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Department of M.Sc SOFTWARE ENGINEERING

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COMPUTER GRAPHICS (XCS 354)

Two Mark Questions

UNIT – I

1. Define Computer graphics?

Computer graphics remains one of the most existing and rapidly growing computer fields. Computer graphics may be defined as a pictorial representation or graphical representation of objects in a computer.

2. What is meant by scan code?

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

3. What is meant by refreshing of the screen?

Some method is needed for maintaining the picture on the screen. Refreshing of screen is done by keeping the phosphorus glowing to redraw the picture repeatedly. (i.e.)By quickly directing the electronic beam back to the same points.

4. Define Random scan/Raster scan displays?

Random scan is a method in which the display is made by the electronic beam which is directed only to the points or part of the screen where the picture is to be drawn. The Raster scan system is a scanning technique in which the electrons sweep from top to bottom and from left to right. The intensity is turned on or off to light and unlight the pixel.

5. List out the merits and demerits of Penetration techniques?

The merits and demerits of the Penetration techniques are as follows

- It is an inexpensive technique
- It has only four colors
- The quality of the picture is not good when it is compared to other techniques
- It can display color scans in monitors
- Poor limitation etc.

6. 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 required
- Selective or part erasing of screen is not possible
- It has poor contrast
- Performance is inferior to the refresh CRT.

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

The emissive display converts electrical energy into light energy. The plasma panels, thin film electro-luminescent displays are the examples. The Non emissive are optical effects to convert the sunlight or light from any other source to graphic form. Liquid crystal display is an example.

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

Merits

- Refreshing is not required
- Produce a very steady image free of Flicker
- Less bulky than a CRT.

Demerits

- It requires complex addressing and wiring
- It is costlier than CRT.

9. What is persistence?

The time it takes the emitted light from the screen to decay one tenth of its original intensity is called as persistence.

10. What is resolution?

The maximum number of points that can be displayed without an overlap on a CRT is called as resolution.

11. What is Aspect ratio?

The ratio of vertical points to the horizontal points necessary to produce length of lines in both directions of the screen is called the Aspect ratio. Usually the aspect ratio is $\frac{3}{4}$.

12. What is meant by Addressability?

The Addressability is the number of individual dots per inch (d.p.i) that can be created. If the address of the current dot is (x, y) then the next dot will be (x+y), (x+y+1) etc.

13. What is a dot size?

Dot size may be defined as the diameter of a single dot on the devices output. Dot size is also called as the Spot size.

14. What is interdot distance?

Interdot distance is the reciprocal of addressability. If the addressability is large, the interdot distance will be less. The interdot distance should be less to get smooth shapes.

15. What is the difference between impact and non-impact printers?

Impact printer press formed character faces against an inked ribbon on to the paper. A line printer and dot-matrix printer are examples. Non-impact printer and plotters use Laser techniques, inkjet sprays, Xerographic process, electrostatic methods and electro thermal methods to get images onto the papers.

Examples are: Inkjet/Laser printers.

16. What are the features of Inkjet printers?

- They can print 2 to 4 pages/minutes.
- Resolution is about 360d.p.i. Therefore better print quality is achieved.
- The operating cost is very low. The only part that requires replacement is ink cartridge.
- 4 colors cyane, yellow, majenta, black are available.

17. What are the advantages of laser printer

- High speed, precision and economy.
- Cheap to maintain.
- Quality printers.
- Lasts for longer time.
- Toner power is very cheap.

18. What are the advantages of electrostatic plotters?

- They are faster than pen plotters and very high quality printers.
- Recent electrostatic plotters include a scan-conversion capability.
- Color electrostatic plotters are available. They make multiple passes over the paper to plot color pictures.

19. Define pixel?

Pixel is shortened forms of picture element. Each screen point is referred to as pixel or pel.

20. What is frame buffer?

Picture definition is stored in a memory area called frame buffer or refresh buffer.

21. What is bitmap and what is pixmap?

The frame buffer used in the black and white system is known as bitmap which take one bit per pixel. For systems with multiple bits per pixel, the frame buffer is often referred to as a pixmap.

