Computer Graphics

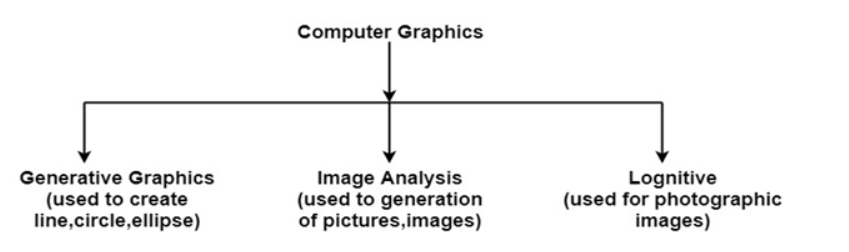
Question Bank

Unit 1 Part 1

Q.Define Computer graphics.

Ans –

It is the use of computers to create and manipulate pictures on a display device. It comprises of software techniques to create, store, modify, represents pictures.



Interactive computer graphics work using the concept of two-way communication between computer users. The computer will receive signals from the input device, and the picture is modified accordingly. Picture will be changed quickly when we apply command.

Q. What are the video display devices

Ans –

The display device is an output device used to represent the information in the form of images (visual form). Display systems are mostly called a **video monitor**or **Video display unit (VDU).**

Display devices are designed to model, display, view, or display information. The purpose of display technology is to simplify information sharing.

Today, the demand for high-quality displays is increasing.

There are some display devices given below:

1. Cathode-Ray Tube(CRT)
2. Color CRT Monitor
3. Liquid crystal display(LCD)
4. Light Emitting Diode(LED)
5. Direct View Storage Tubes(DVST)
6. Plasma Display
7. 3D Display

Q . Define refresh buffer/frame buffer

Ans –

An area of memory used to hold the frame of data that is continuously being sent to the screen. The buffer is the size of the maximum image that can be displayed and may be a separate memory bank on the graphics card (display adapter) or a reserved part of regular memory. Sophisticated graphics systems are built with several memory planes, each holding one or more bits of the pixel.

Q. What is meant by scan code?

Ans –

When a key is pressed on the keyboard, the keyboard controller places a code bear to the key pressed into a part of the memory known as the keyboard buffer. This code is known as the scan code.

OR

A scan code is created by a computer keyboard each time a key is pressed and when it is depressed. After the keyboard has created the scan code, it is received serially by the computer on I/O port . After being received, the keyboard controller informs the microprocessor that a scan code is ready to be read by issuing interrupt. The computer then uses the BIOS codes to match the scan code with the corresponding key that was pressed. After the scan code is matched, the software can read the pressed keys by issuing interrupt .

Q. List out the merits and demeritsof Penetration techniques?

Ans –

**Explain the merits and demerits of Penetration techniques.**

The merits and demerits of the Penetration techniques are as follows:

    It is an inexpensive method.

    It has only four colors.

    The quality of the picture is not good when it is compared to other methods.

    It can display color scans in monitors.

Q . List out the merits and demerits of DVST?

Ans –

**List out the merits and demerits of DVST?**

The merits and demerits of direct view storage tubes [DVST] are as follows

* It has a flat screen
* Refreshing of screen is not needed
* Selective or part erasing of screen is not possible
* It has poor contrast
* Performance is inferior to the refresh CRT.

Q. What do you mean by emissive and non-emissive displays?

Ans –

Flat Panel Display:

The Flat-Panel display refers to a class of video devices that have reduced volume, weight and power requirement compare to CRT.

**Example:** Small T.V. monitor, calculator, pocket video games, laptop computers, an advertisement board in elevator

Diagram

Description automatically generated with medium confidence

**1. Emissive Display:** The emissive displays are devices that convert electrical energy into light. Examples are Plasma Panel, thin film electroluminescent display and LED (Light Emitting Diodes).

**2. Non-Emissive Display:** The Non-Emissive displays use optical effects to convert sunlight or light from some other source into graphics patterns. Examples are LCD (Liquid Crystal Device).

Q . List out the merits and demerits of Plasma panel display?

Ans –

**ADVANTAGES**

1. Slim profile
2. Can be wall mounted
3. Less bulky than rear-projection televisions
4. Produces deep blacks allowing for superior contrast ratio
5. Wider viewing angles than those of LCD; images do not suffer from degradation at high angles unlike LCD's.
6. Less susceptible to reflection glare in bright rooms due to not needing back lighting.
7. Virtually no motion blur, thanks in large part to very high refresh rates and a faster response time, contributing to superior performance when displaying content with significant amounts of rapid motion.

**DISADVANTAGES**

1. Heavier screen-door effect when compared to LCD or OLED based TVs.
2. Susceptible to screen burn-in and image retention, although most recent models have a pixel orbiter that moves the entire picture faster than is noticeable to the human eye, which reduces the effect of burn-in but does not prevent burn-in. However, turning off individual pixels does counteract screen burn-in on modern plasma displays.
3. Phosphors lose luminosity over time, resulting in gradual decline of absolute image brightness (newer models are less susceptible to this, having lifespan exceeding 100,000 hours, far longer than older CRT technology.
4. Susceptible to "large area flicker".
5. Generally do not come in smaller sizes than 37 inches.
6. Heavier than LCD due to the requirement of a glass screen to hold the gases
7. Use more electricity, on average, than an LCD TV
8. Do not work as well at high altitudes due to pressure differential between the gases inside the screen and the air pressure at altitude. It may cause a buzzing noise. Manufacturers rate their screens to indicate the altitude parameters

Q. What is raster scan and Random scan systems

Ans –

Table

Description automatically generated

### **Definition of Raster Scan**

The **Raster Scan** is a scanning technique in graphics monitor where the electron beam is moved along the screen covering one line at a time from top to bottom. The beam intensity is set at high and low levels as the beam sweeps around the screen to generate a pattern of illuminated spots.

