

# Fundamental of Digital Media Design

## Introduction to Animation

by

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# Chapter Description

- **Aims**

- To understand the history and concept of animation
- To identify the types of animation
- To learn about the terms used in animation

- **Expected Outcomes**

- Understand the concept of animation
- Able to produce an animation

- **References**

- Tay Vaughan. Multimedia: Making It Work, Ninth Edition. Mc Graw Hill. 2014. ISBN-13: 978-0071832885.
- Savage, T.M., Vogel, K.E. An Introduction to Digital Multimedia 2nd ed.. 2013
- Zhe-Nian Li, Mark S. Drew.S & Jiangchuan Liu. Fundamentals of Multimedia (Texts in Computer Science) 2nd ed. 2014 Edition. Springer Publication. 2014. ISBN-13: 978-3319052892.

# What is animation?

- The word Animation is generated from word 'anime' which means life.
- Animation is the rapid display of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement
- Animation is the creation of the “illusion of movement” using a series of still images

# What is animation?

## RUN cycle

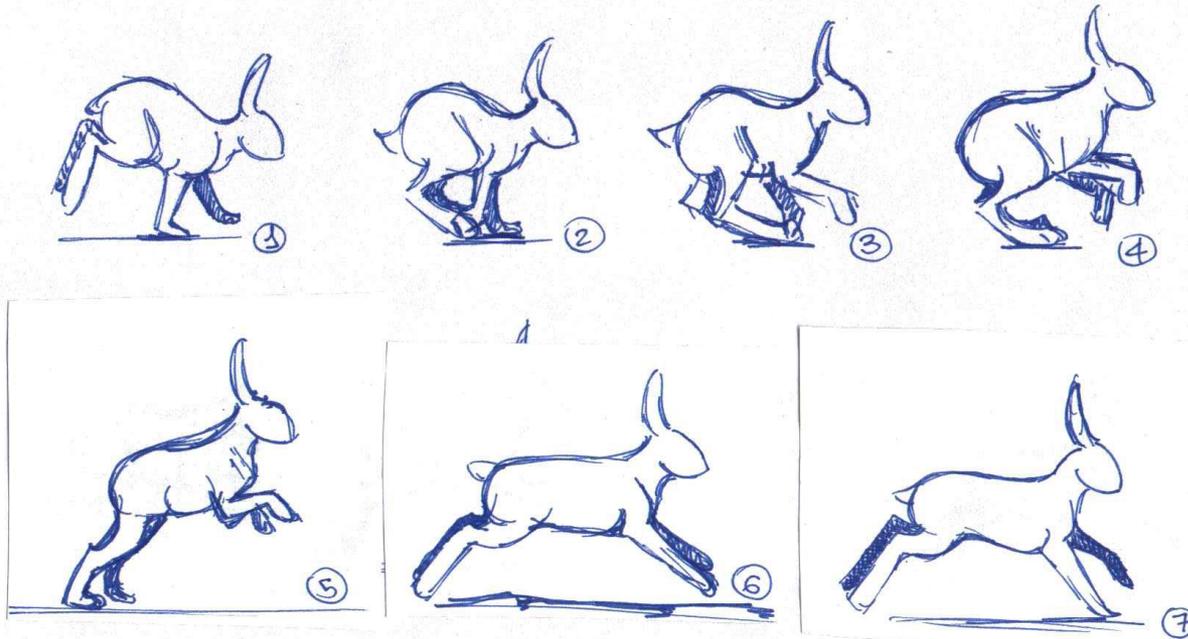


Image source: <https://edimassimo.files.wordpress.com/2011/12/hare-run-cycle.jpg>

# History of animation

- The first animated work on standard picture film was Humorous Phases of Funny Faces (1906) by J. Stuart Blackton. It features a cartoonist drawing faces on a chalkboard, and the faces apparently coming to life.
- The history of film animation began in the 1890s with the earliest days of silent films and continues through the present day. The first animated film was created by Charles-Émile Reynaud, inventor of the praxinoscope, an animation system using loops of 12 pictures.

