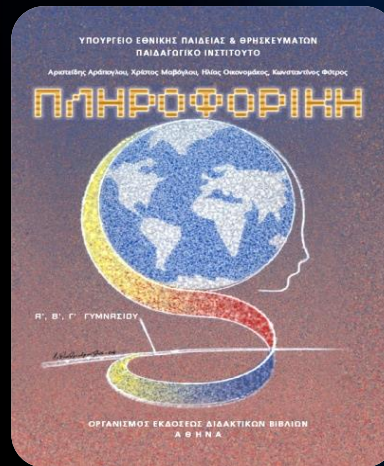


<http://www.zioulas.gr>



# MULTIMEDIA

## CHAPTER 3.2



EVANGELOS C. ZIOULAS (IT TEACHER)

# KEY WORDS



ANIMATION

REFRESH RATE (FPS)

FRAME

PAL & NTSC SYSTEM

SOUND CARD

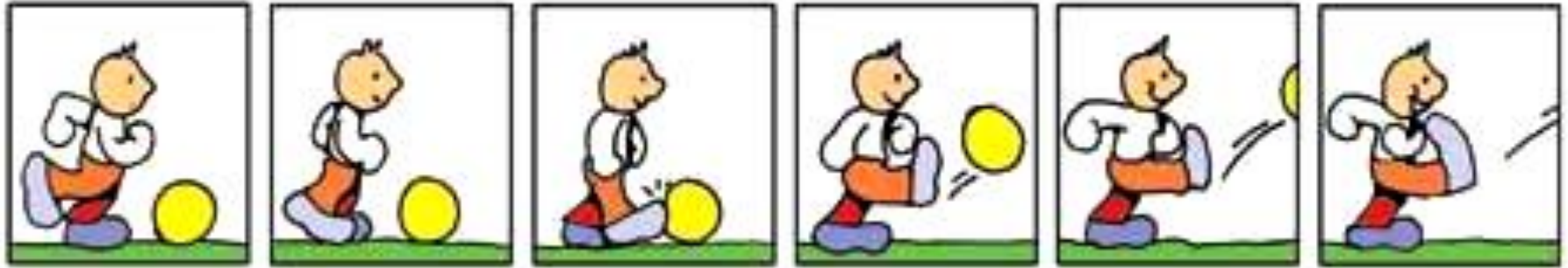
SAMPLING

COMPRESSION

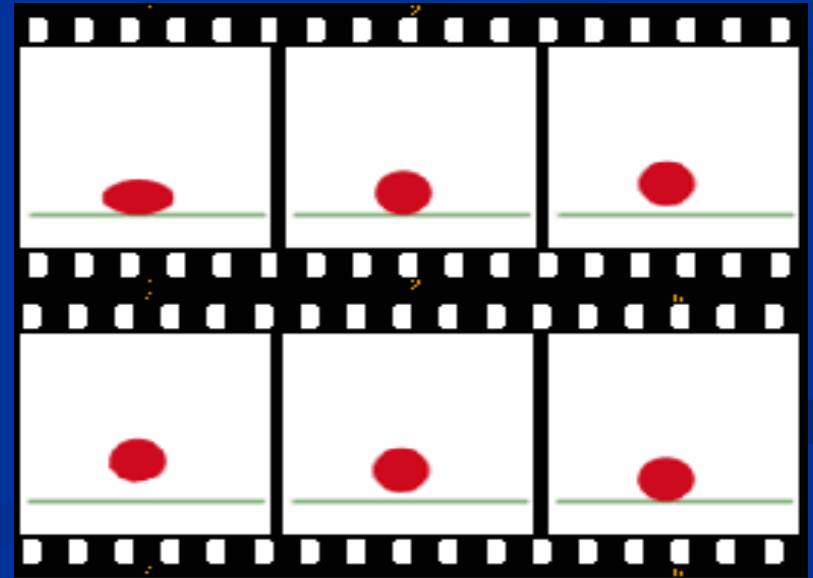
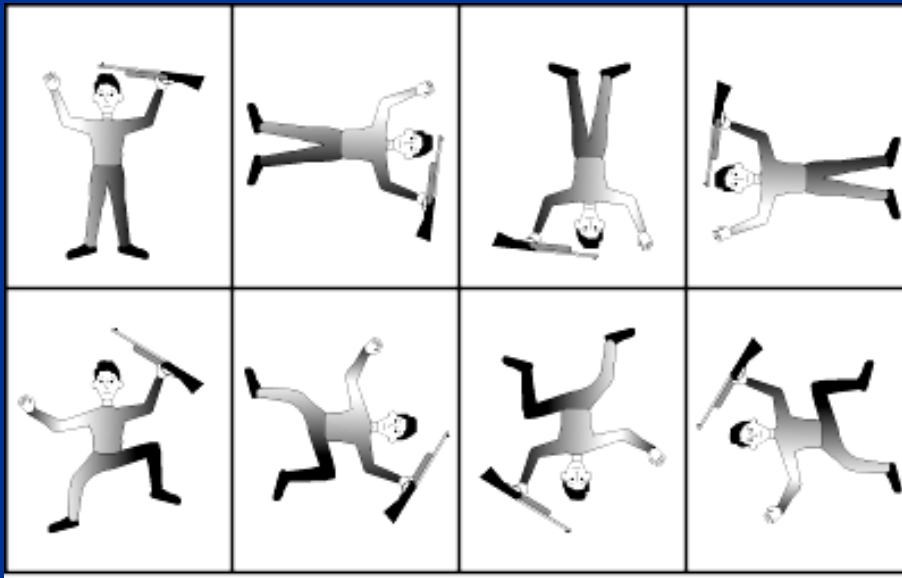
# ANIMATION

- The motion is caused by a **succession of images** (video) or individual designs (animation).
- The switch between two successive images takes place in a few milliseconds.
- This gives the user the **illusion** of a real video clip.
- In order to process a video file, we need to make a separate image (**frame**) for each individually.