### **Definition of Random Scan**

The **Random scan** works in a completely different manner to the raster scan where the electron beam is pointed to merely those areas of the screen where the picture is to be drawn. However, it only involves one line at a time when drawing a picture that is why it is also known as the **vector**or **calligraphic display**. The component lines of an object by a random scan is drawn in the way as shown in the diagram below.

Q. What is pixel?

Ans –

A pixel is the smallest unit of a digital image or graphic that can be displayed and represented on a digital display device.

A pixel is the basic logical unit in digital graphics. Pixels are combined to form a complete image, video, text, or any visible thing on a computer display.

A pixel is also known as a picture element (pix = picture, el = element).

Q. What are the Input devices and Hard copy devices?

Ans –

Diagram

Description automatically generated

Text

Description automatically generated

Q . Define aspect ratio?

Ans –

Aspect ratio is an image projection attribute that describes the proportional relationship between the width of an image and its height. For example, movies, which are usually shot with a wide-angle lens, have an aspect ratio that is typically 16:9, which means that the width of the image area is almost twice its height. The traditional television and computer display, on the other hand, are designed for an aspect ratio of 1.33:1, which means that the width of the display area is only 1.33 times the height, almost square.

Q . What is Output Primitive? What is point and lines in the computer graphics system ?

Ans –

A computer Graphics can be anything like beautiful scenery, images, terrain, trees, or anything else that we can imagine, however all these computer graphics are made up of the most basic components of Computer Graphics that are called Graphics Output Primitive or simply primitive. The Primitives are the simple geometric functions that are used to generate various Computer Graphics required by the User. Some most basic Output primitives are point-position(pixel), and a straight line

Point –

A point function is the most basic Output primitive in the graphic package. A point function contains location using x and y coordinate and the user may also pass other attributes such as its intensity and color. The location is stored as two integer tuple. The color is defined using hex codes. The size of a pixel is equal to the size of pixel on display monitor.

Line –

A line function is used to generate a straight line between any two end points. Usually a line function is provided with the location of two pixel points called the starting point and the end point and it is upto computer to decide what pixels fall between these two points so that a straight line is generated.

Q. What is DDA ? What are the disadvantages of DDA algorithm?

Ans –

DDA stands for Digital Differential Analyzer. It is an incremental method of scan conversion of line. In this method calculation is performed at each step but by using results of previous steps.

## **Advantages of DDA Algorithm-**

The advantages of DDA Algorithm are-

* It is a simple algorithm.
* It is easy to implement.
* It avoids using the multiplication operation which is costly in terms of time complexity.

## **Disadvantages of DDA Algorithm-**

The disadvantages of DDA Algorithm are-

* There is an extra overhead of using round off( ) function.
* Using round off( ) function increases time complexity of the algorithm.
* Resulted lines are not smooth because of round off( ) function.
* The points generated by this algorithm are not accurate.

Q . Digitizea line from(10,12) to (15,15)on a raster screenusingBresenhamsstraightlineAlgorithmwhat arethe variouslinedrawing algorithms ?

Q. What is loading a frame buffer?

Ans – A framebuffer (frame buffer, or sometimes framestore) is a portion of random-access memory (RAM) containing a bitmap that drives a video display. It is a memory buffer containing data representing all the pixels in a complete video frame. Modern video cards contain framebuffer circuitry in their cores.

## **What is frame buffer size**

Browse Encyclopedia. A. F. An area of memory used to hold the frame of data that is continuously being sent to the screen. The buffer is the size of the maximum image that can be displayed and may be a separate memory bank on the graphics card (display adapter) or a reserved part of regular memory.

Q. What is meant by anti aliasing?

Ans –

Antialiasing is a technique used in digital imaging to reduce the visual defects that occur when high-resolution images are presented in a lower resolution. Aliasing manifests itself as jagged or stair-stepped lines (otherwise known as jaggies) on edges and objects that should otherwise be smooth.

Antialiasing makes these curved or slanting lines smooth again by adding a slight discoloration to the edges of the line or object, causing the jagged edges to blur and melt together. If the image is zoomed out a bit, the human eye can no longer notice the slight discoloration that antialiasing creates

Q. What is a filled area primitive?

Ans –

**Filled Area Primitives**: Area filling is a method or process that helps us to fill an object, area, or image. We can easily fill the polygon. The polygon filling is defined as filling or highlighting all the pixels. The pixels appear inside the polygon shape with any color other than the background color.

There are two algorithms or methods used to fill the polygon.

* **Seed Fill Algorithm**
* **Scan Line Algorithm**

Q. What are the various forms of the Filled area Primitives?

Ans –

There are two algorithms or methods used to fill the polygon.

* **Seed Fill Algorithm**
* **Scan Line Algorithm**

Q. What is pixel addressing and object addressing ?

Ans –

Pixel Addressing controls the number of pixels that are read from the ROI.

Pixel Addressing is controlled by two parameters – mode and value.  Pixel Addressing Modes include decimation (0), averaging (1), binning (2) or resampling (3). And values range from 1 to 6. Note: Not all Pixel Addressing modes or values are supported on all cameras.

Pixel Addressing modes determine how the number of pixels are reduced.  The**decimation mode** will skip all the pixels in the block, except for the first group of four. With a Pixel Addressing value of 6, each 12 x 12 block of pixels will be reduced to 2 x 2.  At this level of reduction, detail in the scene can be lost, and color artifacts may be introduced on a color sensor.

Q.