

# **Module 1**

## **Introduction to TV production**

### **I. Introduction**

Television Production, techniques used to create a television program. The entire process of creating a program may involve developing a script, creating a budget, hiring creative talent, designing a set, and rehearsing lines before filming takes place. After filming, the post-production process may include video editing and the addition of sound, music, and optical effects.

The three basic forms of television programs are fictional, nonfictional, and live television. Fictional programs include daytime soap operas; situation comedies; dramatic series; and motion pictures made for television, including the mini-series (a multiple-part movie). The basic nonfictional, or reality, programs include game shows, talk shows, news, and magazine shows (informational shows exploring a variety of news stories in an entertainment format). Live television is generally restricted to sports, awards shows, news coverage, and several network daily talk shows.

Most television programs are produced by production companies unrelated to the television networks and licensed to the networks. The network creates the financing for the production by selling commercial time to sponsors.

### **II. The Production Team**

The personnel involved in the production of a television program include creative talent such as actors, directors, writers, and producers as well as technical crew members such as camera operators, electrical technicians, and sound technicians.

The executive producer is responsible for the complete project and is usually the person who conceives the project and sells it to the network. The executive producer bears final responsibility for the budget and all creative personnel, including the writer, line producer, director, and major cast members. The line producer reports to the executive producer and is responsible for the shooting schedule, budget, crew, and all production logistics.

The writer or writers develop the script for each show. They often work during preproduction and rehearsals to correct problems encountered by the actors or directors, or to revise for budgetary or production considerations.

Reporting to the executive producer, the director helps choose actors, locations, and the visual design of the production, such as the style of sets and wardrobe. In addition, the director is responsible for the performances of the actors as well as all camera movements. After filming, the director edits the videotape to create what is known as a director's cut.

Actors work under the direction of the director to portray a character. Performers include talk-show hosts, newscasters, and sports announcers. Actors and performers are chosen by the producer, and most audition to earn their part. Once they are hired, actors memorize their lines from a script and usually participate in a rehearsal before the program is filmed, or shot. Performers may provide live commentary, or in the case of newscasters, they may read their lines from cue cards or a TelePrompTer—a machine that displays words on a screen.

The production manager is responsible for all physical production elements, including equipment, crew, and location. The assistant directors report to the director and are responsible for controlling the set, managing the extras, and in general carrying out the director's needs. The cinematographer, who operates the camera, is responsible for lighting the set and the care and movement of the camera.

The production designer, also called the art director, is responsible for the design, construction, and appearance of the sets and the wardrobe. Often the makeup artists and hair stylists report to the production designer. The key grip is responsible for the camera dolly (the platform that holds and moves the camera) and all on-set logistical support, such as camera mounts, which are used to affix the camera to a car or crane.

Videotape production involves a technical director, who is responsible for video recording, and video engineers, who are responsible for the maintenance and quality of the electronic equipment and their output.

### **III. Producing a Program**

The creation of a television show begins with an idea for a program and the development of a script. A television network may also require a commitment from one or more well-known actors before financially committing to film a show. Producing a show involves three main stages: pre-production, principle photography, and post-production.

#### **A. Pre-production Activities**

Pre-production activities involve the planning, budgeting, and preparation needed before shooting begins. The pre-production period can last as long as a month or more for a movie, or just a week for a single episode of a situation comedy. Productions of great complexity, such as a telethon or a live-awards ceremony, may take months of pre-production. Three key people involved in pre-production are the production manager, director, and casting director. The production manager's first tasks are to produce a preliminary budget, hire the location manager, and locate key crew department leaders. The first essential production decisions are the location of shooting and a start-of-production date. The director's first activities are to review the script for creative changes, begin the casting process, and select assistant directors and camera operators. Subsequently, every decision involving cast, creative crew, location, schedule, or visual components will require the director's consultation or approval.

The culminating activity of the pre-production process is the final production meeting, attended by all crew members, producers, director, and often, the writer. Led by the director, the pre-production team reviews the script in detail scene by scene. Each element of production is reviewed and any questions answered. This meeting can last from two hours to a full day depending on the complexity of the shoot.

## B. Principle Photography

Principle photography is the period in which all the tape or film needed for the project is shot. All television programs are shot using one of two basic methods of photography: single camera film production and multiple camera tape production. The single camera method is used to produce movies for television and most dramatic series. Multiple camera tape production is used to produce most situation comedies, soap operas, talk shows, game shows, news magazines, and live programs such as sports, awards shows, and the news. Some forms of programming such as music videos or reality programs (special interest news presented in an entertaining format) employ both methods, using single camera shooting for field pieces and multiple camera for in-studio footage.

The single camera film mode of production is virtually identical to the method of making theatrical movies. The script is broken down into individual scenes. Each scene is shot from a number of angles. The widest shot, which includes all the action, is called the master. Additional shots include closer angles of the characters, sometimes in groups of two or more, and almost always at least one angle of each actor alone. That shot can be either a medium shot (from waist to head), close-up (only head and shoulders), or extreme close-up (of the face only). Many times a scene includes insert shots (such as a close-up of a clock or a gun) or cutaways (a shot of the sky or tree or other visual that relates to the scene). Scenes are scheduled to be filmed according to production efficiency, not story progression. The film is pieced together in sequential order during post-production.

The multiple camera tape method is most suitable for shooting inside a studio. Three or four videotape cameras are focused on the action taking place on the set, and scenes are shot in sequence. Each camera operator works from a list of camera positions and framing requirements for the full scene. Together the cameras cover all required camera angles.

Using headsets to communicate with the camera crew, the director asks for camera adjustments during the filming of the scene and indicates to the technical director which cameras to use at each moment. The technical director ensures the selected shot is recorded on a master tape. The result is a fully edited, complete show, needing only sound effects, music, optical effects, and titles to be complete.

### C. Post-Production Activities

Post-production begins with the completion of filming and continues until the project is delivered to the network for airing. The two main activities of post-production are the editing, or assembling, of video footage and the creation of a complete sound track.

Editing may begin during production. In single-camera shoots, the film from each day is reviewed at a later time by the director, producer, and network in the order in which it was shot. These films, called dailies, are then broken down and assembled into scenes by the editors. The first full assemblage is shown to the director, who makes further editing changes and creates the director's cut. Thereafter, the producer and the network make changes until a final cut is created.

The final cut is given to the sound department, which is responsible for preparing the music tracks, or recordings; sound effects; and dialogue tracks for final combination into one track. The final mixing of all the sound is called dubbing. During this period, the sound engineers will spot the music—that is, select the points at which music will be inserted—and musicians will write and record the music. Sound engineers also adjust dialogue recording for production quality and record new or replacement dialogue in a process called looping. Sound effects are also added at this time. The resulting dubbing session, which can take several days for a movie or just a few hours for a multiple camera tape production, can involve the combination of 5 to 25 separate sound tracks.

The final stage of post-production is the addition of optical effects, such as scene fade-outs or dissolves, insertion of titles and credits; creation of special visual effects, such as animations; and color correction.

The post-production process can take as long as eight weeks for a movie to three days for a situation comedy. Commonly, all optical effects, titles, and music are rolled in during the production of soap operas, game shows, or talk shows—greatly reducing post-production.

### IV. Technological Advances

Prior to the advent of videotape in the 1950s, original programming for television was produced live or shot on film for future airing. Variety shows, such as "The Texaco Star Theatre" (1950-1951) with Milton Berle, "Your Show of Shows," (1950-1954) and "The Ed Sullivan Show," (1948-1971) and game shows were the most popular forms. "I Love Lucy" (1951-1957) pioneered the multiple camera style of shooting comedy. But television forms were still limited by the technology. The development of videotape made most live entertainment programming unnecessary and not worth the risk of making mistakes on the air.

The 1960s witnessed great advances in film production technology, including smaller cameras, mobile units, and low-light film. Producing quality film programming became possible, and the film studios entered television production, utilizing their own stages and equipment. The 1970s and the advent of government network regulation of production and distribution opened production possibilities to entrepreneurs and individual creative people. Television producers, including Aaron Spelling, Norman Lear, and Mary Tyler Moore, formed their own companies, and the studio control of production and programming disappeared.

The 1980s and 1990s brought cable and satellite television. As audiences became more fragmented, programming that reached special interest groups, such as community news magazine programs, became profitable. Yet, because of the small audience size, low-cost production became an absolute necessity. In the 1990s advances in technology brought the video camera out of the studio and into the field, expanding television's visual possibilities and making today's magazine show economically possible.

### **Types of TV Programs**

The following are some of the types of tv programs

- Sports- Programs featuring sports or sports event. E.g.: Cricket Match
- Sitcom- An amusing TV series about fictional characters. Also known as situational comedy E.g.: How I met your mother, Friends
- Documentary- A TV program that documents real life events. E.g.: Life on earth
- Soap- Also known as a soap opera . A fictional drama about people's daily life eg: All My Children
- Cartoon- A show that features animated characters Eg: Tom and Jerry
- Travel or holiday- A show that features popular destinations or travel reviews. Eg: Sancharam
- Drama- A fictional TV story, featuring actors. Eg: Game of thrones
- News- A show that reports world events as they unfold. Eg: BBC news
- Cookery- A program hosted by famous chefs, who teach people how to cook. Eg: Masterchef
- Reality shows-A talent show featuring real people. Eg: America has got talent
- Talk/ Chat show- Program hosted by a tv personality featuring guests who talk about their lives. Eg: Ellen DeGeneres Show
- Game show- A show featuring competitive games or quizzes. Eg: Deal or no deal
- Music- A show featuring live or recorded music. Eg: MTV Unplugged
- Lifestyle- featuring topics such as fashion, diet health etc. Eg: Top-gear

### **TV Production Formats**

#### **Clip**

A clip show is an episode of a television series that consists primarily of excerpts from previous episodes. Most clip shows feature the format of a frame story in which cast members recall past events from past installments of the

show, depicted with a clip of the event presented as a flashback. Clip shows are also known as cheaters, particularly in the field of animation. Clip shows are often played before series finales, or once syndication becomes highly likely. Other times, however, clip shows are simply produced for budgetary reasons.

### **Franchise**

A media franchise, also known as multimedia franchise, is a collection of related media in which several derivative works have been produced from an original creative work of fiction, such as a film, a work of literature, a television program or a video game. The intellectual property from the work can be licensed to other parties or partners for further derivative works and commercial exploitation across a range of media and by a variety of industries for merchandising purposes.

### **Prequel**

A prequel is a literary, dramatic, or cinematic work whose story precedes that of a previous work, by focusing on events that occur before the original narrative. A prequel is a work that forms part of a backstory to the preceding work.

### **Serial**

In television and radio programming, a serial has a continuing plot that unfolds in a sequential episode-by-episode fashion. Serials typically follow main story arcs that span entire television seasons or even the full run of the series, which distinguishes them from traditional episodic television that relies on more stand-alone episodes. Worldwide, the soap opera is the most prominent form of serial dramatic programming.

### **Spin-off**

In media, a spin-off is a radio program, television program, video game, film, or any narrative work, derived from already existing works that focus on more details and different aspects from the original work.

### **Docufiction**

Docufiction, often confused with docudrama, is the cinematographic combination of documentary and fiction, this term often meaning narrative film. It is a film genre which attempts to capture reality such as it is and which simultaneously introduces unreal elements or fictional situations in narrative in order to strengthen the representation of reality using some kind of artistic expression.

### **Miniseries**

Miniseries is a television program that tells a story in a predetermined, limited number of episodes. The term "serial" is used in the United Kingdom and in other Commonwealth nations, though its meaning does not necessarily equate to "miniseries" in its usage.

## **Series**

Series (singular) is anything that is presented itself in a serial form. It is important to note that when we are talking about literary or media series, the only possible way to know the future/ending of them is by waiting for the next chapters/episodes to get released.

## **Unaired episode/pilot**

A television pilot is a standalone episode of a television series that is used to sell the show to a television network. At the time of its creation, the pilot is meant to be the testing ground to gauge whether a series will be successful; it is therefore a test episode for the intended television series, an early step in the series development, much like pilot studies serve as precursors to the start of larger activity. In the case of a successful television series, the pilot is commonly the very first episode that is aired of the particular series under its own name; the episode that gets the series "off the ground". A "backdoor pilot" is an episode of an existing successful series, featuring future tie-in characters of an up-and-coming television series or film. Its purpose is to introduce the characters to an audience before the creators decide on whether or not they intend to pursue a spin-off series with those characters.

## **Documentary**

A documentary film is a nonfictional motion picture intended to document reality, primarily for the purposes of instruction, education, or maintaining a historical record. "Documentary" has been described as a "filmmaking practice, a cinematic tradition, and mode of audience reception" that is continually evolving and is without clear boundaries. Documentary films were originally called 'actuality' films and were only a minute or less in length. Over time documentaries have evolved to be longer in length and to include more categories, such as educational, observational, and even 'docufiction'. Documentaries are also educational and often used in schools to teach various principles. Social media platforms such as YouTube, have allowed documentary films to improve the ways the films are distributed and able to educate and broaden the reach of people who receive the information.

## **Micro-series**

A micro-series is a very short episodic television programming narrative sponsored by an advertiser. This is a non-traditional way of reaching primary

markets. A micro-series is intended to promote a product while engaging viewers with entertaining content. These episodes are generally two to three minutes long and often run during commercial breaks of popular television programs. After each air date, they are also available online and on mobile devices.

## **Remake**

A remake is a film, television series, video game or some other form of entertainment that is based on an earlier product and tells the same story.

## **Short**

A short film is any motion picture not long enough to be considered a feature film. The Academy of Motion Picture Arts and Sciences defines a short film as "an original motion picture that has a running time of 40 minutes or less, including all credits". In the United States, short films were generally termed short subjects from the 1920s into the 1970s when confined to two 35mm reels or less, and featurettes for a film of three or four reels. "Short" was an abbreviation for either term.

## **Mockumentary**

A mockumentary or docucomedy is a type of movie or television show depicting fictional events but presented as a documentary.

## **Show**

A television show is any content produced for broadcast via over-the-air, satellite, cable, or internet and typically viewed on a television set, excluding breaking news, advertisements, or trailers that are typically placed between shows. Television shows are most often scheduled well ahead of time and appear on electronic guides or other TV listings.

## **Made-for-TV film**

A television film is a feature-length motion picture that is produced and originally distributed by or to a television network, in contrast to theatrical films made explicitly for initial showing in movie theaters.

## **Sequel**

A sequel is a literature, film, theatre, television, music or video game that continues the story of, or expands upon, some earlier work. In the common context of a narrative work of fiction, a sequel portrays events set in the same fictional universe as an earlier work, usually chronologically following the events of that work.

## **Special**

A television special is a stand-alone television show which temporarily interrupts episodic programming normally scheduled for a given time slot. Specials have been produced which provide a full range of entertainment and informational value available via the television medium, in various formats, and in any viewing lengths.

### **Electronic Field Production and Electronic News Gathering**

Electronic news-gathering (ENG) is when reporters and editors make use of electronic video and audio technologies in order to gather and present news. ENG can involve anything from a single reporter with a single professional video camera, to an entire television crew taking a truck on location. This term was coined during the rise of videotape technology in the 1970s. This term was commonly used in the television news in the 1980s and '90s, but is used less frequently now, as the technology has become commonplace.

Preparing and transmitting news reports is certainly one of the most challenging tasks of broadcast organisations. Radio news reporting has a distinguished and brilliant history: in some of the crucial moments of the twentieth century, radio played an essential role. Still today, the ubiquity of radio receivers keeps radio very high on the list of important news disseminators.

The introduction of television was the next step in the development of the medium. While for radio news the voice of the reporter was, more or less, sufficient, in the case of television it was certainly not: the mandatory requirement for any television newscast is the picture of the event, or at least of the location where it happened and the visual presence of the reporter on that spot. Securing not only news as information, but also as a meaningful picture, meant searching desperately for technical means which could offer such a facility. Photographic techniques were already available, as well as the reversal film as a viable compromise between speed and quality. On the other hand, it was theoretically possible to use OB vans. However, the time required to bring the film back to base, to develop it (even with a pushed process), transfer the sound and edit all that together precluded the inclusion of pictures if the events had occurred less than 2 hours before the start of the newscast. An OB van requires even more time to be rigged and set to work, and then its presence on the spot may sometimes be more important than the event it is supposed to cover. Obviously electronic cameras and magnetic videotape recording were the right answer to that need. Unfortunately, cameras and recorders before the late 1970s were both bulky and heavy, in short a far cry from any thought of portability.

Rightly assessing the importance of immediacy in news operations and the lack of adequate equipment on the market to achieve it, one of the three US networks – CBS – instructed its R&D department to begin, in collaboration with world manufacturers, to develop the electronic equipment for news gathering and thus spearheaded the ENG revolution. A portable camera proved to be feasible, although its portability had not much in common with the present-day understanding of that term. The recorder, however, represented a much more

delicate problem. The existing broadcast-quality format, based on 2-inch tapes, was practically inadaptable to a really portable version. The emerging 1-inch format B and C recorders were still at an early stage of development, so the only possible solution was to use an existing format, which was developed for industrial and educational applications

**Electronic field production (EFP)** is a television industry term referring to a video production which takes place in the field, outside of a formal television studio, in a practical location or special venue. Zettl defines EFP as using "both ENG (electronic news gathering) and studio techniques. From ENG it borrows its mobility and flexibility; from the studio it borrows its production care and quality control. EFP takes place on location (which may include shooting in someone's living room) and has to adapt to the location conditions... Good lighting and audio are always difficult to achieve in EFP, regardless of whether you are outdoors or indoors. Compared to ENG, in which you simply respond to a situation, EFP needs careful planning."