# History of animation

- Many of the early inventions designed to animate images were meant as novelties for private amusement of children or small parties.

Animation devices which fall into this category include the zoetrope, magic lantern, praxinoscope, thaumatrope, phenakistoscope, and flip book

# Persistence of Vision

- Refers to brain retaining the image of what eyes see even after the image is no longer visible.
- The brain can only process a certain number of images at a time.
- Brain can recognize images as separate images if they are viewed at 12 or fewer images per second.
- If the pictures appear faster than 12 per second they begin to merge into each other creating the illusion of movement.
- Television and movies are usually created at 24 to 30 images per second

# Types of animation

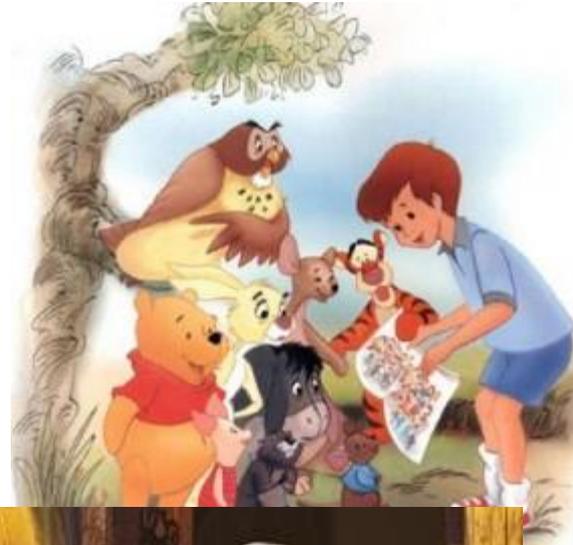
Historically, there are 3 major types of animation:

1. Hand Drawn Animation
2. Stop Motion Animation
3. Computer Animation

# Hand drawn animation

- Done by an artist who draws each character and movement individually
- Very time consuming to have to draw, then colour, then photograph each picture
- Draw pictures first, then colour them on celluloid, then they take pictures and animate them
- Very expensive due to hours of labour involved
- Examples: Older Disney Movies i.e. Bambi, Fox and Hound, Cinderella etc.

# Hand drawn animation



**Image source:** <http://www.nymoviereviews.com/wp-content/uploads/beauty.jpg>

<http://www.diszine.com/wp-content/uploads/2010/05/Pooh-285x300.jpg>

[http://images6.fanpop.com/image/answers/567000/567326\\_1432332733143\\_500\\_140.jpg](http://images6.fanpop.com/image/answers/567000/567326_1432332733143_500_140.jpg)

