CS6504 – COMPUTER GRAPHICS

UNIT – I INTRODUCTION

PART – A

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
• Poor resolution of up to 60 d.p.i
• 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 ¾.

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.

24. What do you mean by scan conversion?
A major task of the display processor is digitizing a picture definition given in an application program into a set of pixel-intensity values for storage in the frame buffer. This digitization process is called scan conversion.

25. What is run length encoding?
Run length encoding is a compression technique used to store the intensity values in the frame buffer, which stores each scan line as a set of integer pairs. One number each pair indicates an intensity value, and second number specifies the number of adjacent pixels on the scan line that are to have that intensity value

26. 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.

27. What do you mean by 'jaggies'?
Line with stair step appearance is known as jaggies.

28. 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).

29. Write short notes on lines.
A line is of infinite extent can be defined by an angle of slope . 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.

30. Define Circle.
Circle is defined by its center xc, yc and its radius in user coordinate units. The equation of the circle is $(x-xc) + (y-yc) = r2$.

31. 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: $(x-xc)2/a2 + (y-yc)2/b2 = 1$

32. 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 from the vertices of the polygon.

33. 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.

34. What is seed fill and soft fill?
One way to fill a polygon is to start from a given point (seed) known to be inside the polygon and highlight outward from this point i.e neighboring pixels until encounter the boundary pixels, this approach is called seed fill.
Soft fill is a filling method in which fill color is combined with the background colors.

35. 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.

36. 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.

37. What is an active edge list in the scan line algorithm?
The active edge list for a scan line contains all edges crossed by that scan line.

38. Define bitmapped font and an outline 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.

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

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

40. 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.

41. 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.

42. 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.

43. 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.

44. What is Color Look up table?
In color displays, 24 bits per pixel are commonly used, where 8 bits represent 256 entries to pixel values in RGB format. This look up table is commonly known as colour table.

45. What is character up vector?
The orientation for a displayed character string is set according to the direction of the character up vector.

46. Define bundled attributes.
Individual attribute commands provide a simple and direct method for specifying attributes when a single output device is used. When several kinds of output device are available at a graphics installation, it is convenient to set up a table for each output device that lists set of attribute values that are to be used on that device to display each primitive type. Attribute specified in this manner is known as bundled attribute.

49. What is aliasing and antialiasing?
In the line drawing algorithms, all rasterzed 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.

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

50. What is pixel phasing?

Pixel phasing is an antialiasing technique, stair steps are smoothed out by moving the electron beam to more nearly approximate positions specified by the object geometry.

PART-B

1. Explain refresh cathode ray tube.
2. Explain color CRT monitors.
3. Explain direct view storage tubes and liquid crystal displays.
4. Write short notes on Raster scan systems.
5. Describe in detail about the DDA scan conversion algorithm?
6. Write down and explain the midpoint circle drawing algorithm. Assume 10 cm as the radius and co-ordinate origin as the centre of the circle.
7. Explain Ellipse generating Algorithm.
8. Explain in detail about Bresenham's line generating algorithm. Give example.
9. Explain in detail about Bresenham's circle generating algorithm. Give example.
10. Explain in detail about Bresenham's ellipse generating algorithm. Give example.
11. Explain in detail about video display devices.
12. Explain in detail about raster and random scan systems.
13. Explain in detail about graphics input devices.

UNIT-II TWO DIMENSIONAL GRAPHICS

PART - A

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.

14.   Write short notes on active and passive transformations.

In the **active transformation** the points x and y 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 y 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.

15.   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 undergo a displacement to (x´,y´). the transformation is:

$x´ = x + tx$
$y´ = y+ty$

4. What is rotation?

A 2-D rotation is done by repositioning the coordinates along a circular path, in
$X = r\cos (q + f)$ and $Y = r \sin (q + f)$.

5. What is scaling?

The scaling transformations changes the shape of an object and can be carried out by multiplying each vertex (x,y) by scaling factor Sx,Sy where Sx is the scaling factor of x and Sy 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? And types of clipping.

Clipping is the method of cutting a graphics display to neatly fit a predefined graphics region or the view port.
- Point clipping
- Line clipping
- Area clipping
- Curve clipping
- Text clipping

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 sx and sy are assigned to the same value, a uniform scaling is produced that maintains relative object proportions. Unequal values for sx and sy 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. .

