenarios include capturing dialog, talks, or speeches in meetings, conferences, and lectures where the speaker does not need to hold a microphone and speak into it.

Shotgun Microphones with Windshield

Other than microphones, more devices are extensively used in audio recording. The “Boomstick” is one such device used in outdoor audio recordings. The Boomstick and the boom operator are both critical in recording such audios.

The Boomstick and the boom operator

The shotgun mics excel for sound recording due to their more precise pick-up pattern. These are a fantastic option when your talents aren't moving around too much, or you have a dedicated boom mic operator who is able to take care of the sound recording along the way. Even though these microphones have a supercardioid or hypercardioid pattern and provide better quality, you still need to place them as close as possible to your sound source, while trying to keep the shotgun mic out of your frame at the same time.

Another advantage of using a shotgun mic is that you do not have to wire up everyone like you should typically do with a lavalier mic. That's why this type of microphone is the perfect choice for an interview setup with many participants. Plus, with boom shotgun mics you have countless options when it comes to wind control when shooting outdoors. Keep in mind, though that these devices are more expensive and less forgiving than lavalier mics when it comes to improper mic placement.

Question 3

Now you have a lot of information about microphones, have you learned anything you didn't know before? What is the most interesting for you?

4.6 Audio File Formats

An audio file format is a file format for storing digital audio data on a computer system. The bit layout of the audio data (excluding metadata) is called the audio coding format and can be uncompressed, or compressed to reduce the file size, often using lossy compression.

There are so many audio formats in use and most few most famous & popular are listed below.WAV and MP 3 are the most common in Television in Sri Lanka as it supports the most devices .

Uncompressed Audio Formats

Audio File Format: PCM

PCM stands for Pulse-Code Modulation, a digital representation of raw analog audio signals. Analog sounds exist as waveforms. To convert a waveform into digital bits, the sound must be sampled and recorded at certain intervals (or pulses).

PCM is the most common audio format used in CDs and DVDs.

Audio File Format: WAV

WAV stands for Waveform Audio File Format (also called Audio for Windows at some point but not anymore). It's a standard that was developed by Microsoft and IBM back in 1991.

Most WAV files contain uncompressed audio in PCM format.

Audio File Format: AIFF

AIFF stands for Audio Interchange File Format. Similar to how Microsoft and IBM developed WAV for Windows, AIFF is an audio file format developed by Apple for Mac systems back in 1988.

Audio Formats With Lossy Compression

Lossy compression is when some data is lost during the compression process—and compression is important because uncompressed audio takes up lots of disk space.

Audio File Format: MP3

MP3 stands for MPEG-1 Audio Layer 3. It was released back in 1993 and exploded in popularity, eventually becoming the most popular audio format in the world for music files. There's a reason why we had "MP3 players" but not "OGG players"!

Audio File Format: AAC

AAC stands for Advanced Audio Coding. It was developed in 1997 as the successor to MP3, and while it did catch on as a popular audio format, it never really overtook MP3 as the most popular.

Audio File Format: OGG (Vorbis)

OGG doesn't stand for anything. Actually, it's not even a compression format. Instead, OGG is a multimedia container that can hold all kinds of compression formats but is most commonly used to hold Vorbis files—hence why these audio files are called Ogg Vorbis files.

Audio Formats with Lossless Compression

Opposite lossy compression is lossless compression, which is a method that reduces an audio file's size without ANY loss of data between the source audio file and the compressed audio file.

Audio File Format: FLAC

FLAC stands for Free Lossless Audio Codec. A bit on the nose, maybe, but it has quickly become one of the most popular lossless formats available since its introduction in 2001.

Audio File Format: ALAC

ALAC stands for Apple Lossless Audio Codec. It was developed and launched in 2004 as a proprietary format but eventually became open-source and royalty-free in 2011. ALAC is sometimes referred to as Apple Lossless.

4.7 Audio Recording Systems

Single System

When it comes to film and video sound, the first thing to determine is whether to use a single or double audio recording system.

In a single system, audio is captured directly into the camera, and records simultaneously with the image. For a double or dual system, sound is captured independently of the camera and onto a digital audio recorder.

The benefit of a single system is that it does not require audio to be synched up in post-production. This is advantageous in news and documentary formats that often require a quick turnaround of material.

Double System

Double system is ideal if your camera lacks higher-grade audio inputs. But more importantly, a double system delivers stronger audio quality.

One of the ways it achieves this is through a higher sampling rate.

When an analog signal is converted to digital, the curves of the wave signal have to be split into samples. The number of times a wave is sampled determines how accurately the digital conversion matches the original. The more samples taken per second, the more accurate the digital representation.

This process is known as quantization and is measured in kilohertz (kHz). For example, 11kHz would be low-quality sound, and 48 kHz would be the standard for digital sound recording.

Double systems also deliver greater bit depth. This term refers to how many different values of amplitude each sound sample possesses. The higher the bit depth, the more accurate a system can record and reproduce the subtle fluctuations in a waveform. For example, 16 bit audio, which is standard for a digital audio recorder, can capture 65,536 different values of sound. This contributes to the richness and complexity of the sound recording.

Perhaps the most apparent benefit of the double system, is that audio does not have to be tethered to the camera. If you have a project that relies heavily on dolly and steadycam shots, you don't want to risk tripping on excess cables or equipment.

This way, you can concentrate on the image, knowing that the sound design will not be jeopardized.

Whether you're using a single or double system, it's important to identify which configuration is most appropriate for your project.

4.8 Additional Noise to Avoid

Controllable Noise

Controllable noise is interference that can be managed.

The biggest offenders of this type of noise are refrigerators, mobile phones and personal electronics. Make sure all phones and appliances are switched off.

Uncontrollable Noise

As the name suggests, uncontrollable noise originates from forces outside of one's control. This might be a passing car or airplane, or music emanating from a nearby building.

This is where professional headphones come into play. If you pick up some of this unwanted interference, make sure to announce it on set. Wait until the sound ceases, or if it doesn't seem to be wrapping any time soon, move to another location.

A big part of good sound design and sound recording will come by way of an experienced sound operator on set. For this reason it is important to have a dedicated sound person on set.

4.9 Additional Sound Gear

Preamps

Preamps help with the quality of sound. Avoiding noise interference is vastly important in sound recording. This is where a preamplifier, or preamp, is useful.

A preamp is an electronic amplifier that boosts a weak electrical signal into a stronger one. This inevitably makes the signal noise-tolerant and ready for processing into a sound mixer.

A microphone, for example, produces a weak electrical signal. Without the assistance of a preamp, the final signal emanating from the device would be noisy and distorted.

Now, most preamps have a switch where a user can toggle between line and microphone signal options.

A line signal typically comes from the console of a sound mixer or playback device. The audio here tends to be strong, and doesn't require significant amplification.

Microphones are weaker and do require this boost.

An important thing to remember though, is that when you boost an audio signal using a preamp, the noise of the preamp is itself boosted. In the single system in-camera preamps tend to be noisier than their dual system counterparts.

Amplification is important when recording sound. But when using a preamp, it is important to be aware of audio levels and avoid clipping.

Clipping occurs when an amplifier is overdriven, and forced to deliver an audio output that is beyond its capacity. The clipping point is the maximum level of loudness.

Keep at least an 18 decibel (dB) difference between ambient noise and the desired signal. Following this simple rule, will ensure a strong, clean signal when using a preamp.

The importance of audio cables

Audio cables are important when it comes to sound design. They come in two varieties: balanced and unbalanced.

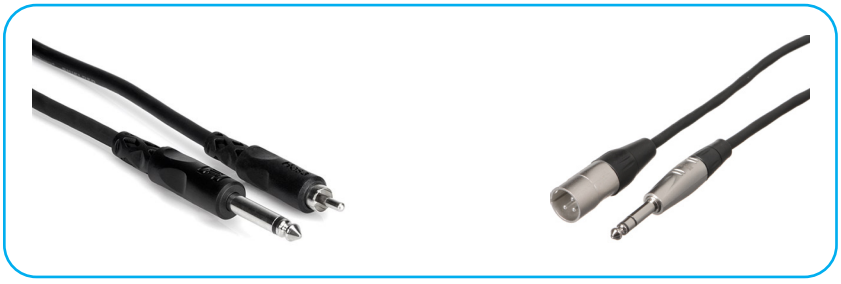
An **unbalanced** audio cable is the simplest, most cost-effective of cables. These devices possess either a mini jack, phono tip sleeve or an rca connector. Most carry a mono audio signal, but there are stereo varieties.

An unbalanced audio cable is comprised of two wires. One wire is a shielding mesh wire known as the ground, which is the zero point for the signal. The other is known as the hot, which is the signal itself. This cable is more susceptible to noise interference and is typically used to cover shorter distances.

For longer distances, the **balanced** audio cable is used. Using either an XLR connection or a tip ring sleeve (TRS), these cables possess three wires instead of two. As with the unbalanced cable, there exists a shielding mesh ground wire and a hot wire. But instead of sending audio down a single wire, it is now being transferred down two wires.

Along with the hot wire, there is a cold wire. When an audio signal reaches the end of one wire, it reverses itself and travels down the other. This process cancels out any external noise or interference that might affect the sound recording.

Because of this, the balanced audio cable can take a lot of strain on set without sacrificing audio quality.



4.10 Usage of Audio Recorders and Mixers

The types of Audio recorders differ from different TV productions or Film production.

For example, in a studio multi-production sound is controlled and mixed using an Audio Mixer Console in the Main Control Room(MCR) or main control unit alongside the Visual Mixer.

Main Control Room of a TV studio

In EFP (Electronic Field Production) TV recordings, an OB (Outdoor Broadcasting bus) is used for audio recording, and audio mixing and the audio mixer console will be placed in the control room of the OB bus.

Outdoor Broadcasting bus

Control room in an OB bus

4.11 Responsibility of Audio Recording and Audio Mixing Personnel

Audio Recordist and Boom Operator

A portable audio recorder is used for audio recording and mixing in single camera shoots. “Recordists” hold different titles such as sound engineer, audio mixer, or sound recordist. This is based on factors like the type of program being shot, the medium-whether film or television, whether it is a studio recording or outdoor recording, and whether it is a live recording or pre-recorded program.

Their responsibilities also differ accordingly. But generally, it is their task to record sounds, handle and manage the required equipment and all other technicalities related to sound recording. They also have a creative responsibility. The audio recordist is entrusted with accurately and creatively recording the sounds of the production. To become a fully-fledged Audio Recordist or Mixer, you will need plenty of technical ability, knowledge, commitment, and talent.

Audio Recordist and Boom Operator

Responsibility of Sound Assistant / Boom Operator

A boom operator (or First Assistant Sound) is a core role in the sound department of a film production, who works with the production sound mixer and utility sound technician. The principal responsibility of the boom operator is microphone placement, usually using a boom pole (or “fishpole”) with a microphone attached to the end (called a boom mic), their aim being to hold the microphone as close to the actors or action as possible without allowing the microphone or boom pole to enter the camera’s frame.

Boom Operators assist the production sound mixer on film and television sets, and operate the boom microphone, which is either hand held on a long arm or dolly mounted (on a moving platform). If radio or clip microphones are required, Boom Operators position them correctly around the set or location, or on actors' clothing. Boom Operators are responsible for positioning microphones so that sound mixers can capture the best quality dialogue and sound effects. If this is done well, a great deal of money can be saved by not having to re-record (post sync) the dialogue at a later stage in the film or television production. Boom Operators are also responsible for all the sound equipment, ensuring that it is in good working order, and carrying out minor repairs where necessary. Boom Operators begin work on the first day of principal photography, after reading the script several times, and familiarizing themselves with the characters and their lines of dialogue. Members of the sound department arrive half an hour before call time, in order to unload and set up all the sound equipment.

Boom Operators are given "sides" (small booklets of pages from the script that are to be shot each day), so that they can memorize all lines of dialogue and anticipate when to move the boom during filming. During the morning rehearsal with the director, director of photography and the actors, Boom Operators carefully note all planned camera movements and lighting requirements, so that they can ensure that the microphone does not accidentally fall into shot or cast shadows. Boom Operators are on set virtually all day, positioned with the camera crew, with whom they must develop good working relationships as they are often asked to move slightly because of lights or camera angles; Boom Operators may also make similar reciprocal requests. They finish work when the film wraps (is completed).

Outdoor

Indoor / Studio

Audio Mixer / Audio Engineer

An audio engineer (also known as a sound engineer or recording engineer] helps to produce a recording or a live performance, balancing and adjusting sound sources using equalization, dynamics processing and audio effects, mixing, reproduction, and reinforcement of sound. Audio engineers work on the "technical aspect of recording—the placing of microphones, pre-amp knobs, the setting of levels. The physical recording of any project is done by an engineer.

Sound engineering is increasingly seen as a creative profession where musical instruments and technology are used to produce sound for film, radio, television, music and video games. Audio engineers also set up, sound check and do live sound mixing using a mixing console and a sound reinforcement system for music concerts, theatre, sports games and corporate events. Alternatively, audio engineer can refer to a scientist or professional engineer who holds an engineering degree and who designs, develops and builds audio or musical technology working under terms such as acoustical engineering, electronic/electrical engineering or (musical) signal processing.

Before the introduction of multitrack recording, all the sounds and effects that were to be part of a recording were mixed together at one time during a live performance. If the sound blend was not satisfactory, or if one musician made a mistake, the selection had to be performed over until the desired balance and performance was obtained. However, with the introduction of multitrack recording, the production phase of a modern recording has radically changed into one that generally involves three stages: recording, overdubbing, and mixdown.

During production dialogue recording of actors is done by a person variously known as location sound mixer, production sound or some similar designation. That person is a department head with a crew consisting of a boom operator and sometimes a cable person.

Audio mixing for film and television is a process during the post-production stage of a moving image program by which a multitude of recorded sounds are combined. In the editing process, the source's signal level, frequency content, dynamics, and panoramic position are commonly manipulated and effects added. In video production, this is called sweetening.

4.12 Sound Tips and Techniques

Sound recording duties on-set

At the start of each take, the first Assistant Director will say, "Roll sound." The sound technician will then press the record button on their digital audio recorder.

Good distances to capture audio

Microphone distance is a vital factor in sound recording. Whether using a shotgun or a dynamic microphone, make sure the device is no further than three feet (1 meter) away from the subject. Remember, closer is always better when building strong sound design. Following this rule will dramatically strengthen your audio quality.

Combat reverb and bouncy sounds

Shooting locations can be unpredictable, especially when it comes to sound recording. One of the most common, and unfortunate side-effects of an indoor location is bouncy sound. To combat this, sound teams have developed a number of practical solutions. Adding soft textile items such as rugs, curtains or acoustic paneling to walls helps to deplete echoes.

Every member of the sound team, from the sound mixer to the recorder, needs to possess a professional pair of headphones. When setting up a location, listen carefully to the space. Then, make a careful determination of whether additional items are required to reduce echo.

Question 4

You have learned that sound is a complex and technical topic. Are you interested in getting more involved with audio at a professional level? Why?/Why not?

Fundamentals and Techniques of Video / Film Editing

Fundamentals and Techniques of Video / Film Editing

The cutting or 'editing' of scenes heralded a new age in film. As shown in earlier chapters, early cinema was made up of uncut scenes, however with the development of film editing a new language or grammar was born.

Directors and critics say that film editing is "the heart of cinema". Dividing parts and re-combining them to create a 'new' look is the basis of film and television editing. Therefore, editing is the primary creative force behind selecting shots and then managing and combining them to elicit cinematic meaning.

Various ideologies and fundamentals exist about film editing. They change according to different beliefs held by filmmakers and the theories that they abide by. Therefore, film editing styles are related to the primary structures in the film upon which filmmakers base their work.

Three main structures that can be identified accordingly:

1. film structures based on montage theory
2. film structures based on collage structure
3. film structure based on long-take film theories.

These structures produce different effects when subjected to editing.

Early Soviet cinema is an example of montage structure. Editing is considered central within its structure. This is because montage technique originates during editing. In contrast, neither collage nor long take-based structures show interest in adding new meanings during editing. Proponents of long takes, especially, considered editing a mechanical treatment that destroyed the essence of cinema. E.g., French New Wave.

This does not mean that structures based on long-takes were devoid of editing; basic editing processes were followed but the long-take always played the dominant role.

5.1 The foundation of Editing

The coordination of shots and the sense the director wishes to achieve can be identified as the foundation of editing. Scenes shot separately are coordinated during editing through what is called “editing joints”. They bear many differences:

- The “direct cut” is what is primarily used in connecting the images. Here “Image A” instantly connects with “Image B”.