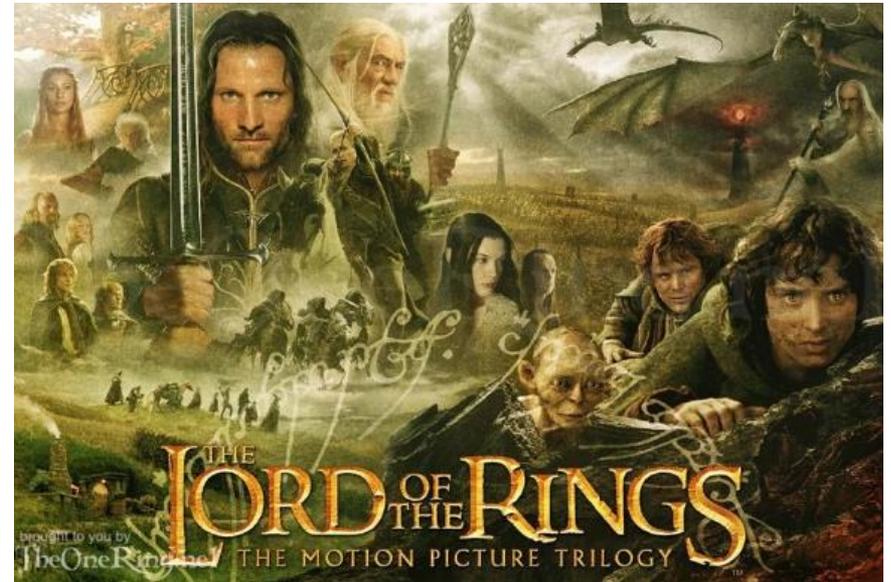
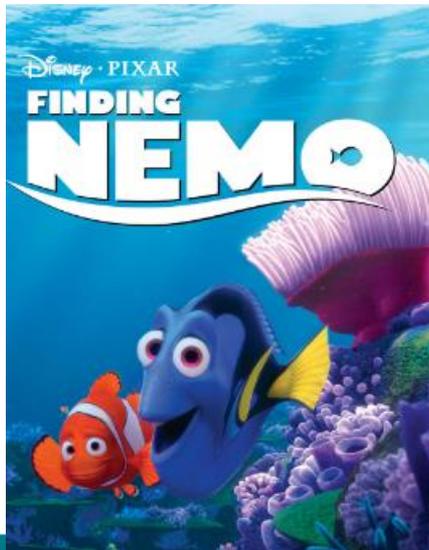
# Stop motion animation

- Can be done by virtually anyone, with no extensive training
- Does not take that much time relative to the other 2 methods
- Uses jointed figures or clay figures that can be moved to make motions
- Take still pictures of the individual movements, then use relatively inexpensive computer software to animate

# Computer animation

- All characters and movements are generated using computer animation software
- Can also be very time consuming as they can get very complicated in movements and effects
- All characters are fully animated with no still pictures
- Can be very expensive because of the complexity of the stunts and animations being done
- Huge budgets because the animation sequences more complicated these days eg.: The war scenes in Lord of the Rings etc.
- Examples: Toy Story, Finding Nemo, Matrix, Lord of the Rings

# Computer animation



**Image source:** <http://www.lanlinglaurel.com/imagenes-toy-story/4574699.html>  
[http://www.goldenglobes.com/sites/default/files/films/finding\\_nemo.jpeg](http://www.goldenglobes.com/sites/default/files/films/finding_nemo.jpeg)  
<https://vignette1.wikia.nocookie.net/lotr/images/8/87/Ringstrilogyposter.jpg/revision/latest?cb=20070806215413>

# Animation Storyboard

- A storyboard is a **series of sketches** that can be used as a guide for making a film or video
- It contains the **action** and **dialogue** of the film
- Can also include the **music, narration, special effects** information etc. for the person to guide them in creating the film

# Animation Storyboard

- Comic strip



Image source: [http://c0389161.cdn.cloudfiles.rackspacecloud.com/dyn/str\\_strip/238132.full.gif](http://c0389161.cdn.cloudfiles.rackspacecloud.com/dyn/str_strip/238132.full.gif)