14. Define Affine transformation.
A coordinate transformation of the form X= axxx +axyy+bx, y 'ayxx+ayy y+by is called a two-dimensional affine transformation. Each of the transformed coordinates x 'and y 'is a linear function of the original coordinates x and y, and parameters aij and bk are constants determined by the transformation type.

15. Distinguish between bitBlt and pixBlt.
Raster functions that manipulate rectangular pixel arrays are generally referred to as raster ops. Moving a block of pixels from one location to another is also called a block transfer of pixel values. On a bilevel system, this operation is called a bitBlt (bit-block transfer), on multilevel system t is called pixBlt.

16. List out the various Text clipping.
- All-or-none string clipping -if all of the string is inside a clip window, keep it otherwise discards.

- All-or-none character clipping – discard only those characters that are not completely inside the window. Any character that either overlaps or is outside a window boundary is clipped.

- Individual characters – if an individual character overlaps a clip window boundary, clip off the parts of the character that are outside the window.

17. 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.

18. List out the various Text clipping.
- All-or-none string clipping - if all of the string is inside a clip window, keep it otherwise discards.
- All-or-none character clipping – discard only those characters that are not completely inside the window. Any character that either overlaps or is outside a window boundary is clipped.
- Individual characters – if an individual character overlaps a clip window boundary, clip off the parts of the character that are outside the window.

19. Write down the shear transformation matrix. (nov/dec 2012)

A transformation that distorts the shape of an object such that the transformed shape appears as if the object were composed of internal layers that had been caused to slide over each other is called a shear.

20. What is the use of clipping?(may/june 2012)
Clipping in computer graphics is to remove objects, lines or line segments that are outside the viewing volume.

21. How will you clip a point?(may/june 2013)
Assuming that the clip window is a rectangle in standard position, we save a point P=(x,y) for display if the following inequalities are satisfied:
$$xw_{min} \le x \le xw_{max} \quad yw_{min} \le y \le yw_{max}$$

where the edges of the clip window (xw_{min}, xw_{max}, yw_{min}, yw_{max}) can be either the world-coordinate window boundaries or viewport boundaries. If any one of these inequalities is not satisfied, the points are clipped (not saved for display).

22. Define viewing transformation.
The mapping of a part of world coordinate scene to device coordinates are called viewing transformation. Two dimensional viewing transformation is simply referred to as window to viewport transformation or the windowing transformation.

PART – B

1. Explain reflection and shear?
2. Explain Liang Barsky line clipping
3. Explain Sutherland Hodgeman polygon clipping
4. Explain about clipping operations
5. Explain in detail about window to viewport coordinate transformation.
6. Write a detailed note on the basic two dimensional transformations.
7. Explain with an example the Cohen-Sutherland line clipping algorithm.
8. Compare Cohen-Sutherland line clipping algorithm and Liang-Barsky line clipping algorithm. Write note on any one polygon clipping algorithm.

UNIT – III THREE DIMENSIONAL GRAPHICS

PART - A

1. What are the various representation schemes used in three dimensional objects?
- Boundary representation (B-res) – describe the 3 dimensional object as a set of surfaces that separate the object interior from the environment.

- 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 is surface patch?

A single surface element can be defined as the surface traced out as two parameters (u, v) take all possible values between 0 and 1 in a two-parameter representation. Such a single surface element is known as a surface patch.

5. Write short notes on rendering bi-cubic surface patches of constant u and v method.

The simple way is to draw the iso-parmetric lines of the surface. Discrete approximations to curves on the surface are produced by holding one parameter constant and allowing the other to vary at discrete intervals over its whole range. This produce curves of constant u and constant v.

6. 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.

7. What are the advantages of rendering by patch splitting?
- It is fast-especially on workstations with a hardware polygon-rendering pipeline.
- It's speed can be varied by altering the depth of sub-division.
-

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. What do you mean by parabolic splines?

For parabolic splines a parabola is fitted through the first three points p1,p2,p3 of the data array of k points. Then a second parabolic arc is found to fit the sequence of points p2, p3, p4. This continues in this way until a parabolic arc is found to fit through points pn-2, pn-1 and pn. The final plotted curve is a meshing together of all these parabolic arcs.

