

Multimedia Applications (Sound and Video Editing)

7.1 Sound :

Sound is a form of energy. It is made when air molecules vibrate and move in a pattern called wave, or sound waves. *Sound is a type of wave that is produced by vibrating object and that travels through matter as longitudinal wave.* Sound needs a medium to travel.

For human beings, sound is one of the most important ways to communicate by :

- Expressing himself through speech.
- Obtaining information through listening.

Sound allows more complex information transfer easier than visual impression.

7.1.1 The Physical Components of sound:

The sound wave can be broken down into a series of basic physical characteristics. These are :

- Frequency :** It is defined as the number of cycles or complete waveforms, that occurs with in the period of 1 second.

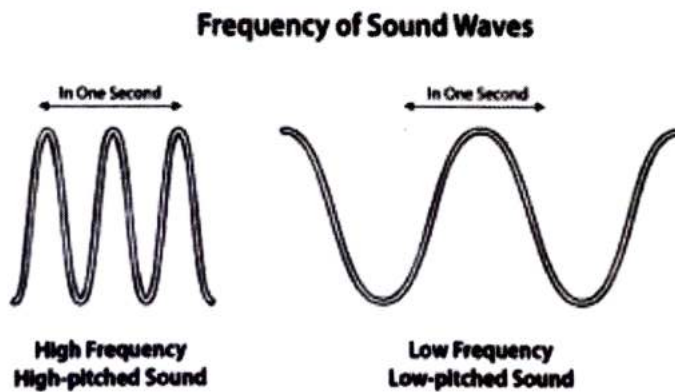


Fig. 7.1 Frequency

- Pitch :** Pitch is relative highness or lowness of a tone or frequency. It is number of cycles with in a second.
- Amplitude :** Amplitude describes the loudness or softness of the sound that we are

listening to. The loudness of a sound is measured in decibel (dB). We can hear at levels 60 dB. Sound levels above 120 dB are felt as discomfort.



Fig. 7.2 Amplitude

7.2 Microphone :

Microphone (or Mic) is a device, a type of transducer, which converts acoustical energy (sound wave) into electrical energy (the audio signal). Different types of microphone have different ways of converting energy but they all share one thing common: **the diaphragm**. This is a thin piece of material, such as paper, plastic or aluminium, which vibrates when it is struck by sound waves. In a typical hand held mic like the one below, the diaphragm is located in the head of microphone. When diaphragm vibrates, it causes other components in the microphone to vibrate. These vibrations are converted into an electric current which become the audio signal.



Fig. 7.3 Microphone

7.3 Types of microphone :

There are different types of microphone. Most popular of these are :

- a) Dynamic microphone.
- b) Condenser microphone.

- a) **Dynamic microphone:** In a dynamic microphone, sound wave hit a thin metallic diaphragm that is attached to a coil of wire. The diaphragm vibrates the coil in response to the sound wave. A magnet that is positioned inside the coil produce magnetic field. It is the motion of coil in the magnetic field which generates the electrical signal.

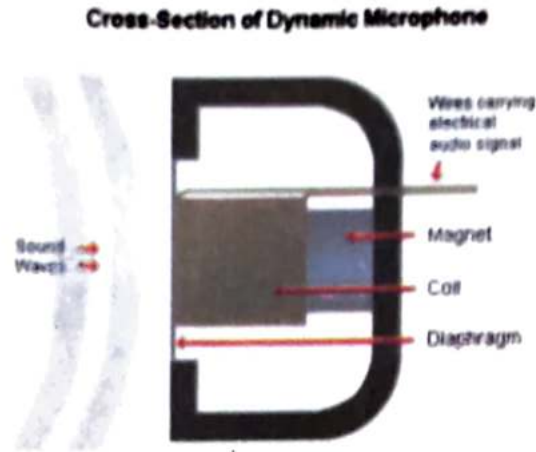


Fig. 7.4 Dynamic Microphone

Advantages :

- Rugged and able to handle high sound pressure levels, like those delivered by kick drum.
- Provide good sound quality in all areas of microphone performance.
- They do not require a power source to run.
- They are relatively cheap.

Disadvantages :

- Generally not suitable for recording instruments with higher frequencies and harmonics like violin.