Typical applications of electronic field production include awards shows, concerts, major interviews for newsmagazine shows like Inside Edition, Extra (TV program) and Dateline NBC, large conventions such as the Democratic National Convention, Republican National Convention or San Diego Comic-Con International, celebrity red-carpet events and sporting events.

EFP ranges from a camera operator or crew of two (camera operator with sound mixer) capturing high-quality imagery, to a multiple-camera setup utilizing videography, photography, advanced graphics and sound.

### **EFP OPERATIONAL PRACTICES**

As in ENG operations, analogue component recording is still used for EFP in a number of organisations around the world. However, digital techniques are quickly taking over, imposing a number of choices, the first one being, naturally, the selection of the most appropriate digital recording format. That choice is based on the evaluation of the already discussed parameters:

- the type of programme to be produced;
- the overall sound and picture quality required;
- the multi-generation capacity necessary; and
- the post-production margin needed.

Considering that EFP methods are used for a large gamut of programme genres, from documentary to drama, it is obvious that the overall picture and sound quality requirements are more stringent than in the case of news operations. The post-production of mainstream television programmes is also more demanding, as it requires a considerably larger number of quasi-transparent generations and creates more occasions when access to individual pixels is necessary, which will lead to more cascaded decompression-compression processes.

The basic definition of EFP refers to the use of 'lightweight electronic equipment' for acquisition. However, EFP borrows a number of film production practices and, while the camcorder is indeed a 'lightweight' piece, the additional equipment, which typically can be found on any film shooting location, can hardly be defined in the same manner. EFP crews will use a large palette of lighting equipment, camera cranes, tracking rails, video monitors, a selection of optical attachments, etc. In short, it could be said that the only noticeable difference between a film and an EFP crew is the replacement of a film camera by a digital camcorder.

In the post-production domain it is difficult to discern EFP-specific requirements and operating practices, since the same linear and non-linear editing systems and post-production practices are used both for EFP and multi-camera productions. It could be said that what distinguishes an EFP post-production is the number of edits, and a more delicate and time-consuming colour matching of different shots.

## **Module 2**

## **Post production overview**

Post-production is the collection, organization and coherent unification of all the elements of an audiovisual project. The end result is called a Master. From this master, you create Deliverables.

**Editing** is the manipulation and arrangement of video shots. Video editing is used to structure and present all video information, including films and television shows, video advertisements and video essays. Video editing has been dramatically democratized in recent years by editing software available for personal computers.

## **Types of editing**

- Linear video editing, using 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 system (NLE), This is edited on computers with specialised software. These are non destructive to the video being edited and use programs such as DaVinci Resolve, Adobe Premiere Pro and Final Cut Pro.
- Offline editing is the process in which raw footage is copied from an original source, without affecting the original film stock or video tape. Once the editing has been completely edited, 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 and is done in the final stage of a video production.

## **Linear and non-linear editing**

**Linear video editing** is a process of selecting, arranging and modifying images and sound in a pre-determined, ordered sequence – from start to finish. Linear editing is most commonly used when working with videotape. Unlike film, videotape cannot be physically cut into pieces to be spliced together to create a new order. Instead, the editor must dub or record each desired video clip onto a master tape.

For example, let's say an editor has three source tapes; A, B and C and he decided that he would use tape C first, B second and A third. He would then start by cutting up tape C to the beginning of the clip he wants to use, then as he plays tape C, it would also be simultaneously recording the clip onto a master tape. When the desired clip from tape C is done, the recording is stopped. Then the whole process is repeated with tapes B and A.

## **Pros vs Cons**

There are a couple of disadvantages one would come across when using the linear video editing method. First, it is not possible to insert or delete scenes from the master tape without

re-copying all the subsequent scenes. As each piece of video clip must be laid down in real time, you would not be able to go back to make a change without re-editing everything after the change.

Secondly, because of the overdubbing that has to take place if you want to replace a current clip with a new one, the two clips must be of the exact same length. If the new clip is too short, the tail end of the old clip will still appear on the master tape. If it's too long, then it'll roll into the next scene. The solution is to either make the new clip fit to the current one, or rebuild the project from the edit to the end, both of which is not very pleasant. Meanwhile, all that overdubbing also causes the image quality to degrade.

However, linear editing still has some advantages:

It is simple and inexpensive. There are very few complications with formats, hardware conflicts, etc.

For some jobs linear editing is better. For example, if all you want to do is add two sections of video together, it is a lot quicker and easier to edit tape-to-tape than to capture and edit on a hard drive.

Learning linear editing skills increases your knowledge base and versatility. According to many professional editors, those who learn linear editing first tend to become better all-round editors.

The **nonlinear video editing** method is a way of random access editing, which means instant access to whatever clip you want, whenever you want it. So instead of going in a set order, you are able to work on any segment of the project at any time, in any order you want. In nonlinear video editing, the original source files are not lost or modified during editing. This is done through an edit decision list (EDL), which records the decisions of the editor and can also be interchanged with other editing tools. As such, many variations of the original source files can exist without needing to store many different copies, allowing for very flexible editing. It is also easy to change cuts and undo previous decisions simply by editing the EDL, without having to have the actual film data duplicated. Loss of video quality is also avoided due to not having to repeatedly re-encode the data when different effects are applied.

Nonlinear editing differs from linear editing in several ways.

First, video from the sources is recorded to the editing computer's hard drive or RAID array prior to the edit session.

Next, rather than laying video to the recorder in sequential shots, the segments are assembled using a video editing software program. The segments can be moved around at will in a drag-and-drop fashion.

Transitions can be placed between the segments. Also, most of the video editing programs have some sort of CG or character generator feature built in for lower-thirds or titles.

The work-in-progress can be viewed at any time during the edit in real time. Once the edit is complete, it is finally laid to video.

Non-linear video editing removes the need to lay down video in real time. It also allows the individual doing the editing to make changes at any point without affecting the rest of the edit.

### **Pros vs Cons**

There are many advantages a nonlinear video editing system presents. First, it allows you access to any frame, scene, or even groups of scenes at any time. Also, as the original video footage is kept intact when editing, you are able to return to the original take whenever you like. Secondly, nonlinear video editing systems offers the flexibility of editing. You can change your mind a hundred times over and changes can also be made a hundred times over without having to start all over again with each change. Thirdly, it is also possible to edit both standard definition (SD) and high definition (HD) broadcast quality videos very quickly on normal PCs which do not have the power to do the full processing of the huge full quality high resolution data in real-time.

The biggest downside to nonlinear video editing is the cost. While the dedicated hardware and software doesn't cost much, the computers and hard drives do, from two to five times more than the gear. As such, the average price for a basic nonlinear video editing package can come in between \$5,000 and \$10,000. For stand-alone systems that approach broadcast quality, the amount you pay may be twice that. However, as the nonlinear technology pushes forward, count on big gains in digital video storage and compression, as well as lower prices on computers and hard disks in the very near future.

### **Difference between online and offline editing**

- offline editing -it's the stage where your raw footage is run through a program that transcodes it to have a lower resolution. You can then use that lower resolution footage to edit your film. Think of this as the storytelling stage. The editor focuses on the timing of the cuts, the pacing of story, and communicating emotions.
- Online editing, better thought of as the finishing stage, is where you'll reconnect those low-resolution files to the original, full quality footage. This is also when color correction, effects work, final titles, and audio are brought into the film. It's at the end of the online stage that you export your completed film.
- Offline editing is actually a rough or draft cut of the project by editing a low-quality footage together, so the main editor and possibly director could get ideas for the final cut.
- Another role for an offline editor is to create an edit decision list (EDL) which is similar to log sheets (a list of shots). It is very important because once the offline editors done a list of the shots they put in a rough cut, the online editor would follow

and make changes in order to edit a final cut. Offline editors can also make creative decisions; shots, cuts, dissolves, fades, etc.

- Online editing is a final cut of the project by editing a high quality footage together.
- Online editors would reconstruct the final cut based on the EDL, created by the offline editors.
- They will add visual effects, lower third titles, and apply color correction

## Montage

- The process or technique of selecting, editing, and piecing together separate sections of film or video to form a continuous whole.
- a film editing technique in which a series of short shots are sequenced to condense space, time, and information.
- The term has been used in various contexts. In French the word "montage" applied to cinema simply denotes editing. In Soviet montage theory, as originally introduced outside the USSR by Sergei Eisenstein, it was used to create symbolism. Later, the term "montage sequence" used primarily by British and American studios, became the common technique to suggest the passage of time
- Methods of Montage:
  1. Metric
  2. Rhythmic
  3. Tonal
  4. Overtonal
  5. Intellectual

## Rhythmic Montage

- Rate of action in comparison to music
- Changing shots in time with musical beat
- Acceleration of action compared to music
- Fast action : Slow music

Example:

- <http://www.youtube.com/watch?v=b2uLNioV> W-M

## Tonal Montage

- Tone of shot matches tone of music

- Dark shot will have dark music
- Loud action has loud music

Example:

[https://www.youtube.com/watch?v=jSTWy25h\\_RiI](https://www.youtube.com/watch?v=jSTWy25h_RiI)

Overtonal/Associational

- Combination of all previous (Metric, Tonal, Rhythmic)
- Abstract + Complicated effect

Example

[https://www.youtube.com/watch?v=a\\_miVgxYQ3q8](https://www.youtube.com/watch?v=a_miVgxYQ3q8)

Battleship Potemkin, 1925

- Made by Sergei Eisenstein
- Celebrates 1905 Revolution against Tsarism in Russia
- Sailors rebellion
- Captain orders them shot
- Gained support
- Created to inspire comrades towards Bolshevism
- Test theory of montage
- Emotional Response
- Characterization simplified
- Odessa Steps Massacre of Civilians on the Odessa Steps
- Many films have paid homage to scene
- Fictional
- Rhythmic Montage

[http://www.yout\\_LEE2UL\\_N7Q](http://www.yout_LEE2UL_N7Q)

## Continuity editing

Continuity editing is the process, in film and video creation, of combining more-or-less related shots, or different components cut from a single shot, into a sequence so as to direct the viewer's attention to a pre-existing consistency of story across both time and physical location

Often used in feature films, continuity editing, or "cutting to continuity", can be contrasted with approaches such as montage, with which the editor aims to generate, in the mind of the viewer, new associations among the various shots that can then be of entirely different subjects, or at least of subjects less closely related than would be required for the continuity approach.

Continuity editing can be divided into two categories: temporal continuity and spatial continuity.

techniques can cause a passage to be continuous, giving the viewer a concrete physical narration to follow, or discontinuous, causing viewer disorientation, pondering, or even subliminal interpretation or reaction, as in the montage style.

The important ways to preserve temporal continuity are avoiding the ellipsis, using continuous diegetic sound, and utilizing the match on action technique.

**ellipsis** is an apparent break in natural time continuity as it is implied in the film's story.

**Diegetic sound** is that which is to have actually occurred within the story during the action being viewed.

**Match on action** technique can preserve temporal continuity where there is a uniform, unrepeated physical motion or change within a passage

Temporal discontinuity can be expressed by the deliberate use of ellipses. Cutting techniques useful in showing the nature of the specific ellipses are the dissolve and the fade.

## Spatial Continuity Techniques

- Establishing shots: A long shot or extreme long shot, usually with loose framing, that shows the spatial relations between the important figures, objects and setting in a scene
- Long take
- 180-degree rule : The angle between any two consecutive shots should not exceed 180 °, in order to maintain spatial relationships between people and objects in any given sequence of shots.
- Eyeline match: It is based on the premise that an audience will want to see what the character on-screen is seeing.

- Shot-reverse-shot: Two shots edited together that alternate characters, typically in a conversation situation.

## **Unity**

Unity is the existence of a central designing principle. It's that property a screenplay has when each of its functioning pieces -- character arcs, plot arcs, and theme -- operates in the service of a central principle.

Sometimes this principle is called theme -- other times it's called "controlling idea". But whatever you call it, it's that thing the script is "about".

- **The Shawshank Redemption**

Shawshank has real unity. It's a movie about freedom. By paradoxically being a movie about the many different kinds of prisons in which we find ourselves. The full development of this theme spawns the plot arc, and the character arcs.

## **The Importance Of Unity**

In a movie with real unity, you can find these thematic threads in all characters and plots. This is how you know that a movie is well-designed. And a movie so well-designed usually finds a symbolic resonance in the minds of its audience. The audience finds it moving and significant because of that symbolic resonance -- because its meaning is designed, planned, woven in.

Shawshank reminds us of our own lives. We all know what it's like to feel like we're in prison. Rightly or wrongly convicted. Desiring or avoiding true freedom and its responsibilities. Devoted to goodness and helpfulness...or to coercion, violence and corruption. We can see ourselves and our qualities in a movie like this. The movie allows us to externalize these aspects of ourselves and observe their interplay in a safe environment. In the dark, where others cannot see our faces. And learn from the experience. That kind of thing is what makes a movie truly valuable, on a personal level.

## **Concepts in visual effects**

Visual effects are the various processes by which imagery is created and/or manipulated outside the context of a live action shot.

- Visual effects involve the integration of live action footage and generated imagery to create environments which look realistic which is impossible to capture on film.
- Visual effects using computer generated imagery has recently become accessible to the independent filmmaker with the introduction of affordable and user friendly animation and compositing software.
- VFX can be categorized into: Compositing, Matte Painting, Animation, Lighting, Texture, Rigging

## CGI- Computer Generated Imagery

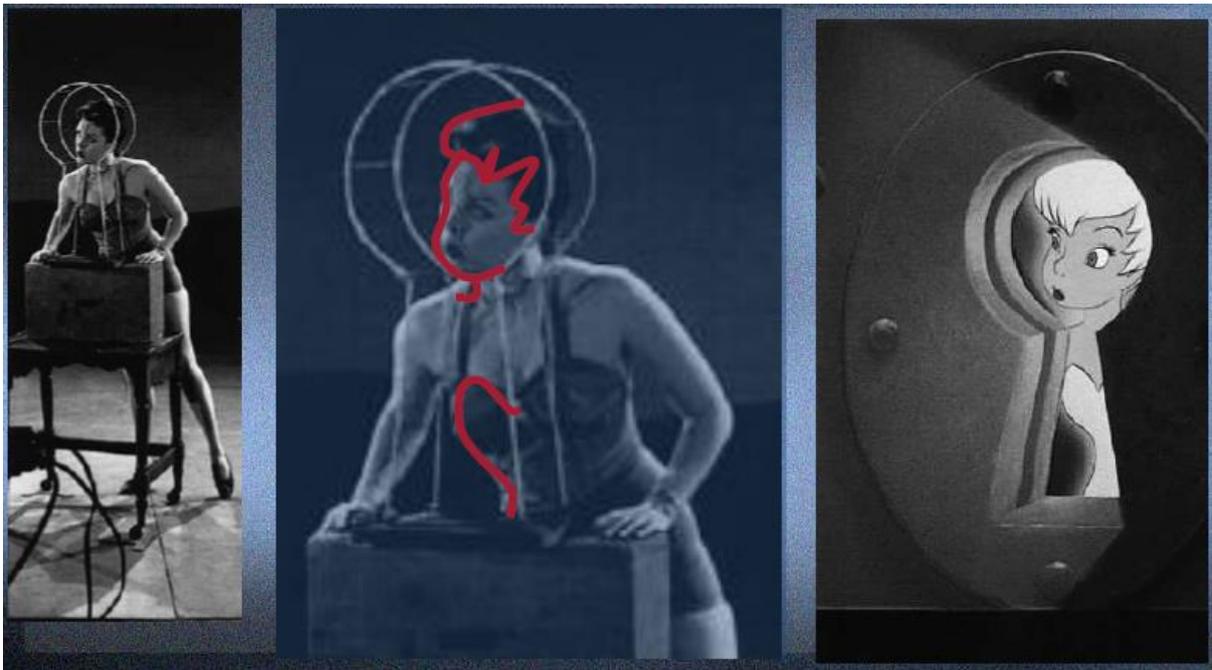
It is the application of computer graphics to create or contribute to images in art, printed media, video games, films, television programs, commercials, and simulators.

- The visual scenes may be dynamic or static, and may be two-dimensional (2D), though the term "CGI" is most commonly used to refer to 3D computer graphics used for creating scenes or special effects in films and television.
- Computer graphics software is used to make computer generated imagery for films, professional-grade films, games, and fine art from their home computers.

## Rotoscoping

Rotoscoping is an animation technique in which animators trace over live-action film movement, frame by frame, for use in animated films.

- Originally, pre-recorded live-action film images were projected onto a frosted glass panel and re-drawn by an animator.
- This projection equipment is called a rotoscope, although this device has been replaced by computers in recent years. In the visual effects industry, the term rotoscoping refers to the technique of manually creating a matte for an element on a live-action plate so it may be composited over another background.