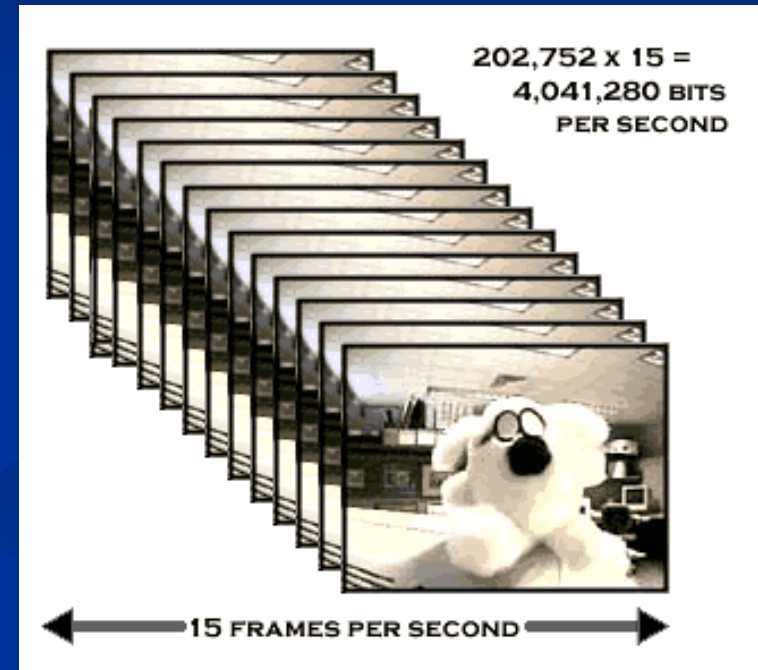
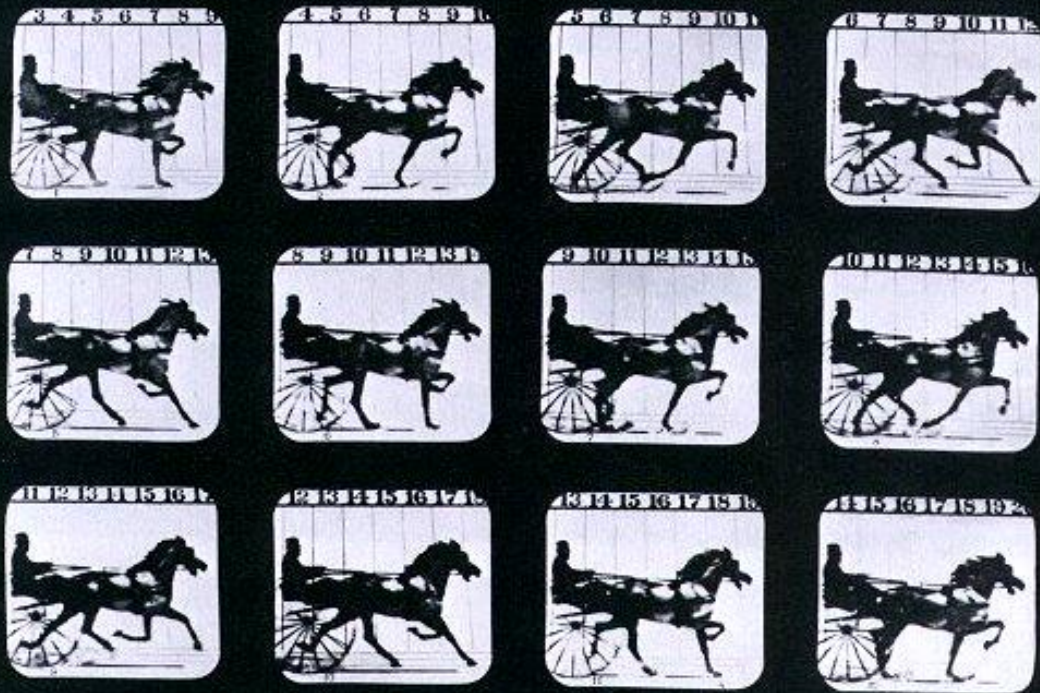
# ANIMATION (Succession of Designs)