22. What is a Vector display or stroke writing or calligraphic display?

Random scan monitors draw a picture one line at a time and for this reason are also referred as vector displays.

23. Where the video controller is used?

A special purpose processor, which is used to control the operation of the display device, is known as video controller or display controller.

UNIT – II

1. What is an output primitive?

Graphics programming packages provide function to describe a scene in terms of these basic geometric structures, referred to as output primitives.

2. What do you mean by ‘jaggies’?

Line with stair step appearance is known as jaggies.

3. What is point in the computer graphics system?

The point is a most basic graphical element & is completely defined by a pair of user coordinates (x , y).

4. Write short notes on lines?

A line is of infinite extent can be defined by an angle of slope q and one point on the line P=P(x,y). This can also be defined as Y=mx+C where C is the Y- intercept.

5. Define Circle?

Circle is defined by its center xc, yc and its radius in user coordinate units. The equation of the circle is

$$(x-x_c) + (y-y_c) = r^2.$$

6. Define Ellipse?

An ellipse can use the same parameters xc, yc ,r as a circle, in addition to the eccentricity e. the eqn of an ellipse is

$$(x-x_c)^2/a^2 + (y-y_c)^2/b^2 = 1$$

7. Define polygon?

A polygon is any closed continues sequence of line segments ie, a polyline whose last node point is same as that of its first node point. The line segments form the sides of the polygon and their intersecting points form the vertices of the polygon.

8. Distinguish between convex and concave polygons?

If the line joining any two points in the polygon lies completely inside the polygon then, they are known as convex polygons. If the line joining any two points in the polygon lies outside the polygon then, they are known as concave polygons.

9. What is scan line algorithm?

One way to fill the polygon is to apply the inside test. i.e to check whether the pixel is inside the polygon or outside the polygon and then highlight the pixel which lie inside the polygon. This approach is known as scan-line algorithm.

10. Define coherence properties?

A coherence property of a scene is apart of a scene by which relate one part of the scene with the other parts of the scene.

11. What is type face?

Letters, numbers and other characters can be displayed in a variety of sizes and styles. The overall design style for a set of characters is called a type face.

12. What do you mean by font?

The term font referred to a set of cast metal character forms in a particular size and format, such as 10-point courier italic.

13. What is a bitmapped font?

A simple method for representing the character shapes in a particular typeface is to use rectangular grid patterns. The set of characters are then referred to as a bitmap font.

14. What is an outline font?

A flexible scheme is to describe character shapes using straight-line and curve sections. In this case, the set of character is called an out line font.

15. What is an attribute parameter?

Any parameter that affects the way a primitive is to be displayed is referred to as an attribute parameter.

16. What are the various attributes of a line?

The line type, width and color are the attributes of the line. The line type include solid line, dashed lines, and dotted lines.

17. What is pixel mask?

Pixel mask is a string containing the digits 1 and 0 to indicate which positions to plot along the line path. The mask 1111000, could be used to display a dashed line with a dash length of 4 and inter dot spacing of three.

18. What is a Line cap?

Line caps can be used to adjust the shape of the line ends to give a better appearance. There are three types of line caps. Butt cap which has a square end, round cap which has a semi circle end, projecting square cap which has one half of the line width beyond the specified end points.

19. List out the methods used for smoothly joining two line segments?

- Mitter join- by extending the outer boundaries of each of the two lines until they meet.
- Round join – by capping the connection between the two segments with a circular boundary whose diameter is equal to the line width.
- Bevel join – by displaying the line segments with butt caps and filling in the triangular gap where the segment meet.

20. What is aliasing?

In the line drawing algorithms, all rasterized locations do not match with the true line and have to represent a straight line. This problem is severe in low resolution screens. In such screens line appears like a stair-step. This effect is known as aliasing.

21. What is antialiasing?

The process of adjusting intensities of the pixels along the line to minimize the effect of aliasing is called antialiasing.

UNIT – III

1. What is Transformation?

Transformation is the process of introducing changes in the shape size and orientation of the object using scaling rotation reflection shearing & translation etc.

