UNIT 14: BASICS IN ANIMATION

UNIT STRUCTURE

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14.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- Learn about animation and its basic terminologies
- Learn about different principles of animation
- Learn about types of animation
- Learn about software and hardware requirements for animation

14.2 INTRODUCTION

In the previous unit, we studied 3-D viewing. Along with this, we have gone through the topics of viewing pipeline, viewing coordinates, world coordinates, clipping, view volume, and different projection transforms.

In this unit, we will learn about animation and its types along with this we will see the hardware and software requirements of animation and the application of animation. In the next unit, we will explore the concept of animation design and the future of animation.

14.3 ANIMATION BASIC

Computer graphics is all about animation. It is defined as the act of making an object come alive. An animation is an object that is moving into or out of the screen. In animation, a series of images rapidly changed to create an illusion of a moment.

14.4 COMPUTER ANIMATION

Animation is the process of creating an illusion of motion images. All the cartoons and animation images are made from thousands of single images. And add them together and play step by step.

Animation can be used in various fields like education, marketing, and business to make it interesting. Following are some fields where animation can be used:

- Education purpose
- Architecture
- Cartoon
- Games
- Film
- Entertainment
- Advertisement
- Marketing
- Demonstration



EXERCISE

1. Write about the need of animation.

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14.5 PRINCIPLES OF ANIMATION

Animators should follow principles to create a good animation. These principles evolved from past animation techniques. In 1981 two bright Disney animators Ollie Johnston and Frank Thomas introduced 12 basic principles

of animation to produce more realistic works. These principles are as follows:

- **Squash and Stretch:** This is the most important principle of animation. Drawing an object gives a sense of weight and volume.
- **Anticipation:** Here, the animator will create a starting scene. This scene shows that something will happen, but suddenly nothing happens.
- **Staging:** The animator creates the scene which attracts the audience.
- **Straight Ahead:** Here all frames are drawn from the beginning to the end and then fill the scene.
- **Flow through and overlapping action:** We can easily describe this principle by considering two objects' actions that have different speeds in a different scenes.
- **Slow in and Slow out:** We can easily describe this principle by considering an object, that has maximum acceleration in between and resisting on the beginning and end.
- **Arc:** All objects in animation will follow some arc in their action.
- **Secondary action:** As with one character's action, the second character's move shows the multiple dimension of animation.
- **Timing:** Perfect timing is important for playing a given action.
- **Exaggeration:** Developing a proper animation style creates extra reality in the animation scene.
- **Solid drawing:** Here objects are created in 3D form to get realistic visualization of the scene.
- **Appeal:** There is no need for the animated character to be the same as any real character. But it seems to be like it creates proper thinking in the audience's mind.



CHECK YOUR PROGRESS

Q 1: Define Animation.

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14.6 TYPES OF ANIMATION

There are 4 types of animation. They are as follows-

- Traditional Animation
- Computer Animation
- Kinematics
- Morphing
  - **Traditional Animation:** Traditional animation can also be termed cell animation. Here, the animator has to draw every single frame to create an animated scene by hand.
  - **Computer Animation:** Here, we use computer graphics and animation techniques to draw all the frames to create animation. In computer animation, we do not need to draw each frame by hand. It is a creation of moving images.
  - **Kinematics:** It is the study of movement and motion of structures that have joints. For example, walking man. This type of animation is used in the areas like machines.
  - **Morphing:** It is an effect in which one image is transferred into another. For example, on Facebook, we have filters to check how we will look when we will become old, etc. here the image we will give will be morphed to get the desired result. The morphed images are built at a rate of 8 frames per second with each transition taking a total of 4 seconds.



CHECK YOUR PROGRESS

Q 2: Write about cell animation.

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Q 3: What is morphing?

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14.7 ANIMATION SOFTWARE AND HARDWARE

Software requirements:

Animators are digital artists. They require the processing of the images using different software. Image editing software examples are given below:

- **3Ds Max (Autodesk):** This animation software tool allows digital artists to produce 3D animations. It includes developing models and rendering them into 2D or 3D images.
- **Photoshop:** Here images are edited. Mainly we modify images in Photoshop. It is developed by Adobe. It is one of the most powerful and widely used photo editing software. It edits raster images.
- **Maya 3D:** This software is used to make an animation or can edit an animated scene. It is used to develop video games, animated films, etc. it runs on Windows, MAC OS, and Linux. It has cached playback which allows the user to check the animation in the viewport. This is created by Alias Systems Corporation. But later Autodesk took all rights.
- **CAD:** It is used to design images like a house or any structure. It creates the design in 2D and 3D. It is used by Construction companies, architects, and civil engineers.
- **CorelDraw:** it is developed by Corel Corporation. It is used for editing vector graphics. Touch-friendly GU interface and multi-monitor are some of the features of CorelDraw.