Succession of images that creates an animation file



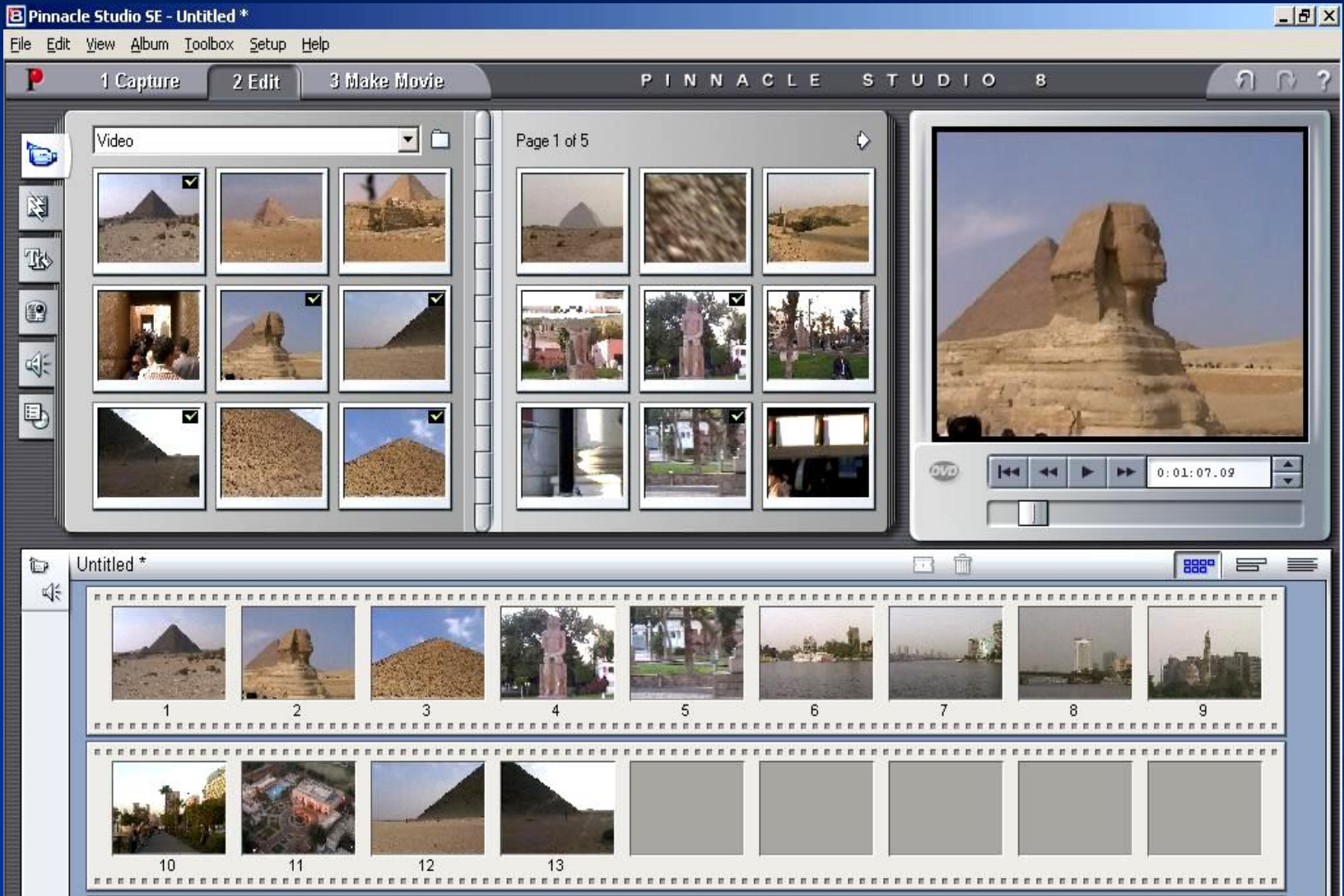
# VIDEO (Succession of Photos)



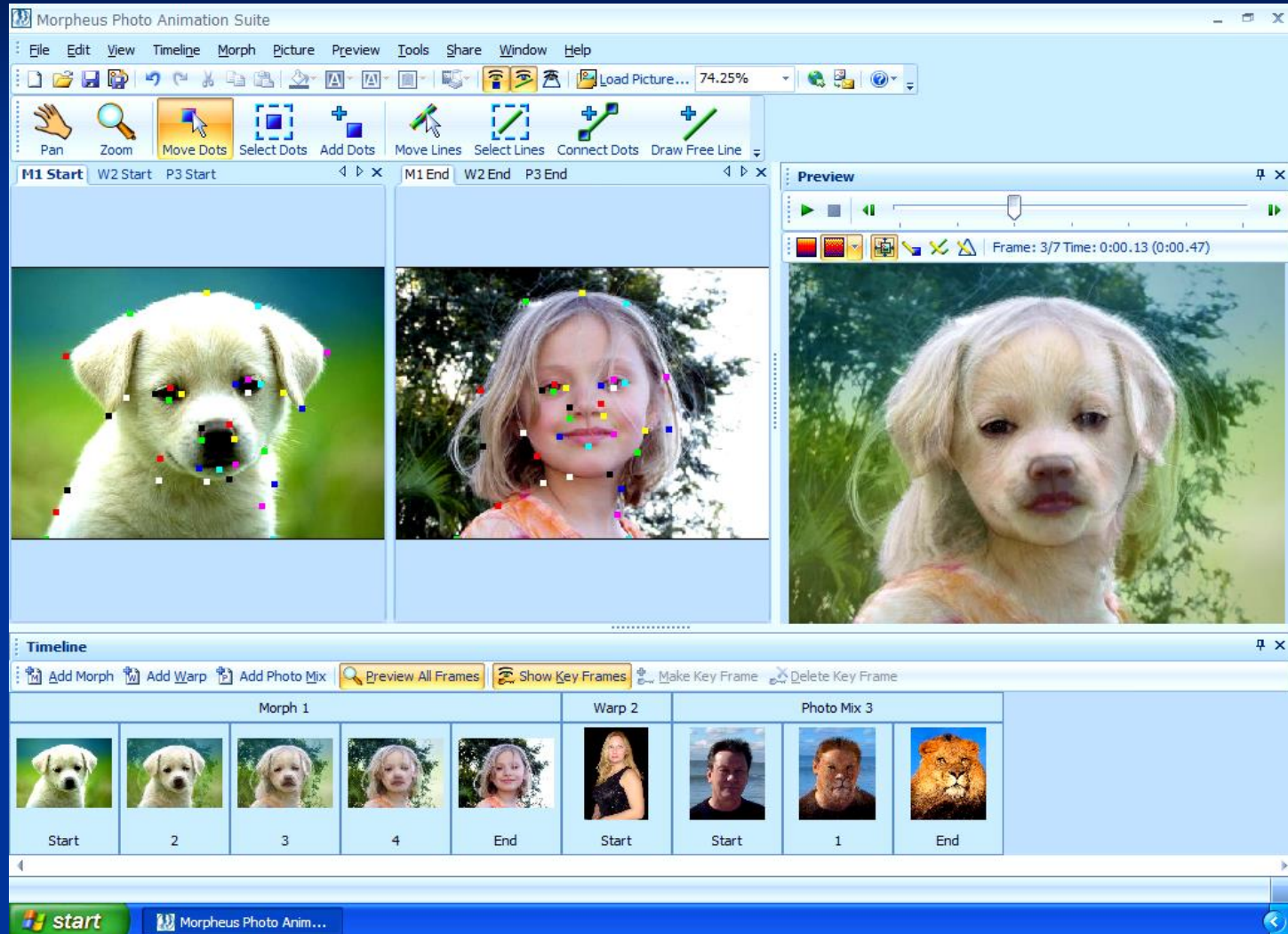
To create a sense of movement, a video file needs to have at least **15 fps (frames/sec)**