- “Fade in, fade out” “dissolve or superimpose,” and “wipe” are among the other editing joints.

These joints are primarily used in between scenes.

Image A is not cut abruptly in all of the above joints but eventually removed and connected to image B. Sometimes, different meanings are implied through the other editing joints. For instance, scenes joined through “fade in, fade out” can indicate time flow between scenes.

Likewise, scenes that connect without changing space can be indicated via time interruption. This joint makes it possible to show the flow of time in scenes in the same space but at two different junctures, thereby flawlessly connecting them and coordinating their sense.

Question 1

Watch a random short video on your smart device for 1 or 2 minutes. What do you notice about the joints between scenes? How do they show the flow of time between scenes?

5.2 Continuity Editing

Continuity editing is the most traditional and classical editing technique in the industry. We already know that a scene is shot as separate, individual shots. It is the editor's responsibility to connect them in a meaningful and coordinated manner.

Smooth relationships between shots and scenes in a coordinated manner is the fundamental of continuity editing. A few of these relationships can be identified as follows:

Continuity in between *Graphic Relations*

The distribution of light and shade, color tones, the direction of movements, shapes, and their solids and volumes are all graphic elements that need to be maintained during editing. Edits should happen based on their graphic elements and other features concerned with connecting those elements to maintain continuity between graphic relations. If these elements do not undergo continuity editing, a mismatch between images will occur.

Continuity in between *Rhythmic Relations*

Two types of rhythms can be identified within an image:

- Physical rhythm based on the visuals (that are eventually connected) and their lengths.
- Internal rhythm based on facts like camera movements and object movements in the shot.

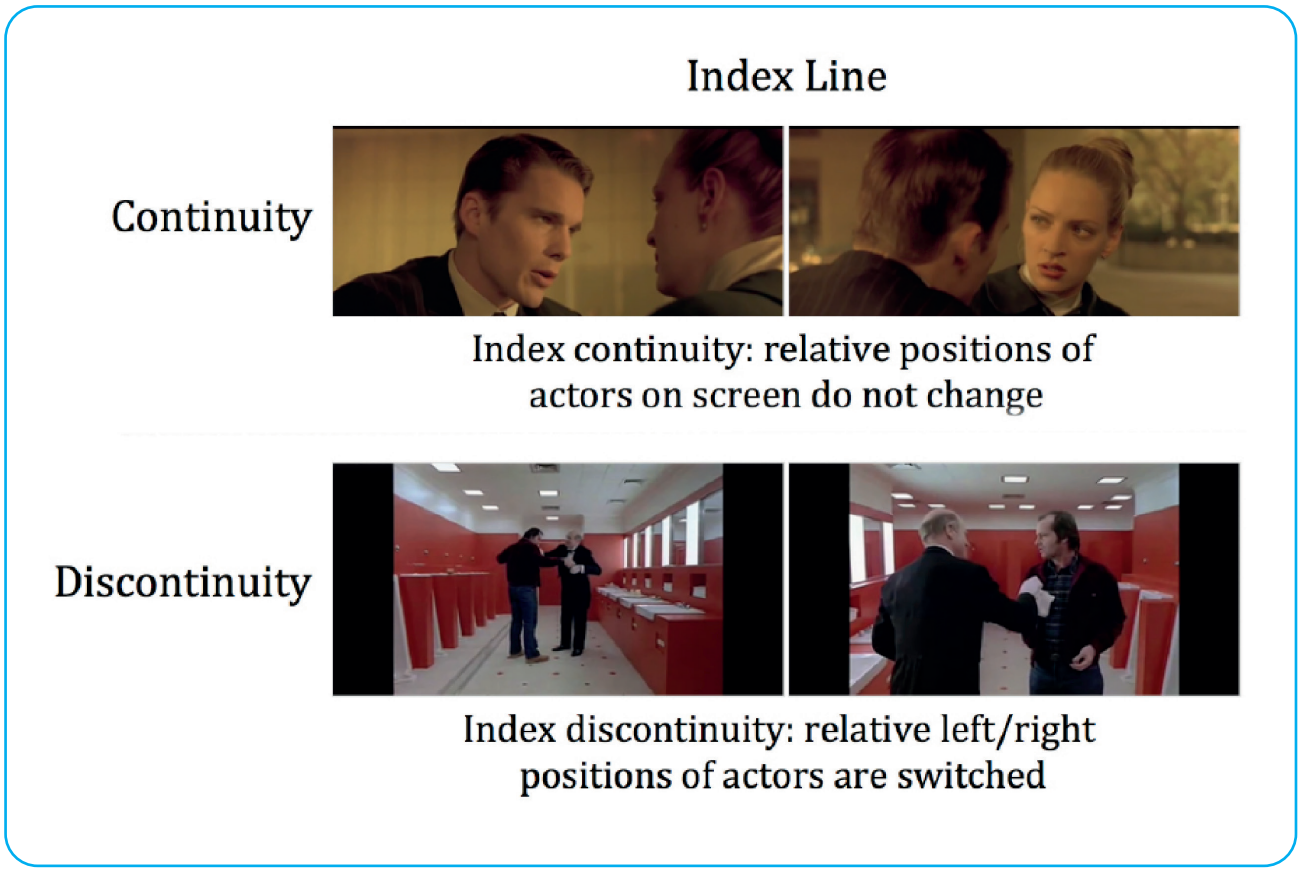
These rhythms can be transformed into a standard rhythm by creating continuity during editing.

Continuity in between *Spatial Relations*

Space is another element that gets divided when images and scenes are shot in part. Therefore, continuity editing is essential to maintain sense and avoid jumps when these separate parts are connected. If continuity editing is not carefully implemented, jumps occur in spatial relations, resulting in an imperfect connection of shots.

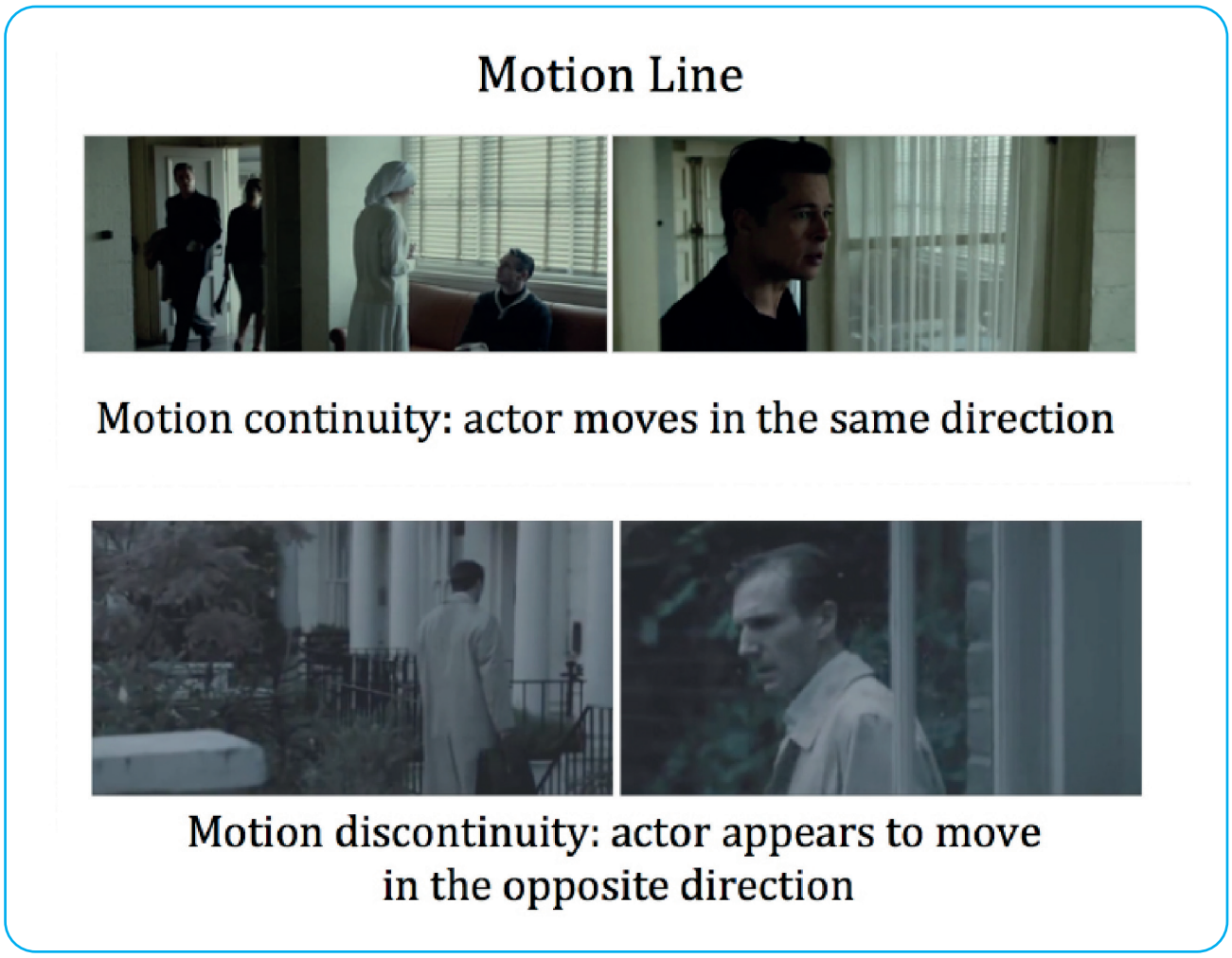
Continuity in between *Temporal Relations*

A story is not always shot in order of beginning, middle, and end, as storytelling is not a task related to shooting scenes. However, narration or storytelling has always been the foundation of expression in film. This is why all genres of movies follow the narrative.



Thus, temporal relations in continuity editing are built upon some narrative rule. The scenes of a film need not always follow the simple law of beginning, middle, and end. Still, despite them being mixed or broken down, a narrative should be maintained in continuity editing. To simplify, the narrative can start in the past and shift between the past and the present, thereby not necessarily following storytelling's beginning, middle and end.

Thus in continuity editing, a transparent order or pattern needs to be maintained so that the difference in its temporal relations makes sense. If this does not occur, there will be a jump in temporal ties, resulting in a loss of meaning.



Continuity relations help the audience maintain spatial and temporal continuity between two shots

Question 2

Why would a director wish to choose to show motion continuity? Why motion discontinuity?

5.3 Fundamentals and Techniques of Continuity

It is necessary to know the fundamentals and technics of continuity editing and shoot accordingly to facilitate a successful edit. As film and television are considered the director's art, ensuring correct techniques during the shoot is their responsibility.

A director who has an intuitive knowledge and understanding of editing will aid the editor in the long run and support the creative process This is why editing should originate at the shooting location itself and not just at the editing table.

180-degree rule

We looked at the 180-degree rule in Chapter 3 of this workbook under Fundamentals of Camera and Lighting Techniques. It is also the main rule for continuity editing. It helps to maintain continuity in space and in every action that takes place within that space.
An imaginative line is the basis upon which continuity is created. Editing needs to be developed based on this line to generate continuity among space and activities, also known as the centerline or axis of action.

Screen Direction

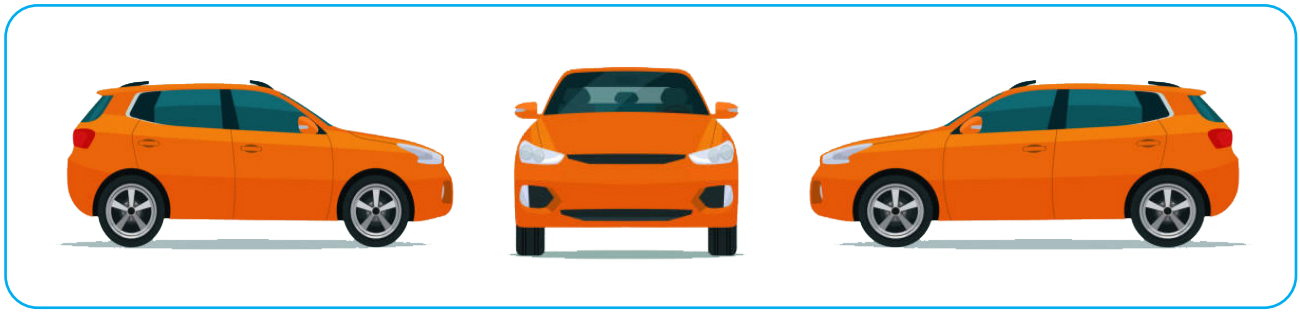
Generally, actions and movements within a frame happen based on a specific direction. So maintaining this direction is a necessity to create continuity in editing. Failing to maintain it can cause jumps to occur when connecting shots as actions and movements seem to happen in opposite directions. Many specific directions are identified in a shot. Let's look at one of them to get a better understanding.

This car is moving from left to the right on the screen. How can we change its direction from right to left without an onscreen jump?

Here it is essential to shoot the front of the car & edit accordingly.

The 180-degree line is the centerline that enables editing to jump from left to right of the car's movement.

Here the shot gets edited in the following order, completing the continuity of the moving vehicle.



5.4 The Classical Methodology of Shot Fragmentation

The main objective of editing is to create a relationship between shots and scenes and establish content through them. Thus, a shot can be considered the primary "cell" in editing while a scene is a "tissue" formed of different cells. Fragmentation of shots is where shots are broken down into parts. As a result, its graphic, rhythmic, spatial, time and audio-visual elements are also broken into parts. Therefore, when creating the whole picture during editing by putting these pieces together, it is crucial to have a specific order that is strived through continuity editing.

In the classical or continuity editing technique, shot fragmentation is primarily based on the "establishing shot."

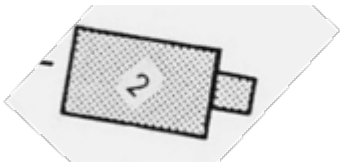
Establishing / re-establishing shots

An establishing shot is a primary shot that undergoes fragmentation. Therefore, it consists of all features that the fragmented shots may lack.

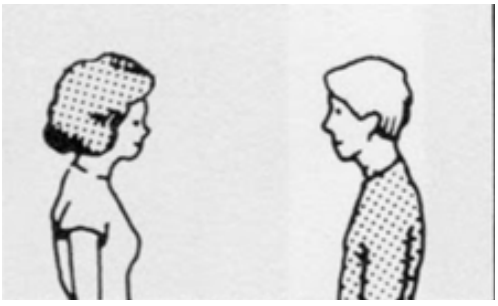
Let's consider the following image of two people talking while facing each other.

Establishing image

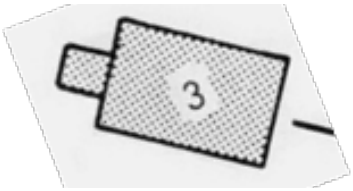
A distant image of X and Y shot through Camera 1.
The image gets fragmented.



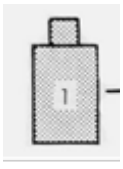
Camera 2



X *Y*

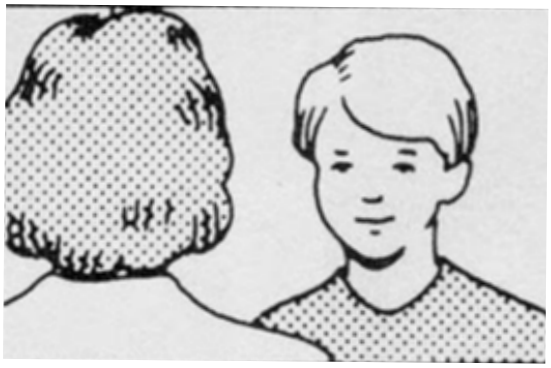


Camera 3



Camera 1

A medium shot of Y shot over the shoulder of X, through Camera 2 and a medium shot of X shot over the shoulder of Y, through Camera 3.



X Y

Shot A (Camera 2)

X Y

Shot B (Camera 3)

Here, the establishing image establishes in the viewer the appearance of X & Y, the actions they do, the space they are in, and any other qualities and features. Even though the fragmentation that follows creates a change within all of the noted elements, it is not felt nor recognized by the viewer because the change happens on the foundation established by the establishing image.

It is suggested in classical theory that the above-noted order in which shot fragmentation happens may exist but is not necessarily needed to abided by. For instance, the fragmentation process can begin from shot fragmentation and arrive at the establishing shot instead of the order discussed in the previous example.

Overlapping Technique

As discussed so far, it is possible to avoid most mismatches between shots using the correct technique of shooting and continuity editing. Yet, they alone are not successful in completely eradicating all mismatches.