- b) **Condenser microphone :** Condenser microphone use a pair of charged metal plates, one fixed (the back plate) and one movable (the diaphragm), forming a capacitor. When a sound wave hits the diaphragm, the distance between the two plates changes which produces a change in electrical characteristics called capacitance. It is the variation of the spacing which produces the electrical signal corresponding to the sound picked up. These require a power source, to charge the plates. This is usually done using a battery.

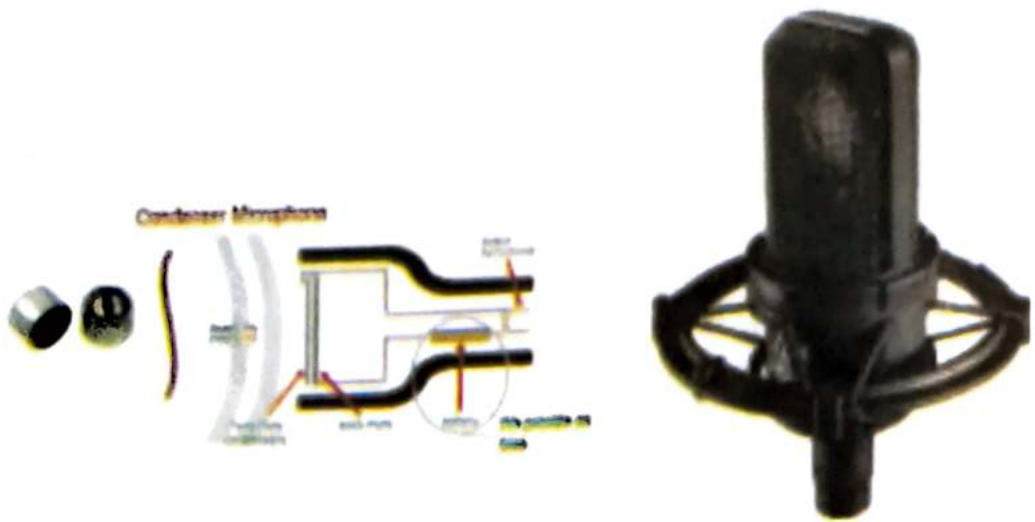


Fig. 7.5 Condenser Microphone

Advantages :

- The diaphragm assembly is light as compared to that of dynamic microphone. Therefore these are more efficient and are capable of capturing a range of high frequency.
- They can be small in design.
- They have better high frequency response characteristics.

Disadvantages :

- These are more complex than dynamic microphone and are affected by extremes of temperature and humidity.
- There is a limit to the maximum signal level the electronics can handle.
- They are more expensive.

7.4 Microphone Characteristics :

Every microphone has a property known as directionality/ polar. This describes the microphone's sensitivity to sound from various directions. There are varieties of directional pattern found in microphone design including:

- a) Omni directional
- b) Bi-directional
- c) Cardioid
- d) Hyper cardioid

Omni directional : These microphones capture sound equally from all directions. They are useful for capturing ambient noise and situations where the mic position must remain fixed while sound source is moving like in play.

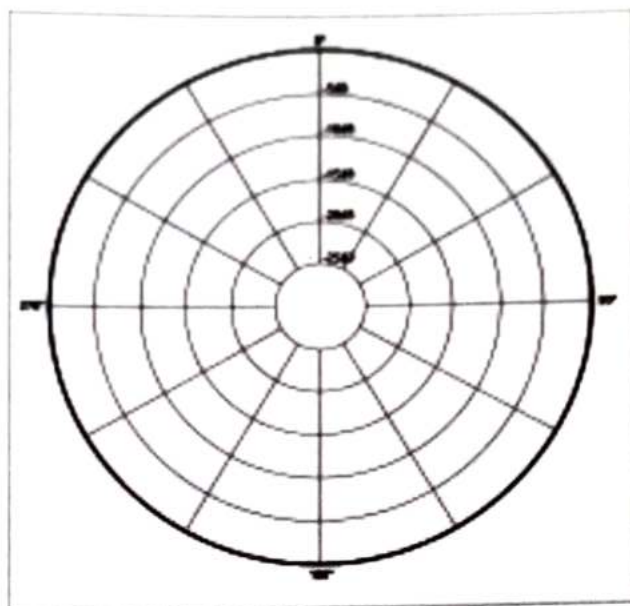


Fig. 7.6 Omni Directional

Bi-directional : These microphones use a figure of eight pattern and pick up sound equally from two opposite directions. One possibility of using such pattern would be an interview with two people facing each other (with the mic between them).