## Compositing

It is the combining of visual elements from separate sources into single image, often to create the illusion that all those elements are parts of the same scene

- Compositing is taking real-life elements with Computer Generated (CG) Element and putting them together – so they seem like they were shot together.
- Live-action shooting for compositing is variously called "chroma key", "blue screen", "green screen" and other names. Today, most, though not all, compositing is achieved through digital image manipulation.



## Matte Painting

A matte painting is a painted representation of a landscape, set, or distant location that allows filmmakers to create the illusion of an environment that is nonexistent in real life or would otherwise be too expensive or impossible to build or visit.

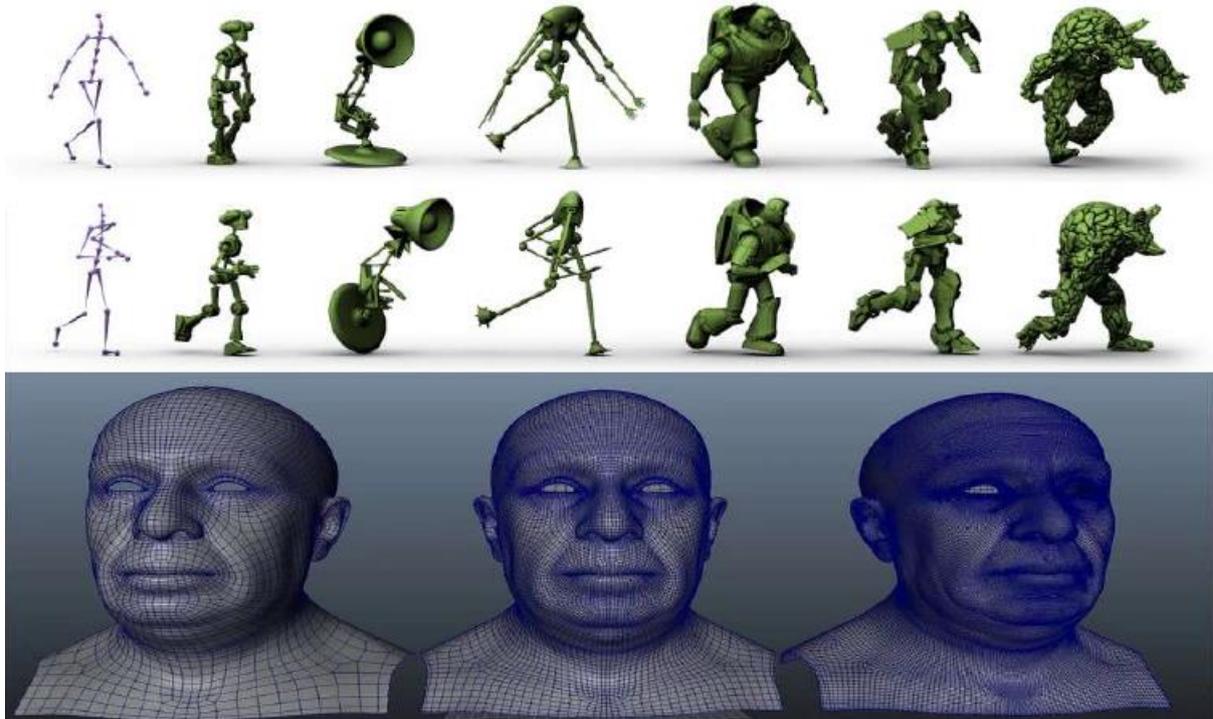
- Historically, matte painters and film technicians have used various techniques to combine a matte-painted image with live-action footage. At its best, depending on the skill levels of the artists and technicians, the effect is "seamless" and creates environments that would otherwise be impossible to film.
- In the scenes the painting part is static and movements are integrated on it.



## Rigging

Skeletal animation is a technique in computer animation in which a character is represented in two parts: a surface representation used to draw the character (called skin or mesh) and a hierarchical set of interconnected bones (called the skeleton or rig) used to animate the mesh. While this technique is often used to animate humans or more generally for organic modeling.

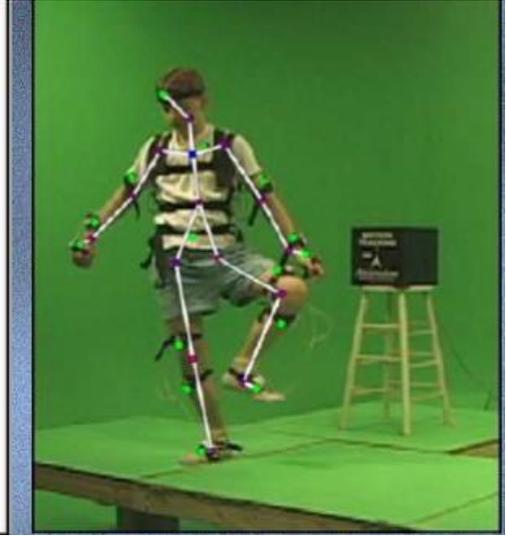
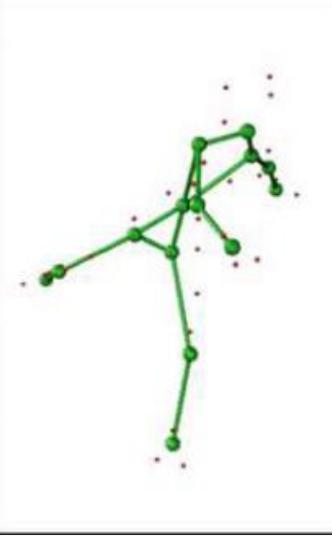
- This technique is used in virtually all animation systems where simplified user interfaces allows animators to control often complex algorithms .However, the intention of the technique is never to imitate real anatomy or physical processes, but only to control the deformation of the mesh data.



## Motion Capturing

Motion capture (MOCAP) is an effective 3D animation tool for realistically capturing human motion .

- In cinematography, match moving is a cinematic technique that allows the insertion of computer graphics into live-action footage with correct position, scale, orientation, and motion relative to the photographed objects in the shot.
- The term is used loosely to describe several different methods of extracting camera motion information from a motion picture. Sometimes referred to as motion tracking or camera solving, match moving is related to rotoscoping and photogrammetry.



## **Module 3**

## **PRINCIPLES OF SOUND**

Sound is a form of mechanical energy that travels in a longitudinal wave in a series of compressions (high pressure) and rarefactions (low pressure). The transmission of sound requires a medium such as air, liquid, or tissue. Because all mediums have some elastic properties, energy and momentum are transported by means of disturbance from one point to another, without the transport of matter.

Human hearing has a limited range of 20 Hz to 20 kilohertz (kHz). Ultrasound is considered those frequencies greater than 20 kHz, while diagnostic ultrasound utilizes frequencies greater than 1 megahertz (MHz). Amplitude (A) is the maximum increase (or decrease) in pressure due to the presence sound. It is often described as the “height” of the wave, and has no relationship to the wavelength or frequency.

Sound is a form of energy similar to light, which travels from one place to another by alternately compressing and expanding the medium through which it travels

### **Wavelength, Frequency and Amplitude**

- like throwing a stone into a pool of water...
- Wavelength: the distance between the ripples. Sounds of a long wavelength are of low frequency and are heard as deep in tone. Sounds of short wavelengths are of higher frequency and are heard as high or shrill. The number of cycles per second, or frequency, of sound determines its pitch:
- Amplitude: the height of the wave
- Frequency-The number of times that a soundwave occurs per second. Generally expressed in cycles per second, or hertz (Hz).

### **Reflection**

- Sound can be reflected by hard surfaces or absorbed by soft surfaces.
- The quality of the wall, ceiling, and floor surfaces of a room or studio will determine the way a sound can be reproduced.

### **Reflection and Reverberation**

- Hard walls reflect sound to produce reverberations.
- If the reflections of the sound can be distinguished separately from the origins of sound they are known as echoes.

### **Distortion**

- When an audio engineer goes beyond the limits of the dynamic range of the equipment and modulates beyond the 100% limit, distortion will be evident.

- Overload
- Any modification, added or taken away from the original sound can cause distortion

### **Types of Distortions**

- **HARMONIC:** caused by non-linearity of the input-to output characteristics of the recording chain or reproducing chain, introducing harmonics or altering the original harmonics.
- **FREQUENCY:** Unequal frequency range. Large changes of balance in bass or treble frequencies.
- **INTERMODULAR:** Two sounds of different frequencies are superimposed upon each other that results in a modulation of one frequency by the other. (on location—wind modulation vs. high freq musical instrument. Lower have more power so use windshield.)
- **TRANSIENT:** High transient hits either the microphone diaphragm or the loudspeaker cone, unable to recover quickly enough and continues to ring.
- **SPATIAL:** “The hole in the middle effect”, Sounds in the middle of the listening field are lost because of phasing effects due to the arrival time of the signal at each microphone, thus cancelling out some of the information.
- **VOLUME:** or “scale distortion”, usually caused by listening at different levels from the original recorded sound on a loudspeaker or headset. Often very-low volume speech is reproduced to avoid this.

### **Resonance**

- Sound waves are caused by vibrating air particles, and are capable of causing anything in their path to vibrate in sympathy. Any item that has mass or stiffness will vibrate more freely at one particular frequency than another. This is its **resonance**. (wine glass—generator...rooms...)

### **Perception of Sound**

The study of the human perception of sound is called psychoacoustics. Many factors go into hearing, including wave properties, sensory and brain processes. First, the wave has to be made, and it has a specific wavelength and frequency. Then the sound wave reaches the human ear, and is processed through many areas. Finally, the sound wave makes it through the ear and to the human brain, where even more action happens. You might think that when something makes a noise that you hear it instantaneously but, in reality, it goes through many steps first.

## Wave Properties

We are not going to go into too much detail about the wave's physical properties, since it is out of the scope of this atom, but remember:

- Frequency is perceived by humans as pitch;
- The sound intensity is the amplitude;
- Humans can only hear a specific range of sound, usually from 20 Hz to 20,000 Hz;
- The factors that go into a sound are its intensity, frequency and overtones (which are like interference, or background noises).

## The Human Ear

The human ear is made up of three main sections,

- The outer ear
- The middle ear
- The inner ear

We are going to start where a sound wave would start and follow it on its journey from outside your ear all the way to your brain. When you look at someone's ear, you are really only seeing the pinna, the outer most portion of the ear. It collects and focuses the sound wave. The wave then goes through your ear canal to the eardrum. The sound waves cause the eardrum to vibrate. Then we are in the middle ear, which has three very, very small bones: the malleus, incus and stapes. These can also be referred to as the hammer, anvil and stirrup, respectively. These three bones transmit the signal to the elliptical window. This is the beginning of the inner ear. The sound waves are then transmitted from the elliptical window through the inner ear's semicircular canals, the cochlea, and the audio nerve, which is filled with fluid. This fluid is what allows the body to detect movements and maintain balance. Your cochlea is shaped like a snail, and is full of teeny tiny hairs. These hairs vibrate differently depending on the frequencies. These vibrations release electrical impulses to the auditory nerve and are then sent to your brain, where they are understood as sound. So while this seems to happen very quickly, sound waves have to travel a long way before you ever hear anything!

## LOUDNESS

The ear can respond to a remarkable range of sound amplitude. (Amplitude corresponds to the quality known as loudness.) The ratio between the threshold of pain and the threshold of sensation is on the order of 130 dB, or ten trillion to one. The judgment of relative sounds is more or less logarithmic, such that a tenfold increase in sound power is described as "twice as

loud". The just noticeable difference in loudness varies from 3 dB at the threshold of hearing to an impressive 0.5 dB for loud sounds.

The sensation of loudness is affected by the frequency of the sound. A series of tests using sine waves produces the curves shown. At the low end of the frequency range of hearing, the ear becomes less sensitive to soft sounds, although the pain threshold as well as judgments of relatively loud sounds are not affected much. Sounds of intermediate softness show some but not all of the sensitivity loss indicated for the threshold of hearing. At high frequencies the change in the sensitivity is more abrupt, with sensation ceasing entirely around 20 khz. The threshold of pain increases in the top octave also.

The ability to make loudness judgments is compromised for sounds of less than 200ms duration. Below that limit, the loudness is affected by the length of the sound; shorter is softer. Durations longer than 200ms do not affect loudness judgment, beyond the fact that we tend to stop paying attention to long unchanging tones.

## **MASKING**

The threshold of hearing for a particular tone can be raised by the presence of another noise or another tone. White noise reduces the loudness of all tones, regardless of absolute level. If the bandwidth of the masking noise is reduced, the effect of masking loud tones is reduced, but the threshold of hearing for those tones remains high. If the masking sound is narrow band noise or a tone, masking depends on the frequency relationship of the masked and masking tones. At low loudness levels, a band of noise will mask tones of higher frequency than the noise more than those of lower frequency. At high levels, a band of noise will also mask tones of lower frequency than itself.

## **PITCH**

People's ability to judge pitch is quite variable. (Pitch is the quality of sound associated with frequency.) Most subjects studied could match pitches very well, usually getting the frequencies of two sine waves within 3%. (Musicians can match frequencies to 1%, or should be able to.) Better results are obtained if the stimuli are similar complex tones, which makes sense since there are more active points along the basilar membrane to give clues. Dissimilar complex tones are apparently fairly difficult to match for pitch (judging from experience with ear training students; I haven't seen any studies on the matter to compare them with sine tone results).

Judgment of relative pitch intervals is extremely variable. The notion of the two to one frequency ratio for the octave is probably learned, although it is easily learned given access to a musical instrument. An untrained subject, asked to set the frequency of a tone to twice that of a reference, is quite likely to set them a twelfth or two octaves apart or find some arbitrary and inconsistent ratio. The tendency to land on "proper" intervals increases if complex tones are used instead of sine tones. Trained musicians often produce octaves slightly wider than two to one, although the practical aspects of their instrument strongly influence their sense of

interval. (As a bassoonist who has played the same instrument for twenty years, I have a very strong tendency to place G below middle C a bit high.)

Identification of intervals is even more variable, even among musicians. It does appear to be trainable, suggesting it is a learned ability. Identification of exact pitches is so rare that it has not been properly studied, but there is some anecdotal evidence (such as its relatively more common occurrence among people blind from birth) suggesting it is somehow learned also.

The amplitude of sound does not have a strong effect on the perception of pitch. Such effects seem to hold only for sine tones. At low loudness levels pitch recognition of pure tones becomes difficult, and at high levels increasing loudness seems to shift low and middle register pitches down and high register pitches up.

The assignment of the quality of possessing pitch in the first place depends on the duration and spectral content of the sound. If a sound is shorter than 200ms or so, pitch assignment becomes difficult with decreasing length until a sound of 50ms or less can only be described as a pop. Sounds with waveforms fitting the harmonic pattern are clearly heard as pitched, even if the frequencies are offset by some additive factor. As the spectral plot deviates from the harmonic model, the sense of pitch is reduced, although even noise retains some sense of being high or low.

## **TIMBRE**

Recognition of sounds that are similar in aspects other than pitch and loudness is not well studied, but it is an ability that everyone seems to share. We do know that timbre identification depends strongly on two things, waveform of the steady part of the tone, and the way the spectrum changes with time, particularly at the onset or attack. This ability is probably built on pattern matching, a process that is well documented with vision. Once we have learned to identify a particular timbre, recognition is possible even if the pitch is changed or if parts of the spectrum are filtered out. (We are good enough at this that we can tell the pitch of low sounds when played through a sound system that does not reproduce the fundamentals.)

## **LOCALIZATION**

We are also able to perceive the direction of a sound source with some accuracy. Left and right location is determined by perception of the difference of arrival time or difference in phase of sounds at each ear. If there are more than two arrivals, as in a reverberant environment, we choose the direction of the first sound to arrive, even if later ones are louder. Localization is most accurate with high frequency sounds with sharp attacks.

Height information is provided by the shape of our ears. If a sound of fairly high frequency arrives from the front, a small amount of energy is reflected from the back edge of the ear lobe. This reflection is out of phase for one specific frequency, so a notch is produced in the spectrum. The elongated shape of the lobe causes the notch frequency to vary with the

vertical angle of incidence, and we can interpret that effect as height. Height detection is not good for sounds originating to the side or back, or lacking high frequency content.

## **Sound recording and reproduction**

Sound recording and reproduction is an electrical, mechanical, electronic, or digital inscription and re-creation of sound waves, such as spoken voice, singing, instrumental music, or sound effects. The two main classes of sound recording technology are analog recording and digital recording.