For example, a forward jump is created when editing from a long-shot to a mid-shot or closeup. Similarly, when connecting a closeup or mid-shot to a long-shot, a backward jump is created. Different techniques in editing are used to distract the viewer from noticing these issues. The “overlapping technique” is one such technique used in editing.

There are two primary types of overlapping:

- overlapping activities
- overlapping sound

Overlapping action, overlapping movement, and matching actions are all overlapped in the first technique. They are termed differently in editing as “cutting one action,” “continuity on movement,” and “match action cut,” respectively.

As film and television are both audio-visual mediums, editing should consider the audio and visual aspects of a scene.

Sound in cinema or television can be divided into five categories:

- location sound
- dialogue
- sound effects (FX)
- musical score
- foley sound

Location Sound

A production sound mixer, location sound recordist, location sound engineer, or simply sound mixer is the member of a film crew or television crew responsible for recording all sound recording on set during the filmmaking or television production using professional audio equipment, for later inclusion in the finished work.

Dialogue

Dialogue is self-explanatory. It's a conversation between two or more people, and its sound that delivers that conversation. In film, dialogue should be clear, loud, and audible so the audience can understand what the characters are saying throughout the film.

Sound Effects (FX)

Special Effects or FX typically refers to video, camera or animation effects achieved through tricks or technical means. The term is occasionally used in the audio field to refer generally to audio effects such as delays, reverbs, etc.

Musical Score

A film score is original (usually instrumental) music composed and recorded especially for a film or TV production. Written by a single composer, though sometimes more, it is designed to fit the its story perfectly, adhering to a strict timecode.

Foley Sound

Foley sound effects are custom sounds made in post-production. Every sound made in movies, TV shows, and even some video games — from zipping jackets to setting down coffee mugs — was likely created exactly for that specific moment in post-production. These tailor-made sounds are called Foley sound effects. It is named after Jack Foley, the sound effects artists who developed and shaped the technique.

Correctly overlapping the above sounds can distract the viewer from noticing any visual jumps because they will be engaged with a continuous sound.

5.5 Types of Editing

Though once the province of expensive machines called video editors, video editing software is now available for personal computers and workstations. Video editing includes cutting segments (trimming), re-sequencing clips, and adding transitions and other special effects.

Linear video editing uses video tape and is edited in a very linear way. Several video clips from different tapes are recorded to one single tape in the order that they will appear.

Non-linear editing systems (NLE) allow video to be edited on computers with specialized software. This process is not destructive to the raw video footage and is done by using programs such as DaVinci Resolve, Avid Media Composer, Adobe Premiere Pro and Final Cut Pro.

Offline editing is the process by which raw footage is copied from an original source, without affecting the original film stock or video tape. Once the editing is complete, the original media is then re-assembled in the online editing stage.

Online editing is the process of reassembling the edit to full resolution video after an offline edit has been performed. It is done in the final stage of a video production.

Cloud-based editing is the process of utilising the internet to work with content remotely, collaboratively or of a time-critical nature such as editing of live sports events in real-time using video proxies (lower resolution copies) of original material.

Vision mixing is used when working within live television and video production environments. A vision mixer is used to cut live feed coming from several cameras in real time.

What is the difference between video editing and film editing?

Video editors typically work on short pieces, while film editors work with multiple scenes. Video editing positions are often found in a newsroom or at a media production or an advertising company. In some cases, an editor may edit both long-form and short-form pieces on a freelance basis.

Cutting on Action

This is what it sounds like. You cut at the point of action, because that's what our eyes and brains are naturally expecting. When someone kicks open a door, we expect to see the change in angle when the door is kicked, not after it's flown open and swaying for a moment.

Cutaway Shots

Cutaways are shots that take viewers away from the main characters or action. They give extra context to the scene, and can create more tension and foreshadowing.

Cross Cut, aka Parallel Editing

This type of editing is when you cut between two different scenes that are happening at the same time in different places. It can be great for adding tension (heist movies use a lot of parallel editing, like showing someone breaking into a safe while a security guard walks toward their location). The quintessential cross-cut example these days is the movie “Inception”, since there are four levels of (un) consciousness all happening at once.

Match Cut

A match cut is an edit that gives context and continuity to the scene and pushes it in a certain direction, without disorienting the viewer. You use it to either move between scenes or move around a space, while keeping everything coherent. A very basic version is shooting someone opening a door from behind, and then cutting to the opposite side as they walk through it. The most famous examples of match cuts are “2001: A Space Odyssey” and “Lawrence of Arabia”.

Smash Cut

If you’ve got a loud scene that immediately goes to a quiet scene or vice versa, this is where you’d use the smash cut. You want to use it when you’re transitioning between two completely different scenes, emotions, or narratives and you need to make an abrupt transition. This is used when people wake up from dreams, and it’s also used quite often in comedy — it’s also referred to as a “Gilligan Cut,” because the television show Gilligan’s Island often employed this edit. It’s when a character vehemently disagrees or is 100% confident about their stance, and then you cut to them doing exactly the opposite.

Invisible Cut

You can really prove just how creative you are as an editor (or how organized you are in pre-production) by adding some invisible cuts in your video or film. The goal of these types of cuts is to keep the shot looking like one continuous take. You can replicate this by filling the end of one frame entirely with something black or low-lit (or of a similar color in general) and blending it with the beginning of the next clip, or doing something like a whip pan (a staple of Paul Thomas Anderson’s films).

Another way to cWWreate invisible cuts is by using something like a light leak or lens flare, or by using a foreground object to fill the frame and transition to the next clip or scene.

Question 3

Watch a film preview, what Foley Sounds can you identify?

5.6 Alternative Editing Techniques

Continuity editing is accepted as an essential editing technique. However, there are alternatives used in different film genres. It is common to see slight deviations from continuity editing and also accepted to omit elements of it completely.

Use of Jump Cuts and Mise-en-scene Techniques

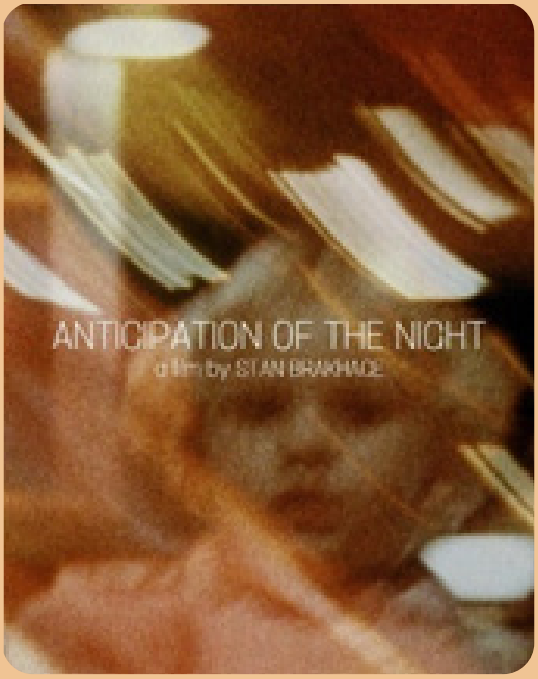
One famous example of this is the cinema of the French New Wave. The jump cut of this movement, discussed in a separate part of this workbook, is an alternative method of continuity editing. It edits in such a way that time and space are jumped. The composition, sets, props, actors, costumes, lighting, and everything else that appears in front of the camera, along with its arrangement putting together, is called mise-en-scène.

The editing points in this alternative method are placed afar from the editing points of the classical editing technique to allow time for the mise-en-scene. This is called the mise-en-scène space in alternative editing.

Use of Graphic Elements & Rhythmic Elements Separately

The relationship between graphics and rhythm is recreated parallel to time and space according to the rule of editing. Therefore, narrations are created based on this relationship between graphics and rhythm. Yet, they act differently when used as individual entities.

Stan Brakhage's "Anticipation of the Night" (1958), "Western History" (1971), Bruce Conner's "Cosmic Ray "(1961), and" Report" (1967) are famous examples of films that have used these alternative techniques of editing. Likewise, single-frame films that only used the technique of rhythmic connection to shots are Robert Breer's "Fistfight" (1964) and Peter Kubelka's "Schwechater" (1958).



Stan Brakhage's
"Anticipation of the Night" (1958)

Bruce Conner's
"Cosmic Ray " (1961)

5.6.1 360 Alternative Rule in Alternative Film Making

We have discussed how the 180-degree line acts as the axis of activity in continuity editing. It also acts as the centerline of editing. The 360 alternative technique replaces this axis. Here, the middle axis of a 360-degree circular space is considered the axis of activity.

Continuity is not observed within this technique, and its directions are asymmetrical. While the spatial relations are also asymmetrical, even the positioning of the eye and its relationship to its point of view are opposed to each other.

Yasujro Ozu's
"Early Summer" - 1951

Yasujro Ozu's

Jacqves Tati's
"Mr. Hulot's Holiday" - 1953

Jacqves Tati's
"Playtime" - 1967

Jacques Tati's "Mr. Hulot's Holiday(1953)", "Playtime"(1967), and Yasujro Ozu's "Early Summer"(1951) are great examples that show meaningful usage of these alternative editing techniques.

5.7 Evolution of Editing Technology

During its analog era, film was shot in positive celluloid and then developed into a negative reel in laboratories. The digital revolution changed film production in many ways, including editing technology. Before the dawn of non-linear editing, film editors used machines such as Moviola or the Steenbeck, now referred to as "old school film editing machines." These editing machines were required for any film shot in 8mm, 16mm, or 35mm. Before actual editing, laboratory processing of the exposed film negatives was required, called the workprint.

Today, editors use computer software for film and television editing in the digital era. The editing process in this technology is digital and computerised whereas, previously, it required a manual process wherein each shot in the film had to be physically cut and spliced to be edited accordingly.

When putting transitions and even the most basic visual effects, the film had to undergo additional processes. Such requirements entailed complicated procedures and very high cost, unlike using video editing software where simple graphics, transitions, and visual effects can be done in a few clicks without incurring additional cost.

Working on a Steenbeck editing bench

5.7 Non-linear Editing Software

Question 4

Which editing software do you know? What are its advantages and disadvantages in your opinion?

Nowadays, the technology of film and television is digital and it uses computer software such as Avid, Final Cut Pro & Adobe Premiere, etc.

Avid Media Composer

Avid Media Composer is a film, and video editing software application or non-linear editing system (NLE) developed by Avid Technology.

Initially released in 1989 on Macintosh II as an offline editing system, the application has since evolved to allow offline and online editing, including uncompressed standard definition (SD), high definition (HD), 2K, and 4K editing and finishing. Since the 1990s, Avid Media Composer has been the dominant non-linear editing system in the film and television industry, first on Macintosh and later on Windows.

Key features

Animate

3D Warp

Paint

Live Matte Key

Tracker / Stabiliser

Timewarps with motion estimation (FluidMotion)

SpectraMatte (high-quality chroma keyer)

Color Correction toolset (with Natural Match)

Stereoscopic editing abilities (expanded in MC v6)

AMA - Avid Media Access can link to and edit with P2, XDCAM, R3D, QuickTime, and AVCHD native material directly without capture or transcoding.

Mix and Match - put clips of any frame rate, compression, scan mode, or video format on the same timeline

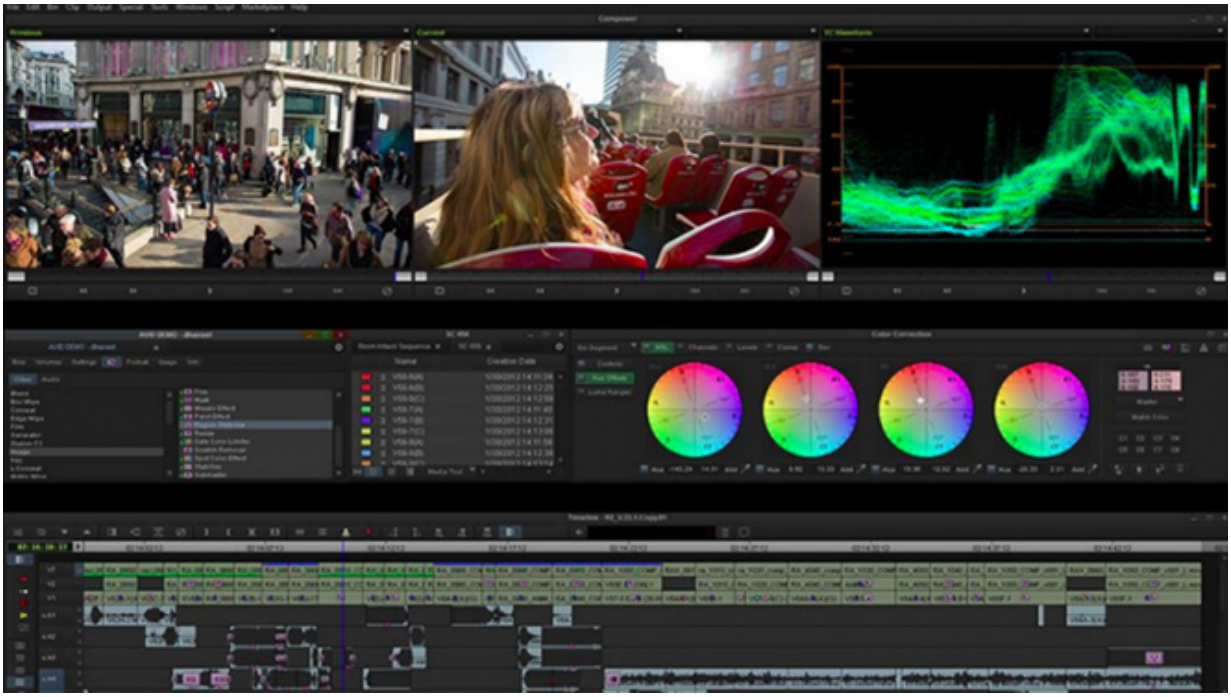
SmartTools - drag, and drop style editing on the timeline, can be selectively adjusted to the types of actions that the user wants to use when clicking on timeline.

RTAS - (RealTime AudioSuite), support for real-time track-based audio plug-ins on the timeline.

5.1 and 7.1 Surround Sound audio mixing, compatible with Pro Tools

PhraseFind - analyses clips and indexes all dialog phonetically, allowing text search of spoken words. (reacquired as of 8.9.3)

ScriptSync (with Nexidia phonetic indexing and sync) (reacquired as of 8.9.3)



Final Cut Pro

Final Cut Pro is a series of non-linear video editing software programs first developed by Macromedia Inc. and later Apple Inc. The most recent version, Final Cut Pro 10.5.4, runs on Mac computers powered by macOS Catalina 10.15.6. The software allows users to log and transfer video onto a hard drive (internal or external), where it can be edited, processed, and output to a wide variety of formats. Apple introduced the entirely rewritten Final Cut, Pro X, in 2011

Since the early 2000s, Final Cut Pro has developed a large and expanding user base, mainly video hobbyists and independent filmmakers. The software gives powerful tools to the hands of editors to enable them to create stunning videos. These include filters, motion graphics, special effects, and more.Final Cut Pro also supports 360-degree video editing for VR and real-time VR headset playback to see how the modifications work in their intended environment.

Moreover, Final Cut Pro is built on state-of-the-art computing architecture that allows it to leverage the powers of the latest CPUs and graphics processors that run on the latest Mac machines. This way, users can edit videos smoothly and speedily.

Adobe Premiere Pro

Adobe Premiere Pro is a timeline-based video editing software application developed by Adobe Inc. and published as part of the Adobe Creative Cloud licensing program. First launched in 2003, Adobe Premiere Pro is a successor of Adobe Premiere (first launched in 1991). It is geared towards professional video editing, while its sibling, Adobe Premiere Elements, targets the consumer market.

Key features

Simultaneous Projects
Motion Graphics Templates
Shared Projects
VR Editing
VR Rotate Sphere
VR Audio Editing
Effects
Video Titling & Graphics
Transitions
Regional Closed Caption standards
Labels
Lumetri Support
Type Tool
Libraries
Multiple Video Types
Direct Publishing
Multiple Formats Support

Scriptwriting and Content Development

Scriptwriting and Content Development

Chapters 1 to 5 demonstrate how image is at the centre of everything to do with television and film. However, they both require literature and creative writing to form their structure.

The intention and structure of writing something to be read as opposed to something to be watched are fundamentally different. A screenplay acts as the foundation of a film, television program, or teledrama, with only slight variations in its structure and approach made to suit each category.