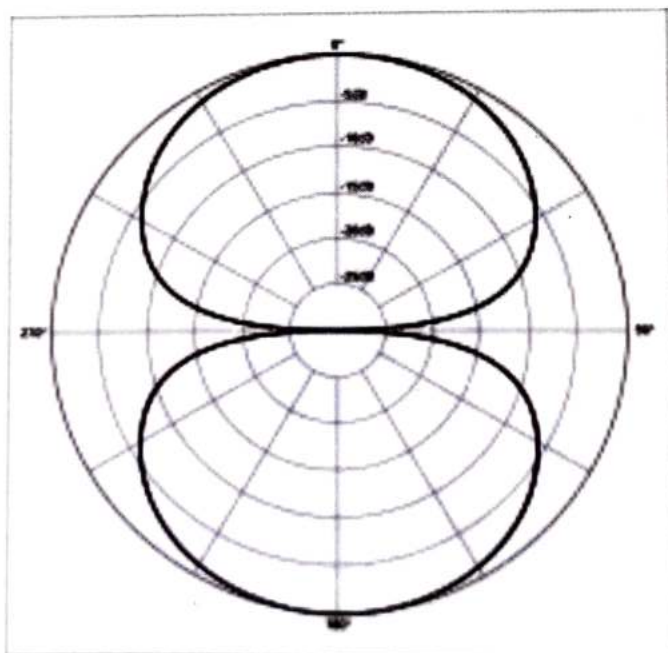


Fig. 7.8 Bi-Directional

Cardioid : Cardioid means 'heart - shaped', which is the type of pick up pattern, these mic uses. Sound is picked up mostly from the front, but to a lesser extent the side as well. The cardioid is a very versatile microphone. Hand held mics are usually cardioid.

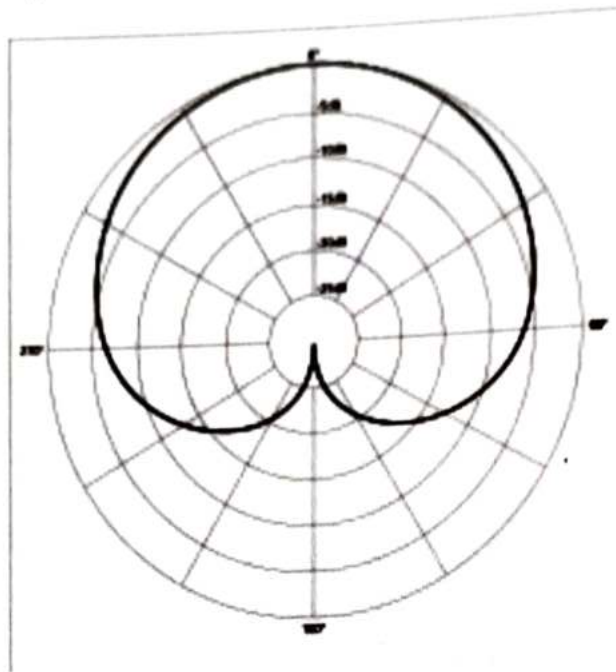


Fig. 7.9 Cardioid

Hyper cardioid : It is very directional and eliminates most sound from sides and rear. They are used for isolating the sound from a subject or direction when there is a lot of ambience noise. But you need to be careful to keep the sound consistent. If mic does not stay pointed at the subject you will lose the audio.