### Types of Recorders

- Geared for music recording
- Geared toward news gatherers
- Analog Recorders – Use tape to record information
- Digital recorders – record in a compressed or uncompressed digital format
- Consumer recorders – inexpensive, not meant for rough service
- Professional recorders – cost more, but are made to take more abuse and capture higher quality audio

### Choosing an audio recorder

- Cost - Generally, newsrooms purchase several audio recorders to supplement their staff. With prices too high, bulk purchases can become very costly. You must also weigh in maintenance and repair costs.
- Quality - Does the recorder give you the ability to use an external microphone? Very few recorders have built-in microphones that are useful for field reporting. Does the recorder have XLR (professional grade) input, Tip-Ring Sleeve (TRS) input or just a mini jack?
- Format - There are two types of audio files: compressed and uncompressed. Cheap audio recorders will compress all of the audio it captures. This not only brings down the quality during the capture process, but when you edit that audio and then re-compressed it, the audio is further degraded in the finished project. Buy a recorder that will allow you to capture uncompressed audio (.wav, .aiff)
- Durability - This is important. Some of these audio recorders are as expensive as a digital SLR camera, and repairs are on par with high-end electronic devices as well.
- Power - Probably one of the most overlooked attributes of audio recorders. Can the batteries be removed? What type of batteries does it take? Can they be easily obtained? What is the power consumption of the device? Will it last a long time on a single set of batteries/charge?

## **Microphone**

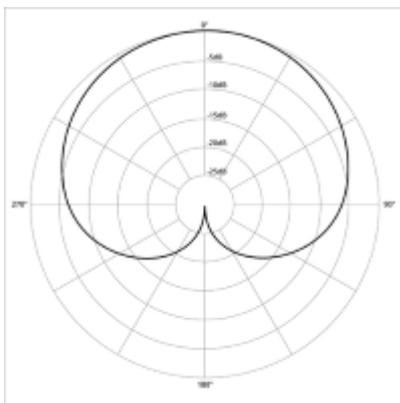
A microphone, colloquially named mic or mike] is a device – a transducer – that converts sound into an electrical signal. Microphones are used in many applications such as telephones, hearing aids, public address systems for concert halls and public events, motion picture production, live and recorded audio engineering, sound recording, two-way radios, megaphones, radio and television broadcasting, and in computers for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic sensors or knock sensors.

Several types of microphone are in use, which employ different methods to convert the air pressure variations of a sound wave to an electrical signal. The most common are the dynamic microphone, which uses a coil of wire suspended in a magnetic field; the condenser microphone, which uses the vibrating diaphragm as a capacitor plate; and the piezoelectric microphone, which uses a crystal of piezoelectric material. Microphones typically need to be connected to a preamplifier before the signal can be recorded or reproduced.

### **Microphone Polar Patterns**

Polar patterns describe how microphones pick up sound, showing specifically where mics 'listen' spatially and which positions are blocked. Having a good grasp of these polar patterns will help you select the right mics that capture the sound that you need while minimizing unwanted noise.

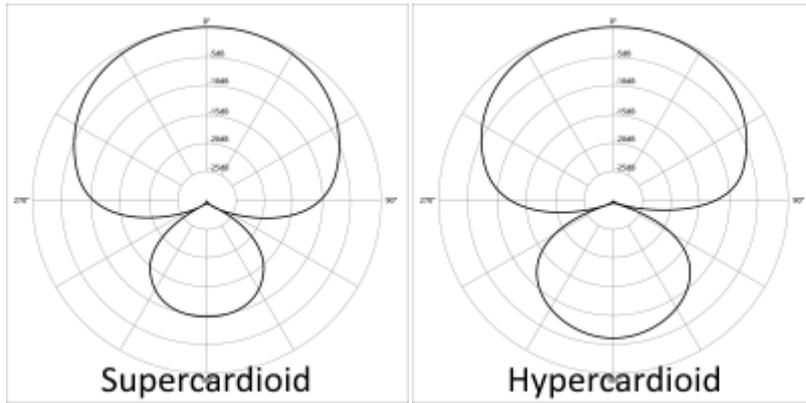
### **Cardioid Microphones**



Cardioid mics capture everything in front and block

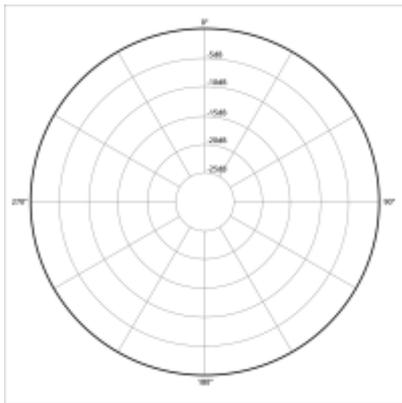
everything else. This front-focused pattern will let you point the mic to a sound source and isolate it from unwanted ambient sound, making it ideal for live performance and other situations where noise reduction and feedback suppression are needed. Cardioid mics surpass other polar patterns by far in terms of popularity, used widely in live performances, from karaoke to big arena concerts. Other common uses include miking loud instruments like drum kits and guitar speakers. Note that these types of mics add subtle sound coloration when the source is off axis, which is why mic position when speaking and singing is very important.

### **Super/Hyper Cardioid Microphones**



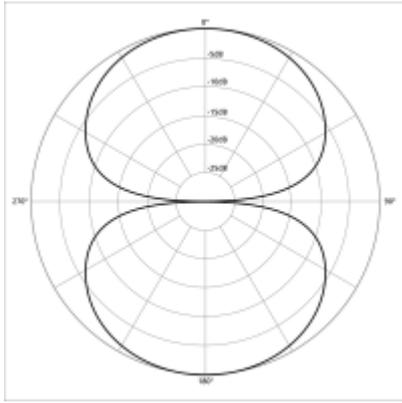
These mics have the same front directionality, but have a narrower area of sensitivity compared to cardioids. This results in improved isolation and higher resistance to feedback. Because of their enhanced ability to reject noise, you can use these for loud sound sources, noisy stage environments or even for untreated recording rooms. On the flip side, back rejection is a bit compromised, so you will have to position unwanted sounds like stage monitors and drum kits on the dead spot sides.

### **Omnidirectional Microphones**



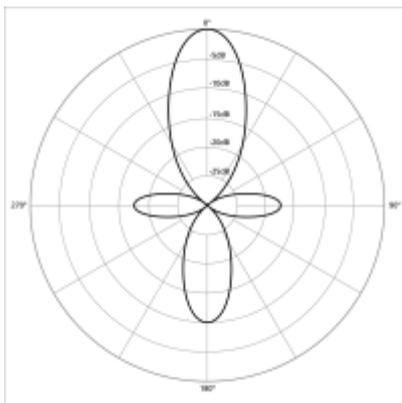
These are microphones that capture sound from all angles. Because of their non-directional design and zero rejection, these mics capture nuances better, resulting in a more natural sound. You can use these mics in studios and other venues (like old churches) with great acoustics, and can also be used for live recording of multiple instruments, as long as the noise level is low. The obvious downside is that they lack background noise rejection and are prone to monitor feedback, which makes them unsuitable for loud and noisy venues.

### **Figure-8 Microphones**



The name of this pattern is derived from its graphical representation, which looks like the number 8. The long and short of it is that Figure-8 mics capture the sound of both the front and back, while rejecting the two sides. This front and back sensitivity makes them ideal for stereo recording and for capturing two or more instruments. They are essentially like omnidirectional mics, but with sound rejection on two sides. Although not as popular as other polar patterns, the figure-8 is commonly used on ribbon mics and on some large diaphragm condenser microphones.

### Shotgun Microphones



Shotgun mics, also called Line and Gradient, feature a tube-like design that makes their polar pattern even more directional than hypercardioids. The capsule is placed at the end of an interference tube, which eliminates sound from the sides via phase cancellation. This design results in a tighter polar pattern up front with longer pickup range. Although Shotgun mics are more commonly used for film and theatre, they also make great overhead mics for capturing things like singing groups, chorals, drum cymbals. .

### Switchable/Multi-Pattern Microphones

These are microphones that can change between different polar patterns, allowing for versatile placement. Many of today's USB condenser microphones have this feature, letting you switch between multiple patterns by simply flicking a switch. Others provide the same flexibility through changing the mic head. The advantage that these mics offer is obvious, more positioning possibilities and more usage. Just remember to be careful when handling these mics, you don't want to accidentally damage the extra moving parts and circuitry that give them their versatility.

### Diaphragm Sizes

Microphones pick up sounds through their diaphragm, a thin material that vibrates when it comes into contact with sound. This vibration converts sonic energy into electrical energy. While there is no actual standard unit of measurement, there are currently three main classifications for mic diaphragms, all of which are referring to the diaphragm's mass. The size of the diaphragm affects the microphone's sound pressure level handling, sensitivity, dynamic range and internal noise level.

### **Small Diaphragm**



Mics with small diaphragms are commonly called pencil mics because of their thin cylindrical shapes. Their compact design makes them lighter and easier to position, and interestingly, they are designed to be stiffer, to handle higher sound pressure levels and have wider dynamic range. You can use them on acoustic guitars, hi-hats, cymbals, and other instruments. Known limitations of this particular diaphragm type are increased internal noise, and low sensitivity.

### **Large Diaphragm**



The bigger the diaphragm, the more it can sense air vibrations, and the more vibrations are captured, more of the sonic details are faithfully reproduced. Unlike small diaphragms that are stiff, large diaphragms move easily, allowing them to detect even faint differences in sound pressure levels which result in a more transparent and natural sound. This affinity to fidelity has made large diaphragm mics a staple in recording studios, and they are now the most common configuration used on modern USB mics. You can use them to record just about anything, from vocals to guitars and other instruments, just make sure that you keep the volume in check because they can distort when the sound pressure level is increased.

## Medium Diaphragm



Medium Diaphragm mics are sometimes called hybrid because they combine the characteristics of small and large diaphragms. They tend to have a slightly fuller and warm sound similar to large diaphragms while retaining some of the high frequency content that small diaphragms could. These are modern microphones that are gaining reputation in both live and recording situations, but essentially, you can skip on these mics if you're setting up a small home studio or a small venue, especially if you already have large and small diaphragm mics to work with.

## 3 Types of Microphones used in Music

Here are the three types of microphones most commonly used in music, available with either XLR or USB connectivity. Note that USB powered versions don't require phantom power.

### Dynamic



If you're looking for something reliable and versatile, then you ought to start with [dynamic mics](#). Thanks to their moving coil magnetic diaphragm, these mics reliably capture sound and can do so even at high sound pressure levels. As such, you can use them for miking loud sound sources like bass and guitar amplifiers, and even drum kits without worrying about unwanted distortion or damage. Finally, they are not just for high SPL (Sound Pressure Level) applications because they work quite well in quieter settings.

### Condenser



Condenser mics have a thin conductive diaphragm that sits close to a metal backplate. This configuration works like a capacitor wherein sound pressure vibrates the diaphragm which in turn changes the capacitance to produce the audio signal. Since they use capacitance instead of actual moving coils, fidelity and sound quality is improved, making these mics ideal for precision recording in the studio. Note that this method of sound capture requires power, so you'll need a mixer or direct box with phantom power (except in cases where batteries are used). Whatever instrument you are trying to record, condenser mics will get the job done so long as the sound pressure levels aren't too high. Just remember to handle them with care as they are not as sturdy as dynamic mics.

### **Ribbon**



While these mics are no longer as popular, Ribbon mics were once very successful particularly in the radio industry. The light metal ribbon used in these mics allows it to pick up the velocity of the air and not just air displacement. This allows for improved sensitive to higher frequencies, capturing higher notes without the harshness while retaining a warm vintage voicing. These days, interest for Ribbon mics have returned, especially since modern production ribbon mics are now sturdier and more reliable than their old counterparts, making them viable for live multi-instrument recording on venues where noise level is manageable. You can also use them for recording if you're looking for vintage vibe, or you can set it up in combination with dynamic or condenser mics for a more open sounding track.

### **Practical Microphone Applications in Music**

Here we look at the main purpose each kind of microphone is typically used for. This is a good guide to get you started and once you gain experience with each mic type you'll find additional applications that work for you.

## Vocals



For live vocal performances where stage volume can get loud and feedback suppression is important, the best choice is to use cardioid mics - see our guide to the [best microphones for singing live](#). Recording vocals on the other hand is a different undertaking that requires more attention to the singer's nuances, as such large diaphragm condensers work best. If you are going for a more vintage sounding vocal recording, use ribbon mics or go for good old dynamic mics instead. In addition, small diaphragm omnidirectional mics and shotgun mics can be used for capturing choirs and singing groups, and are especially useful when choirs perform in venues with great acoustics, like churches.

## Drums



Because acoustic drum kits are naturally loud and punchy, you'll want to go with dynamic cardioid mics for the snare, bass and toms. Small diaphragm microphones can then be used to capture the nuances of the hi-hat, ride and cymbals. For best results, there are specialized mics that are fine tuned to handle the different frequencies and SPLs of each part of a drum kit, you can either get them one by one or go for convenient drum kit mic bundles. In the studio, you can setup an Omnidirection or ribbon mic to blend in some ambience into your drum tracks.

## Electric Guitar Amplifier



Close mic'd guitar amplifiers are as loud, sometimes louder than drum kits, and as such they require mics that can handle high SPL. Your best bet is a cardioid or hyper cardioid dynamic mic that is well positioned in front of the amp speaker. Again a second condenser mic or ribbon mic, set back at a distance, can be used in case you are using multiple amps or if you want a warmer more classic sounding output, or in combination with a close mic to capture some of the room ambience.

### **Acoustic Guitar**



Acoustic guitars when not amplified have a softer sound with immersive nuances. These type of instruments require the fidelity and quality of large diaphragm condenser mics. You can also go for a well placed Cardioid condenser mic or Figure-8 pattern ribbons depending on the situation and noise level. Finally, setting up an extra small diaphragm mic will work wonders in capturing the higher frequencies that sometimes get lost when acoustics are plugged in or miked directly up front.

## **Module 4**

## **Location Recording**

Remote recording, also known as location recording, is the act of making a high-quality complex audio recording of a live concert performance, or any other location recording that uses multitrack recording techniques outside of a recording studio. The multitrack recording is then carefully mixed, and the finished result is called a remote recording or a live album. This is in contrast to a field recording which uses few microphones, recorded onto the same number of channels as the intended product. Remote recording is not the same as remote broadcast for which multiple microphones are mixed live and broadcast during the performance, typically to stereo. Remote recording and remote broadcast may be carried out simultaneously by the same crew using the same microphones.

One important benefit of a remote recording is that the performers will respond to the audience; they will not be as distracted by the recording process. Another reason for a remote recording is to capture an artist in a different acoustic space such as a church, ballroom or meeting hall.

To make a remote recording, studio-quality recording equipment is trucked to the concert venue and connected to the concert microphones with a bank of microphone splitters. Other microphones may be added. The individual microphone signals are routed to separate tracks.

A remote recording is often made using a specially built remote truck: a rolling recording studio carrying a mixing console, studio monitors and multitrack recorders. Beginning modestly in 1958, recording engineer Wally Heider developed and popularized the use of a remote truck in California in the mid-1960s and throughout the 1970s.

There are 2 Types of Location Audio Acquisition in Film Production:

- Single System – The audio is recorded on the same medium as the visuals - ie: on a camcorder – max 16 bit.
- Dual-System (aka Double System) – The audio is recorded separately from the visuals on a secondary device. This type of recording requires that the two sources be synchronized and linked in post production – max 24 bit.

### **Pilot track**

Pilotone/ Pilot track (or Pilotone) and the related neo-pilotone are special synchronization signals recorded by analog audio recorders designed for use in motion picture production, to keep sound and vision recorded on separate media in step. Before the adoption of timecode by the motion picture industry in the late 1980s, pilotone-sync was the basis of all professional magnetic motion picture sound recording systems, whereas most amateur film formats used pre-stripped magnetic coating on the film itself for live-sound recording.

Pilot tone, a precursor of SMPTE time code, is typically encountered when working with open reel audio used in film or video production. The tone is a 50 or 60 Hz signal sent from a

motion picture camera and recorded on one track of the tape. Not to be confused with hum, during production this tone was used for synchronizing tape playback to picture by matching the camera speed.<sup>1</sup> Crosstalk is reduced by recording the tone 180 degrees out of phase with respect to the program so that it will cancel out during playback.

## Direct Sound

The term direct sound refers to the cinematic technique of recording the music, noise (ambient and otherwise), and speech (dialogue and otherwise) of an event at the moment the event is being captured on film.

While direct sound is commonly employed in many Hollywood films, its use in various documentary styles such as Cin`ema Verit`e and Direct Cinema present arguably a more pure form of the technique. In these films, the sound is taken “as recorded” without any components being added in the post-production process (no postsynchronization). In turn this creates a much more realistic and believable sound(composite)track.

In the Maysles brothers and Charlotte Zwerin’s, direct cinema ‘rockumentary’, Gimme Shelter (1970) the virtues of direct sound are highlighted extensively. While nearly the entire film is shot using direct sound, one scene in particular showcases direct sound and its ability to lend an unparalleled sense of realism and authenticity to the images on screen. In the scene above, the band is playing the final notes of Under My Thumb when a murmur of voices can be heard growing louder off screen, the camera immediately switches to the crowd where there seems to be a fight breaking out. Suddenly a lone high-pitched scream pierces the air and a member of the audience is seen being stabbed repeatedly by a member of the Hells Angels Motorcycle Gang. In the following chaos bits and pieces of conversation can be made out but the audio quality is quite low. In an effort to calm everyone down, Mick Jagger begins to talk into the microphone and his voice is heard above the cacophony of noise coming from the crowd and the stage. The scene ends with a Hells Angel member telling the group that someone is running around out there with a gun. The changes in the clarity, volume, and fidelity of the sound in the scene are directly correlated with the filmic event. The event’s sounds taking place closer to the camera are more distinguishable than those further away and sounds that are amplified by some means are recorded as such. These fluctuations are textbook examples of the function of direct sound and furthermore illustrate the stylistic conventions that are achievable through the use of direct sound; an aural narrative that is very close to how we actually hear the world around us.