- The refresh rate of a video is measured in **FPS** (frames per second).
- The European system **PAL/SECAM** works with **25 fps** while the American **NTSC** works with **30 fps**.
- Video processing software includes:
  - *Power Director*
  - *Pinnacle Studio*
  - *Corel Video Studio*
  - *Adobe Premiere Elements*
  - *Nero*

# VIDEO PROCESSING SOFTWARE



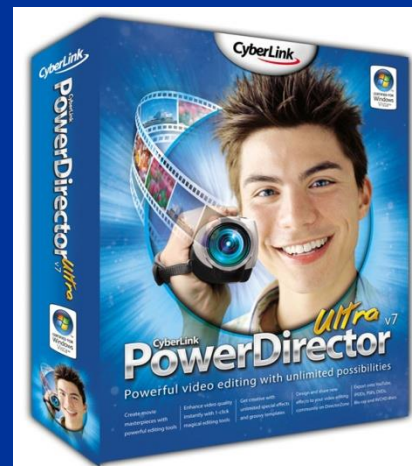
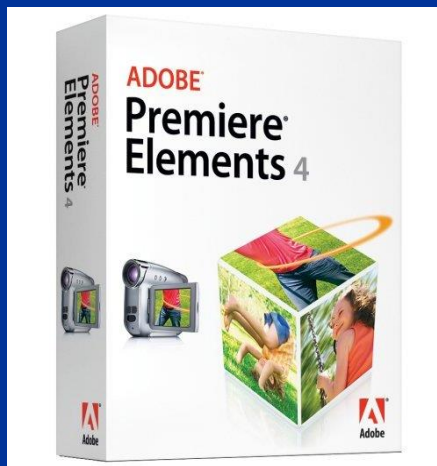
# ANIMATION PROCESSING SOFTWARE



[Link to fantamorph.com](http://www.fantamorph.com)