Classical Screenplay Structure

Scripts are traditionally divided into three main categories, namely:

1. Literary scripts
2. Technical scripts
3. Shooting scripts

Question 1

Do you enjoy reading? Do you enjoy writing? Why?/why not?

6.1 Literary scripts

Literary scripts are not written to be read like other forms of literary texts. Instead, they tend to express ideas and concepts through images since their purpose is to be visualized.

It is also important to note that shot breakdowns do not occur in literary scripts they usually follow a unique structure where the sounds and visuals are written separately. Here descriptions of the images are written on the left side or at the top of the page. Descriptions of audio or sounds for the script, including dialogue, is written on the right or underneath the specific line of text.

6.2 Technical scripts

Technical scripts are different from literary scripts mainly because they include suggestions of a technical nature that are absent in the latter. These are connected to structural and design elements of the production.

The suggestions could be directed at any part of the production process, such as camera, acting, editing, makeup, creative direction, or music.

Example for technical script

Film: Sevan samurai (1954)
Written by: Akira Kurosawa, Shinobu Hashimoto & Hideo Oguni
Director: Akira Kurosawa

Akira Kurosawa 1910 – 1998
Legend in Asian Cinema

"Sevan Samura"i - 1954

"Seven Samurai" – On location

"Sevan Samurai" - 1954

Film Script - Sevan Samurai
Scene 1

Credits fade in and out, white on black, with music associated with the bandits over drums, gongs, and bassoons.
After the credits, a title.
Title: The Sengoku Period was a time of civil wars; it was a lawless era and in the country, the farmers were at the mercy of bands of brigands.
Title: Around the time of the St. Bartholomew Day Massacre in France, Japan was in the throes of the Civil War.
Title: And the farmers everywhere were being crushed under the iron heels of cruel brigands.
Dissolve into a long shot, looking across a grassy, rolling plain to the horizon with the dawn sky above. Bandits appear on horseback on the horizon and ride across towards the camera, which pans as they pass Medium shot of one of the bandits galloping past, camera panning left with him; hold as the others gallop past after him.
Long shot of the bandits galloping across the frame, silhouetted against the sky. Pan left, then held as they passed.
Very long shot of the bandits galloping up a slope against the sky.

Quick dissolve to a medium shot looking along a path; the bandits ride up in the foreground and turn, going away up the path.
Medium shot of another part of the countryside with grass and trees in the foreground. The bandits gallop past in the background. Pan left with them as they gallop up an incline.
Dissolve to a high-angle medium shot of the bandits, seen from behind, where the roofs of houses can be seen. They move forward slightly to get a better look.
Medium close-up of the BANDIT CHIEF and his CAPTAIN

CAPTAIN

We'll take this place next.

High-angle long shot looking down onto the village. It is
peaceful and quiet. Smoke drifts up from one or two chimneys.
The bandits agree noisily, off.
Low-angle medium close-up of the CHIEF on his horse, with the
horse's head nearest camera.

CHIEF

We took it last autumn. They
haven't got anything worth taking
yet. Let's wait.

As he speaks, he has difficulty in controlling his horse,
which swings round and round,
Low-angle medium close-up of the CAPTAIN on his horse,

CAPTAIN

All right. We'll come back after
the barley harvests.

He turns his horse.

6.3 Shooting scripts

Shooting scripts are a combination of Literary and Technical scripts. However, this does not mean that a literary or technical script is mandatory to form a shooting script; there are instances where shooting scripts are created anew.

Question 2

Is there a movie or TV show screenplay that you have particularly enjoyed (i.e. you have enjoyed it because of the quality of the writing)? Why?

6.4 Directors approach towards scripts

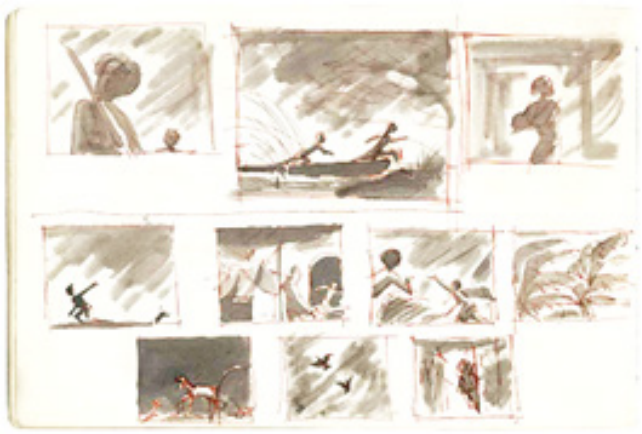
Despite these approaches to scriptwriting being termed traditional or classical, they have gone through many novel changes over the years. A majority of writers have therefore adapted and added new elements to the existing scriptwriting processes and helped in the evolution of its structure and methods used. Some have even wholly revolutionized the concepts by straying entirely from the set rules to create new ones. The main reason behind all these changes and developments happens to be the practical and creative needs of the writer or the director.

Based on differences in their creative approaches, directors can be divided into two major categories.

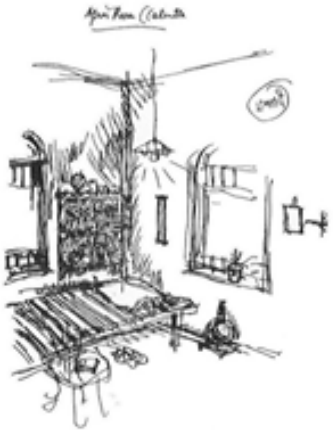
The directors who work according to set rules and regulations which do not stray from their original plan can follow the traditional approach, the "Classical Screenplay Structure" discussed above.

Their primary weapon or tool becomes the camera, and it allows them to progress as planned because the camera collectively controls everything. Therefore, they need to plan everything from the images shot, the motion of the camera, the position of the actors/actresses to backdrops.

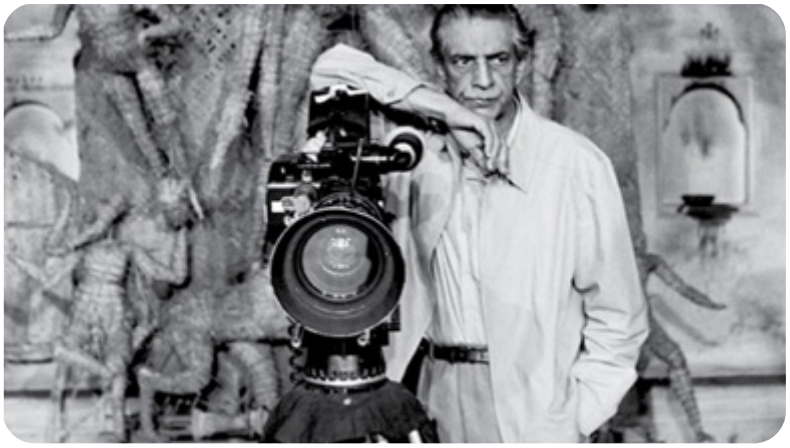
Therefore, a script is vital to this approach as all technicalities can be entrusted to it. Sergei Einstein and Satyajit Ray are directors who famously followed this approach. They paid so much attention to detail that they even drew the picture frames to be recreated on stage. One such example is shown below where Satyajit Rai has visualized and drawn shots for his film "Pather Panchali" – 1956 and sketched Apu's room in Calcutta for his film "World of Apu" – 1959



Drawings by Ray for "Pather Panchali"



Sketched by Ray for "World of Apu""



Satyajith Ray 1949-1992
A pioneer of Asian Cinema

"Pather Pancahali" - 1956

"World of Apu"

The second set of directors differ from the above by paying less attention to the script. For them, the screenplay is most often a simple sketch used to help form their creation. Systems, rules, structures, and traditions are not essential to these creators as they never want to be framed within the traditional production process. They value their independence in creation, but their production and thinking do not revolve around the camera. Instead, their developments in production occur within the scenes as they are being shot.

The scant value given to the script among these directors is exemplified through moments where the sketch has been paid zero attention.

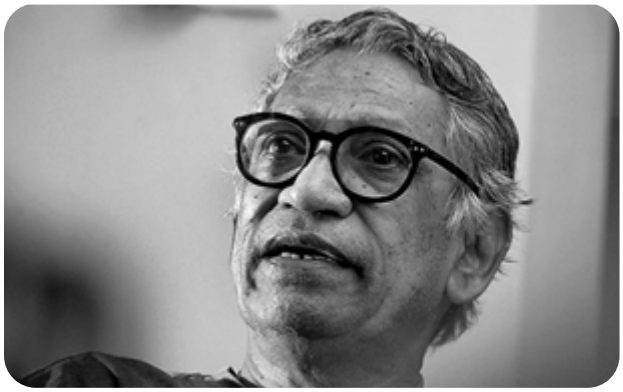
For instance, "Breathless" by Jean-Luc Godard is said to have been produced in the complete absence of a script. A newspaper article about a murder was the only document in his possession that had any relation to the development of the story as it was shot.

"Breathless " – 1960
One of the top films of French New

Jean-Luc Godard -
French-Swiss film director/ a legend of
"French New Wave "Cinema movement

Dharmasena Pathiraja's "Ahas Gauwa" bears similarities to this type of script-less creation as he developed the story based on a sketch.

"Ahas Gawwa"- 1974



Dharmasena Pathiraja 1943 - 2018
Pioneer of realistic cinema movement of
Sri Lankan Cinema

However, the value of a script depends not on the type of approach used but on the impact that the chosen method has on the creation.

6.5 Scripts vs. internal features of a creation

The screenplay acts as the nervous system of a film because it connects to the external features of production, such as its appearance. It is also promotes internal features directly related to the fundamental ideologies the film is based upon. Below are a few of the most important of these elements:

1. Narrative structure
2. Characters and character development
3. Dialog writing
4. Development of content
5. Creative approach and view

Narrative Structure

"Narration" is where the "plot" and the "story" meet. The story can be defined as what is being narrated, while the plot is how it happens.

Though experiments have been made in cinema to produce without a story, plot or narration, cinematic creations have not achieved complete separation from narration up to date.
This is because the timing and spacing of any film or teledrama are controlled by the narration that comes in the screenplay/script.

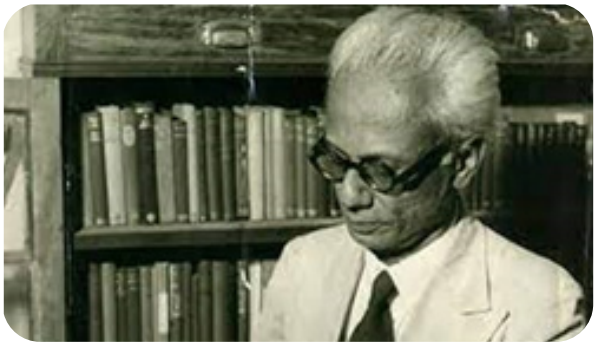
Characters and Character Development

Characters and character development play a significant role in the story and plot. Here, the screenplay acts as the basis of their creation, where their nature, behavior, and expressions are all developed. Thereby the script assists the director in recreating these characters as they are on stage.

“Gamperaliya” Film - 1963
Piyal & Nanda

“Gamperaliya” Film - 1963
Muhandiram Kaisaruwaththe,
Muhandiram Hamine,Anula & Nanda

Dr.Lester James Pieris 1956 – 2014
Father of Sinhala Cinema



Martin Wickramasinghe 1914 – 1976
Father of modern Sinhala literature

Dialog Writing

Dialog creates the basis for the characters and the clashes between them, it helps them communicate and express themselves. It also assists in carrying out the general message of the film by developing its story and plot.

Ajith Thilakasena
Pioneer in modern Sinhala litreture/ Script writer
"Para dige" film

Dhrmasena Pathraja's
"Para dige" film - 1981

Ashoka Handagama
Pioneer Film / TV Director/Script Writer of the new generation

"Diyaketa Pahana" Tele Drama -1997
Deepthi & Nimali

Development of Content

Another element based on the screenplay is content. The content is what the director wants his creation to express.

Creative Approach and Vision

The screenplay provides the director with resources to recreate his vision of the world, life, or a particular concept that he has in mind. Therefore, his creative approach and vision are also supported by the script.

Question 3

As a writer, do you imagine it would be more satisfying to write for TV or Cinema? Why? What are the differences between writing a novel & writing a film or TV script?

6.6 Writing for Television

So far, we have looked at the features of cinematic screenplays. Can these cinematic elements be modified to suit television? If so, how?

It is possible to apply structural aspects of a film script to some genres that appear on television, such as teledramas. However, it cannot be done with all television programmes.

This is because the content written for television is most often customized to match a television programs' objectives which are often different from that of cinema.

The Structure in Writing for the Television

Content written for television differs from programme to programme.

For instance, a live program's structure and content are different from that of a pre-recorded programme. Similarly, a programme shot in a studio is differently structured to that of a programme shot outside.

These differences mainly occur based on their diverse technical and production needs. In a live programme, time management is crucial, especially during transitions from a programme to commercial break and vice versa.

More differences begin at the level of the terminology itself. A script/screenplay for television is called a "run down." It categorically differentiates further in the following manner:

- In pre-recorded programmes, the anchor has a well-organized script that assists him during his presentation.
- In live programmes: the script is only a simple guide for the anchor, and often lacks a narration.

Looking at these contrasting yet related differences of film and television scriptwriting, it is wise to approach written content for television through the prism of cinema to have a more comprehensive understanding of it.

Writing for a Television Audience

It is necessary to understand that a television audience is much larger than a film audience.

While the cinema may have different sets of audiences, it is not easy to distinguish a television audience. This is because television audiences comprise of people with diverse tastes and needs.

We cannot forget that unlike the film viewer with his undivided attention, the television viewer mostly watches it out of habit while engaging in other work in his day-to-day life.

While the film viewer rarely questions what is presented to him, the television viewer may be reluctant to embrace everything at face value. They may be opinionated or be open in their views about the world, society, and life.

A television viewer is also able to switch between channels at the click of a button on a remote. Therefore, it is clear that keeping the viewer interested while maintaining their attention span is an everyday challenge that television has to face as a medium.

Television viewer – the remote is on his hand

A Few thoughts to share with Content Developers and TV Directors

- Identify the objective of your programme
- Identify the audience/target market that is being addressed by your programme
- Get a proper understanding of the target audience; their likes and dislike, their behavior patterns, etc
- Do the necessary to grasp and maintain their attention
- Keep in mind that your audience is not always an individual; they could be watching with family, friends, etc
- Know that the taste of the television viewer is not as advanced as that of the film viewer
- Know that television can make addicts out of their audience. Try to make your programmes as addictive as possible so that people are drawn to your content
- Add a specific attraction at the beginning and the end of your programme. Try to instigate curiosity among your audience
- Use short words in writing and speech, make everything as brief as possible

Creative Process & Production Process

Creative Process & Production Process

The cinema and other forms of audio-visual media are considered to be the "Director's Art." It is termed this way because creative thoughts and methods of presentation are conceived in the director's mind.

Directing relies on emotion and instinct as much as technical skill. The best directors combine artistic skill with excellent technical ability.

Auteur theory makes the strongest claim of cinema being a "Director's Art". The idea was developed by the American theorist Andrew Sarris(1928 – 2012). The foundation of the idea can be traced to the 1940s, where Andre Bazin (1918- 1958) and Alexandre Astruc (1923 –2016), critics and scholars of French cinema, first talked of it.

Andre Bazin
French Film Theoretician

Alexandre Astruc
French Film Theoretician

Andrew Saris
American Film Theoretician

Jean-Luc Godard
French Film Theoretician / Director

François Truffaut
French Film Theoretician / Director

The French New Wave created a conversation around the art of cinema in the early 20th century. The theory of director-as-author was principally advanced in Bazin's periodical Cahiers du cinéma (founded in 1951). Two of its theoreticians—François Truffaut and Jean-Luc Godard—later became significant directors of the French New Wave.

Today, the concept of Director's Art has heavily implanted itself in the film industry. For example, the director is officially viewed as the author of the film under European Union law.

While this may be the case in theory and law, we must realize that the director is unable to reach his goals without the help of his team. We understand that unlike other forms of media, television and cinema heavily depend on the success of teamwork.

The number of members working in a film crew is high. Therefore, controlling, advising, and getting the maximum possible output from them is a massive task that the director has to perform.

Question 1

Before you started this course which part of the creative / production team were you most interested in being part of? Have you changed your mind? Why/ why not?

7.1 The Crew

It is difficult to generalize about film crew members due to the diverse roles they undertake in different types of production.

For instance, the crew of an international production may vary from that of a local production. Similarly, the members and their duties differ depending on whether it is a film or television production.