## What is Audio Post Production?

Audio Post Production is the process of creating the soundtrack for moving images. Ever since the once silent movies developed a pre recorded track, filmmakers have been looking to control and improve the quality of the sound of their visions. As soon as moviemakers realized there was a way to control and enhance the sound of their pictures, Audio Post was

born and has been a fact of life ever since. In television, audio was originally "live," like the visual program it was part of. As TV evolved and grew to include "videotaped" and "filmed" programming, its need for audio post increased. Nowadays, it would be difficult to find any feature film or television show (or video game) that hasn't been through audio post.

### **What is involved in Audio Post?**

Audio post usually consists of several processes. Each different project may need some or all of these processes in order to be complete. The processes are:

- Production Dialogue Editing
  - ADR (Automated Dialogue Replacement or Looping)
  - Sound Effects Design and Editing
  - Foley Mixing and Editing
  - Music Composition and Editing
  - Mixing (also called Re-Recording)
- Production Dialogue Editing - In order for the production audio recorded on the set or on location to be properly mixed, a Dialogue Editor needs to prepare it. This means locating the takes used by the Picture Editor from the recorded production audio, checking sync (so the audio works with the picture properly), and eliminating extraneous noise so the Dialogue Mixer has clean dialogue to use during the mix.
  - ADR [Automated Dialogue Replacement] - In cases where the production audio is too noisy or otherwise unusable (bad line reading, airplane fly-by, etc.), or where the filmmakers want to add voice over narration or simply add dialogue that was never recorded, the line will be programmed or "cued" for "looping" or ADR. This process takes place on the ADR Stage, a specialized recording studio where the actor can record while watching the edited picture, matching the sync of the original line or fitting the new lines with the actions.

After a loop lines have been recorded, the ADR Editor will check the sync carefully, modifying the take if necessary to precisely match it to the picture, and prepare it for the Mixing Stage.

- Sound Effects Design and Editing - Ever wonder how they made the sound of Darth Vader's helmet breath, or the roar of Jurassic dinosaurs, or those great explosions that seem to get bigger every year? Sound Effects Editors and Sound Designers are how. They are the craftspeople who add the computer beeps, gunshots, laser blasts, massive explosions; and more subtle sounds like background ambiances such as air, rivers, birds, and city traffic. Sound Designers use a variety of technologies from bleeding edge to tried & true to create unique sound effects that have never been heard before, or to artistically create specific "mood" sounds to complement the filmmakers' vision of the visuals. Sound Effects Editors put those sounds in sync with the picture as well as selecting from libraries of hundreds of

thousands of prerecorded sounds; and organize them so the FX Mixers can “PreDub” those sounds efficiently.

- **Foley** - Taking its name from Jack Foley, the Hollywood sound editor regarded as the "father" of these effects, Foley effects are sounds that are created by recording (usually) everyday movement while watching the edited picture. Different from the environmental backgrounds (“BGs”) and hard effects (FX), Foley effects are sounds like footsteps, object handling, the rustling of clothing, etc. The people involved in this process are the Foley Walkers or Artists who perform those sounds and the Foley Mixer who records them. After the Foley Effects are “shot,” the Foley Editor will use his/her craft to polish those sounds to ensure that they are exactly in sync with the final picture.
- **Music Composition** - Music for motion pictures falls into two general categories: Score and Source. The Composer is the individual hired to prepare the dramatic underscore. Source music is what we hear coming from an on screen or off screen device like stereos, televisions, ice cream trucks, and so on. Source music may be original or licensed from a number of libraries that specialize in the creation of "generic" music. Songs (music with vocals) may occupy either function, depending on the dramatic intent of the director. For "Pulp Fiction" for example, Director Quentin Tarantino hired a Music Supervisor (Karyn Rachtman) to "score" the picture using period music of the 1970's almost exclusively. Most contemporary films use a combination of score and source music.
- **Music Editing** - The Music Editor assists the Composer in the preparation of the dramatic underscore. Frequently working also with the Music Supervisor, the Music Editor will take timings for the Composer during a spotting session in order to notate the specific locations in the film where underscore or source music will punctuate the narrative. Once the underscore is recorded and the source music gathered, the Music Editor would be the person who edits or supervises the final synchronization of all music elements prior to the mix.
- **Mixing (also called Dubbing)** - The Mixers have the responsibility of balancing the various elements, i.e., the Dialogue & ADR, Music, Sound Effects, and Foley Effects, in the final mix. The Dialogue Mixer, (also called the Lead Mixer or Gaffing Mixer) commands the mixing stage; his/her partners in the mix traditionally were the Effects Mixer and the Music Mixer. As of now, the Lead Mixer commonly does the Music mixing as well, reducing the traditional mixing team by a third. On huge pictures with tight deadlines, it is possible that several teams of mixers are working simultaneously on numerous stages in order to complete the mix by the release date.

## **Sound Mixing**

Audio mixing is the process by which multiple sounds are combined into one or more channels. In the process, a source's volume level, frequency content, dynamics, and panoramic position are manipulated or enhanced. This practical, aesthetic, or otherwise creative treatment is done in order to produce a finished version that is appealing to listeners.

Audio mixing is practiced for music, film, television and live sound. The process is generally carried out by a mixing engineer operating a mixing console or digital audio workstation.

- **Recorded music**

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.

- **Film and television**

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 process, the source's signal level, frequency content, dynamics and panoramic position are commonly manipulated and effects added.

The process takes place on a mix stage, typically in a studio or theater, once the picture elements are edited into a final version. Normally the engineer will mix four main audio elements: speech (dialogue, ADR, voice-overs, etc.), ambience (or atmosphere), sound effects, and music.

- **Live sound**

Live sound mixing is the process of electrically blending together multiple sound sources at a live event using a mixing console. Sounds used include those from instruments, voices, and pre-recorded material. Individual sources may be equalised and routed to effect processors to ultimately be amplified and reproduced via loudspeakers. The live sound engineer balances the various audio sources in a way that best suits the needs of the event.

## **What is Audio Editing?**

When you think of audio editing, what exactly do you come up with? Most often, when we think of editing, we often don't think of music or audio. In fact, it's more common to think of writing in relation to editing in many cases. In reality, audio editing is a lot like editing a written document. Things are deleted, replaced, cut, copied, and pasted just like they would be in an essay or a novel. Only, instead of manipulating words, you are manipulating sounds. So, the answer to the question, "What is audio editing?" is that it is a way to edit, shorten, or otherwise shift a piece of music or spoken audio to make it ideal for either listening or viewing pleasure.

## **How it Works**

With the advent of new technologies in audio editing, editing over the years has become more accurate and easier. Software and hardware programs are designed specifically to help editors piece together music or audio pieces. These programs are generally referred to as digital audio workstations (DAWs). The idea behind audio editing is usually to take a piece of music and slice it and dice it so that it is free of errors and consistent to listen to.

Editing can be purely for audio (example audio podcast, music cds etc.) or it can be for a video. For audio which needs to be synced with video, the editors are provided with a video clip and an audio clip that both need to be matched. Obviously, the video clip isn't going to undergo any editing because it is the section of media that the music is supposed to conform to (not the other way around).

In many cases, the audio editor is given a file that works with their specific DAW. They can then manipulate virtually every part of the musical piece. Most DAWs give you access to all of the individual tracks that go into making a complete song. That means editors gain access to the vocal track, the guitar track (or other instrumental track), the drum track, and many more. This is not just an mp3 audio file, but, instead, a song divided into its individual tracks (or stems). It's also conveniently placed into a visual interface—generally conveyed as “waveform”—that is a visual representation of each audio track.

Some general application of audio editing are:

- Remove breaths, cough, ringing of the phone or any other unwanted interference
- Remove repeated dialogues
- Add music intro/outro
- Stretch/shorten audio and sound effects according to the length of the visual.
- Splice together audio recorded at different sittings
- Sync up different musical instruments so that they all sound on the beat.
- Loop, slice and edit beats.

### **Challenges of Audio Editing**

The difficulty of matching audio and video shouldn't be underestimated. In fact, many audio editors are given a 30-second video clip to work with and a song that is, of course, well over 3 minutes. You have to pare down the audio file so that it fits into that 30-second window, but you also have to make sure that it is aesthetic and feasible within the constraints of the time allotted.

In some cases (for instance, in films), the script might be flipped. Audio editors might receive a 30-second audio clip that needs to fit into a 53-second video window. In that event, they must stretch the audio either by looping it in some sections or slowing down the tempo. Looping essentially means repeating a section of music (you can think of it copying and pasting—some DAWs even use those terms). But, again, the edit needs to appear flawless and completely enmeshed with the video. During an emotionally powerful scene in a film, it's not often that you recognize the music if only because it generally fits so well with the visual.

Editing only for audio is less challenging but equally difficult. The editor has to make sure the voice flow is natural and there are no jerks in the audio. Music editing requires very minute cuts (correct upto 1 millisecond), which ensures that the song sits perfectly on the tempo.

### **Difference between Sound editing and mixing**

**Sound Editing:** The actual recording and creation of sounds both on set and off set (foley)

Production sound mixers are on the set, recording and mixing live what the audience will eventually hear such as dialogue. There are various experts who are sound editors and who assemble sounds you hear on screen — the dialog, the Foley, ADR (automated dialog replacement), walla (crowd noises), incidental sounds (paper rustling), atmosphere (wind, a distant tugboat) and sound effects (engines revving, gunshots). Sound editors make audio choices; sometimes they tap into a library of sounds, sometimes they make their own recordings, and sometimes they fabricate sounds that are completely new.

**Sound Mixing:** The process of adjusting the levels of all the individual sound layers

While production sound mixers are on the set during filming, there is also a post-production sound mixer, who performs one of the final stages of post work. The key person or team is the re-recording mixer — the sound mixer who takes all the sound editing elements and the elements from some other mixers (ADR mixer, Foley mixer, scoring mixer) and, together with the sound that was captured and mixed on set by the production sound mixer, brings the whole thing together for the finished project.

The sound elements are often prepared/gathered in isolation, and the post-production sound mixer takes all of these (plus the music score), and determines the appropriate levels, judging which elements the audience needs to hear. In other words, after the sound editors have assembled what the audience hears, the sound mixer determines how they hear it.

### **Single and Multi track recording**

Multitrack recording (MTR)—also known as multitracking, double tracking, or tracking—is a method of sound recording developed in 1955 that allows for the separate recording of multiple sound sources or of sound sources recorded at different times to create a cohesive whole. Multitracking became possible in the mid-1950s when the idea of simultaneously recording different audio channels to separate discrete "tracks" on the same reel-to-reel tape was developed. A "track" was simply a different channel recorded to its own discrete area on the tape whereby their relative sequence of recorded events would be preserved, and playback would be simultaneous or synchronized.

Prior to the development of multitracking, the sound recording process required all of the singers, band instrumentalists, and/or orchestra accompanists to perform at the same time in the same space. Multitrack recording was a significant technical improvement as it allowed studio engineers to record all of the instruments and vocals for a piece of music separately. Multitracking allowed the engineer to adjust the levels and tone of each individual track, and if necessary, redo certain tracks or overdub parts of the track to correct errors or get a better "take." As well, different electronic effects such as reverb could be applied to specific tracks, such as the lead vocals, while not being applied to other tracks where this effect would not be desirable (e.g., on the electric bass). Multitrack recording was much more than a technical innovation; it also enabled record producers and artists to create new sounds that would be impossible to create outside of the studio, such as a lead singer adding many harmony vocals with their own voice to their own lead vocal part, an electric guitar player playing many harmony parts along with their own guitar solo, or even recording the drums and replaying the track backwards for an unusual effect.

In the 1980s and 1990s, computers provided means by which both sound recording and reproduction could be digitized, revolutionizing audio recording and distribution. In the 2000s, multitracking hardware and software for computers was of sufficient quality to be widely used for high-end audio recordings by both professional sound engineers and by bands recording without studios using widely available programs, which can be used on a high-end laptop computer. Though magnetic tape has not been replaced as a recording medium, the advantages of non-linear editing (NLE) and recording have resulted in digital systems largely superseding tape. Even in the 2010s, with digital multitracking being the dominant technology, the original word "track" is still used by audio engineers.

## **Process**

Multi-tracking can be achieved with analogue recording, tape-based equipment (from simple, late-1970s cassette-based four track Portastudios, to eight track cassette machines, to 2" reel-to-reel 24-track machines), digital equipment that relies on tape storage of recorded digital data (such as ADAT eight-track machines) and hard disk-based systems often employing a computer and audio recording software. Multi-track recording devices vary in their specifications, such as the number of simultaneous tracks available for recording at any one time; in the case of tape-based systems this is limited by, among other factors, the physical size of the tape employed.

With the introduction of SMPTE timecode in the early 1970s, engineers began to use computers to perfectly synchronize separate audio and video playback, or multiple audio tape machines. In this system, one track of each machine carried the timecode signal, while the remaining tracks were available for sound recording. Some large studios were able to link multiple 24-track machines together. An extreme example of this occurred in 1982, when the rock group Toto recorded parts of *Toto IV* on three synchronized 24-track machines.[1] This

setup theoretically provided for up to 69 audio tracks, which is far more than necessary for most recording projects.

For computer-based systems, the trend in the 2000s is towards unlimited numbers of record/playback tracks, although issues such as RAM memory and CPU available do limit this from machine to machine. Moreover, on computer-based systems, the number of simultaneously available recording tracks is limited by the number of sound card discrete analog or digital inputs.

When recording, audio engineers can select which track (or tracks) on the device will be used for each instrument, voice, or other input and can even blend one track with two instruments to vary the music and sound options available. At any given point on the tape, any of the tracks on the recording device can be recording or playing back using sel-sync or Selective Synchronous recording. This allows an artist to be able to record onto track 2 and, simultaneously, listen to track 1, 3 and 7, allowing them to sing or to play an accompaniment to the performance already recorded on these tracks. They might then record an alternate version on track 4 while listening to the other tracks. All the tracks can then be played back in perfect synchrony, as if they had originally been played and recorded together. This can be repeated until all of the available tracks have been used, or in some cases, reused. During mix down a separate set of playback heads with higher fidelity are used.

Before all tracks are filled, any number of existing tracks can be "bounced" into one or two tracks, and the original tracks erased, making more room for more tracks to be reused for fresh recording. In 1963, The Beatles were using twin track for Please Please Me. The Beatles' producer George Martin used this technique extensively to achieve multiple track results, while still being limited to using only multiple four-track machines, until an eight-track machine became available during the recording of the Beatles' White Album. The Beach Boys' Pet Sounds also made innovative use of multitracking with 8-track machines of the day (circa 1965).[2] Motown also began recording with 8-track machines in 1965 before moving to 16-track machines in mid-1969.

Multitrack recording also allows any recording artist to record multiple "takes" of any given section of their performance, allowing them to refine their performance to virtual perfection by making additional "takes" of songs or instrumental tracks. A recording engineer can record only the section being worked on, without erasing any other section of that track. This process of turning the recording mechanism on and off is called "punching in" and "punching out". (See "Punch in / out".)

When recording is completed, the many tracks are "mixed down" through a mixing console to a two-track stereo recorder in a format which can then be duplicated and distributed. (Movie and DVD soundtracks can be mixed down to four or more tracks, as needed, the most common being five tracks, with an additional Low Frequency Effects track, hence the "5.1" surround sound most commonly available on DVDs.)

Most of the records, CDs and cassettes commercially available in a music store are recordings that were originally recorded on multiple tracks, and then mixed down to stereo.

In some rare cases, as when an older song is technically "updated", these stereo (or mono) mixes can in turn be recorded (as if it were a "submix") onto two (or one) tracks of a multitrack recorder, allowing additional sound (tracks) to be layered on the remaining tracks.

## **Components of sound track in television**

Music:

Music is used throughout film and other media in numerous different ways, most of which are laid out in Zofia Lissa's *Ästhetik der Filmmusik*

The 10 Most prominent uses are:

1. Emphasise on Movement –underlines a specific movement, such as choral synths while flying.
2. Emphasise on Real Sounds –exaggerates a real life sound, something falling down accompanied by loud bass drum.
3. Representation of Location –provides a particular stereotype for a cultural or historical origin e.g. lutes and drums for a medieval setting.
4. Source Music –Diegetic sound within film, which happens within that world e.g. marching band at a parade.
5. Comment – gives off a particular vibe for the scene.
6. Expression of Actors Emotions – used to exaggerate character emotions, e.g. music in a minor key when the main character is sad.
7. Basis for Audiences Emotions – Leads the audience into feeling a certain way, e.g. a build up before a “jump scare”
8. Symbol –associated with a character, such as when a character is being spoken about but not present, at some point in the narrative becomes intrinsically linked with the character.
9. Anticipation of Subsequent Action – used as a cue that the mood of the scene is going to change.
10. Enhancement and demarcation of the films formal structure – music that progresses the films narrative, may show passage of time or that a new section of the film is about to commence.