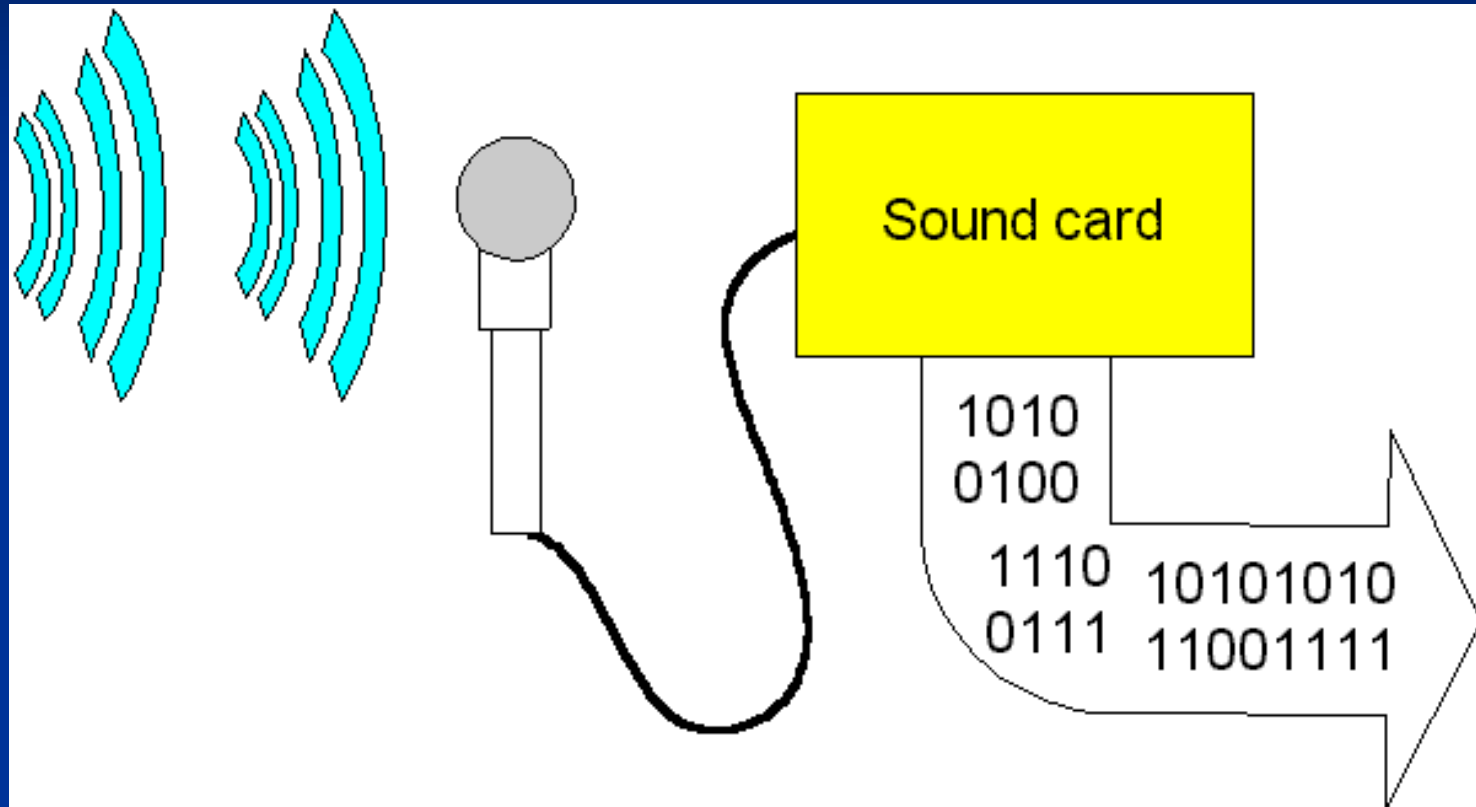
# VIDEO PROCESSING SOFTWARE



# SOUND

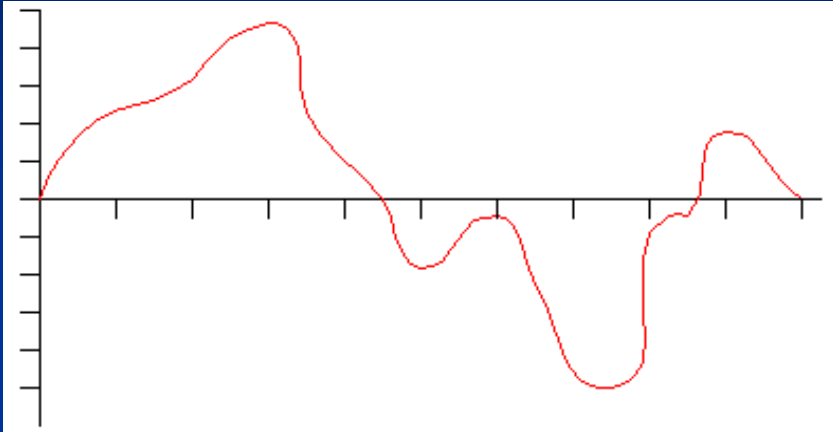
- In a computer we often insert analog sound (mainly from a microphone or musical instruments).
- The **sound card** is responsible for converting (digitalize) the sound input from analog to digital form (bits).
- This converting process requires the measurement of signal volume in regular time intervals.
- This procedure of converting analog to digital sound is best known as **sampling** (since an individual interval of analog signal is converted in digital **samples**).

# SOUND CARD (DIGITALIZATION)

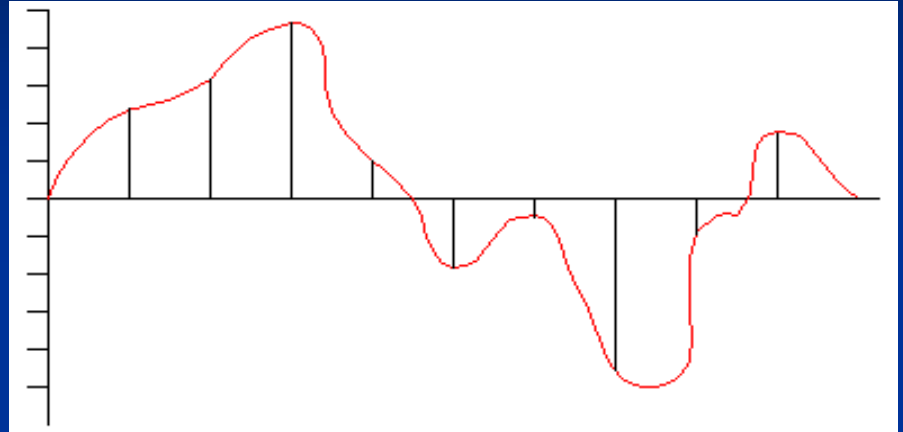


For **sound reproduction** the reverse process is used, so the sound card converts bits sequence into analog form and forwards it to an audio output device such as speakers or headphones.