It is also necessary to have a deep understanding of the subject to comprehend television production. It consists of many genres such as News, Drama, Educational, Documentary, Reality, TV game shows, Comedy, Studio programs, Talk shows, Sports, Musical, Events, Advertising & promotions, etc.

The technique and technology used for different television productions are also unique.

Among the genre and shooting technique necessary for different TV show types are :

Single Camera Shoots

Shooting using one single camera

Multi-Camera Shoots

Using several cameras to shoot

Studio recordings

Recordings that happen inside television studios

ENG/EFP recordings

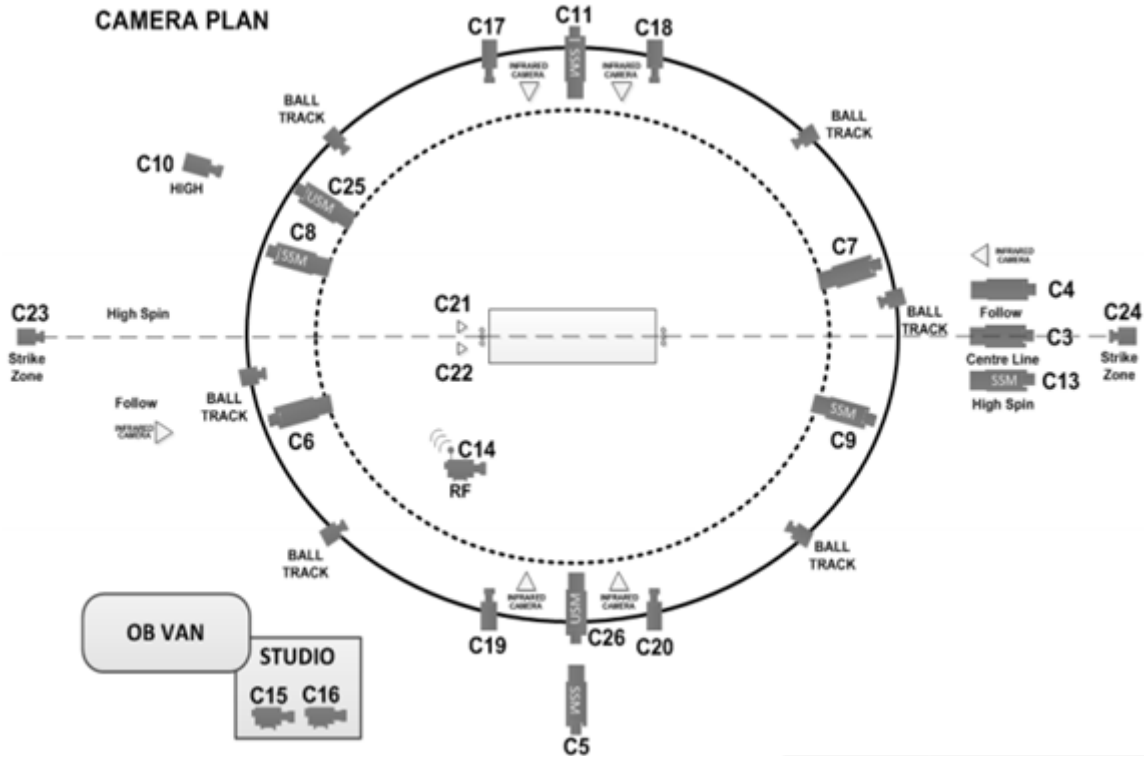
ENG stands for Electronic News Gathering
EFP stands for Electronic Field Production

Coverage of events

These are shootings that occur externally.
E.g., Shooting of a cricket match.

TV Station Studio Setup

TV Station Control Room Setup



Outline of a Camera plan for a Cricket match

Question 2

Which type of productions interest you? Why?

7.2 Members of a TV crew

7.2.1 The Director / Producer

The term “Producer” is used in two different ways in television and cinema. The producer of a film is often the individual or individuals who are funding the movie.But in television, the person in charge of the director’s production and operations is called a producer.

Considering the diversity in television programs and the creativity, knowledge, and experience needed for its production, it is clear that a producer/director alone cannot oversee all the different areas of his production.

It is normal for a producer or director to be a skilled expert in only one or two of these are.

For instance, it is not crucial for a producer skilled in teledrama production to have the same level of expertise in a live or reality program. In the same manner, a producer engaged in another kind of program production need not have any knowledge in teledrama production.

This situation is very similar to the differences we note between a short story writer, a novel writer, and a poet in literature. The point is that the skills set, knowledge, experience, and creativity needed in production differ from program to program. This is why we commonly come across directors and producers working in only a selected number of areas in television.

However, despite the differences, the role of the producer/director in television production still has some common features.

The Role of the Producer/Director

Though the word “Director” initially strikes as creative and artistic, his role in television production carries more weight. They are expected to have a broad set of skills and carry many responsibilities.

The following may assist you if you intend to become a director

Be Creative

The director provides creative impetus to act upon, and he later develops this impetus into a valuable TV production.

Therefore, creativity is something that should always be present in directors, it enables them to effectively express their ideas.

The director should also have a good hold on facts, such as the target audience, the subject being addressed, and the message to be communicated through the work. They should be able work with these facts in a creative way.

Be an outstanding organizer

The organizing skills of the director are as important to their creative process and as to the production process. This is because they become the main organizer throughout their work’s pre-production, production, and post-production.

So the success of a creation largely depends on the director’s ability to organize.

Be an effective coordinator

A TV production crew is a large group consisting of diverse members from different departments.

For instance, individuals from the camera crew, AD department, art department, makeup department, production and post-production department, and the artists and presenters are all needed to make a successful production.

Organising them work together is another responsibility that falls on the director.

They are also expected to know the responsibilities of each member of the team and coordinate them accordingly.

Be technically knowledgeable

As television is a medium centered around technology, the production benefits from the director knowing how and where to use it.

Techniques associated with television are not limited to technical areas such as camera work and editing.

Art direction, makeup, acting, and even presentation benefit from technology.

Thus, a director ought to have some knowledge of their basics and principles. They do not need an expert knowledge of these fields, but enough to get the work done by technical specialists.

Be a leader

Leadership qualities are essential for a director/producer.

They must be well prepared and clear on what needs to be accomplished.

Other than being organised, they must be well disciplined.

They should lead from the front, build a team and get everyone to perform at a consistently high level.

They should also assist, help and respect others on their team. By looking after their team they will set an example for others.

They should be able to balance being firm, strict, and loveable when needed.

Question 3

Which directors of film or television do you admire? Why?

The Subject Area of a Director/Producer

The subject areas of a director/producer can be broadly categorized as follows:

- the creative process
- the production process

Both are controlled and led by the Director/Producer.

The following can be included in the creative process:

- Scriptwriting
- Camera & lighting
- Sound recording
- Art direction
- Makeup
- Acting & presentation
- Music
- Editing & post-production work
- Publicity & promotions

The main actions within the production process:

- Selection of the creative & production team
- Selection of locations
- Selection of artists
- Production planning
- Scheduling
- Production & production management
- Pre-production & pre-production management

7.2.2 Director of Photography (DOP)

The “Director of Photography” is in charge of both camera and lighting in production. However, there are TV productions in which we find two different people employed under the titles of lighting director and camera director. This phenomenon is common in studio productions.

Working alongside a director, the DOP is responsible for a film’s visual elements. So, they are able to influence narrative elements through a visual style.

The primary duties of a DOP are as follows:

- Developing the visual style of the production
- Determining lighting requirements
- Deciding on the best camera angles and frames for scenes
- Ordering and testing lighting and camera equipment
- Supervising a camera crew and directing camera movement
- Selecting the appropriate camera and equipment
- Controlling natural or artificial lighting conditions
- Coordinating and managing the camera and lighting crew
- Making sure that the camera equipment is in working condition
- Testing out special filters and lenses

7.2.3 Assistant Director (AD)

Considered to be the director's right hand, the first assistant director (AD) is the one who plans the filming schedule.

The primary duties of an AD are as follows:

- Co-ordinate between the director, director of photography, and other department heads to ensure the efficiency of a shoot
- Analyse and break down the script during pre-production in cast, locations, equipment, and crew. During an assigned period of recess, searches for locations and tests their suitability for filming
- Fix dates for artists according to the shooting schedule
- Manage the set during production, enabling the director to freely focus on the actors and the framing of shots
- Assist the director during the edit & post-production work

7.2.4 Art Director

As in most cases, the role of an Art Director slightly changes depending on the kind of TV program being produced.

For instance, the art director's responsibility in a studio show is to draw plans and visuals and make models in order to give life to the creative vision of the production design.

The primary duties of an Art director are as follows:

Organise the art department and monitor the construction of the set
Dress the set and manage the inclusion of props

These duties extend throughout the production, ensuring that the dressing of the set is maintained to accommodate the varied content. They joins forces with the director when the production has no set. Instead, they create mini-sets at the different chosen locations for filming.
Be it indoors or outdoors; they manage the dressing and styling of the area.

Most often, it is the art director who designs the props and monitors their building process.

With a set or without, other duties include planning special effects like fire, smoke, and snow.
The costume department often falls under the Artistic Director's purview.

7.2.5 Makeup artist

A makeup artist is responsible for any makeup or other decorations applied directly to the skin or hair.

Television makeup is used to:

- Make faces appear natural under various lighting conditions.
- Improve or alter the appearance of talent, actors, etc.
- Add to the character of an actor, e.g., happy or tired appearance.
- Create special effects, e.g., age, wounds, etc.

The primary duties of a Makeup artist are as follows:

Designing each character's look, applying makeup products on actors' faces and bodies and using prosthetics to create unique makeup effects.

Coordinating with the film director and DOP to get briefed on character descriptions and shooting conditions. They will have to sketch makeup looks for all actors, based on character descriptions. If needed, create special makeup effects using prosthetics and latex masks. They also have to coordinate with costume designers and hairstylists to create a cohesive look.

During the shoot they must keep makeup consistent from scene to scene and in line with continuity requirements.

7.2.6 Editor

The duties of an editor change according to the nature of each television production. Generally, ENG recordings, studio recordings, multi-camera productions, live programs, etc., are edited online. The assistance of an audio mixer and video mixer is required during edits that happen on location.

The Editor, however, does not work on location for edits of pre-recorded programs.

The moment the editor receives pictures (rushes) from the set, they start the process of putting them together (cuts).

It is important to note that the shoots are not shot in the linear order of how the story unfolds.

Thus, the editors work in the order of reception of scenes or in any order they please other than from beginning to end. So without following the order of the story, they work on editing one part of one scene at a time.

The Editor works closely with the director to decide the best possible output of the script during pre-production.

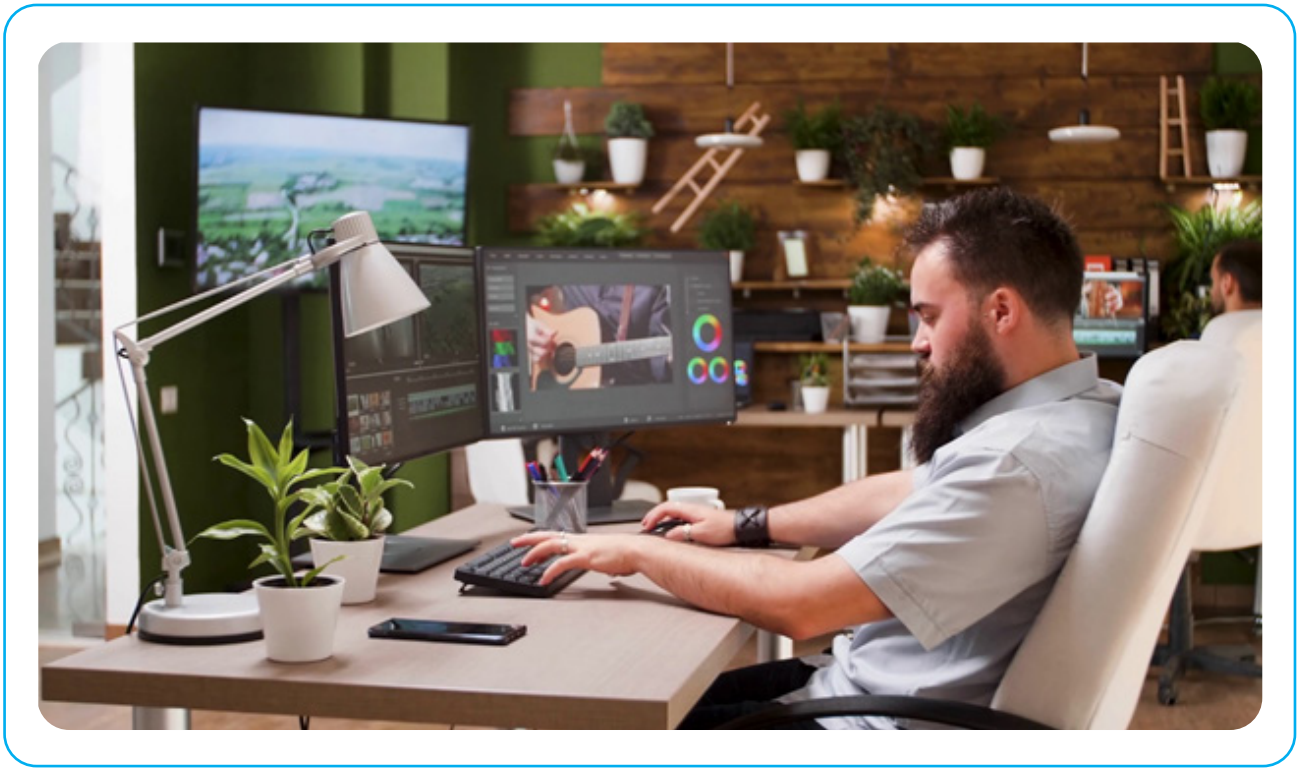
Once the shoot begins, they view the rushes daily for technical standards and determine the emerging sense of story and performance. Then they roughly assemble the scenes in the order of the story.

While the Editor will supervise the addition of music and sound post-production, they will also work closely with the director to refine the assembly edit into a director's cut.

Other than the above duties, their creative assistance towards the production is immense. For example:

- overseeing the maintenance of the audio-visual rhythm and the rhythm of acting etc
- assembling narration, audio-visual presentation, and the inclusion of music while avoiding technical errors
- including other parts of the production, such as graphics, animations, and visual effects.

An animator generally assists an editor in this process.



7.2.7 Production Manager

The Production Manager is responsible for production planning and other management, administrative, and finance functions.

Their work is not limited to being on location; as a lot of work takes place in the production office as well.

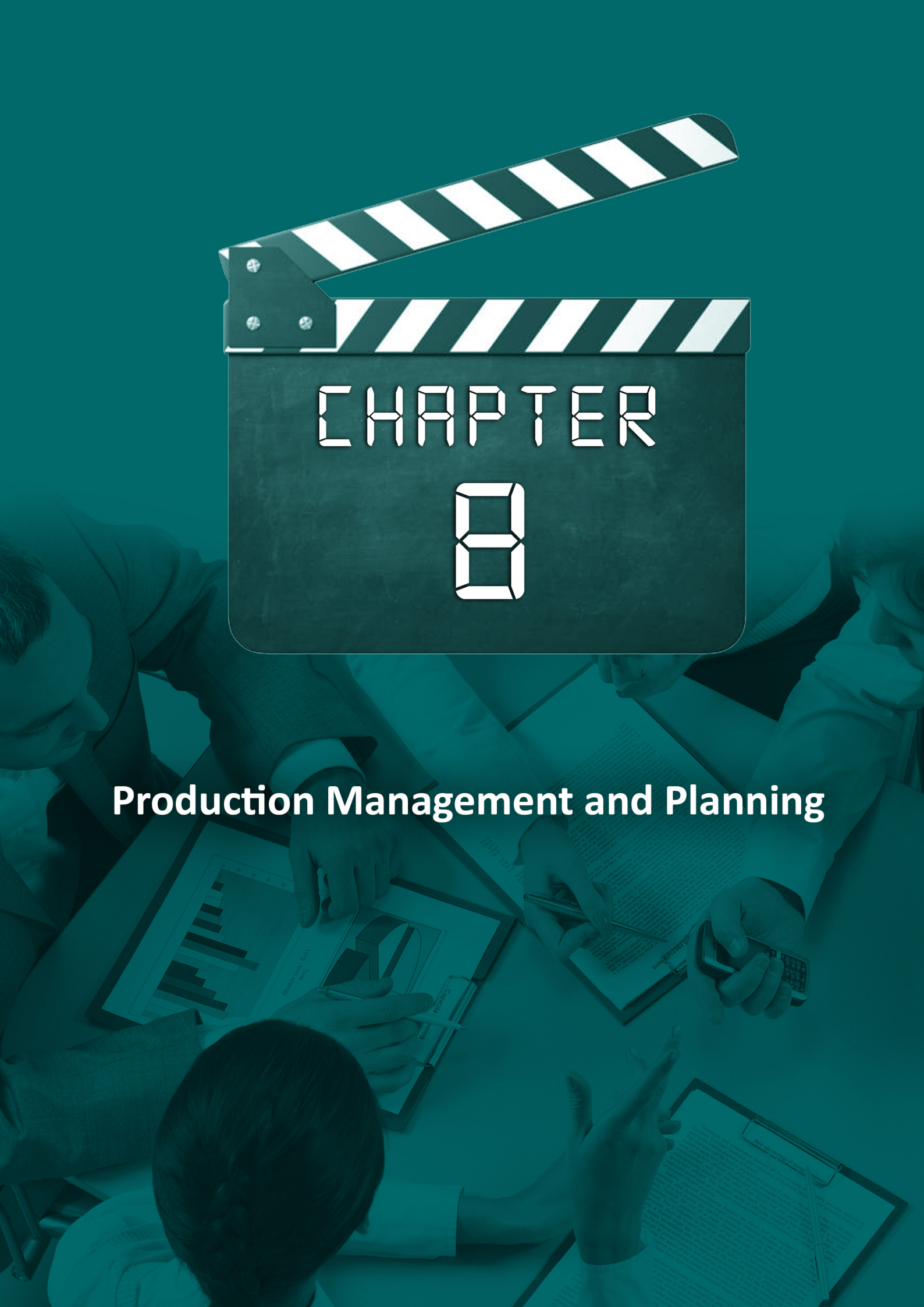
They are responsible for planning and scheduling a large portion of the entire production. In addition, they troubleshoots and solve issues that arise during production.