*Elements of Music:* Timbre, melody, rhythm

Timbre

Another word for tone color; determined by which instruments are heard.

Melody

Determined by what the notes are doing. Defines things such as the pitch, shape, structure, length, and style of the music.

### Rhythm

Determines the tempo and meter of a given piece of music.

### **Sound Effects:**

Musical elements need to be backed up with non-musical sounds, which would be added since they wouldn't be able to be tracked during filming.

This could take the form of something fictional which needs a new sound created for it because one doesn't exist, which would fall under sound design.

While real life sounds would have to be performed in postproduction along to the created footage, called Foley.

### **Dialogue and Spoken Word:**

Like sound effects, its very rare a movie will use the recorded audio from the live take in the final version, instead, the actor(s) will take it in turns to come into a studio and sync their lines to the video, this process is known as dubbing.

## **Module 5**

A television studio, also called a television production studio, is an installation room in which video productions take place, either for the recording of live television to video tape, or for the acquisition of raw footage for post-production. The design of a studio is similar to, and derived from, movie studios, with a few amendments for the special requirements of television production. A professional television studio generally has several rooms, which are kept separate for noise and practicality reasons. These rooms are connected via 'talkback' or an intercom, and personnel will be divided among these workplaces.

### **Studio floor**

The studio floor is the actual stage on which the actions that will be recorded and viewed take place. A typical studio floor has the following characteristics and installations:

- decoration and/or sets
- professional video camera (sometimes one, usually several), typically mounted on pedestals
- microphones and foldback speakers
- stage lighting rigs and the associated controlling equipment.
- several video monitors for visual feedback from the production control room (PCR)
- a small public address system for communication
- a glass window between PCR and studio floor for direct visual contact is often desired, but not always possible

While a production is in progress, people composing a television crew work on the studio floor.

- the on-screen presenters themselves, and any guests - the subjects of the television show.
- a floor manager, who has overall charge of the studio area stage management, and who relays timing and other information from the television director.
- one or more camera operators who operate the cameras, though in some instances these can also be operated from the PCR using remotely controlled robotic pan tilt zoom camera (PTZ) heads.
- possibly a teleprompter operator, especially if this is a live television news broadcast

### **Production-control room (PCR)**

The production control room is the place in a television studio in which the composition of the outgoing program takes place. The production control room is occasionally also called a studio control room (SCR) or a "gallery" – the latter name comes from the original placement of the director on an ornately carved bridge spanning the BBC's first studio at Alexandra

Palace, which was once referred to as like a minstrels' gallery. Master control is the technical hub of a broadcast operation common among most over-the-air television stations and television networks. Master control is distinct from a PCR in television studios where the activities such as switching from camera to camera are coordinated. A transmission control room (TCR) is usually smaller in size and is a scaled-down version of centralcasting.

### **Master control room**

The master control room (MCR) houses equipment that is too noisy or runs too hot for the production control room (PCR). It also makes sure that coax cable, SDI cable, Fibre optic cable or other wire lengths and installation requirements keep within manageable lengths, since most high-quality wiring runs only between devices in this room. This can include the actual circuitry and connections between:

- character generator (CG)
- camera control units (CCU)
- digital video effects (DVE)
- video routers
- video servers
- vision mixer (video switcher)
- VTRs
- patch panels

The master control room in a US television station is the place where the on-air signal is controlled. It may include controls to playout television programs and television commercials, switch local or television network feeds, record satellite feeds and monitor the transmitter(s), or these items may be in an adjacent equipment rack room. The term "studio" usually refers to a place where a particular local program is originated. If the program is broadcast live, the signal goes from the PCR to MCR and then out to the transmitter.

A television studio usually has other rooms with no technical requirements beyond broadcast reference monitors and studio monitors for audio. Among them are:

- one or more make-up and changing rooms
- a reception area for crew, talent, and visitors, commonly called the green room

### **Role of functionaries- Television Production Roles and Responsibilities**

There are different behind the scenes roles and responsibilities often found in television productions. Of the following listed, some are necessary for a production to be possible, while others are optional - depending on the production's scale and its requirements. The roles are additionally categorised in to production team, crew and postproduction, to

differentiate their place in the course of the production. These areas may, however, overlap at times – depending on the nature of the production.

## **Production Team**

- Executive Producer

This role (interchangeable with the title of show runner, considered the „auteur“ of the program) is more abstract than other roles in production, though likely the most crucial to the production happening in the first place. The concept and initiative for the program often comes from this person/s. In commercial productions, an executive producer is often the chief financial backer or production company head. Occasionally, an executive producer/show runner may have conceived the program’s idea, and will develop its direction throughout the series, though wishes to delegate the tasks of executing their idea to a producer.

- Producer

In television, a producer is generally the primary person of responsibility for the production. The program may often be their own brain-child and a producer’s role co-ordinates all elements of production at its highest level. A talented producer is adept at co-ordination - of crew and cast; administrative, legal, financial, budgeting and scheduling issues, as well as being the driving creative force. With all these issues and tasks to consider, a talented producer is a great delegator, being willing and able to pass on responsibility to trusted production team members they have assembled. It’s often best for the producer to delegate as many roles as necessary to ensure they have enough time (and headspace!) to coordinate the production.

- Director

The role of director varies between programs filmed in-studio and onlocation shoots. A director of a multi-camera studio program is responsible overall for the inner workings of the control room, and the crew working within (occasionally known as a tech manager on some SYN TV productions). As such, they hold responsibility of the final product of a program as it goes to air live, trying to maintain quality output from the in-studio camera operators; as well as vision switchers, audio operators and graphic operators in the control room. A talented director is knowledgeable of all equipment in studio, plus the broadcast equipment it feeds in to. Similar to a floor manager, a good director makes decisions quickly, communicates clearly, and can react with a level head swiftly to unexpected occurrences, understanding any occurrence in studio or the control room to be expected. The director communicates to the crew member’s earpieces via a studio microphone.

An on-location program’s director carries out duties similar to what a film director may, though the TV program’s vision and ultimate creative responsibility lies with the producer - whereas in film, this would be the director. The director is responsible to the producer’s wishes - though a producer may also direct, which may be favourable for some productions so the director can pay more attention to the production elements. They are able handle these

dual roles by delegating producing tasks to an assistant on shooting days. The director's tasks include directing actors, co-ordinating the senior technical crew, as well as holding the central authority for the execution of the day's filming on-set. A director will likely work in close tandem with the producer from early in the creative process.

The task of creating a shot list lies within a director's responsibility also, assisting whoever in the production team is to schedule the filming of these shots. A good director is conscious of all production elements at a big-picture level; is able to keep the day's shoot to schedule; holds a strong vision of their final product and an ability to communicate this evocatively, as well as holding a sound direction of the steps necessary to reach that vision. As the leader on-set, it's also important for a director to foster a good working environment for all cast and crew to aid the creation of the final product.

- Assistant Director

On location-based programs, an assistant director acts as somewhat of an intermediary between the director and the cast and crew - this role is somewhat optional, and may depend on the scale of the production. For live television productions (and with regards to SYN TV's live shows), the Assistant Director may also keep time to make sure all segments are running to the appropriate duration. The AD also counts ad breaks in and out.

- Assistant producer

As its name suggests, this role is the right-hand person to the producer, and often the first line of delegation - perhaps tasked with delegating to others in the crew, yet again.

This role may occasionally serve as the producer's representative on shooting days, ensuring the shooting goes to plan. A good assistant producer communicates well with the producer and is self-motivated to carry out the tasks requested of them.

Other similarly-titled producer roles delegated by the head producer may include a segment producer, tasked with being responsible for a pre-taped segment's production; or a daily producer, who may hold responsibility for a particular day's production for a program which shoots live each weekday

- Writer

A writer's role varies depending on the program. For a narrative-based program, writers are tasked with forming a screenplay to be filmed from. In a program's credits, the person who conceived the broad structure of the story (credited as "Story by...") may have been different to the person that filled that broad story out to a usable script (credited as "Screenplay by..." - this credit is also used when a script has been adapted from an existing work e.g. novel.) In a studio-based program (i.e. talk show) a writer, or team of writers may write jokes for a host's monologue or similar segments, depending on the type of program.

- Publicity

A publicist is given the task of raising awareness of a production's airing to increase the viewership, and sales if applicable. This may be done via various mediums of promotion, including advertising, social media, press releases, media interviews and articles and further alternate means of marketing

- Casting director

A casting director casts actors or personalities to appear on camera to suit each role in a script, as instructed by the director/producer.

## Crew

- Production manager

A production manager's role varies dependent on whether the production is commercial in nature. In commercial productions, the role is head of the administrative business of the production, organising the crew and its technical requirements.

A non-commercial production manager's role holds similar tasks of organising the crew and tech requirements, though may be less responsible for managing and reporting the costs. A talented production manager has a good mind for the practicalities of creating a TV program.

- Floor Manager

In a studio-based program, the floor manager holds responsibility for operation of the studio floor where filming takes place, co-ordinating the talent, crew, props, set and tech equipment - acting as the main line of communication from the director within the control room. A good floor manager is able to co-ordinate many tasks and variables with a cool, even temperament and adapt flexibly and swiftly to the frequent unexpected occurrences typical of many shoots. They do this by communicating succinctly and clearly to the crew members they co-ordinate. Additionally, a floor manager ensures the set - with its many items and cables - is safe for all cast, crew and visitors.

They will be responsible (though able to delegate) for checking that any props or required equipment are available for use; may situate and turn on lights in the absence of a lighting director; make announcements and requests to crew and audience (including keeping order on the set) as well as calling cues to begin the action. A floor manager may delegate duties to an assistant or team of runners to carry out miscellaneous duties and communicate to crew members, guests, etc. to ensure a taping goes to script and schedule.

To keep the program to schedule, they may keep time, performing countdowns to the broadcast, ad breaks and upcoming segments aloud to the crew via the studio microphone. In larger productions, this role is often delegated to a separate crew member.

- Camera operator/Cinematographer/Director of Photography

A camera op generally operates at the instruction of the director, and the composition (or framing) of their shots may be left to their own initiative, or instructed specifically to the

director's desire. A talented camera op has a natural feel for shot composition and light factors; takes instruction well, and has good stamina and stays attentive on a long day's shoot, in addition to a good instinct to the action taking place.

A cinematographer (or Director of Photography) is only necessary for productions that wish for one (generally when a director/producer has a specific vision of the program's appearance), as the role is concerned with the creative aesthetic of the TV program - evoking themes, emotions and setting a tone for the audience. This is done by capturing and manipulating light, as well as factoring in the use of lenses, camera type (or film stock, if not shooting on digital) and various factors related to film photography. On a smaller crew, a camera op may hold the role a cinematographer would on a production concerned with how the visuals will affect the audience. In a production involving a cinematographer, a camera op would take instruction from the cinematographer. A cinematographer collaborates prior to, and during filming with the director, to ensure the director's creative vision is translated to film.

- Audio operator

Depending on the scale of production, sound can be handled by a single audio operator. On larger productions however, these roles can be broken up and delegated.

In a small studio, this role can advise on-air presenters and guests of the positioning of their lapel or wireless microphones, while mixing the audio output from these mics within the control room's audio mixing desk. In larger studios, a separate sound mixer would be operating an audio mixing desk, keeping the various mic outputs to a volume and quality suitable for broadcast. Location shoots may simply require a crew member operating a boom or shotgun mic to capture audio, while listening to the output through headphones to ensure appropriate audio levels are being achieved.

A separate sound mixer may be used in the editing process, to mix the sound for the final product. In some cases however, the editor may perform this task themselves, using their editing software. It serves the sound mixer best however, to capture the best audio quality possible while shooting.

- Boom operator

Whether in-studio or on location, a boom operator's main task is operating and placing a microphone from lengthy boom poles. A boom op positions the mic to record audio as required, ensuring the mic hovering above or near the action on-camera, is out of shot. As this sometimes heavy pole is on occasion held for long lengths, a boom operator has physical strength and stamina in holding the boom for extended periods. In a large team, they communicate and receive instruction from a sound mixer in the control room.

- Vision switcher

A vision switcher (or mixer) performs switching between the different video sources - both from camera shots and videos to be played during an in-studio shoot, selecting shots

presented before them on a bank of screens in the control room,. Along with this, the role requires managing the contrast balance and colour of the final broadcast output. Performing this function occurs via a vision switching panel in the control room. In some productions, a director's role holds this task, and in others, gives instruction to a vision switcher. A good vision switcher has a natural intuition for which shots and pace of cuts suit the nature of the program.

- Graphics operator

This role prepares and displays on-screen graphics to go to air, usually via the use of a graphics-operating software on a computer. They conduct this role during an in-studio shoot, with a swift reaction and flexibility to opportunities for the display of a graphic as required by the action on camera.

- Make-up artist

This crew member is tasked with applying make-up to those appearing on screen. The use of make-up isn't essential to all productions, though in those which elect to use it, this is to make the on-screen face appear more aesthetically pleasing - or whatever the production requires - in some cases applying materials to evoke more elaborate or grotesque features. A hair stylist and wardrobe designer may multi-task under this role, or be separate altogether.

Along with the make-up artists, the hair stylists, costume designers, and dress technicians all combine their effort into transforming an actor into a character, or a person into a presenter.

- Costume designer

The costume designer selects, designs and is in charge of all garments and accessories to be worn on-camera, as well as designing, planning, and organising the creation of the garments down to the fabric, colours and sizes. On some productions, this role is considered an art form, with each costume piece meticulously procured or created, contributing to the overall aesthetic and creative tone of a production - perhaps conveying the inner, emotional mindset and interpretation of a character. On other productions though, the role is mostly practical to have the on-air presenters clothed appropriately.

- Production designer

The production designer holds the responsibility of the visual appearance of a production, evoking a vision in accordance with the producer or director. They design, plan, organise, and arrange set design, equipment availability, as well as the on-screen appearance a production will have.

- Gaffer/Lighting director

A gaffer is the primary electrician on-set, tasked with lighting the stage at the instruction of the cinematographer or tech manager. The term "gaffer" is often limited to film production and lighting may even be co-ordinated by the tech manager where possible. The term "best

boy” refers to one of the gaffer’s electrical assistants. In a smaller television production, the Gaffer positions lighting to ensure the set is well-lit.

- Dolly grip

A dolly grip places and moves the dolly track (“dolly’s” being a vehicle which allows for smooth camera movement along the ground) where required by the camera op or cinematographer, motioning the dolly along the track during filming.

- Key grip

A key grip’s responsibility is the movement of equipment for camera mountings and support when that equipment is more complex than a simple tripod. Grips may also be tasked with maneuvering of tech equipment on a large set.

- Runner

Runners are tasked with carrying out the miscellaneous tasks required for the production, in support of those crew members requesting it.

## **Post-production**

- Editor

On programs which do not go live-to-air, in post-production an editor will work alongside the director (and possibly the producer) to edit the footage that has been shot to create the final product. An editor’s role is largely one of cutting together and juxtaposing shots and audio to the requirements of the director/producer. In some productions however, an editor’s abilities may influence the creative output.

An editor may commence work prior to the completion of the shoot and in most productions the editing process takes longer than the shoot. Editing work is commonly carried out on computer-based video editing software. An editor’s ability is largely dependent on their proficiency with that software, as well as their intuitive feel for the editing together of disparate shots to create the tone and pace instructed by the director/producer. The process is fairly labourious and may go through many changes before being suitable for presentation as a final product.

- Music/Composer

This role is required for productions requiring their own original music - whether for an opening theme, closing credits, or music to be played throughout the program. The composer writes and sometimes also performs this music. They may also conduct or produce a group of musicians to perform the work they have written. The tone of the composition and theme may be communicated by the producer, or written based on a viewing of the cut of an episode.

- Opening titles designer/motion graphics designer

The opening titles displayed at the beginning of a program can set the tone of the program to come. As such, a producer will communicate to an opening titles designer a brief of what they may like these titles to convey. The titles designer may be given a lot of freedom to design and conceive an idea, or be instructed specifically, tasked with producing in accordance with this brief. The titles design should often be designed with the opening titles music in mind. This position may also be responsible for creating stings and breakers for the program, as transitions between segments. They may animate a graphic created by someone else, or produce their own graphic for animation.

### **Directing Commands:**

The Floor Manager / Floor Director remains in the TV Studio during production through headphones. Are in direct communication. Bidirectional control room Director. Normally, the talent can not use the headset and does not receive instructions directly from the Director. It is the responsibility of the Floor Manager / Floor Director acts as a liaison between the Director and talent. Since it is not practical to entrust talent orally during production, the Floor Manager / Floor Director stands or kneels next to the camera that talent to speak and uses a system of hand signals to relay instructions of director . Although any system signal hand understandable from the floor manager and talent would work, it is recommended that you use the internationally accepted system shown in the picture.

The basic hand signals, both floor manager / Floor Director and talents must understand are listed in the following text.

#### **1. Stand by**

For a hand signal to "stand by " floor Manager / Floor Director raises his hand and arm at the beginning of the Show or when additional subdivision.