Hardware requirements for animation:

We will require the following input and output devices for animation:

Input devices:

- Touch panels
- Light pens
- Graphics tablet
- Microphone
- Film recorder
- Mouse
- Joysticks

- Keyboard
- Data gloves
- Image scanner

Output devices:

- Cathode Ray Tube(CRT)
- Vector scan display/ random scan display
- Raster scan display
- Coloured monitors
- LED, LCD, TFT Screen

Processor (CPU)

This is the most important part of our machine. At least a quad-core that operates at 2Ghz is needed that is capable of running a 64-bit operating system.

Graphics card (GPU)

A good GPU will enable the machine to perform modeling, mapping, and animation work in 3D spaces smoothly and with more stability. We should go for a dedicated GPU to have at least 2GB of RAM.

Memory (RAM)

We need a minimum of 8GB RAM.

Storage/Hard Drive (HDD or SSD)

At least 1TB of storage is needed.



CHECK YOUR PROGRESS

Q 4: Write about the minimum software and hardware requirements for animation.

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14.8 COMMON TERMS IN ANIMATION

Following are some common terminologies used in animation.

- **Append:** Append is an additional keyframe. It is added to either the end or the start of the animation. And this increases the total duration of the animation.

- **Frame:** A frame is an image. It represents a moment in a particular time. The frames can be connected to other frames to generate a video.
- **Keyframe:** It is a visual waypoint along the animation path scene. When an animation is played, values such as the location of the camera, the current map time, the current map range, and layer transparencies are interpolated between the stored states using a configurable transition type.
- **Maintain speed:** The camera travel speed is maintained when appending keyframes to the animation.
- **Transition time:** It is the period between the keyframes. Usually, the transition time is 3 seconds. But we can set different transition times or the transition time can be automatically calculated using the travel speed of the camera.
- **Transition type:** The type of transition determines how frames are interpolated between keyframes. Normally Fixed, Adjustable, Linear, Hop, Stepped, and Hold transition types are there.
- **Animation Timeline pane:** It contains the animation timeline control, the keyframe gallery, and the overlay timeline if overlays exist for the animation.
- **Animation timeline control:** It displays the full length of the animation, including the timing between individual keyframes.
- **Cluster:** It is a single representative icon on the timeline when keyframes are very close and become automatically grouped.
- **Overlay:** Overlays are on-screen text, image, and shape elements that add detail and information to the animation.
- **Control point:** These points allow the shape of the Bezier curve to be customized.
- **Look at point:** It overrides the interpolation of the camera's heading and pitch between keyframes. It is used across consecutive keyframes to maintain focus on an important feature as the camera moves.



CHECK YOUR PROGRESS

Q 5: Write about the animation timeline control.

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14.9 LET US SUM UP

- Animation is the process of creating an illusion of motion images. Here the figures appear as moving images
- Traditional animation can also be referred to as cell animation. This type of animation requires the animator to draw every single frame by hand to create an animated scene.
- Games and cartoons are some of the major examples of animation.
- Append an additional keyframe to your animation. A new keyframe is added to either the end or the start of the animation, and the total duration of the animation increases.
- A single representative icon on the timeline when keyframes are very close or overlapping and become automatically grouped.
- Overlays are on-screen text, image, and shape elements that add detail and information to the animation.



14.10 FURTHER READINGS

1) D. Hearn and P.M. Backer, Computer Graphics, Prentice Hall of India, 1986.
2) W. Newman and R.F. Sproul, Principles of Interactive Computer Graphics, McGraw Hill Publication, 1980.
3) W.K. Giloi, Interactive Computer Graphics, Prentice Hall of India, 1978.



14.11 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: Animation is the process of transforming still images into moving images. When still images are displayed rapidly on media, such as film or video, they create the illusion of motion.

Ans to Q No 2: Traditional animation can also be termed cell animation. Here, the animator has to draw every single frame to create an animated scene by hand.

Ans to Q No 3: It is an effect in which one image is transferred into another. For example, on Facebook, we have filters to check how we will look when we will become old, etc. here the image we will give will be morphed to get the desired result.

Ans to Q No 4:

Hardware requirements are as follows:

- A quad-core that operates at 2Ghz at the very least. One that is capable of running a 64-bit operating system.
- GPU to have at least 2GB of RAM.
- A minimum of 8GB RAM.
- At least 1TB of storage (SSD).

Following are some examples of software that helps in creating animation:

- FlipBook (Digicel)
- Maya (Autodesk)
- Moho Pro 13 (Smith Micro)
- After Effects (Adobe)

Ans to Q No 5: The animation timeline control displays the full length of the animation, including the timing between individual keyframes. It groups them into a cluster.



14.12 MODEL QUESTIONS

Q 1: Write about the principles of animation.

Q 2: Describe the different types of animation.

Q 3: Define 3D animation.

Q 4: Define frame.

Q 5: Write about five tools that are used for animation creation.

Q 6: What do you mean by look at point?

Q 7: Define transition time.

Q 8: Differentiate between 2D and 3D animation.

Q 9: Give some major applications of animation.

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