# Animation Storyboard

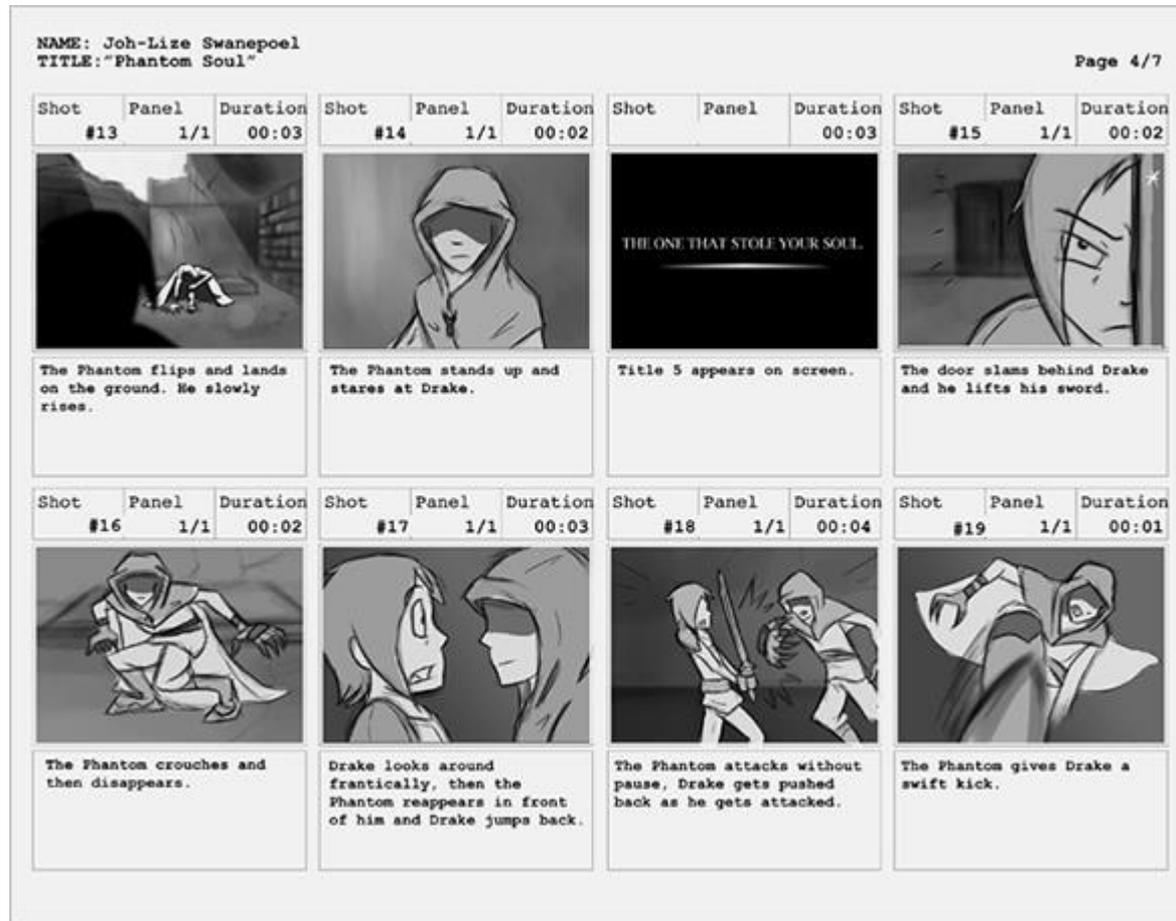


Image source: <https://images.template.net/wp-content/uploads/2015/08/Phantom-Soul-Animated-Storyboard-Template-Download.jpg>