#### **2. Cue.**

For the hand of "start talking" or "begin," the floor manager / Floor Director raises his hand and points to the talent.

#### **3. Cut.**

For the hand-signal to "cease talking " or "stop action, the floor manager / Floor Director pulls his hand " in his throat in a cutting motion.

#### **4. Stretch.**

For a direct reference to "stretch" "it or slow down," Director floor pulling his hands together as if stretching a rubber band. The amounts are longer than the time when

call manager puts his hands far apart at the end of the proposal extends; shorter time amounts when call manager puts his hands closer together.

#### **5. Speed up.**

The hand signal to "talk faster," the head of the section rotates his arm and hand clockwise in circles above his head. Speed refers to the urgency of the time.

#### **6. OK.**

For the hand signal, that "everything is in order, " the floor Manager / Floor Director is a circle with his thumb and index finger.

#### **7. 30 seconds to go.**

The hand signal, which is 30 seconds remaining in the show segment, the floor manager / Floor Director forms the letter T in both hands.

#### **8. 15 seconds to go**

There are 15 seconds of the Show remained in the segment, and talent is doing text wraps to the hand/signal, resulting in a punch to floor Manager / Floor Director creates a movement by grabbing.

#### **9. Speak more softly.**

For hand signal to "speak more slowly" floor manager / Floor Director raises the Palm of the hand to his mouth.

#### **10. Speak up**

For a hand signal to "speak, ' floor Manager / Floor Director cups his hand to ear.

#### **11. Speak or look at this camera**

For the hand signal to "speak or look at this camera," floor management refers to the on-camera in his hand in the air. Waving pen motion from one camera to another, change the declarations of the talent leader is another must-air camera shot.

## **Multiple-camera setup**

The multiple-camera setup, multiple-camera mode of production, multi-camera or simply multicam is a method of filmmaking and video production. Several cameras—either film or professional video cameras—are employed on the set and simultaneously record or broadcast a scene. It is often contrasted with single-camera setup, which uses one camera.

Generally, the two outer cameras shoot close-up shots or "crosses" of the two most active characters on the set at any given time, while the central camera or cameras shoot a wider master shot to capture the overall action and establish the geography of the room. In this way, multiple shots are obtained in a single take without having to start and stop the action. This is more efficient for programs that are to be shown a short time after being shot as it reduces the time spent in film or video editing. It is also a virtual necessity for regular, high-output shows like daily soap operas. Apart from saving editing time, scenes may be shot far more quickly as there is no need for re-lighting and the set-up of alternative camera angles for the scene to be shot again from the different angle. It also reduces the complexity of tracking continuity issues that crop up when the scene is reshot from the different angles. It is an essential part of live television.

Drawbacks include a less optimized lighting which needs to provide a compromise for all camera angles and less flexibility in putting the necessary equipment on scene, such as microphone booms and lighting rigs. These can be efficiently hidden from just one camera but can be more complicated to set up and their placement may be inferior in a multiple-camera setup. Another drawback is in film usage—a four-camera setup may use (depending on the cameras involved) up to four times as much film (or digital storage space) per take, compared with a single-camera setup.

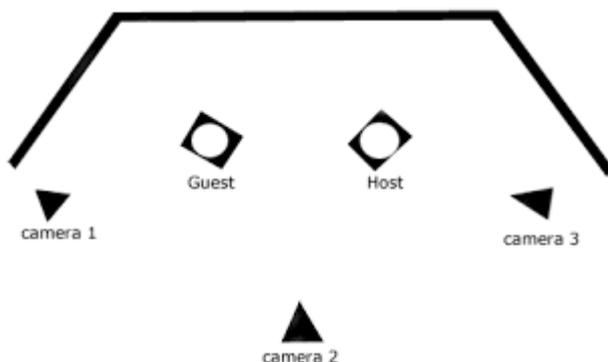
While shooting, the director and assistant director create a line cut by instructing the technical director (or vision mixer in UK terminology) to switch between the feeds from the individual cameras. In the case of sitcoms with studio audiences, this line cut is typically displayed to them on studio monitors. The line cut might be refined later in editing, as often the output from all cameras is recorded, both separately and as a combined reference display called the q split. The camera currently being recorded to the line cut is indicated by a tally light controlled by a camera control unit (CCU) on the camera as a reference both for the actors and the camera operators.

Multi-camera techniques are mainly used in Live shows, like Sports, Concerts & Chat or Game shows. This is so that the viewer's get the full feel that the show wants you to get. The

3 main shows use multi-camera for these reasons:

- **Sports-** Wrestling for example, multi-camera is used so you can get a view from all 4 sides of the ring, they can cut to the crowd to give a feeling of the atmosphere and have a camera at the announcers table so it can cut to them if they need to say something or to show their reaction if something happens.
- **Concerts-** All live concerts use multi-camera so you can have a view of every member of the band together or single shots of the members of the group if they are doing solos or just to get a close-up of them, there's also a camera on the crowd so you can get the atmosphere feeling and it makes it almost feel like you are there.
- **Chat/Game Shows-** Celebrity Juice for example uses multi-camera so you can have a crowd shot, have a view of the entire stage, have a single shot on Keith (The host), then have 2 cameras for both teams and have cameras to get single shots of the team members.

A basic studio production layout looks like this:



This shows a basic interview with multi-camera techniques, Camera 1 shows an over the shoulder shot of the host. Camera 2 shows both the guest and the host. Camera 3 shows an over the shoulder shot of the guest.

Advantages of using multi-camera techniques are the audience can feel as though they are more involved in the action which can give them a sense of excitement and thrill. Another being that a multi-camera set up can be cheaper to make. This is because there is less editing as the editing can sometimes be done live by flicking from camera to camera which also means that multi-camera saves a lot of time and effort.

### **Planning a program**

Once producer made a decision about the most effective production approach, he begins coordination phase by founding clear communication channels among all the people

involved, and he takes care of the facilities request, scheduling, publicity and promotion, permits and clearances.

- People and Communication

Post-script planning stage involves hiring additional personnel for the production. The producer is the chief coordinator among the production crew. Producer must be able to contact every team member reliably and quickly. His most important task is to establish a database with such essential information as names, positions, e-mail addresses, home addresses, business addresses, and various phone, beeper, and fax numbers (Zettl 2009, 35). A good producer triple-checks the communication list and its credibility, he does not rely on a secondhand information. The communication is not complete until the producer hears back from the person he tried to reach. Other crew members should also have access to the needed contact information to each other.

- Facilities Request

The facilities request lists all pieces of production equipment, properties and costumes needed for a production. The facilities request usually contains information about concerning date and time of rehearsals, recording sessions, and on-the-air transmission; names of producer and director; all technical elements, such as cameras, microphones, lights, sets, costumes, makeup, graphics, video recorders, video and audio recording facilities, and other specific production equipment requirements.

It lists the needed studio and control room or the remote locations. Location shooting can add a specific look and mood to the production. It is generally less expensive than on a soundstage, especially if the location comes with furnishings, props, colors, or production space. A moving location can include a character on a busy street, shooting a day-in-the-life sequence, or an extra montage and background footage B-roll. A location scout is a valuable component in location shooting. (Kellison 2005, 117)

Shooting in a foreign location can lend additional depth or mood, or might be part of the scripts direction. Foreign locations can be less expensive by offering professional support crews with lower pay scales, tax incentives, or a strong currency exchange rate. Locations like Canada, South America, Eastern Europe, Australia, Iceland, and New Zealand can help the producer stretch the budget as well as provide viable locations. In some countries, the weather patterns can also extend a shooting season.

Locations can be costly. Sometimes a location cannot be negotiated, is unavailable, is too expensive, or simply does not exist. An excellent alternative is that virtual locations can be designed and created on a computer by computer 3-Dimensional graphics that can give a range of creative images, such as a futuristic building, a landscape, or a battleground with thousands of warriors. Building these virtual locations relies on a blue screen or a green screen background that is placed behind the shooting action and which later is replaced by the chroma key.

- Production Schedule

The production schedule tells everybody involved in production who is doing what, when, and where over. One of the most important responsibilities of the producer is to monitor the progress of each activity and know where everyone stands relative to the stipulated deadlines. A call sheet lists what will be shot and who needs to be on the shoot, as well as call times for cast and crew, the locations, equipment, and scene numbers. The call sheet is distributed to the producer(s), director, production coordinator, studio or network executives, and other people that the producer puts on the distribution list.

- Permits, Clearances and Rights

If a producer did not create the project idea himself, it is owned by someone else. If he wants to use it, he has to get permission before use. This applies to almost every aspect of the project: the talent, the script, the music, clips, images, photographs, products with brand names, props, and more. It is producers job to protect legally every single component with some form of permission. The legal aspect of producing is as important as the creative, technical, or budgetary needs of any project. This involves a common sense of understanding of entertainment law, and an awareness of the contracts, agreements, and rules that are integral in each stage of producing the project. A deal may start with a hearty handshake, and a verbal promise, but ultimately producer wants to make sure it is backed up with a solid legal documentation. There are three areas of intellectual property such as copyright, trademark and patent.

**Copyright** protects rights of author or creator and his original work, including the privilege to copy, distribute, adapt and sell the content. To protect an own expression (video, graphics, music, etc.) and get the ©-symbol creator has to register his work with the Copyright Office in the country. In Finland, there is a Copyright Council in the Ministry of Education and Culture, which is appointed by the government to assist the copyright matters and to give its opinion on the application of the Copyright Act. When work has been copyrighted — a screenplay, a drawing, an original idea — it must be either bought outright or licensed for its use in a project

**Trademark** is distinctive sign or indicator used by an individual, business organization which includes any word, symbol, name, or device. For example, brands, consumer goods, even buildings and well-known landmarks can be trademarked. If the producer wants to feature a trademarked item, he needs to ask permission from the trademark holder.

**Patent** is a set of exclusive rights granted by a state or national government and gives the right to the inventor to prevent other people from making, using, or selling the invention. Patent has a limited period of time in exchange for a public disclosure of an invention, and it is seldom an issue in TV production. There is an option to use the material from a free use area known as the public domain. There is a great amount of available artistic expression such as music, photography, and other material that is no longer protected by copyright and can be freely used by other people and producers.

The *talent release* form helps a producer to be sure that the person appearing on the screen agrees or will not later object to the material has been used from or about him. It may state: —I hereby consent for value received and without further consideration or compensation for the use (full or in part) of all videotapes taken of me and/or recordings made of my voice and/or written extraction, in whole or in part, of such recordings or musical performance for the purposes of illustration, broadcast, or distribution in any manner

- Publicity and Promotion

The best show is worthless if no one knows about it. Producer wants people to see his project. He wants to win festival awards, secure distribution or broadcast, and to attract the attention of potential buyers. As the producer, he is the liaison between the program and the network, distributor, or festival, and it is important that he makes people aware of his work. This is where publicity comes into the picture. Hiring a publicist can be expensive.

Producer stays on top of any generated press or publicity material and carefully supervises what is appearing in the media about his project. Social media helps a lot in publicity and promotion. It gives the producer the power to take an active role in managing the brand by creating interactive profiles or micro websites with project information. Social media gives an opportunity to get potential clients discussing the project, posting comments and reviews and continually promoting the brand of the show.

Everything the producer does must live up to the prevailing ethical standards. Producer has to respect and have compassion for his audience, because his decisions always affect the project and a very large number of people.

### **Most Common Video File Formats**

A normal video file in a digital format is made up of two parts, a “codec” and a “container”. A “codec” is used to compress and decompress a video file, as there are times where video files are too large and may cause difficulty when trying to download or play the file. Some examples of “codecs” are FFMpeg, DivX, XviD, and x264. A “container” is a collection of files that stores information about the digital file. It simply means there is a combination of both audio and video data in a single file to allow for simultaneous audio-with-video playback. Some popular types of “containers” are AVI, FLV, WMV, MP4, and MOV.

- AVI (Audio Video Interleave)

Developed by Microsoft and introduced to the public in November 1992 as part of its Video for Windows technology, the AVI format is one of the oldest video formats. It is so universally accepted that many people consider it the de facto standard for storing video and audio information on the computer. Due to its simple architecture, AVI files are able to run on a number of different systems like Windows, Macintosh, Linux; is also supported by popular web browsers. AVI files stores data that can be encoded in a number of different codec’s, although most commonly with M-JPEG or DivX codecs. This means that all AVI

files, while they may look similar on the outside, differ substantially from one another on the inside.

- FLV (Flash Video Format)

FLV files are videos that are encoded by Adobe Flash software, usually with codecs following the Sorenson Spark or VP6 video compression formats. They can be played via the Adobe Flash Player, web browser plugins or one of several third party programs. Since virtually everyone has the player installed on their browsers, it has become the most common online video viewing platform used on the Web today. As almost all video sharing sites such as Youtube stream videos in Flash, practically all browsers support and are compatible with the Flash Video format and can play the video with ease. In addition to being an online video viewing format, the Flash Video format is also what many video-sharing sites convert videos to, from formats that were uploaded by their users in something other than Flash. This is because videos in the FLV format remain in high quality even after compression to a smaller file size, which means that the videos on the Web load quickly and won't spend a lot of time using up bandwidth. Some notable users of the Flash Video are Youtube, Yahoo! Video, VEVO, Hulu and Myspace among many others.

- WMV (Windows Media Video)

Developed by Microsoft, WMV was originally designed for web streaming applications, as a competitor to RealVideo, but it can now cater to more specialized content. WMV files are the tiniest video files over the Web, as their file size decreases significantly after compression, which results in poor video quality. However, one advantage of this small file size is that it is probably the only video file format that allows users to upload and share their videos through the e-mail system. Being a Microsoft software, the Windows Media Player is the main application that is used to play WMV files on all Microsoft's Windows operating systems, but there are also WMV players available for free for the Macintosh operating system.

- MOV (Apple QuickTime Movie)

Developed by Apple. Inc, the QuickTime file format is a popular type of video sharing and viewing format amongst Macintosh users, and is often used on the Web, and for saving movie and video files. In recent years, Apple came up with a newer version called QuickTime X, currently available on Mac OS X Snow Leopard, Lion and Mountain Lion. MOV files are most commonly opened via the Apple QuickTime Player for the Macintosh Operating System. However, MOV files are not just limited to being played on Apple computers, as there is a free version of the QuickTime Player available for the Windows Operating System among many other players. Considered one of the best looking file formats, MOV files are of high quality and are usually big in file size.

- MP4 (Moving Pictures Expert Group 4)

MP4 is an abbreviated term for MPEG-4 Part 14, a standard developed by the Motion Pictures Expert Group who was responsible for setting industry standards regarding digital

audio and video, and is commonly used for sharing video files on the Web. First introduced in 1998, the MPEG-4 video format uses separate compression for audio and video tracks; video is compressed with MPEG-4 or H.264 video encoding; and audio is compressed using AAC compression. The MP4 file format is also another great file sharing format for the Web, MP4 file sizes are relatively small but the quality remains high even after compression. MP4 standard is also becoming more popular than FLV for online video sharing, as it compatible with both online and mobile browsers and also supported by the new HTML5.

## **The Television Camera**

The television camera changes lights into an electronic signal that can be stored on videotape or digital computer memory, transmitted, and displayed on a television receiver or monitor. Television cameras are probably easier to operate than film or still cameras because the camera output can be watched and controlled as it was recorded.

### How Television Camera Works

All television cameras, big or small, work on the same principle: they convert the optical image into electrons. The lens gathers the light reflected off of the object and focuses on the beam splitter, or also known as an imaging device, which splits the white light into red, green and blue pictures. These beams are directed toward their respective sensors (CCD or CMOS), which transforms the RGB lights into electrical RGB charges; these are amplified, processed, and then reconverted by the viewfinder into video pictures (Zettl 2009, 72-73).

### Lenses

A camera lens (also known as photographic lens or photographic objective) is an optical lens or assembly of lenses used in conjunction with a camera body and mechanism to make images of objects either on photographic film or on other media capable of storing an image chemically or electronically.

There is no major difference in principle between a lens used for a still camera, a video camera, a telescope, a microscope, or other apparatus, but the detailed design and construction are different. A lens may be permanently fixed to a camera, or it may be interchangeable with lenses of different focal lengths, apertures, and other properties.

While in principle a simple convex lens will suffice, in practice a compound lens made up of a number of optical lens elements is required to correct (as much as possible) the many optical aberrations that arise. Some aberrations will be present in any lens system. It is the job of the lens designer to balance these out and produce a design that is suitable for photographic use and possibly mass production.

### Types of lens

#### "Close-up" or macro

A macro lens used in macro or "close-up" photography (not to be confused with the compositional term close up) is any lens that produces an image on the focal plane (i.e., film

or a digital sensor) that is the same size or larger than the subject being imaged. This configuration is generally used to image close-up very small subjects. A macro lens may be of any focal length, the actual focus length being determined by its practical use, considering magnification, the required ratio, access to the subject, and illumination considerations. It can be a special lens corrected optically for close up work or it can be any lens modified (with adapters or spacers) to bring the focal plane "forward" for very close photography. The depth-of-field is very narrow, limiting its usefulness. Lenses are usually stopped down to give a greater depth-of-field.