2. Write short notes on active and passive transformations?

In the active transformation the points x and x' represent different coordinates of the same coordinate system. Here all the points are acted upon by the same transformation and hence the shape of the object is not distorted. In a passive transformation the points x and x' represent same points in the space but in a different coordinate system. Here the change in the coordinates is merely due to the change in the type of the user coordinate system.

3. What is translation?

Translation is the process of changing the position of an object in a straight-line path from one coordinate location to another. Every point (x, y) in the object must under go a displacement to (x', y') . the transformation is

$$\begin{aligned}x' &= x + tx \\ y' &= y + ty\end{aligned}$$

4. What is rotation?

A 2-D rotation is done by repositioning the coordinates along a circular path, in the x-y plane by making an angle with the axes. The transformation is given by

$$\begin{aligned}X' &= r \cos (\theta + \varphi) \\ Y' &= r \sin (\theta + \varphi)\end{aligned}$$

5. What is scaling?

The scaling transformation changes the shape of an object and can be carried out by multiplying each vertex (x,y) by scaling factor S_x, S_y where S_x is the scaling factor of x and S_y is the scaling factor of y .

6. What is shearing?

The shearing transformation actually slants the object along the X direction or the Y direction as required. ie; this transformation slants the shape of an object along a required plane.

7. What is reflection?

The reflection is actually the transformation that produces a mirror image of an object. For this use some angles and lines of reflection.

8. Distinguish between window port & view port?

A portion of a picture that is to be displayed by a window is known as window port. The display area of the part selected or the form in which the selected part is viewed is known as view port.

9. Define clipping?

Clipping is the method of cutting a graphics display to neatly fit a predefined graphics region or the view port.

10. What is covering (exterior clipping)?

This is just opposite to clipping. This removes the lines coming inside the windows and displays the remaining. Covering is mainly used to make labels on the complex pictures.

11. What is the need of homogeneous coordinates?

To perform more than one transformation at a time, use homogeneous coordinates or matrixes. They reduce unwanted calculations intermediate steps saves time and memory and produce a sequence of transformations.

12. Distinguish between uniform scaling and differential scaling?

When the scaling factors s_x and s_y are assigned to the same value, a uniform scaling is produced that maintains relative object proportions. Unequal values for s_x and s_y result in a differential scaling that is often used in design application.

13. What is fixed point scaling?

The location of a scaled object can be controlled by a position called the fixed point that is to remain unchanged after the scaling transformation.

UNIT – IV

1. What are the various representation schemes used in three dimensional objects?

- 1. Boundary representation (B-res) – describe the 3 dimensional object as a set of surfaces that separate the object interior from the environment.**
- 2. Space- portioning representation – describe interior properties, by partitioning the spatial region containing an object into a set of small, no overlapping, contiguous solids.**

2. What is Polygon mesh?

Polygon mesh is a method to represent the polygon, when the object surfaces are tiled, it is more convenient to specify the surface facets with a mesh function.

The various meshes are

- Triangle strip – (n-2) connected triangles**
- Quadrilateral mesh – generates (n-1)(m-1) Quadrilateral**

3. What is Bezier Basis Function?

Bezier Basis functions are a set of polynomials, which can be used instead of the primitive polynomial basis, and have some useful properties for interactive curve design.

4. What are the advantages of rendering polygons by scan line method?

- i. The max and min values of the scan were easily found.**
- ii. The intersection of scan lines with edges is easily calculated by a simple incremental method.**
- iii. The depth of the polygon at each pixel is easily calculated by an incremental method.**

5. What are the advantages of rendering by patch splitting?

- i. It is fast- especially on workstations with a hardware polygon-rendering pipeline.**
- ii. It's speed can be varied by altering the depth of sub-division.**

6. Define B-Spline curve?

A B-Spline curve is a set of piecewise(usually cubic) polynomial segments that pass close to a set of control points. However the curve does not pass through these control points, it only passes close to them.