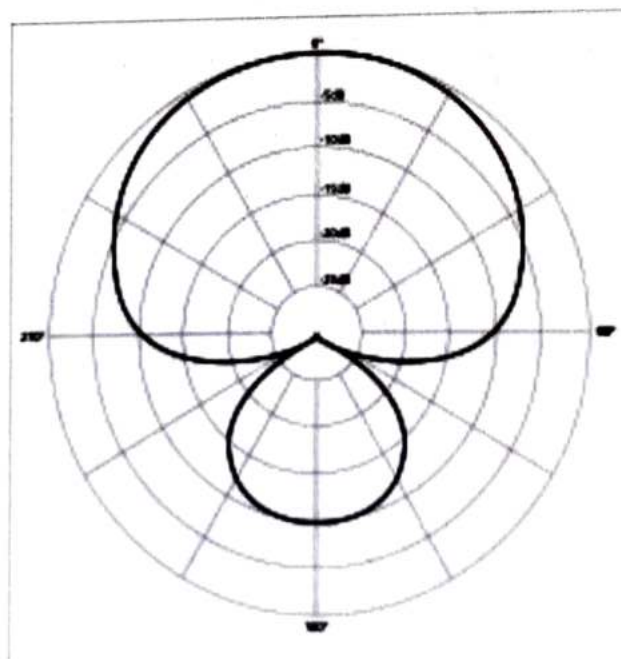


Fig. 7.10 Hyper Cardioid

7.5 Soundtrack :

Sound plays very important role making our experience of something complete. Though we might think film as an essentially visual experience, but we can not underestimate the importance of film sound.

The term soundtrack can refer to several things, depending on use. In broadest sense it simply means anything you hear in the movie i.e. sound effects, dialog, music etc.

The entire soundtrack is comprised of three essential ingredients, which must be mixed and balanced so as to produce the necessary emphases which in turn create desired effect.

- The human voice (dialogue)
- Sound effects
- Music (background sound)

7.6 Sound Editing :

Sound editing is an art of producing great quality sounds for mixing, implementation and processing. In simple words, **sound editing is a laborious task of making noisy and lousy recordings sound good.** Sound editing is not just cleaning up bad recordings. Some creative processes include:

- a) Dialogue editing: Fine – tuning lines spoken by actors in case of speech defects.
- b) Dubbing: Re-recording dialogue in case of unsalvageable audio recording.
- c) Sound design: Enhancing original audio with sound effects and filters.
- d) Music editing: Editing or synchronizing a soundtrack to events in the film.
- e) Mixing: Finely adjusting the levels, equalization, and dynamics of all the tracks, in a program to focus attention on important audio cues and dialogue, to make the other sound effects, ambience, and music tracks blend together seamlessly.

Sound editing is done using software. These software let you record and edit music, voice and other audio recordings. Some popular sound editing software are Acoustica Basic edition, Audacity, wavepad etc.

7.7 Mixing Console :

A mixing console is an electronic device for combining sound of many different audio signals. Mixing consoles are used in many applications, including recording studios, public address system, night clubs, broadcasting, film post production etc.

A typical, simple application combines signals from microphones on stage into an amplifier that drives one set of loudspeakers for the audience. Mixer often classified by their input and output capabilities. For example, a 32 X 8 mixer would have 32 individual channel input and 8 main output channel. More professional boards have many more input and output capabilities besides the main I/O's.



Fig. 7.11 Mixing Console

7.8 Video Editing :

Video editing is the process of manipulating and rearranging video shots to create a new work. Editing is usually considered to be one part of the post – production process. Other post – production tasks include titling, colour correction, sound mixing etc.

In general terms video editing means :

- Rearranging video shots.
- Adding or removing section of video.
- Creating transition between clips.
- Applying colour corrections, filters.

7.8.1 Goals of Video Editing :

The video editing is needed due to certain reasons. These are :

- You can remove unwanted footage.
- You shoot several versions of a shoot and among those you can select the best one.
- Using video editing, you can add several effects, sound to your video.
- You can give your video a particular 'angle' or viewpoint on a certain agenda.

7.9 Types of Video Editing :

There are several different ways to edit video and each method has its own advantages and disadvantages. Some commonly used methods are:

- Linear editing
- Non linear editing
- Film splicing

(a) Linear editing : Linear editing was the original method of editing electronic video tapes. In linear editing, video is selectively copied from one tape to another. That's why it is also called tape to tape editing. It requires at least two video machines connected together – one act as the source and other is the recorder. The basic procedure is :

- Place the video to be edited in the source machine and a blank tape in recorder.
- Press play on the source machine and record on the recorder.

The idea is to record only those parts of the source, you want to keep. In this way the desired footage is copied in the correct order from the original tape to new tape.