## Zoom

Some lenses, called zoom lenses, have a focal length that varies as internal elements are moved, typically by rotating the barrel or pressing a button which activates an electric motor. Commonly, the lens may zoom from moderate wide-angle, through normal, to moderate telephoto; or from normal to extreme telephoto. The zoom range is limited by manufacturing constraints; the ideal of a lens of large maximum aperture which will zoom from extreme wideangle to extreme telephoto is not attainable. Zoom lenses are widely used for small-format cameras of all types: still and cine cameras with fixed or interchangeable lenses. Bulk and price limit their use for larger film sizes. Motorized zoom lenses may also have the focus, iris, and other functions motorized.

## Wide Angle Lenses

Traditionally, a super wide-angle lens is classified as anything under 20mm. Wide-angle is 21-35mm. With the advent of digital cameras, and the APS-C format, camera manufacturers have also started producing specific lenses for this format. Wide-angle lenses for crop frame DSLRs range from 10-24mm, with a few going down to a super wide 8mm.

Wide-angle lenses are most commonly used for photographing landscapes and architecture, although they are often also used for photographing large groups of people.

## Standard Lenses

A standard lens has a focal length range of 35-70mm. The most common standard lens is a fixed 50mm lens.

Standard lenses are most commonly used for documentary and street photography, where photographers need to move quickly and capture an interesting point of action. Pioneers of modern street photography, such as Henri Cartier-Bresson, always used a 50mm lens, choosing to move themselves around so as to best frame an image.

## Medium Telephoto / Portrait Lens

The focal range between 80-135mm is nearly always used by portrait photographers. Fixed lenses at these lengths produce ideal framing for head and shoulders shots. These are specialist lenses, but can be surprisingly reasonably priced.

## Telephoto

Any lens with a focal length of between 135mm and 300mm is a true telephoto lens. Manufacturers make a huge range of lenses in this range ... at an equally large range of prices!

Telephoto lenses are traditionally used for sports and wildlife photography, but their essential function is to bring distant objects closer.

### Specialist Lenses

There are a variety of specialist lenses available. Some of the more common are:

- Super Telephoto. These have a focal length of more than 300mm, and are used by dedicated sports and wildlife photographers. The Nikon AF-S Nikkor 400mm f/2.8G super telephoto lens (pictured here) is an example.
- Fisheye. These are on the edge of wide-angle lenses, and give a distorted view of the subject matter. The center of the image is magnified, and objects diminish in size in all directions around it.

### Lightning

Television is a means of changing patterns of light into electrical signals for storage or transmission and then recreating those patterns on a screen (Inman & Smith 2006, 5). The television camera must be presented with appropriately illuminated scenes. The three important considerations are level, contrast range, and color temperature.

Light is the narrow band of electromagnetic radiation to which the human eye is sensitive. There are no exact boundaries to the range of visible light, as individuals differ (Präkel 2007, 11). Naturally, human eyes are receptive to a range of wavelengths of light between 400-700 nanometers.

White light passing through a prism in the camera creates all the colors of the rainbow, but only three additive colors – red, green, and blue – are necessary to make up all the others. Lighting levels for television are generally set by adjusting the incident light, or the light striking the subject. (Inman & Smith 2006, 7) To measure the useful incident light, there is a meter, which is held near the subject and pointed toward the camera. The unit of measure for incident light in the meter is the American foot candle (fc) and the European lux, which is the amount of light produced by a standard candle at a distance of one foot. One lux is equal ten-foot candles.

**Contrast** refers to the difference in brightness from the brightest parts of a scene to the darkest. Common digital video signals are 24-bit color, with eight bits, each for red, green, and blue. This scheme allows for 256 individual shades from dark to light for each color. Since 24-bit color allows for over sixteen million colors, the limited numbers of shades available for each color are not usually a problem, although the luminance steps may be visible in monochromatic scenes. (Inman & Smith 2006, 6) Every source of light has a characteristic color. This color is related to its "temperature" (Inman & Smith 2006, 7).

Lower color temperatures tend to be red or orange while higher temperatures tend to be green or blue. Color temperatures are measured in degrees Kelvin.

The eye "remembers" how things are supposed to look and interprets color accordingly, regardless of the color temperature of lighting sources. A white sheet of paper seems white whether viewed under an incandescent lamp or sunlight. The eye can even adjust for "correct color" when two light sources of different colors are present in the same scene. Sunlight streaming into a room which is also lit by incandescent lamps doesn't make objects it strikes appear bluish. (Inman & Smith 2006, 7) To be able to photograph in a range of lighting conditions keeping white appearing as white and not blue-white or yellow-white, there is a need to use light filters, or an appropriate film stock for a specific light. In conclusion, I would like to say that for video production the relevant temperatures range is from around 2,000K to 8,000K. In practical terms this usually means selecting lights, gels and filters, which are most appropriate to the prevailing light or to create a particular color effect (Media College 2012). For example, a camera operator will select a "5600K filter" to use in shootings outside in the middle of a sunny day. Television lights are much more powerful than normal incandescent lights. They range from 25 watts for DC camera lights up to as high as 5000 watts. Lights used for electronic news gathering (ENG) or electronic field production (EFP) normally ranged from 500 to 1000 watts each. This presents problems whenever they are used in locations that were not intended for television recordings. (Inman & Smith 2006, 9)

### Lighting Instruments

There are two basic kinds of lights used in television: **spot and flood light**. The spotlight has a narrow beam that casts well-defined light that can be adjusted from a sharp light beam like a focused flashlight to a softer beam is still highly directional but lights up a larger area. Fresnel spotlight is the most popular in studio production. It is lightweight, flexible and has a high output. This type of spotlight uses a glass lens that consists of concentric grooves or steps on its front surface, which forms the light into a softedged beam. The most common Fresnels are the 1kW and the two kW instruments in television studios. The second type of spotlight is the ellipsoidal spotlight. This lighting instrument produces intense, sharply defined light beams. The ellipsoidal spotlight is used primarily for special effects lighting. For example, to create "pools" of light reflecting off the studio floor, the ellipsoidal spotlight would be the perfect instrument to use. Even when the Fresnel spotlight is in its focused position, it cannot emit as sharp an outline as the ellipsoidal.

*Floodlights* are designed to produce a great amount of highly defused light. They are often used as principal sources of light in situations where shadows are to be kept to a minimum, such as news sets and product displays; to reduce contrast between light and shadow areas; and provide a base light. There are four basic types of studio floodlights: the scoop, a rugged, all-purpose peculiar scoop like reflector; the soft and broad light, which produces extremely diffused light and used for illumination with slow falloff; the fluorescent floodlight, which major advantage is that it does not get as hot as incandescent light of equal output; and the strip or cyclorama light, used to illuminate large areas.

Scrimms are special disks of screen wire that can be used to soften lights and reduce their intensity slightly (Inman & Smith 2006, 9). Lamps and housing become extremely hot when they are in use. Hot lamps should be handled only with protective gloves to prevent burns. On the remote locations are used the same lighting instrument but of smaller sizes. Portable spotlights are easy to set up and transport; they usually come with the lights support systems, which hold them in the correct position such as ballasts or light stands and clamps. When there are not enough light outdoors, then collapsible reflectors become very useful for additional highlighting of the object or talent. The reflector can be folded up for easy transport as well. It has a silver-colored reflector on the one side and gold-colored on the other.

*Clamp lights.* These lights are the most budget-friendly, but are the hardest to diffuse for soft, even light. Clamp lights are perfect for illuminating a space with little effort, while also being the perfect addition to a DIY lighting kit

*Studio lights.* Studio lights give you more control over diffusion and offer more light to work with. These powerful lights allow you to manipulate the exposure, flash, and depth of field for some truly stunning results.

*High-end lights.* These are the most expensive option, with one light sometimes costing as much as a full studio light kit. However, these lights offer a full range of features, including dimmers, wireless controls, color temperature, diffusion, and stronger output. It is recommended to invest in high-end lights only if you are filming frequently

## **Lighting Techniques**

In lighting there are two goals: get enough light; use the light you have to shape and define objects in the scene. Lighting is often tried out "on paper" by using a lighting diagram before it is actually set. Many potential problems can be spotted in the process of constructing a lighting diagram. The most common of these is to light for a theoretical "stage front" instead of lighting for specific camera positions. It is also useful in anticipating problems with shadows falling where they are not wanted. Every light casts a shadow. The lighting diagram will make it easier to see where those shadows might fall. (Inman & Smith 2006, 11)

For people who work with lighting there is a very good online portal Strobox, where photographers share their own creations, discuss different techniques and learn each from other. You can see the different lighting techniques achieve different effects on the images below

The **Three Point Lighting** technique is a standard method used in visual media such as video, film, still photography and computer-generated imagery. It is a simple but versatile system which forms the basis of most lighting.

Key Light

The first light set is usually the key light. It is positioned thirty to fortyfive degrees to the side of the camera and should strike the subject at an angle of about forty-five degrees from vertical (Präkel 2007, 117). This lighting angle is best for people with normal features. People with short noses or weak chins should be lit from a steeper angle to increase the length of the shadows cast under the nose or chin. Those with long noses should be lit with fewer angles to produce shorter shadows. Moving the light closer to the camera will reduce the amount of modeling in the face and make the subject appear heavier than he is. Conversely, moving the light farther from the camera will throw more of the face in a shadow, making it appear narrower. The key light is focused on the subject by putting the bulb in the "full spot" position and centering the beam on the subject. (Inman & Smith 2006, 11-12)

### Fill Light

Fill light is added on the side of the camera opposite the key light. Fill light should be about half the intensity of the key and back lights. It should also be softer, producing no harsh shadows. Often a broad, scoop, or soft light is used instead of a spotlight to provide fill. Fill lights are also frequently scrimmed to soften them and reduce their intensity. (Inman & Smith 2006, 12) Shooting videos indoors with external windows is a common issue for video makers. The large difference in light levels between the room and the outside view challenges finding the correct exposure. It is highly recommended to avoid reflections on the face and eyes from glasses, to do this may need only adjusting the position of the person or the lights.

### Back Light

The back light is positioned directly behind the subject. It is spotted down and pointed at the subjects neck. People with blonde or missing hair requires less intensity, and over wise, people with very dark hair require more. When the back light is too bright in the full flood position, a scrim can be fitted in front of the housing to soften and reduce the light (Inman & Smith 2006, 12). The back light helps to separate the subject from the background and provide a three-dimensional look.

Cinematography lighting is closely similar to [photography lighting](#). You've probably heard many of these techniques, especially if you've done some studio photography in the past, but it helps to learn how they can uniquely benefit filmmakers in creating different moods and atmospheres in every scene.

It's also important to note that these techniques are not clear-cut, so many of them can actually take the form of several other lighting techniques. What matters is that you learn what each is good for and are able to make the best use of them for achieving your cinematic goals.

- Side Lighting
- Practical Light

- Hard Lighting
- Soft Lighting
- Bounce Lighting
- High Key
- Low Key
- Motivated Lighting
- Ambient Light

### **Side Lighting**

Needless to say, side lighting is for illuminating your scene from the side, parallel to your subject. It is often used on its own or with just a faint fill light to give your scene a dramatic mood or what's referred to as "chiaroscuro" lighting. To really achieve this effect, your side light should be strong so as to create strong contrast and low-key lighting that reveals the texture and accentuates the contours of your subject.

When used with a fill light, it's advisable to lessen the fill light's intensity down to 1/8 of that of the side light to keep the dramatic look and feel of a scene.

### **Practical Lighting**

Practical lighting is the use of regular, working light sources like lamps, candles, or even the TV. These are usually intentionally added in by the set designer or lighting crew to create a cinematic nighttime scene. They may sometimes be used to also give off subtle lighting for your subject.

However, practical lights are not always easy to work with, as candles and lamps are typically not strong enough to light up a subject. A hidden, supplementary motivated light (more on that later) may be used or dimmers can be installed in lamps so the light's intensity can be adjusted.

### **Bounce Lighting**

Bounce lighting is about literally bouncing the light from a strong light source towards your subject or scene using a reflector or any light-colored surface, such as walls and ceilings. Doing so creates a bigger area of light that is more evenly spread out.

If executed properly, bounce lights can be used to create a much softer key, fill, top, side, or backlighting, especially if you don't have a diffuser or softbox

### **Soft Lighting**

Soft lighting doesn't refer to any lighting direction, but it's a technique nonetheless. Cinematographers make use of soft lighting (even when creating directional lighting with the

techniques above) for both aesthetic and situational reasons: to reduce or eliminate harsh shadows, create drama, replicate subtle lighting coming from outside, or all of the above.

### **Hard Lighting**

Hard light can be sunlight or a strong light source. It's usually unwanted, but it certainly has cinematic benefits. You can create hard lighting with direct sunlight or a small, powerful light source.

Despite it creating harsh shadows, hard lighting is great for drawing attention to your main subject or to an area of the scene, highlighting your subject's contour, and creating a strong silhouette.

### **High Key**

High key refers to a style of lighting used to create a very bright scene that's visually shadowless, often close to overexposure. Lighting ratios are ignored so all light sources would have pretty much the same intensity. This technique is used in many movies, TV sitcoms, commercials, and music videos today, but it first became popular during the classic Hollywood period in the 1930s and 40s.

### **Low Key**

Being the opposite of high key, low key lighting for a scene would mean a lot of shadows and possibly just one strong key light source. The focus is on the use of shadows and how it creates mystery, suspense, or drama for a scene and character instead of on the use of lighting, which makes it great for horror and thriller films.

### **Motivated Lighting**

Motivated lighting is used to [imitate a natural light source](#), such as sunlight, moonlight, and street lamps at night. It's also the kind of lighting that enhances practical lights, should the director or cinematographer wish to customize the intensity or coverage of the latter using a separate light source.

To ensure that your motivated lighting looks as natural as possible, several methods are used, such as the use of filters to create window shadows and the use of colored gels to replicate the warm, bright yellow light coming from the sun or the cool, faint bluish light from the moon.

### **Ambient Lighting**

Using artificial light sources is still the best way to create a well-lit scene that's closely similar to or even better than what we see in real life. However, there's no reason not to make use of ambient or available lights that already exist in your shooting location, may it be sunlight, moonlight, street lamps, or even electric store signs.

When shooting during the day, you could always do it outdoors and make use of natural sunlight (with or without a diffuser) and supplement the scene with a secondary light for your

subject (bounced or using a separate light source). Early in the morning and late in the afternoon or early evening are [great times for shooting outdoors](#) if you want soft lighting. The only downside is that the intensity and color of sunlight are not constant, so remember to plan for the weather and sun placement.

## Studio Equipments

- **Video Camera**

A video camera is the centerpiece of your filmmaking gear package. What camera you choose depends on your budget, the type of shooting you're doing (static, stealth, run-and-gun, etc.) and where you plan to showcase your film (web-only, theater, broadcast, etc). You can shoot a documentary on anything from your iPhone to a DSLR to a top of line digital cinema camera such as the [RED](#). Whatever camera you choose, make sure you capture excellent audio.

- **Tripod**



A necessary piece of equipment to keep your footage looking steady and professional. A **tripod** is a portable three-legged frame or stand, used as a platform for supporting the [weight](#) and maintaining the stability of some other object. A tripod provides stability against downward forces and horizontal forces and movements about horizontal axes. The positioning of the three legs away from the vertical centre allows the tripod better leverage for resisting lateral forces.

- **Camera Light**

Studio lighting is an essential addition to most photographers' arsenal. It allows us to create natural lighting effects in a variety of situations, and is far more controllable than a flashgun. Sometimes a nice pop of light from the camera can help fill in ugly shadows. A camera light is a nice accessory to have especially in a documentary/news style shoot where you might not have time for a full 3-point lighting set-up.

- **Microphone**

A microphone, colloquially named mic or mike is a device – a transducer – that converts sound into an electrical signal. Microphones are used in many applications such as

telephones, hearing aids, public address systems for concert halls and public events, motion picture production, live and recorded audio engineering, sound recording, two-way radios, megaphones, radio and television broadcasting, and in computers for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic sensors or knock sensors.

Several types of microphone are in use, which employ different methods to convert the air pressure variations of a sound wave to an electrical signal. The most common are the dynamic microphone, which uses a coil of wire suspended in a magnetic field; the condenser microphone, which uses the vibrating diaphragm as a capacitor plate; and the piezoelectric microphone, which uses a crystal of piezoelectric material. Microphones typically need to be connected to a preamplifier before the signal can be recorded or reproduced.

- **Boom Pole**

A boom mic set-up comes in handy to capture audio from a group interview, crowd scenes or any situation where you need to gather professional audio quickly. In addition to the boom pole (right), you'll need a shockmount and a shotgun mic.

- **Shock Mount**

Here's the simple gadget needed to turn your shotgun mic into a boom pole mic. A **shock mount** keeps the mic steady on top of the pole and prevents the mic from picking up "bumping" sounds when the pole is moving around.

- **Audio (XLR) Cables**

If you plan to use a professional audio set-up with your camcorder, you'll need XLR cables to go from your camera to the mic.

- **Headphones**

Unlike most studio gear, headphones are one item that we're all thoroughly familiar with.

For pro audio, there are 2 special types of studio headphones intended for 2 very specific tasks:

closed back headphones

open back headphones