7. What is a spline?

To produce a smooth curve through a designed set of points, a flexible strip called spline is used. Such a spline curve can be mathematically described with a piecewise cubic polynomial function whose first and second derivatives are continuous across various curve section.

8. What is the use of control points?

Spline curve can be specified by giving a set of coordinate positions called control points, which indicates the general shape of the curve, can specify spline curve.

9. What are the different ways of specifying spline curve?

- Using a set of boundary conditions that are imposed on the spline.
- Using the state matrix that characteristics the spline
- Using a set of blending functions that calculate the positions along the curve path by specifying combination of geometric constraints on the curve

10. What are the important properties of Bezier Curve?

- It needs only four control points
- It always passes through the first and last control points
- The curve lies entirely within the convex half formed by four control points.

11. Differentiate between interpolation spline and approximation spline?

When the spline curve passes through all the control points then it is called interpolate. When the curve is not passing through all the control points then that curve is called approximation spline.

12. Define Projection?

The process of displaying 3D into a 2D display unit is known as projection. The projection transforms 3D objects into a 2D projection plane.

(OR)

The process of converting the description of objects from world coordinates to viewing coordinates is known as projection

13. What are the steps involved in 3D transformation?

The steps involved in 3D transformation are

- Modeling Transformation
- Viewing Transformation
- Projection Transformation
- Workstation Transformation

14. What do you mean by view plane?

A view plane is nothing but the film plane in camera which is positioned and oriented for a particular shot of the scene.

15. What you mean by parallel projection?

Parallel projection is one in which z coordinates is discarded and parallel lines from each vertex on the object are extended until they intersect the view plane.

16. What do you mean by Perspective projection?

Perspective projection is one in which the lines of projection are not parallel. Instead, they all converge at a single point called the center of projection.

17. What are the different types of parallel projections?

The parallel projections are basically categorized into two types, depending on the relation between the direction of projection and the normal to the view plane.

They are

1. Orthographic parallel projection
2. Oblique parallel projection.

1. Orthographic parallel projection

When the direction of the projection is normal (perpendicular) to the view plane then the projection is known as orthographic parallel projection

2. Oblique parallel projection.

When the direction of the projection is not normal (not perpendicular) to the view plane then the projection is known as oblique projection.

18. What is vanishing point?

The perspective projections of any set of parallel lines that are not parallel to the projection plane converge to a point known as vanishing point.

UNIT – V

1. Define computer graphics animation?

Computer graphics animation is the use of computer graphics equipment where the graphics output presentation dynamically changes in real time. This is often also called real time animation.

2. Define frame?

One of the shape photographs that a film or video is made of is known as frame.

3. What is key frame?

One of the shape photographs that a film or video is made of the shape of an object is known initially and for a small no of other frames called keyframe

4. How realistic pictures are created in computer graphics?

To create a realistic picture, it must be process the scene or picture through viewing-coordinate transformations and projection that transform three-dimensional viewing coordinates onto two-dimensional device coordinates.

5. What is turtle graphics program?

The turtle program is a Robot that can move in 2 dimensions and it has a pencil for drawing. The turtle is defined by the following parameters.

- Position of the turtle (x, y)
- Heading of the turtle θ the angle from the x axis.

6. Give some examples for computer graphics standards?

- **CORE – The Core graphics standard**
- **GKS -- The Graphics Kernel system**
- **PHIGS – The Programmers Hierarchical Interactive Graphics System.**
- **GSX – The Graphics system extension**
- **NAPLPS – The North American presentation level protocol syntax.**

7. Write the four subdivisions of area subdivision methods?

The four subdivisions of area subdivision methods are

- **Surrounding Surface**
- **Overlapping Surface**
- **Inside Surface**
- **Outside Surface**

8. Define Octrees?

Hierarchical tree structures are called octrees, are used to represent solid objects in some graphics systems. Medical imaging and other applications that require displays of object cross sections commonly use octree representation.

9. What are the Classification of Visible Surface Detection Methods?

The Classification of Visible Surface Detection Methods are

- i.) **Image Space Method**
- ii.) **Object space Method**