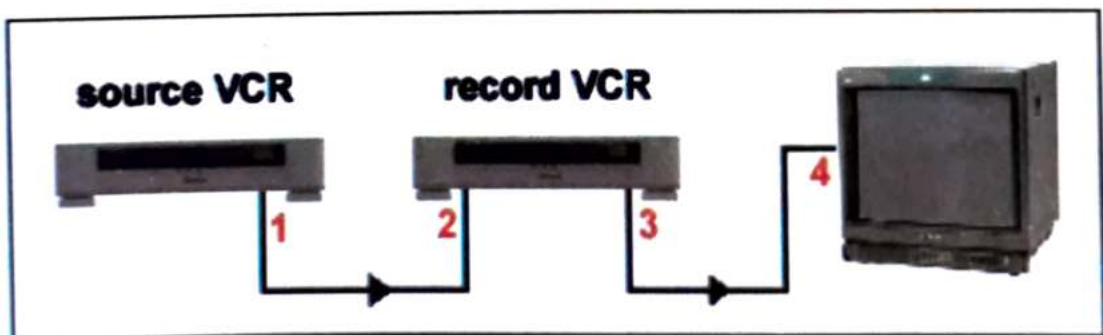


Fig. 7.12 Linear Editing

This method is called linear editing because it must be done in a linear fashion, means, starting with the first shot and working through to the last shot. The linear editing

is relatively simple and trouble free. Some advantages of linear editing are:

- It is very simple and requires little knowledge to work.
- It is very inexpensive as compare to other editing techniques.

(b) Non linear editing : In this method, video footage is recorded on to a computer hard drive and then edited using specialized software. Once the editing is complete, the finished product is recorded back to tape or optical disk. It is generally carried out on computer using editing software.

It is also known as Digital Editing. The editor first gather footage together in to the software program than cuts, copies and pastes it together in any order which is desired. When the non linear sequence is ready, it is recorded on to the master page.



Fig. 7.13 Non Linear Editing

One of the most difficult aspect of digital video editing is the array of the hardware and software options available. Now which one is suitable for you, need skills. Although, it is more difficult to learn than linear editing.

The advantages of non linear editing are :

It allows you to access any frame, scene at any time.

Original footage is kept intact while editing, so you are able to return to original take when ever you like.

It is possible to edit both Standard Definition (SD) and High Definition (HD)

broadcast quality.

You can made changes hundred times over without starting all over again as in linear video editing.

(c) Film Splicing : Technically this is not video editing, it's film editing. But it was the first way to edit moving pictures and conceptually it forms the basis of all video editing.

Traditionally, film is edited by cutting sections of the film and rearranging or discarding them. The process is very straight forward and mechanical. A splicing machine allows film footage to be lined up and held in place while it is cut or spliced together.



Fig. 7.14 Film Splicing

7.10 Role of Video Editor :

A video editor is a highly skilled person who edits movies or videos. Video editor are generally responsible for editing and assembling recorded raw material into a suitable, finished product ready for broadcasting. The material may include camera footage, dialogue, sound effects, graphics and special effects.

The editor may be the part of team and they will usually work closely with director to achieve the desired end result. The key responsibilities of a video editor are :

- Edit raw footage content for producing film and video.
- Perform video and audio editing based on story sequence and continuity.
- Cut video sequences effectively to ensure the scenes are seamless and flow logically.

- Works closely with producers and directors during production.
- Review the script to better understand the video production requirements.
- Perform all editing work including inserting music, sound effects, story boarding etc.
- Review all edited tapes to identify any issues and recommend changes as necessary.
- Discuss with directors and producers about video layouts and editing styles.
- Develop post – production models for films.
- Organize video screenings for directors and producers to get their feedback.

7.11 Video Cassette Recorder (VCR) :

A video cassette recorder 'VCR' is an electromechanical device that records analog audio and analog video from broadcast television or other source, on a video tape that can be viewed at any time.

A video cassette recorder is commonly used to record television programs broadcast over the air or by the cable, and to playback commercially recorded cassettes on a television set. Most VCRs have fast – forward and reverse controls and a timer that enables television programs to be recorded automatically. They can record a program on one television channel while a viewer watches a program on another channel on same television set.

In VCR, the magnetic tape inside the VHS tape progresses above a recording/playback head at a constant speed. It permits the transfer of video signal from or to the tape. These signals are recorded on the tape in diagonal tracks. The stored video signal is sent to the television for viewing. Some of the VCRs can erase the tapes prior to recording on them; so that better playback quality is meet out.

VCRs are less expensive than other electronic devices.