# THE PROCESS OF SAMPLING

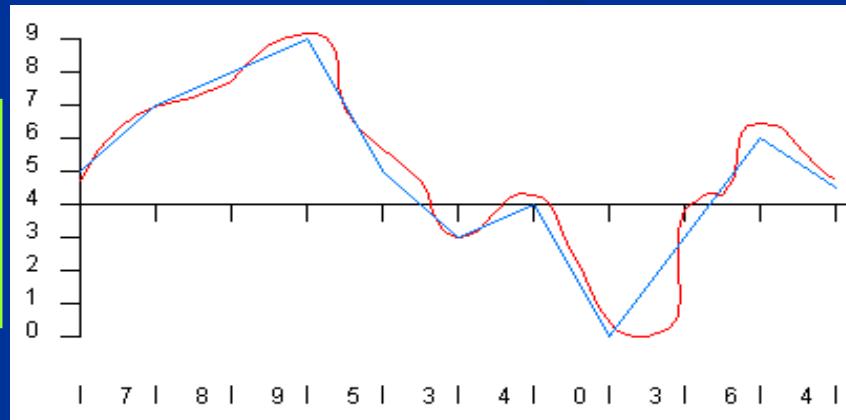


The graphical representation of analog sound wave



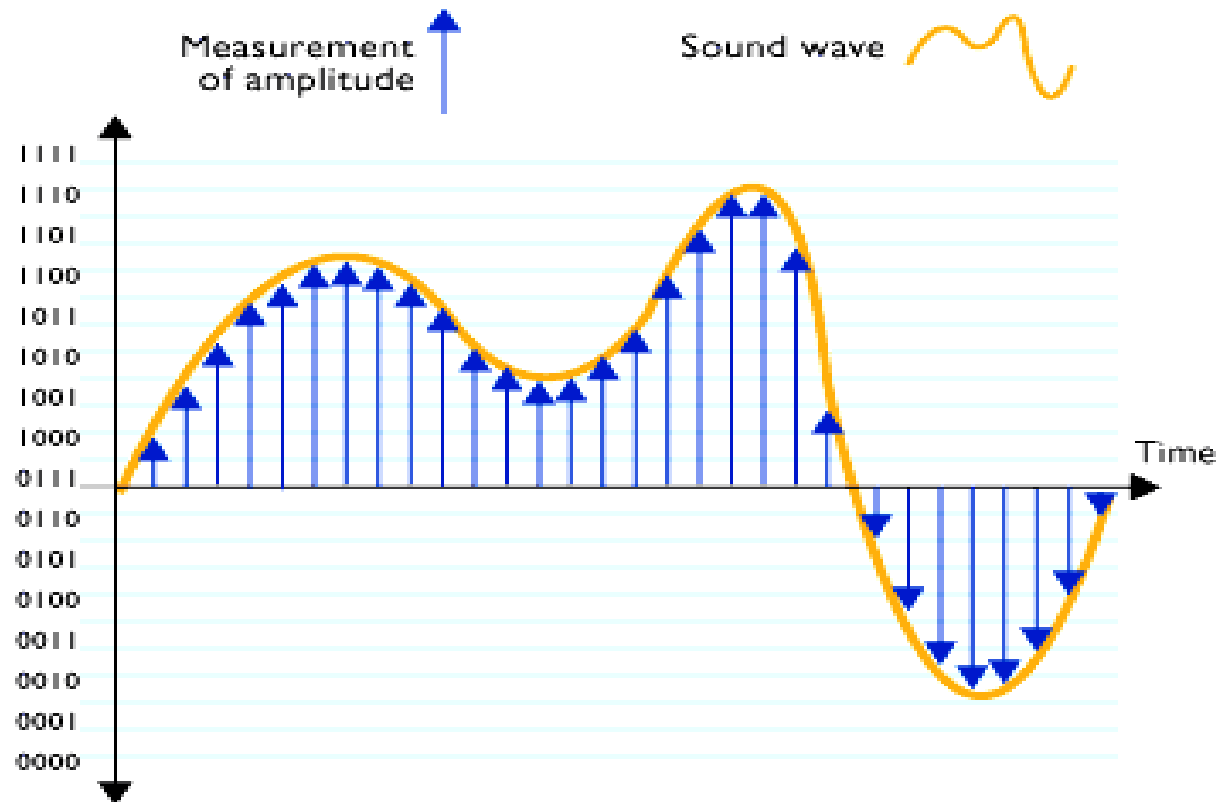
Specific sound intervals (samples) are selected periodically to be represented in digital form