Administrative responsibilities include:

- managing the project money and invoices
- paying bills, maintains petty cash floats, books crews, and
- preparing staff and contributor contracts
- liaising with local authorities for permits and permissions
- monitoring location searches before and during production
- arranging crew food, accommodation, and transport facilities

They are also in charge of releasing and collecting forms, creating filming schedules, monitoring call sheets, and managing the health and safety of the crew members.

The production manager reports to the head of the production.



Production Management and Planning

Production Management and Planning

8.1 Process & documentation

Question 1

Are you good at organising things (your work? your social life? your bedroom?)? or do you prefer others to do the organising for you?

Television production management is rarely given the same amount of the attention as the creative process. This is a mistake as the production process shares equal importance with the creative side.

For the creative process to function effectively and efficiently, the production process must be professionally implemented.

The success of the production process determines whether or not the project will make a profit. What follows are a few of the many points that highlight its importance.

8.2 Steps of the Production Process

The different genres in television production that we discussed in an earlier chapter show differences in their production processes. Therefore here, we shall look at various steps in the general television production process.

Accordingly, we shall look into production management and planning that each step of the process goes through.

The stages of the production process can be listed as follows:

8.2.1 Concept Paper

A television program will first come as an idea.
Later it is developed into a concept. This concept is usually committed to writing.

A “concept paper” or “dummy paper” thus becomes the first step of the production process.

8.2.2 Manual for a Concept for a TV series

Title:

Tagline:

Genre:

Table of Contents

Introduction:

Introduction to your TV series. What is it about, and why do you want to make it an Idea and Genre?

1. *Describe your idea. You can refer to other TV series, movies, books, plays, etc.*
2. *Genre, style, and mood.*
3. *What is new and unique about your series?*
4. *What are the 'identification' and the 'fascination' of your TV series?*

Theme and Premise:

Premise, theme, and subject of the series. How does it show in the series?

The Main Characters Describe the main characters, the protagonists. Give their goals, secrets, passions, and ideals, and so on. Describe their looks, homes, clothes, things, pets, cars, and so on. And describe their essential relationships.

Supporting Characters:

Describe the supporting characters and their relationships.

Arenas, Locations, and Time:

Describe the main locations of the TV series

Style and Mood:

Give the colors, the style, and the mood of the series. How should it be filmed and edited and so on.

Title Sequence:

Describe the title sequence of the TV series.

Synopsis:

Write a synopsis for the whole first season. Describe the main conflict, how it develops and how it ends.
Give the motivation for the characters. Give the structure of the episodes. And give the storytelling elements of the series, like a flashback, voiceover, suspense, etc.

Story Lines:

Write pitches for all the episodes of the first season.

Script:

Write the script for the first episode of the season.

The team :

Give the names of the proposed people involved and their functions: Director Producer, Scriptwriter, DOP, Art Director, Music Director, Makeup artist, and so on.

Cast & Crew:

Make a list of the actors. Make a list of the crew.

Production:

Describe how the TV series could be made: Budget, finance, plans, strategies, studios, filming schedule, and so on.

The TV Slot and the Audience:

Give when and where the TV series should air. And who your target audience is.

Marketing, PR, and Merchandise Ideas:

Describe how the TV series could be marketed.

8.2.3 Production Budget

Question 2

What do you think the average budget is for a film made in Sri Lanka? Or a teledrama? What do you think are the most expensive parts of the production?

Budgeting is an essential part of production.

A TV production budget determines how much money will be spent on the entire project. It involves identifying and estimating cost items for each phase of the production (development, pre-production, production, post-production, and telecast).

All expenses that are estimated to occur during production are included in the budget. It is formulated by the Accounts Department with the Head of Production, Director/Producer, and Production Managers.

Maintaining the actual expenses at a lower level than the estimated amount is a key responsibility of the production department. It falls under the duties of the Head of Production or Production Manager.

Example of a production budget

PROGRAMME:

NUMBER OF EPISODES:

CATAGORY	RATE	NO OF DAYS	TOTAL SLR	REMARKS
TV CREW PAYMENTS				
Director				
Producer				
Camera Director				
Assistant Director				
Art Director				
Makeup Artis				
Editor				
Production Manager				
Assistant Production Manager				
BATTA PAYMENTS				
Camera Assistant				
Lighting Assistants				
Makeup Assistant				
Art Assistant				
ARTIST PAYMENTS				
Main Cast				
Extras				
EQUIPMENT HIRE				
Camera & Accessories				
Other Equipment				
TRANSPORT				
Van 1				
Van 2				
Van 3				
MEALS & REFRESHMENTS				
Meals				
Refreshments				
LODGING				
Lodging				
ART PROPS & LOCATION FEES				
Art Props				
Costumes				

Location Fees				
MUSIC				
Music Director				
Music Recording				
Voices				
GRAPHIC & ANIMATIONS				
Animator Fee				
Graphic Cost				
PRE-PRODUCTION & POST-PRODUCTION EXPENSES				
Pre-Production				
Post-Production				
ADMINISTRATION COSTS				
Phone & internet				
Printing				
Stationary				
Documentation				
OTHER COSTS				
Hard Drive				
TOTAL FOR NUMBER OF EPISODES				

8.2.4 Script Breakdown

As we have learned, the script is the foundation on which a television production is built. This makes the “script breakdown” the first document that needs to be compiled in production management.

The assistant director generally works out the schedule breakdown. It is a document that has information detailed from scene to scene. For example, cast, extras, equipment, wardrobe, special effects, make up/hair etc.

The script breakdown is an important document to separately identify all shooting requirements for every scene in a television shoot.

It is a living document which continuously updates every element at scene level until a complete script breakdown is formulated.

Both the production and creative teams can easily organize their schedules because the script breakdown acts as the foundation in comprehending the mechanics of a production.

Sample of a script breakdown

BREAKDOWN SHEET: #	*Page Count:*	*Date:*

Production Company:
Project Title:

Scene #:	*Scene Name:*	*INT/EXT:*	*D/N:*

Script Page:	*Location Name:*

Description:

CAST	EXTRAS	EXTRAS ATMOSPHERE
EQUIPMENT	SPECIAL EQUIPMENT	SPECIAL EFFECTS
WARDROBE	MAKEUP/HAIR	VEHICLES/ANIMALS
OTHER:	PRODUCTION NOTES:	

The above categories are usually highlighted in different colors such as red, orange, green, yellow, blue, purple, pink, etc. & it is called "A color chart" in the production

8.2.5 Shooting schedule

The next step of production planning is to create a shooting schedule.

A shooting schedule is a project plan of each day's shooting. It is usually created and managed by the assistant director, who oversees the schedule.

The director and assistant director usually make the schedule together. The process includes figuring out what scenes can be shot together on the same day, scheduling actors to work consecutive days, and how to tighten the schedule so the film can be shot in fewer days.

Scheduling the shoot includes :

- Lining the script by going through and marking items such as actors, props, wardrobe, and special effects.
- Putting those items on individual breakdown sheets, each representing one scene from the film.
- Transferring the elements on the breakdown sheets to production board strips.
- Rearranging the order of production strips to find the best shooting schedule.

Sample of a Shooting schedule

Shooting Schedule Project title: Director:							
Day/ Date	Time	Scene Number	Interior/Exterior Day/Night	Shot description/ Summery	Location	Characters	Notes
Day 1							
Day 2							

8.2.6 Daily call sheet

A daily call sheet is a document distributed among the cast and crew that outlines where they need to be on an upcoming day of shooting. The assistant director creates this document.

A daily call sheet contains essential details like the shooting location, the cast call times (the time they should arrive at the location), and the shooting schedule, all based on the director's shoot list.

Sample of a daily call sheet

Daily call Sheet Production: Director: Assistant Director: Shooting Day: Date: Crew call: On location time:					
Page	Scene	Description	Cast	Set time	Location
Notes/Requirements					
Makeup		Art Department		Camera Department	
Transport		Meals			
		Breakfast time	Lunchtime	Dinner time	

8.2.7 Transport Schedule & Running Charts

Transport is a crucial element in any production.

Transport arrangement should be a well-planned process as the television crew must be daily picked up from their lodgings/homes and brought to the shooting location. The production must drop them at their lodging/homes by the end of a day of shooting too.

Therefore, the production manager creates a transport schedule containing all necessary transport details on a particular day.

Sample of a Transport Schedule

The production should appropriately manage the transport fleet. So the production manager must provide all drivers with a transport schedule and running chart which is to be followed and correctly filled by them and certified by the production manager at the end of the day.

Daily Transport Schedule
Production:
Date:

	Name of person	Pick up time	On location time	Address	Remarks
Van 1					
Van 1					
Van 1					

Sample of a running chart

Running Chart
Production:
Date:
Vehicle Number:
Drivers Name:

Time	Opening meter	Description of running	End mileage	Number of KM	End Time

Number of KMs for the day:					
Driver's signature					

8.2.8 Payments & Documents

The production manager is provided a cash advance to pay for on-location expenses that commonly happen in television productions.

Documents such as payment vouchers that can cover for advances should always be with the production manager. It is also necessary for him to send a daily statement to the accounts department stating all daily expenses.

The production manager should also check the crew call sheet / batta sheets the television crew will submit daily.

The details of the equipment used for the shoot and the crew batta are entered in the crew call sheet/ batta sheet.

Diversity and Inclusion

Diversity And Inclusion

Introduction

Working in the film and television industry gives you an extraordinary opportunity to influence how your audience view each other and themselves. How you choose to represent other people in your work, be it fact or fiction, will have an effect on how your audience sees such people in their own lives.

People in society have traditionally had a strong or weak position. For example, in Sri Lanka, women have been subservient to men in most social contexts. Film and television has done little to challenge this, at best offering a mirror on society, not doing anything to affect change.

This passivity is understandable in as much as trying to actively nudge society to behave differently is difficult and, initially at least, unwelcome. However, as Sri Lanka moves into the twenty-first century it desperately needs women to take a more active role in social and economic matters. The country also needs to rethink the contribution people with disabilities can make to its development.

This chapter on diversity and inclusion will help you better understand the issues involved and put you in a stronger position to produce content for film and television that helps your audience re-evaluate traditional roles in Sri Lankan society.

9.1.1: Gender Concepts

Gender refers to the socially given attributes, roles, activities, responsibilities and needs connected to being men (masculine) and women (feminine) in a given society at a given time, and as a member of a specific community within that society. Women and men's gender identity determines how they are perceived and how they are expected to think and act as men and women.

Sex refers to the biological characteristics between men and women, which are universal and do not change. These sets of biological characteristics are not mutually exclusive as there are individuals who possess both, but these characteristics tend to differentiate humans as males and females.

Gender blindness - The failure to recognise that gender is an essential determinant of social outcomes impacting on projects and policies. A gender blind approach assumes gender is not an influencing factor in projects, programs or policy.

Gender roles - These are learned behaviours in a given society/community, or other special group, that condition which activities, tasks and responsibilities are perceived as male and female. Gender roles are affected by age, class, race, ethnicity, religion and by the geographical, economic and political environment. Changes in gender roles often occur in

response to changing economic, natural or political circumstances, including development efforts. Both men and women play multiple roles in society. The gender roles of women can be identified as reproductive, productive and community managing roles, while men's are categorized as either productive or community politics. Men are able to focus on a particular productive role, and play their multiple roles sequentially. Women, in contrast to men, must play their roles simultaneously, and balance competing claims on time for each of them.

Productive roles refer to the activities carried out by men and women in order to produce goods and services either for sale, exchange, or to meet the subsistence needs of the family. For example, in agriculture, productive activities include plating, animal husbandry and gardening that refers to farmers themselves, or for other people at employees.

Gender discrimination – Unequal or preferential treatment of individuals or groups on the basis of gender that results in reduced access to/ or control of resources and opportunities.

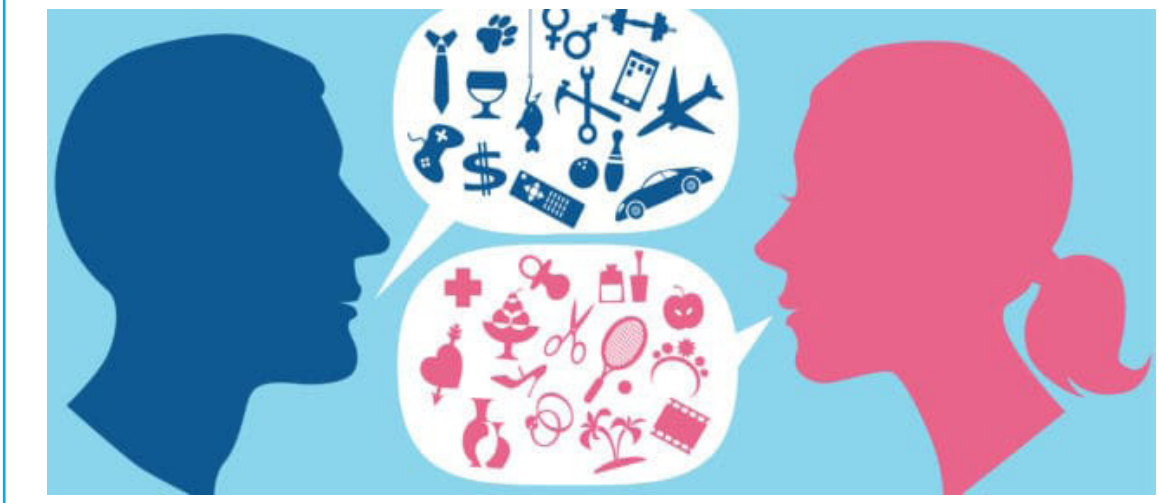
Gender stereotyping – The assigning of roles, tasks and responsibilities to a particular sex policy on the basis of pre-conceived prejudices. Gender equality- refers to the equal rights, responsibilities and opportunities of women and men, and girls and boys. Equality does not mean that women and men will become the same, but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female.

Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognising the diversity of different groups of women and men.

Gender equity refers to the practice of fairness and justice between men and women, boys and girls in the distribution of benefits, access to and control of resources, responsibilities, power, opportunities and services.

Gender-sensitivity - encompasses the ability to acknowledge and highlight existing gender differences, issues and inequalities and incorporate these into strategies and actions.

Gender-based violence – Any act of violence that results in, or is likely to result in physical, sexual, or psychological harm or suffering to women, girls, boys and mean on the basis of gender.



The Woman Who Broke The Glass Ceiling!

Anomaa Rajakaruna

Anomaa Rajakaruna has travelled extensively in **Sri Lanka** documenting the lives of community groups, particularly the lives of women and children in these communities and has addressed issues such as women in armed conflict, displacement, sexual harassment and violence against women among others.