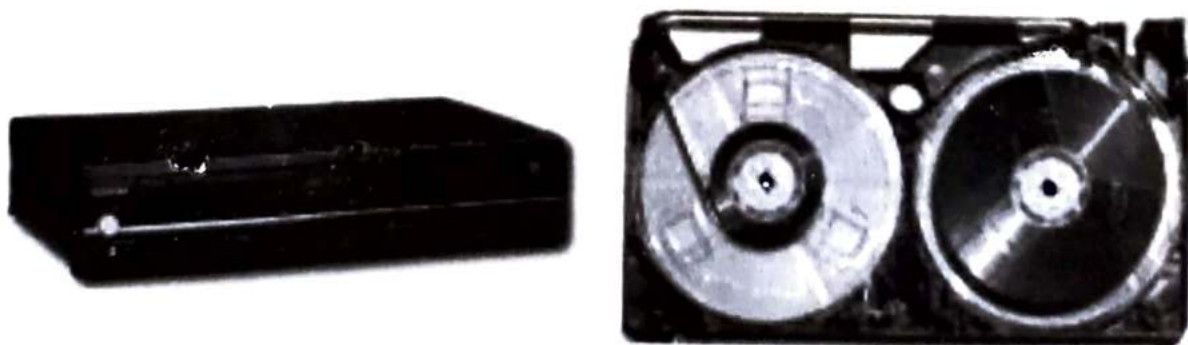


Fig. 7.15 VCR

7.12 Video Editing Software :

There are many software packages available for editing video on your computer. Typically *video editing software includes tools to convert file formats, trimming, join clips, rotate or crop footage, add sound or transitions and other special effects.* Some popular video editing softwares are:

- Adobe Premier Pro
- Pinnacle Studio
- Windows Movie Maker

7.12.1 Windows Movie Maker :

Windows movie maker is a very popular video editing application. It allows you to add captions, titles, transition effects, adjust the audio and video frame rates and levels and a lot more. It is an in built feature of windows. Windows movie maker lets you assemble a range of video, picture and sound elements to create a story.

The steps to create and edit video in Windows Movie Maker are :

1. Open movie maker, click Start → All Programs → Movie Maker.
2. A window named as movie maker interface will be opened on the screen.