Comparison between analog (red) and digital (blue) waveform



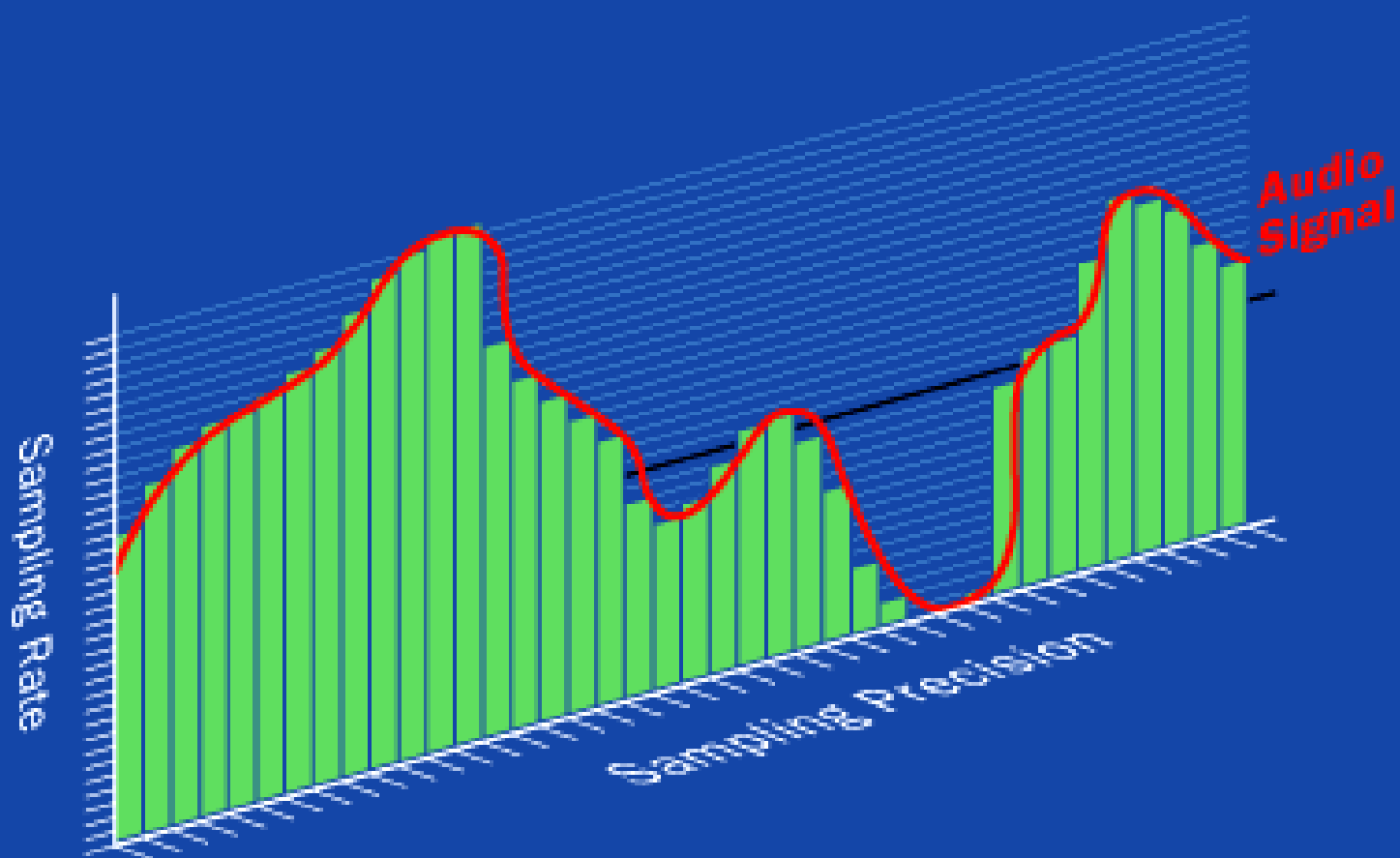
# SAMPLING

## Sampling in a 4-bit A to D converter



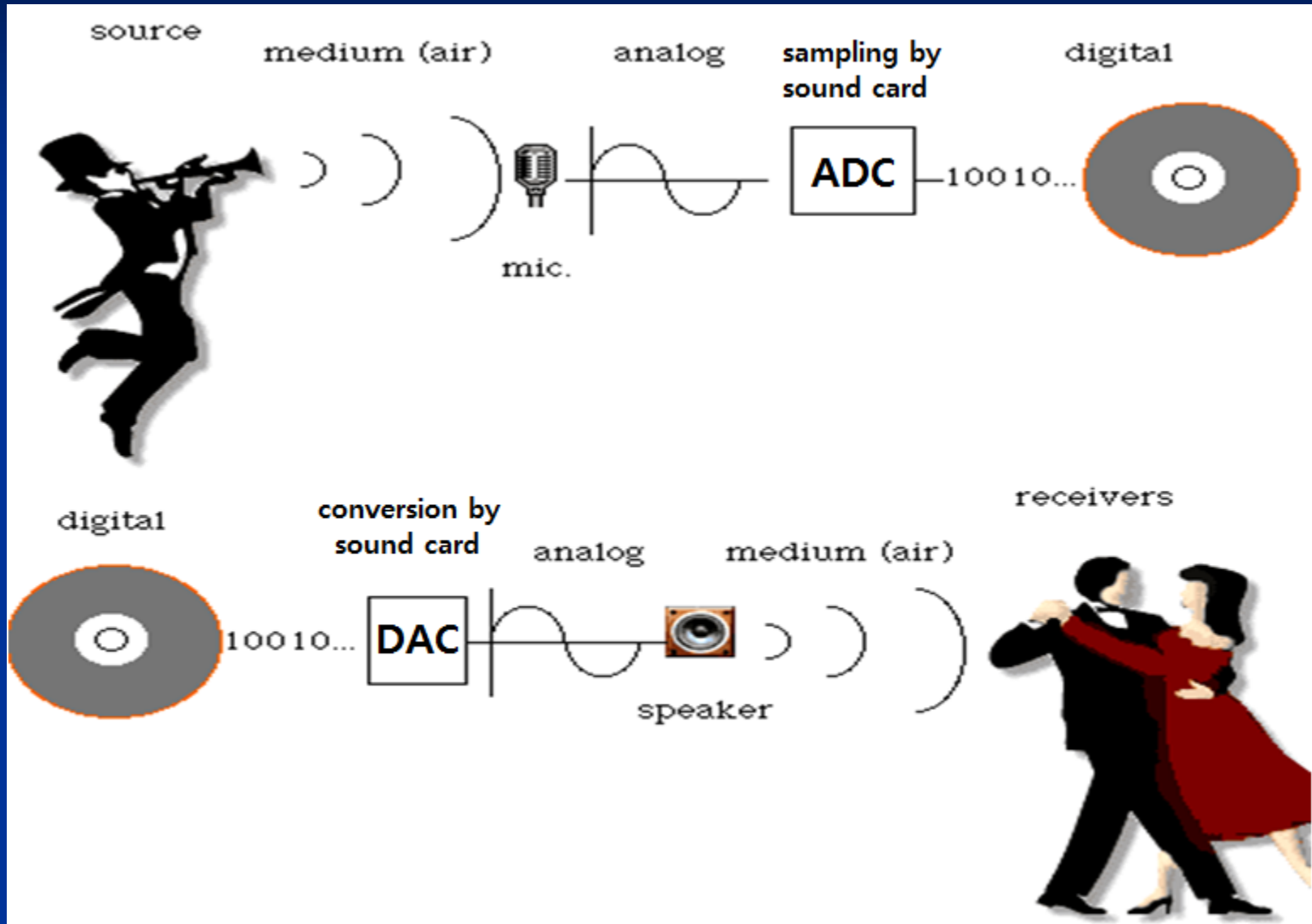
Each measurement is assigned a number (byte) according to its amplitude. The end result is a file comprising a string of bytes, eg ...  
1001 1110 0001 1010 0111 0100 1111 1101 etc

# Digital Sampling



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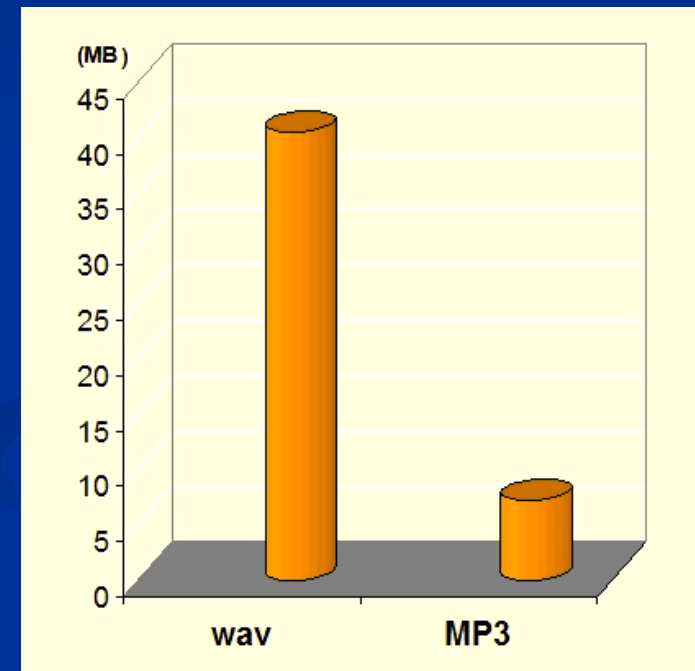
# SOUND CONVERSION



# SOUND COMPRESSION



- Through **sound compression**, a digital compressed audio file (e.g. **.mp3**) becomes smaller almost 10 times than the initial uncompressed sound file (e.g. **.wav**).
- The quality of compressed sound is poorer than the initial one, but this is not perceivable by users.