15. What is cubic spline?

Cubic splines are a straight forward extension of the concepts underlying parabolic spline. The total curve in this case is a sequence of arcs of cubic rather than parabolic curves. Each cubic satisfies :ax+ bx + cx + d

16. What is a Blobby object?

Some objects do not maintain a fixed shape, but change their surface characteristics in certain motions or when in proximity to other objects. That is known as blobby objects. Example – molecular structures, water droplets.

17. Define Octrees.

Hierarchical tree structures 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.

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

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

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

20. 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.

21. What is view-plane normal vector?

This normal vector is the direction perpendicular to the view plane and it is called as [DXN DYN DZN]

22. What is view distance?

The view plane normal vector is a directed line segment from the view plane to the view reference point. The length of this directed line segment is referred to as view distance.

23. Mention some surface detection methods.

Back-face detection, depth-buffer method, A-buffer method, scan-line method, depth-sorting method, BSP-tree method, area subdivision, octree method, ray casting.

24. 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.

25. 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.

26. What is Projection reference point?

In Perspective projection, the lines of projection are not parallel. Instead, they all converge at a single point called Projection reference point.

27. What is the use of Projection reference point?
In Perspective projection, the object positions are transformed to the view plane along these converged projection line and the projected view of an object is determined by calculating the intersection of the converged projection lines with the view plane.

28. 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 orthographic parallel projection and oblique projection.

29. What is 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

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

31. What is an axonometric orthographic projection?
The orthographic projection can display more than one face of an object. Such an orthographic projection is called axonometric orthographic projection.

32. What is cavalier projection?
The cavalier projection is one type of oblique projection, in which the direction of projection makes a 45-degree angle with the view plane.

33. What is cabinet projection?
The cabinet projection is one type of oblique projection, in which the direction of projection makes a n angle of arctan (2)=63.4- with the view plane.

34. What is vanishing point?
The perspective projections of any set of parallel lines that are not parallel to the projection plane converge to appoint known as vanishing point.

35. What do you mean by principle vanishing point.
The vanishing point of any set of lines that are parallel to one of the three principle axes of an object is referred to as a principle vanishing point or axis vanishing point.

36. What is view reference point?
The view reference point is the center of the viewing coordinate system. It is often chosen to be close to or on the surface of the some object in the scene.

PART-B
1. Explain spline representation
2. Explain Back face detection method and Depth buffer method
3. Explain area subdivision and A- Buffer method
4. Briefly explain about the basic transformations performed on three dimensional objects.
5. Write short notes on parallel and perspective projections.
6. Explain in detail about three dimensional display methods.
7. Explain in detail about the boundary representation of three dimensional objects.
8. Explain in detail about the three dimensional transformations.
9. Explain in detail about 3D window to viewport coordinate transformation.

PART - A

1. State the difference between CMY and HSV color models.(nov/dec 2012)
The HSV (Hue,Saturation,Value) model is a color model which uses color descriptions that have a more intuitive appeal to a user. To give a color specification, a user selects a spectral color and the amounts of white and black that is to be added to obtain different shades, tint, and tones.
A color model defined with the primary colors cyan, magenta, and yellow is useful for describing color output to hard-copy devices.

2. What are subtractive colors?(may/june 2012)
RGB model is an additive system, the Cyan-Magenta-Yellow (CMY) model is a subtractive color model. In a subtractive model, the more that an element is added, the more that it subtracts from white. So, if none of these are present the result is white, and when all are fully present the result is black.

3. Define YIQ color model
In the YIQ color model, luminance (brightness) information in contained in the Y parameter, chromaticity information (hue and purity) is contained into the I and Q parameters.
A combination of red, green and blue intensities are chosen for the Y parameter to yield the standard luminosity curve. Since Y contains the luminance information, black and white TV monitors use only the Y signal.

4.What do you mean by shading of objects?(nov/dec 2011)
A shading model dictates how light is scattered or reflected from a surface. The shading models described here focuses on achromatic light. **Achromatic light** has brightness and no color; it is a shade of gray so it is described by a single value its intensity.
A shading model uses two types of light source to illuminate the objects in a scene : **point light sources** and **ambient light**.

5. What is texture?(nov/dec 2011)
The realism of an image is greatly enhanced by adding surface texture to various faces of a mesh object. The basic technique begins with some texture function, **texture(s,t)** in **texture space** , which has two parameters s and t. The function texture(s,t) produces a color or intensity value for each value of s and t between 0(dark)and 1(light).

6. What are the types of reflection of incident light?(nov/dec 2013)
There are two different types of reflection of incident light
- Diffuse scattering.
- Specular reflections.