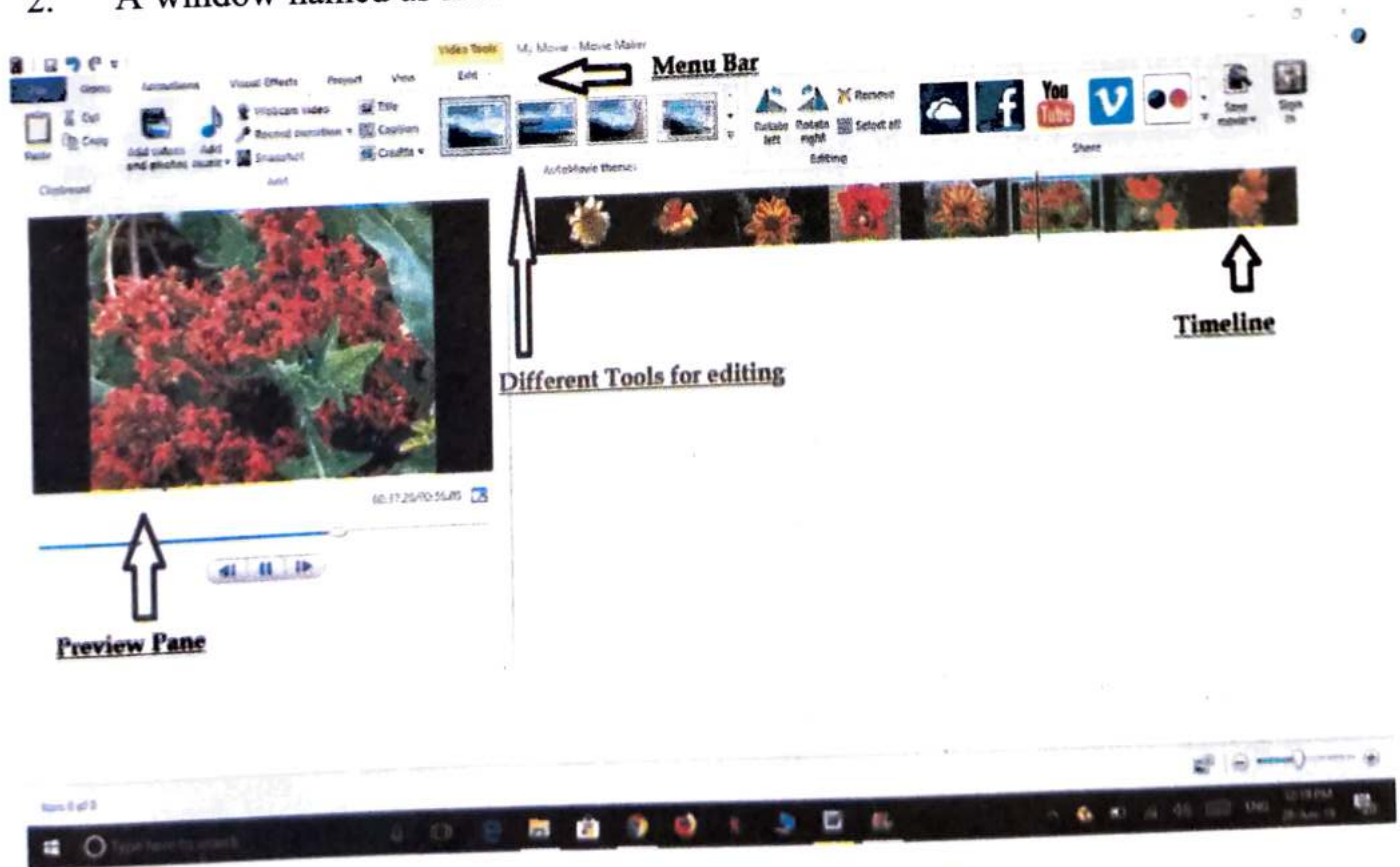


Fig. 7.15 Window Movie Maker Interface

3. Now “click here to browse for video and photo” in the story board pane.

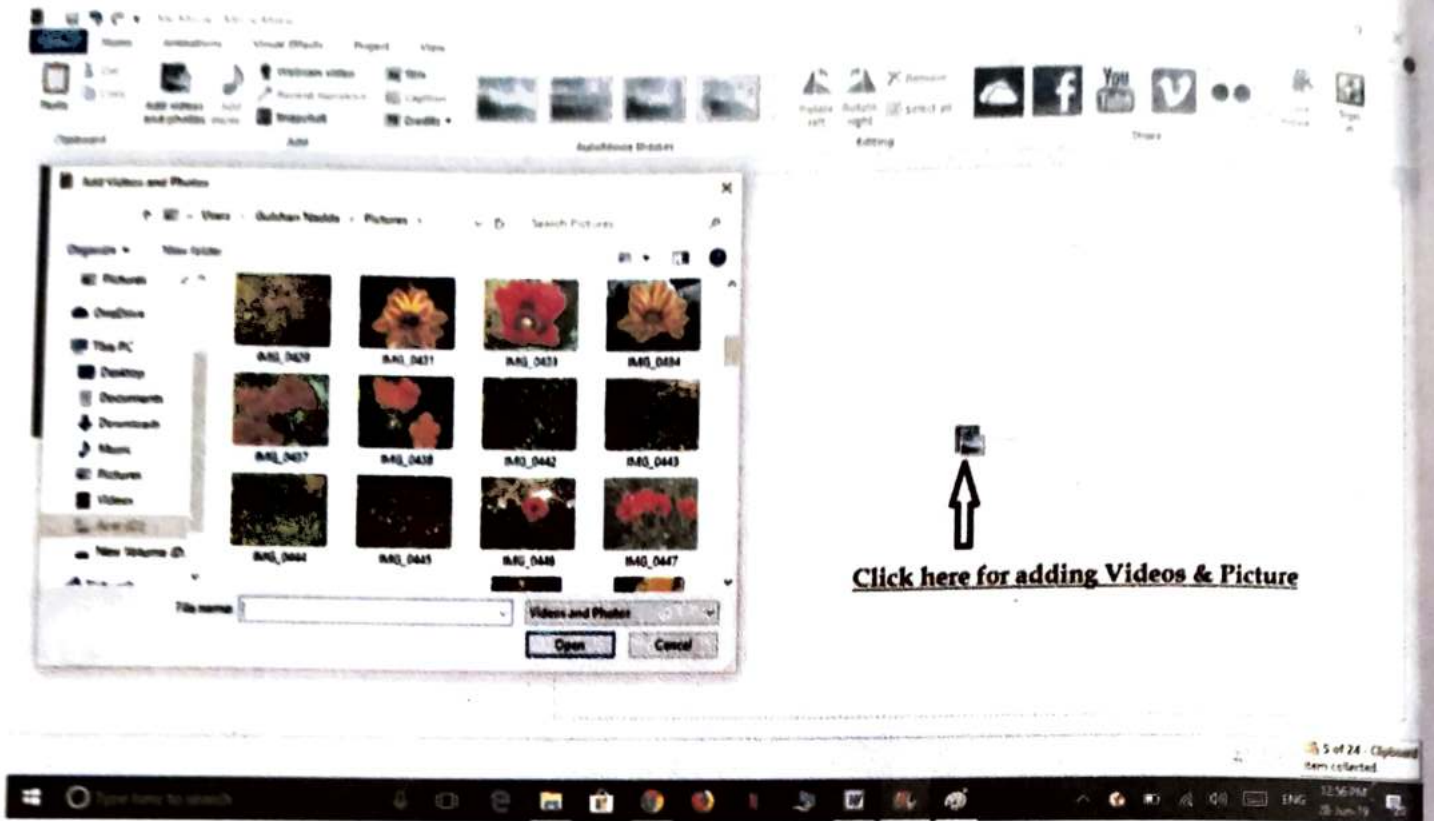


Fig. 7.16 Adding videos to Movie Maker

4. Add videos and photos dialog will pop up on the screen. Now locate your photo and video clips by clicking each and then click open button.
5. The selected clips will be added into timeline. In the final movie, the clips will show in the same order as they are listed in the story board pane. You can rearrange them by clicking and dragging.
6. You can add animation to the movie. For adding it, first select the clip in storyboard pane.
7. Now click Animation tab and select desired animation. Movie Maker will show its effects in the preview pane.
8. You can add music, by clicking Add Music option under Home tab.
9. In the Add Music dialog, locate the desired audio file and click on open.
10. You can add Caption to your clip, for adding caption select the clip you want to add caption.
11. Click Home tab, then click caption option.

12. It will add the text place holder on the clip where you can type the text using Text tool.
13. Now click File tab and then click Save Project As command. You can name the project and save the project file on computer hard drive.
14. To open the project click File tab then click on Open Project command.

SUMMARY

- Sound is the form of energy, which is made when air molecules vibrates and move in a pattern called wave.
- Sound has intensity, frequency and duration.
- Range of human hearing is with in 20Hz to 20000Hz.
- Microphone is a device, which converts acoustical energy into electrical energy.