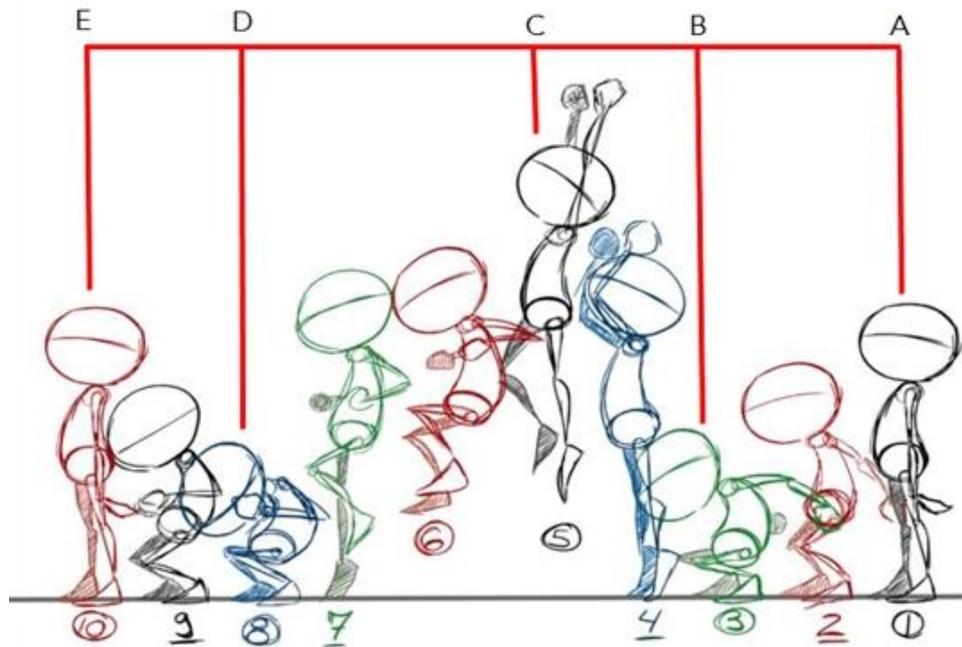
# Animation terms

Familiar with these animation terms ?

- Keyframe
- Tweening
- Onion Skinning
- Frame by Frame
- Frame Rate

# Animation terms: **KEYFRAME**

- Which drawing refers to keyframe(s)? Why ?
- What is keyframe ?
- Why we have to use keyframe?



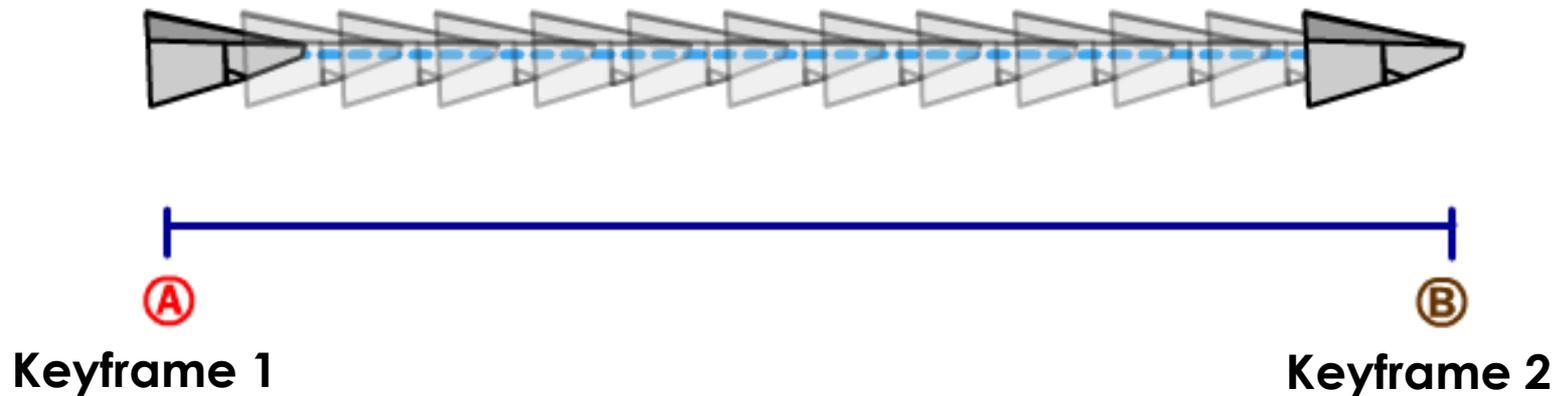
**Image source:** [https://learn.toonboom.com/modules/animation-principles/Resources/Images/EDU/TBS/005\\_Lesson\\_05/AnimationChart-Jump0001.jpg](https://learn.toonboom.com/modules/animation-principles/Resources/Images/EDU/TBS/005_Lesson_05/AnimationChart-Jump0001.jpg)

# Animation terms: **KEYFRAME**

- A set of parameters defining a point in a animation.
- For example a keyframe may define a picture size, position and rotation.
- Any digital effect must have a minimum of two keyframes, start and finish, although more complex moves will use more.