"I started using the library at the British Council in the 1980s. The library was the key resource place for information and had many of the books I wanted to read on cinema. I spent hours and hours reading in the library and borrowing books so that I could read at home. I was a school kid and that was the first time I saw so many books on cinema in one place. I was born and living in Panadura which is 17 miles away from Colombo. First, I came to read books on cinema. After some time, I started to attend film screenings at the British Council. Later, I photo-documented many projects of the British Council Society Programme and engaged with other activities as a trainer. Much later I made films and even curated film programmes for the British Council."

She was interested in story-telling from an early age and by observing her creative aptitude for narration, her tutor suggested she join a course on script-writing. From that time, she started facing challenges due to discrimination and accusations due to the limited chances of being successful in this genre. However, her dreams and determination never allowed her to give in to this stereotype.

She fought hard to make her way and her hard work always found a path as she eventually got a chance to make mini-tele-drama. She was seventeen when her first production was released but once again, was restrained by **Political Censorship**. The issue was simple. Her first tele-drama, "Sonduriya" contained some sensitive social material. *In her words, the story was about a woman whose emotions were torn between two men and her conflicts regarding this issue*. Sri Lankan society was not ready to accept this bold attempt of showcasing a story where reality overpowered society's formulated norms.

However, at the age of 22, her short drama '***Amma Keneck'*** (Another Mother) 1987 was released. This film dealt with family issues exacerbated by the 1983 anti-Tamil violence. The film was screened at the Presidents House and her work was appreciated at last. However, her fight was not over. Her attempts were being questioned again and again as the society felt threatened by her activities even though her work actually talks of freedom, reality and exposure of true human psychology.

Frustrated by the oppression and regular banning of her films she started making documentary films. She was passionate about photography too. By using visual images, she even brought out some vital issues like elephant-human conflict in Sri Lanka. Some of her photography even won the international prizes and among those a specific one was very special for her.

The story behind this photography was remarkable. These three types of pitchers symbolized three different religions and when the women carrying them share it with other women from a different religion, they build peace among divergent communities. Her photography has a deep and meaningful story behind it. It has inspired many with its inspirational cry for freedom of expression.

9.1.2: Gender

INTRODUCTION TO GENDER: In common usage, the word GENDER often refers to the sexual distinction between male and female. Gender is the set of relations between and among men and women in different societies based on socially constructed roles, behaviours considered appropriate for men and women. In simple words, gender refers to the set of relationships between men and women at a particular point of time in a given society. While discussing gender, we generally refer to the social differences and relations between men and women, which are learned and transformed.

The term gender does not replace the term sex, which refers exclusively to biological differences between men and women. The following are the broad differences between Gender and Sex for a clear understanding in the subsequent analysis.

Characteristics		
Men /sex	**Both**	**Women /sex**
Grow beard Voice changes at puberty	Sensitive Aggressive Short- tempered Soft spoken Creative	Grow long hair Give birth to babies

GENDER	SEX
Socially constructed	Biologically defined
Differs between and within cultures	Determined by birth
Includes variables identifying differences in roles, responsibilities, opportunities, needs and constraints	Universal
Can be Changed	Unchanging

GENDER ROLES are not natural roles: boys and girls are systematically taught to be different from each other. Socialization into gender roles begins early in life. This includes learning to be different in terms of, for example: appearance and dress, activities and pastimes, behaviour, emotions that we show, responsibilities, intellectual pursuits etc. Gender roles are learnt and therefore can be unlearnt. They are not unchangeable. Gender roles are those that define what is considered appropriate for men and women within the society, social roles and division of labour. These gender roles decide the behaviour of men and women and

a) Involve the relation to power (how it is used, by whom and how it is shared);

b) Vary greatly from one culture to another and change overtime;

c) Vary from one social group to another within the same culture;

d) Race, class, religion, ethnicity, economic circumstances and age influence gender roles;

e) Sudden crisis, like war or famine, can radically and rapidly change gender roles.

GENDER QUIZ

No.	STATEMENT	Mark 'S' (SEX) or 'G' (GENDER)
1	Women give birth to babies, men do not	
2	Little girls are gentle and boys are tough	
3	Amongst Indian Agricultural workers, women are paid 40-60% of the male wage	
4	Women can breastfeed babies, men cannot	
5	Women are better at caring for children than men	
6	Men are sexually more aggressive than women	
7	Men need more help in post disaster because they the main breadwinners of the families	
8	Men's voice break at Puberty, women's do not	
9	At Construction sites, construction materials are carried by women	

9.1.3: Gender Equality

In a society the gender relations may be equal or unequal. It is an undeniable truth that to realize complete human potential there has to be gender equality. This involves empowerment in gender relations at personal, collective and societal level. Gender equality refers to the state of relations where women have the same opportunities and access as men in all spheres of activity. Experience of inequality and discrimination across all categories- community, caste, class, religion, race and country is a common identity for women. Gender is above and beyond but inclusive of sex. One of the most important characteristics of gender is that it is variable and changing. It differs within and between cultures/religions / regions/generations. For example, in many parts of India women are treated as passive and home bound. But amongst the sherpa's of Nepal women are considered home providers, running family business. Even within a country gender relations vary across regions. In northern India men are major decision makers and in north east India women and men have relatively equal role within the family and society.

Gender equality implies

- promoting the equal participation of women and men in making decisions;
- empowering or supporting women and girls so that they can fully exercise their rights; and
- reducing the gap between women's and men's access to and control of resources and the benefits of development is still out of reach for most women worldwide.

In many low-income countries, women continue to have fewer rights, lower education and health status, less income, and less access to resources and decision-making than men. Nevertheless, women's critical roles in food production, income generation, and management of natural resources, community organization and domestic responsibilities are essential for sustainable development. If equitable and sustainable progress is to be achieved, women's status must be improved, the rights must be respected, and their contributions must be recognized.

The international community has made important commitments to women's rights and equality between women and men, including:

- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), (1979)
- Beijing Platform for Action, (1995)
- Millennium Development Goals, (2000)
- United Nations Security Council Resolution 1325 on Women, Peace and Security. (2000)

Barriers Women Faced In Tele-Visual Sector

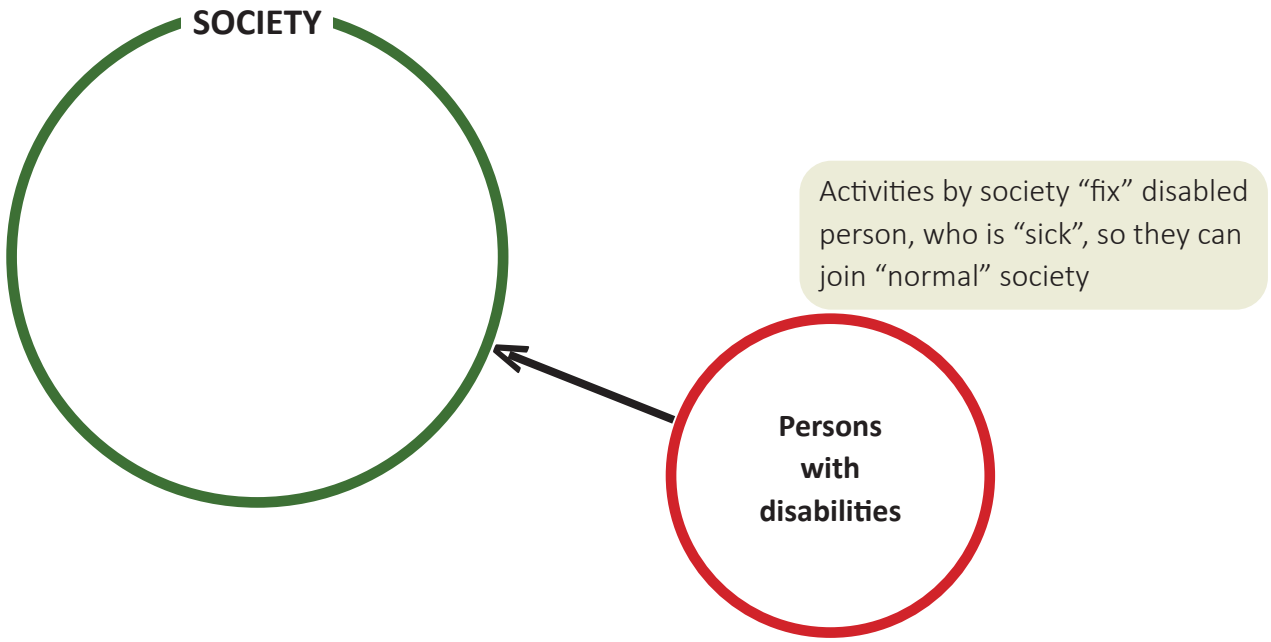
Globally, women in film have been running a campaign over the last few years, asking for equal opportunities. It's known as "50/50 by 2020" campaign. Yet, we are still debating women's position in the film industry, i.e., lack of gender equality in terms of access to the industry, training, funding for film production and working conditions. All the challenges that women face today are attitudinal due to cultural and social environment of disparities, within which women and men are brought up and where women's skills, and creativity is devalued.

"Just do it. Make the decision, own it, and just take action. **Nowadays all you need is a phone –** everyone has the tools. It is about having the guts to get out there and start making something, whether you are a guy or a girl." **- Jacqui Hocking, documentary filmmaker at Vision Strategy Storytelling**

"You need to have a hunger for it, as it can be a very tough business sometimes. You have got to be patient. You need confidence and drive." **- Charlotte Worthington, Puttnam School of Film**

9.2.1: Disability Models

1. THE MEDICAL MODEL (Individual Focus)



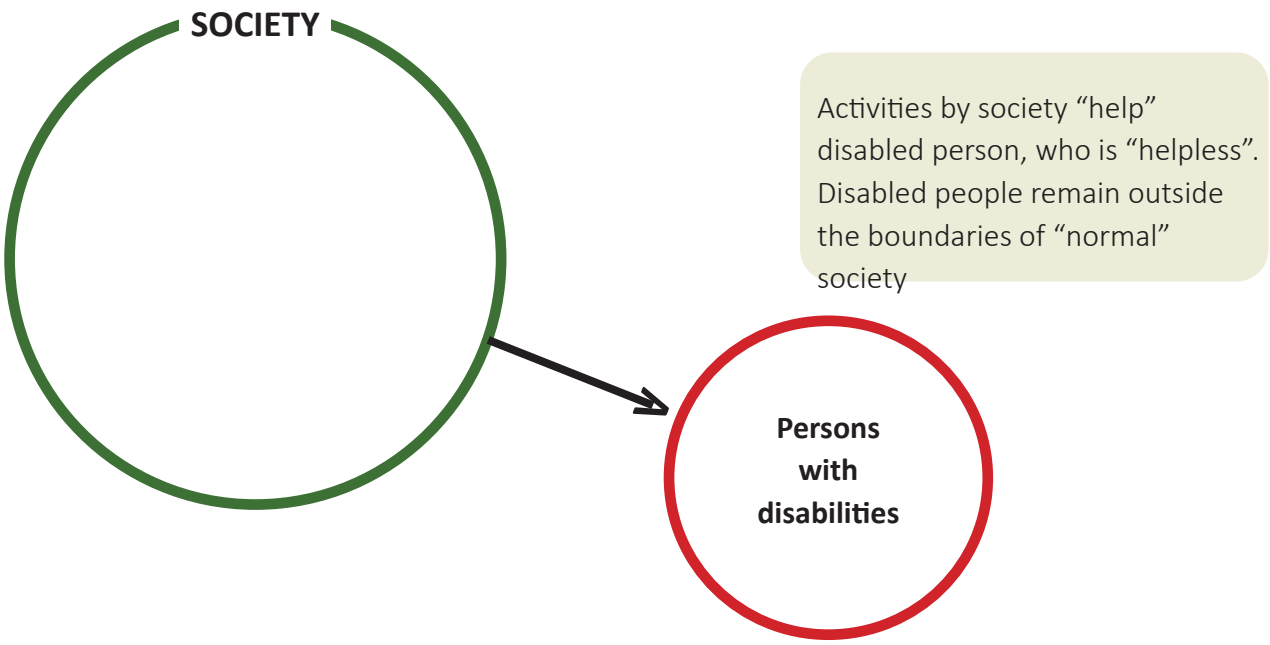
The medical approach to disability is the traditional understanding of disability. It focuses on the impairment the individual person has and sees it as an obstacle preventing them from fully participating in society. The focus is to "cure" or "improve" individuals with impairments in order to include or "fit" them into society.

This model is not about the merits of providing or not providing medical support / intervention to disabled people. Neither does the model suggest whether providing medical support is good or bad. The model is about how society – especially non-disabled people - believe there is something "wrong" with disabled people and so believe disabled people need to be "fixed" (often medically) so they can be "integrated" into society and participate according to the way society is structured for the needs and desires of non-disabled people.

This traditional approach to disability issues assumes that obstacles disabled people face will be solved if medical intervention/support is provided (defined by non-disabled medical "experts") and disabled people are "cured" or their health "improved".

In summary, the medical approach perceives disability as a problem located in the disabled individual, and assumes that working to "fix" or "cure" individuals solves the problem. The disabled person becomes defined solely in terms of his or her diagnosis (impairment), as a patient with medical needs and not as a person with a whole range of needs. In development terms, this has tended to increase the segregation of disabled people from the mainstream by focusing all efforts on the provision of specialist services. Interventions are of a medical / rehabilitation nature, carried out by specialists and are often located only in major urban areas.

2. THE CHARITY MODEL (Individual Focus)



The charity approach to disability regards people with impairments as "unfortunate", "dependent" or "helpless"- people who deserve pity and charity. The focus is to provide disabled people with money or gifts, such as food or clothing. Disabled people are long-term recipients of welfare and support and are assumed to be insignificant contributors to society.

As with the medical approach, the charity approach to disability is not about the merits of providing or not providing charity to disabled people. The model highlights the traditional views and attitudes towards disabled people – that people with impairments have been considered helpless, objects of pity, unfit to work, and often of less value as human beings. This model assumes charity is the only way to help disabled people.

In summary, like the medical approach, the charity approach perceives disability as a problem located in the disabled individual. The disabled person becomes defined only as a passive recipient of long-term aid, gifts and other help, and not as a citizen who can be a productive member of society. **In development terms,** this view- alongside the very similar medical approach- is manifest in the tendency for aid to be delivered to disabled people via specialist organisations and for general mainstream development agencies to assume their programmes are of little benefit to disabled people. Examples might include special income generating projects or vocational training centres created specifically for disabled people, rather than looking at how mainstream projects can incorporate disabled entrepreneurs. The underlying assumptions are that disabled people are not capable of working and therefore need to be supported.

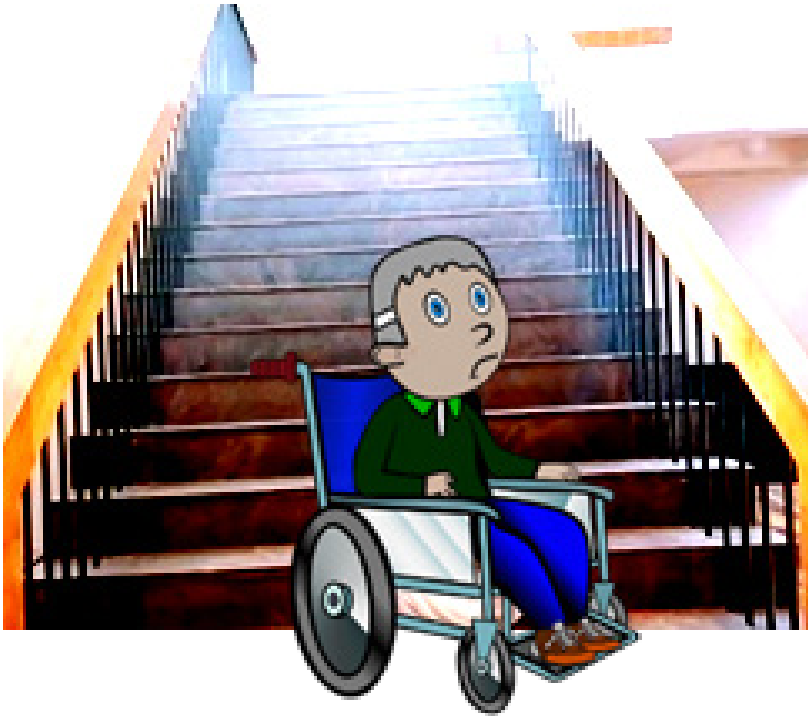
3. THE SOCIAL MODEL OF DISABILITY
(Society focus – as a part of the society)

Persons with disabilities are part of society and should be included in all activities. Society needs to change. Activities focus on **inclusion** and the **elimination of barriers** present the effective participation in society of persons with disabilities:

- **Attitude** – prejudice, stigma
- **Institutional** – policies
- **Environmental** – e.g., access to buildings

The social model of disability focuses on society. Its starting place is different from the individual models of disability (medical and charity models) as it recognises that disabled people <u>are</u> part of society. **It sees disability as the social consequences of having an impairment.** It recognises the inability of a society to accept and accommodate all of its members as it excludes disabled people. With this model or view, **people are disabled by society** as they are deprived of rights and opportunities due to their impairment. The social model identifies three major barriers that prevent people who have impairments effectively participating in society: **attitudinal** (negative views of disabled people by non-disabled people), **environmental** (physical, access to buildings, communication issues), and **institutional** (systematic exclusion or neglect in social, legal, educational, religious, and political institutions). Removing these barriers is possible and has a hugely beneficial impact, both on the lives of disabled people and on the whole community.