- Microphone can be dynamic microphone or condenser microphone.
- The term soundtrack simply means everything you hear in the movie – sound effects, dialog and music.
- A video is actually a series of still images, changing fast enough that it looks like continuous motion.
- Video editing is the process of manipulating and rearranging video shots to give desired look and feel to a video / film.
- Video or film editor is responsible for assembling recorded raw material into a finished product suitable for broadcasting.
- Popular video editing softwares are: Adobe Premier Pro, Pinnacle Studio, Windows Movie Maker etc.
- Different types of video editing are: Linear Editing, Non Linear Editing, Film Splicing.
- Film splicing is not video editing, it's film editing.
- Linear editing is the process of assembling footage in sequential manner from start to finish.
- A VCR is a general electromechanical device used for home entertainment.
- Window Movie Maker is a feature of Windows that enables you to create home movies and slide shows on your computer.

EXERCISE

- Q.1 What is sound ? What are its properties ?
- Q.2 What are microphones ? Explain its working.
- Q.3 What is the difference between omni directional and bi-directional microphone ?
- Q.4 What do you mean by sound editing ? Explain.
- Q.5 What is video editing ? Explain.
- Q.6 Why we need video editing ?
- Q.7 What are the different types of video editing ?
- Q.8 Explain the role and responsibilities of video editor.
- Q.9 Explain the working of VCR.
- Q.10 **Write short note on :**
- Windows Movie Maker
 - Linear Editing
 - Non Linear Editing
 - Hyper Cardioid Mic