# SOUND EDITING

- By using specific types of software users can:
  - mix sound with other audio sources,
  - add special effects,
  - cut/copy & paste whole parts of a sound file
- Here are names of well-known sound editing software:
  - Sound Forge (Sony)
  - Audacity
  - WavePad Sound Editor
  - Soundtrack Pro (Apple)
  - Sound Studio

# SOUND EDITING

The screenshot displays the Audio Editor Pro interface. The main window shows a waveform of an audio file named "02-0322-16.mp3". The waveform is split into two channels, with the top channel in red and the bottom in blue. A selection box is visible on the waveform, spanning from approximately 3:20 to 4:10. The control panel on the right is open, showing the "Position" section with the following values:

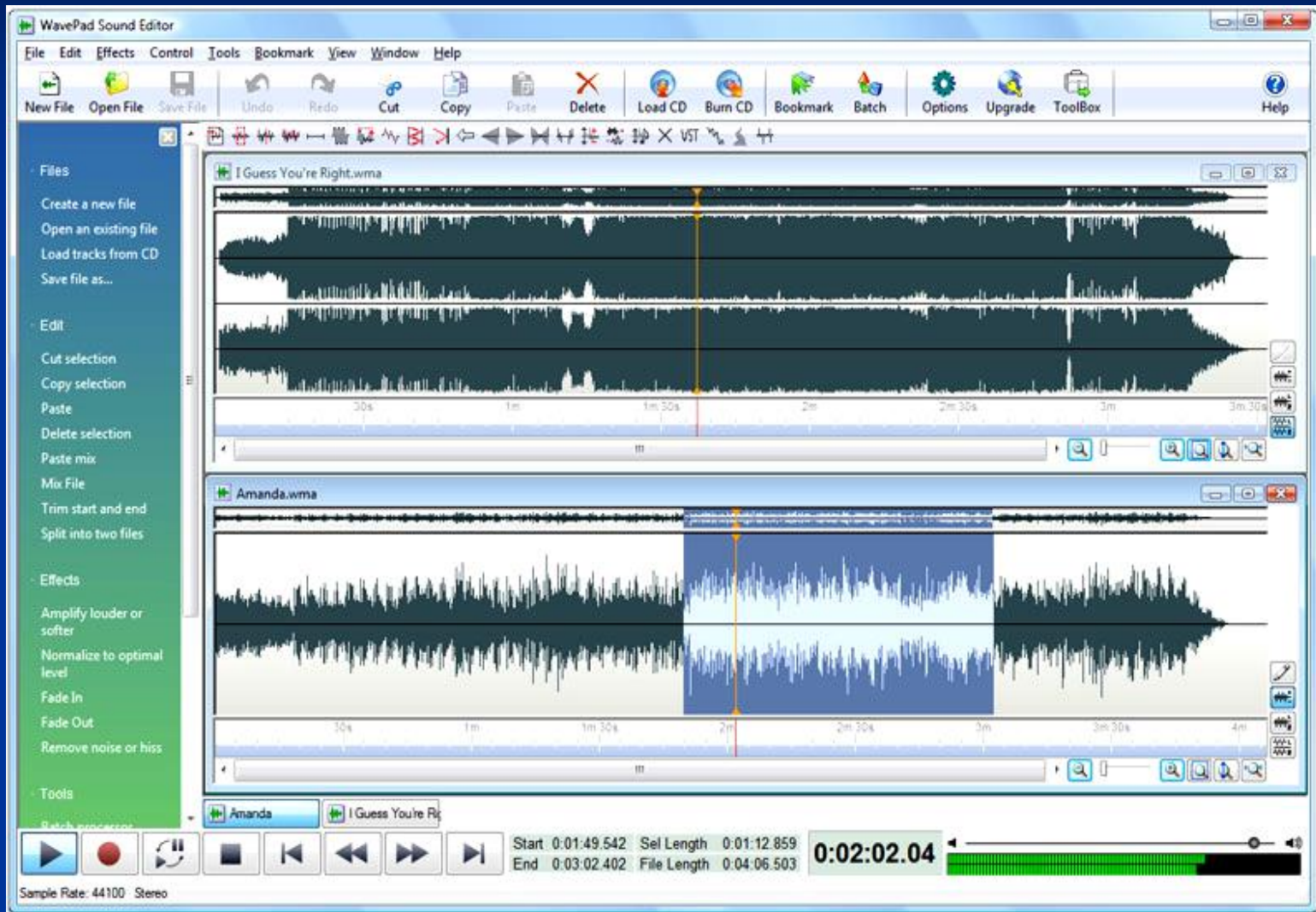
Begin - Sample	Begin - Time
7845981	0 : 2 : 57
End - Sample	End - Time
10637927	0 : 4 : 1

Below the "Position" section, there are "Selection" controls for Begin, End, and Sel, each with left and right arrow buttons. The "Marker" section contains a table with one entry:

Label	Position
<input type="checkbox"/> New Marker	3362563 - 7173468

At the bottom of the control panel, there are "Add", "Delete", and "Clear" buttons. The status bar at the bottom of the window indicates "Playing" and provides technical details: "MPEG 1.0 layer-3: 44,100 kHz; Stereo; 128 Kbps; 12961152 0:4:53".

# SOUND EDITING



# SOUND EDITING SOFTWARE