# Animation terms: **TWEENING**

- What is tweening ?
- The relationship between keyframe and tweening ?



# Animation terms: **TWEENING**

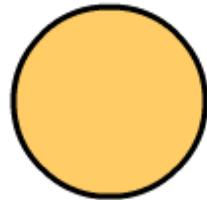
- "Tween" is actually short for "in-between", and refers to the creation of successive frames of animation between key frames.
- The process of generating intermediate frames between two images to give the appearance that the first image evolves smoothly into the second image.

# Animation terms: **TWEENING**

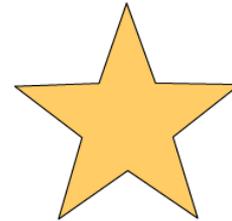
## Tweening in Adobe Flash ?

- In computer animation, the term is most commonly used for Flash's "shape tweening" and "motion tweening" processes where the user can define two key frames and Flash will automatically create the in-between frames, either morphing one shape into another over a set period of time or else moving a shape or shapes from point A to point B over a set period of time.

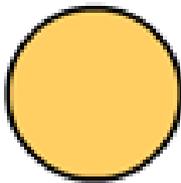
# Animation terms: **TWEENING**



**1<sup>ST</sup> cell**



**Final cell**



Sel 1



Sel 5



Sel 8

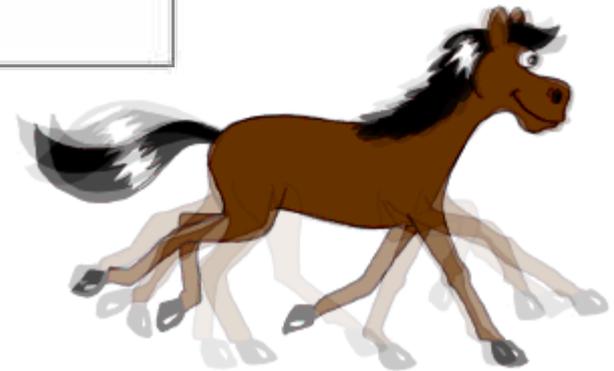
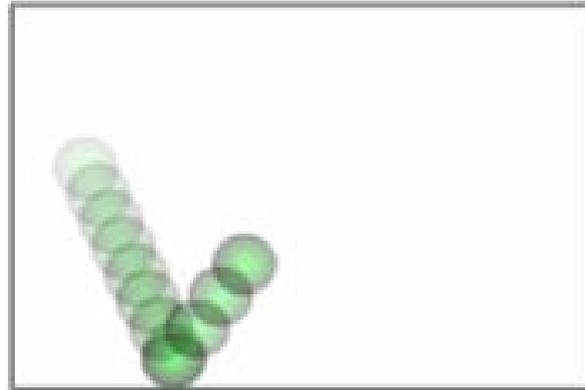
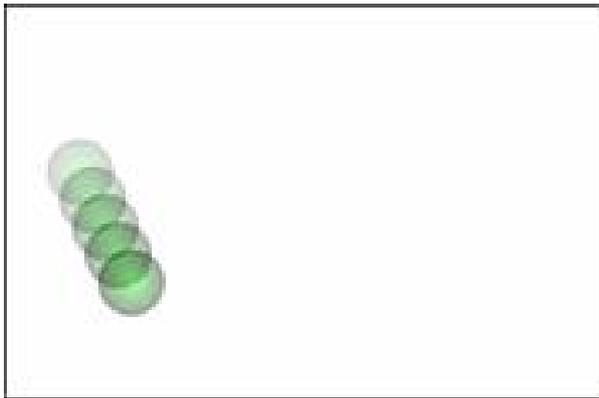


Sel 15

**Inbetween or tweening**

# Animation terms: **ONION SKINNING**

- What is Onion Skinning ?
- Where and when to use onion skinning ?