Adopting the social model of disability does not mean rejecting medical services, rehabilitation, or assistance from others, but does change the way in which services and assistance should be given, placing them in the wider context of disabled people's lives. Disabled people's needs are basically the same as non-disabled people's: for life, love, education, employment, full participation in society, access to adequate services (including medical and rehabilitation services when necessary) as of right, and some choice and degree of control in their lives. The social model has allowed many disabled people to regain control of their own lives, becoming the experts on their own experience and changing their outlook in fundamental ways. In summary, the social model states disability as a problem located in society rather than the disabled individual. 3 types of barriers– attitude, environment and institutional – prevent disabled people playing a full and active role in society. In development terms this means programmes need to understand how their current practices exclude disabled people. It means taking responsibility for understanding how to include disabled people as stakeholders and beneficiaries in all mainstream work and in looking for ways to support their participation in community life.



Social model thinking:

Is the reason this person can't access the library because he is a wheelchair user or because the building does not have a ramp? The medical model or charity model perspective would reply "it's because he uses a wheelchair", but social model thinking would place the problem with the buildings' lack of ramps.

9.2.2: Barriers to Participation of Persons with Disabilities in Society

According to the **social model of disability,** 3 main barriers prevent disabled people participating in society on equal terms with non-disabled people – attitudinal, environmental and institutional.

ATTITUDINAL BARRIERS

Attitudinal barriers are not as obvious as the other barriers, but disabled people often say they cause the biggest problems for them. Disabled people are commonly assumed to fit into one or more of the following categories:

- incapable/inadequate
- bitter/resentful
- tragic
- aggressive
- of low intelligence
- in need of "cure"
- needing "special" services
- inspirational/marvellous/exceptional
- exceptionally brave/courageous/heroic
- smiling and cheerful in adversity

These assumptions are damaging and offensive, because they represent unthinking value-judgments, based on negative generalisations. People who make these judgments generally fail to respond to the individual person who is disabled: his or her personality, strengths, weaknesses, etc. This also applies to assuming disabled people have "super-human" abilities for emotionally coping with their condition, and placing them on a "pedestal" which can make the disabled person feel they are not able to show negative feelings.

At a deeper level, non-disabled people may respond with feelings that include fear, pity, repulsion, or a sense of superiority. These assumptions and emotions are reinforced by literature, films, newspapers, and television. Negative language reflects and can reinforce prejudices. Disabled people are now starting to say they wish to change the language used by non-disabled people about them, especially language that is offensive and inaccurate.

Examples of attitudinal barriers are seen when disabled children are not allowed to participate in a mainstream school when the school does not accept them because of their impairment, or because parents do not see value in education for their disabled children. Disabled people can be excluded from employment if an employer feels a disabled employee is not good for business or incapable of doing productive work. Exclusion of disabled people is also often seen in use of language as non-disabled people talk about “them” (disabled people) and “us” (non-disabled people). Also, there may be assumptions/expectations of disabled people and how they should behave. For example, disabled people can be seen as unintelligent, violent, strange, tragic, in need of care, weak, incapable, patient, non-sexual, obedient or submissive.

An extreme case of the attitudinal barrier is infanticide, where babies are killed simply because they are born with impairments and are considered cursed or not worthy of living.

ENVIRONMENTAL BARRIERS

Disabled people encounter environmental barriers in the following areas:

- public transport
- housing
- public buildings
- roads
- pedestrianized streets
- leisure and recreation facilities
- offices and factories
- places of worship
- communications systems
- access to information

It is relatively easy, once aware, to see the environmental barriers that disabled people face: inaccessible offices, shops, banks, government offices, toilets; inaccessible public transport; and poor signposting throughout. It is less easy to see how barriers in communications systems are disabling for a range of people, particularly those who are deaf, hard of hearing, or who have visual impairment

For example, a health clinic may exist in an urban or rural area, but only have steps to enter the clinic and narrow doorways – if you are a wheelchair user the clinic is inaccessible .

Another example, in bus or railway stations in many countries travel information is given visually and not always supplemented by information on a loudspeaker system for the benefit of people who are blind or partially sighted. Signs for services on the station can be difficult to read or badly placed. Deaf people are disadvantaged when last-minute changes to timetables and platforms are announced on the loudspeaker but not altered on indicator boards.

Another example is HIV and AIDS education activities with school children. Those with hearing, visual or intellectual impairments are unlikely to be able to access the information provided in class or in print. Also, since 98% of disabled children in developing countries do not attend school, they are likely to miss out on important education and information. The low rates of disabled children attending school is linked to low literacy rates amongst them which makes communication of messages about HIV and AIDS more difficult. And because many special schools are not under the Ministry of Education, their educational curriculum is different from that of mainstream school. So the chances of children who attend special schools missing important information is high. A study in Uganda found 38% of women and 35% of men with impairments had an STD (sexually transmitted disease) at one time. The result of communication or information barriers disabled children/people face is devastating.

INSTITUTIONAL BARRIERS

Institutional barriers exclude or segregate disabled people from many areas of society. Key institutions (or systems) include:

- the legal system
- the class system
- employment
- the political system
- education
- health services
- social services
- the family
- religion
- humanitarian and development agencies

Many of these institutional barriers link directly to environmental and attitudinal barriers. But it is only by looking at institutions as a whole that we can identify how these barriers interlock, and see the ways in which disabled people are segregated and disempowered.

In many countries, the marginalisation and exclusion of disabled people (for instance in terms of employment or political representation) is similar to – and compounded by – the negative treatment of women and members of ethnic-minority groups. In the UK, for example, black men and women with impairments experience “double or triple disability” at all levels.

For disabled people generally, the effects of exclusion from institutions such as education and training are cumulative. Segregated education makes fewer academic demands on pupils, and much smaller schools and classes expose them to a more limited range of cultural stimuli and experiences. The virtual exclusion of disabled people from teacher training colleges also limits the numbers of qualified disabled teachers who are available as role models for disabled and non-disabled pupils in mainstream schools.

9.2.3: Conducting Tele-Interviews with Men and Women with Disabilities

GENERAL – MEETINGS & INTERVIEWS

- Know your audience/clients in advance and make provisions and/or adaptations to suit their specific requirements. Ensure that people are greeted on arrival; look for visual clues.

- Physical access: Is the venue close enough? Is the venue and all its facilities (toilets, cafeteria, break out rooms, etc.) accessible? Is it at the top of a steep slope or hill and/or with rough paths to reach it? Is it on the ground floor? Are there many stairs?

- Hearing impairment: Are participants partially or completely deaf? What is their preferred form of communication (Sign Language, own gestures, lip reading)? Sign Language interpreters can usually be accessed through local deaf organisations. If someone uses their own gestures, ensure they are accompanied by a family member or friend who is familiar with this. Ensure that people's faces and hands are clearly visible (well-lit and sight lines). Drawings and text help with accuracy, clarification and confirmation.

- Visual impairment: Familiarize participants with the venue layout and facilities. Ensure people state their name before talking. At the beginning of each session, go round the group and ask people to say their name. Describe any visual aids used and/or let people touch any aids. Make visual aids tactile by using string.

- Intellectual impairments: ability to understand depends on the degree of impairment. Simple language, short messages, repetition and patience.

DOs	DON'Ts

• After selecting your interviewee for the programme, the person's consent is required at following levels:
  • Before starting to interview the person (for recording the story)
  • After editing before publishing (on content to be published)
 	
• When scheduling interviews, be aware of the typically heavy demands on women's and men's time and ensure that interviews are arranged at convenient time for your interviewees
 	
• Schedule interviews in convenient and appropriate places for your interviewees, at their choice.
 	
• Interviewing persons with disabilities should not be any different from interviewing persons without disabilities, except that you need to ensure reasonable accommodation for their specific needs, e.g., Sign Language interpretation for the deaf persons, accessible locations for those who have mobility issues
 	
• Always be polite, respectful and interested [ready to learn]
 	
• Communicate with participants in a language in which they feel comfortable
 	
• If the interviewee is taking more time to answer a question give him/her an extra time to answer.
 	
• If the person doesn't understand the question, re-word and clarify.
 	
• If the interview has other commitment in the middle of the interview, have another appointment to continue.
	• Be considerate, but never patronize, or treat persons with disabilities as small children
	
	• Never rush a person to answer your question/s. Many people are visual thinkers and learners. They need extra time to understand the question.
	
	• Attitude – Never think/ act as if, you know better than them. You are to explore their experience.

INAPPROPRIATE TERMINOLOGY	APPROPRIATE TERMINOLOGY
The disabled, The handicapped	Persons/people with disabilities or disabled persons/people
Wheelchair-bound, confined to a wheelchair	*Avoid using terms that define a person's impairment as a limitation* *A person who uses a wheelchair/ wheelchair user*
Cripple, spastic, victim	Disabled persons/persons with a disability
Visually-handicapped	Person with visual impairment
The blind	A person who is blind
Hearing impaired	A person with hearing impairment
The deaf	A person who is deaf
Mental handicapped	Intellectual impairment
Mentally handicapped	Intellectually impaired
Mad, crazy, with Unsound Mind/ unsound	Persons with mental illness/psychiatric impairment/ psychosocial disability
Suffers from autism/autistic	Has autism
Normal able bodied	Non-disabled person [Never use the word "NORMAL" to refer to non-disabled people in contrast to persons with disabilities. Avoid saying "… is doing well with her studies just like normal students"; instead say: … is doing well with her studies

9.2.4: Making Your Videos Accessible for All

Have you ever thought of persons with disabilities when you are watching a film or tele-drama, or any other televisual products? Many persons with disabilities, especially, persons with hearing impairments, and visual impairments have no access to visual or audio media, which need to be taken into account seriously.

An accessible video can be helpful to anyone at different times, but can be critical for many persons with disabilities.

HOW TO MAKE YOUR VIDEO ACCESSIBLE?

1. Create accessible video content

The material that makes up a video itself is critical to accessibility, and achieving accessible video content is much easier if the right steps and considerations are taken into account from the very beginning.

- Use colors thoughtfully and with good contrast: Viewers may have deficiencies in vision (low vision, color vision, etc). As the population ages, consider how many people may fall into one of those visual categories. Additionally, even people without a visual disability will appreciate a color palette that isn't distracting and won't cause unnecessary eye strain. In simple terms, the text used for sub-titles, transcripts, and descriptions required to be distinguishable so that it is clear to read.

- Use text that is easy to read: When displaying text on screen, ensure the font size is large enough and text is on the screen for long enough to read.

- Avoid fast-flashing content: Flashing content may provoke seizures/irritable distractions among some viewers, e.g. those living with epilepsy. Avoid fast-flashing content in your productions and if included, ensure not to exceed three flashes within a period of one second.

- Sign language:

2. Choose a current video format for the web

Entirely apart from a video's content, the format of the video file can have a big impact on its usability for everyone. Before creating a video or having one created for you, determine if the format the file will be delivered in is current enough to load and play seamlessly.

3. Choose an accessible video player

- Ensure the video player supports captions, transcripts, and audio descriptions.
- Ensure all controls, like volume, play, and pause, can be operated with a keyboard and have accessible labels for assistive technology such as screen readers.
- Ensure videos do not play automatically when the webpage loads. This can be confusing for many users, and the sound can interfere with assistive technology such as screen readers.

4. Add captions to your video

WCAG Success Criterion 1.2.2 Captions (level A) says captions should be "provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such."

This means every prerecorded video should have captions.

Captions are text alternatives of the audio content, synchronized with the video. Popular video hosting sites such as YouTube and Facebook have specific captioning options available.

Captions should not be confused with subtitles — they are similar, yet distinct from each other. While subtitles are a straightforward translation of the video's dialogue, often times in a different language, captions not only have a text description of the spoken word but also include description of the background music or sound so as to provide the same level of information as one would get from hearing the audio.

To meet web content accessibility standards, always include captions to prerecorded videos or provide real-time captions for live videos. According to WebAIM, "captions should be:

- Synchronized- the text content should appear at approximately the same time that audio would be available
- Equivalent- content provided in captions should be equivalent to that of the spoken word
- Accessible- caption content should be readily accessible and available to those who need it."

Benefits of captioning videos

Apart from the standard benefit most people think of — to make media accessible to people who are deaf or have hearing loss — captioning has additional benefits.

- Captions help you increase your viewer base. Multilingual captions are a great way to make your video accessible to all. It opens up the audience to people who speak a language different from the language the video is created in and allows your content to have the widest reach for your message.
- Captions help when watching videos in loud environments such as on the bus or places where you need to be quiet such as a library or work. It's estimated that 85% of Facebook videos are watched without sound.
- Captions improve the search engine optimization (SEO) of your video as content in text form is better indexed by search engines.
- Captions can be closed or open. Closed captions can be turned on or off, whereas open captions are always visible. For the sake of viewers' convenience, most websites provide closed captions for video content. To read and understand more about closed captions, read Internet Closed Captioning Requirements.

5. Add a transcript to your video

Transcripts can be thought of as text versions of your video. A transcript should include not only what is spoken in the video, but also descriptions of actions or important information on-screen.

Usually, a fully-accessible video should include both captions and a transcript.

There are several options for creating a transcript:

- Format and reuse captions: If you have already created a caption file, the same can be edited or added to and used as a transcript.
- Use a professional transcribing services: There are many services that transcribe audio and video files and provide the transcript in HTML format for a fee.
- Use a speech recognition software: Speech recognition software such as Dragon Naturally Speaking is one of the most popular software in the market. However, like any other voice assisted technology, this software needs "training" to understand the voice, accent, tone, etc. and has an initial learning curve.
- Manually type up the content: If you are creating videos occasionally, this is a good DIY option.

Benefits of transcribing your video

Including a transcript to your video has added benefits.

- A person who is blind, has other disabilities, or otherwise cannot or prefers not to watch the video will still be able to get all the information in text form.
- A person using assistive technology such as a screen reader to access a transcript may be able to get the same content in less time than listening to the actual audio content. This is because experienced screen reader users may increase their reading speed to a pace much faster than we speak.
- Including transcripts can be helpful to everyone at different times — for example, when people don't want to spend the time to watch the video but will scan a transcript to get the information they want quickly.
- Including a transcript makes your video more searchable as content in text form is better indexed by search engines.

6. Include audio description if needed

In cases where important information or actions are happening on-screen but are not clearly described or apparent in the audio track, an audio description can help fill in the missing information for someone who can't see what's being displayed.

In the defined terms of Section 508 standards, audio description is defined as, "Narration added to the soundtrack to describe important visual details that cannot be understood from the main soundtrack alone. Audio description is a means to inform individuals who are blind or who have low vision about visual content essential for comprehension. Audio description of video provides information about actions, characters, scene changes, on-screen text, and other visual content. Audio description supplements the regular audio track of a program. Audio description is usually added during existing pauses in dialogue. Audio description is also called "video description" and "descriptive narration".

One of the keys in this definition is that descriptive audio is usually added during existing pauses. There is absolutely a science and an art to this, but consider how providing succinct descriptions during natural pauses can help a viewer have complete understanding of the scene.

If videos are created with accessibility in mind, audio descriptions probably aren't necessary, as long as important visual elements of the video are described in the audio track itself. Or, if for example the entire video is a man speaking at a podium (or some other relatively static presentation), audio descriptions would usually be considered unnecessary.

Accessible video recap

An accessible video usually includes captions; a transcript; and careful use of color, text, and flashes or animation. A video should also be delivered in an accessible format with an accessible media player, and may include additional audio description when the default audio track isn't sufficient.

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