# Animation terms: **ONION SKINNING**

- Onion skinning is a term for a technique used in creating animated cartoons and editing movies to see several frames at once.
- This way, the animator can take decisions on how to create or change an image based on the previous image in the sequence.

# Animation terms: **FRAME BY FRAME**

- What is frame in animation world?
- What is frame by frame animation ?

# Animation terms: **FRAME BY FRAME**

- In animation, a "frame" is a single complete image out of the sequence of images comprising an animation.
- Taken alone, the frame is just a drawing - a piece of art. When sequenced with other drawings, it becomes an animation frame.

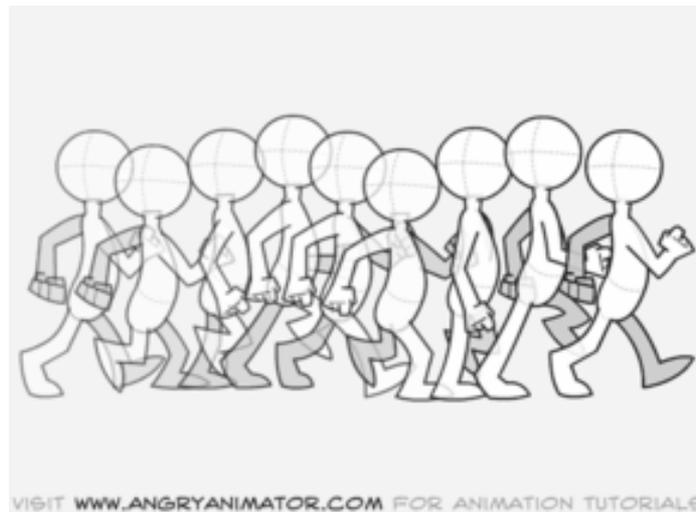


Image source: <http://mhstgj3m.wikispaces.com/file/view/walkCycle/179452201/290x215/walkCycle>

# Animation terms: **FRAME BY FRAME**

- Frame by frame animation is an animation technique to make a physically manipulated object appear to move on its own.
- The object is moved by small amounts between individually photographed frames, creating the illusion of movement when the series of frames are played as a continuous sequence.

# Animation terms: **FRAME BY FRAME**



# Animation terms: **FRAME RATE**

## What is frame rate ?

- Frame rate is the measurement of the frequency (rate) at which an imaging device produces unique consecutive images called frames.
- Frame rate is most often expressed in frames per second (fps).

# Animation terms: **FRAME RATE**

- Frame rate for movie or video
  - 24 – 30 fps
- Frame rate for animation; view on television or as video presentation
  - 24 – 30 fps

# Animation terms: **FRAME RATE**

- Frame rate for digital animation ?
  - Computer or digital animation will function smoothly when using frame rate between 12 to 15 frames per second (12 –15 fps).
  - If we used less from that value, animation that produced will be stucks/slow and human eyes can see differences when frames changing between one image to another image.

# Animation impact

- Animation is NOT just for kids
- It has become mainstream and kids, teenagers, adults and seniors.
- When most teachers today were kids it was very odd for a parent to be sitting with their children and watching an animated show.
- Now, adults take their kids to the movies and watch with them and there are often “inside jokes” for adults too

# Animation uses

- Animated Movies: Million dollar industry;
- 1- 20 millions spent on each movie
- Animation & Computer Graphics Effects are used in movies frequently
- Video games
- TV Programs (e.g. Weather, News)
- Used online (images, ads, chatting)
- Simulations (Science & Engineering)
- Virtual reality (e.g. second life)

# Conclusion of The Chapter

- Animation is the creation of the “illusion of movement” using a series of still images
- The history of film animation began in the 1890s with the earliest days of silent films and continues through the present day.
- Types of animations are hand drawn, stop motion and computer animation.
- Animation terms are: keyframe, tweening, onion skinning, frame by frame & frame rate.