7. Define rendering (may/june 2013)
     Rendering is the process of generating an image from a model (or models in what collectively could be called a *scene*file), by means of computer programs. Also, the results of such a model can be called a rendering.

8. Differentiate flat and smooth shading (may/june 2013)
The main distinction is between a shading method that accentuates the individual polygons (**flat shading**) and a method that blends the faces to de-emphasize the edges between them (**smooth shading**).

9. Define shading (may/june 2012)
Shading is a process used in drawing for depicting levels of darkness on paper by applying media more densely or with a darker shade for darker areas, and less densely or with a lighter shade for lighter areas.

10. What is a shadow? (nov/dec 2012)
Shadows make an image more realistic. The way one object casts a shadow on another object gives important visual clues as to how the two objects are positioned with respect to each other. Shadows conveys

lot of information as such, you are getting a second look at the object from the view point of the light source.

11. What are two methods for computing shadows?
- Shadows as Texture.
- Creating shadows with the use of a shadow buffer.

12. Write any two Drawbacks of Phong Shading
- Relatively slow in speed.
- More computation is required per pixel.

13. What are the two common sources of textures?
- Bitmap Textures.
- Procedural Textures.

14. Write two types of smooth shading.
- Gouraud shading.
- Phong shading.

15. What is a color model?
A color model is a method for explaining the properties or behavior of color within some particular context. Example: XYZ model, RGB model.

16. Define intensity of light.
Intensity is the radiant energy emitted per unit time, per unit solid angle, and per unit projected area of source.

17. What is hue?
The perceived light has a dominant frequency (or dominant wavelength). The dominant frequency is also called as hue or simply as color.

18. What is purity of light?
Purity describes how washed out or how "pure" the c olor of the light appears. pastels and pale colors are described as less pure.

19. Define the term chromacity.
The term chromacity is used to refer collectively to the two properties describing color characteristics: purity and dominant frequency.

20. How is the color of an object determined?
When white light is incident upon an object, some frequencies are reflected and some are absorbed by the object. The combination of frequencies present in the reflected light determines what we perceive as the color of the object.

21. Define purity or saturation.
Purity describes how washed out or how "pure" the color of the light appears.

22. Define complementary colors.
If the two color sources combine to produce white light, they are referred to as 'complementary colors. Examples of complementary color pairs are red and cyan, green and magenta, and blue and yellow.

23. Define primary colors.
The two or three colors used to produce other colors in a color model are referred to as primary colors.

24. State the use of chromaticity diagram.
Comparing color gamuts for different sets of primaries. Identifying complementary colors. Determining dominant wavelength and purity of a given color.

25. What is Color Look up table?

In color displays, 24 bits per pixel are commonly used, where 8 bits represent 256 level for each color. It is necessary to read 24- bit for each pixel from frame buffer. This is very time consuming. To avoid this video controller uses look up table to store many entries to pixel values in RGB format. This look up table is commonly known as colour table.

26. What is the use of hidden line removing algorithm?

The hidden line removal algorithm determines the lines, edges, surfaces or volumes that are visible or invisible to an observer located at a specific point in space.

PART – B

1. Explain in detail about XYZ color model.
2. Explain in detail about RGB color model.
3. Explain in detail about YIQ color model.
4. Explain in detail about CMY color model.
5. Explain in detail about HSV color model.
6. Compare and contrast RGB and CMY.
7. Explain in detail about the conversion between HSV and RGB color models.
8. Explain in detail about HLS color model.
9. Explain in detail about shading models.
10. Explain about shading and graphics pipeline.
11. Compare Flat shading and Smooth shading.
12. Explain Gouraud shading and Phong shading.

UNIT – V ANIMATION AND REALISM

PART - A

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. What is tweening?

It is the process, which is applicable to animation objects defined by a sequence of points, and that change shape from frame to frame.

3. Define frame.

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

4. What is the normal speed of a visual animation?

Visual animation requires a playback of at least 25 frames per second.

5. What are the different tricks used in computer graphics animation?
   a. Color look Up Table manipulation
   b. Bit plane manipulation
   c. Use of UDCS
   d. Special drawing modes
   e. Sprites
   f. Bit blitting

6. What is solid modeling?

The construction of 3 dimensional objects for graphics display is often referred to as solid modeling.

7. What is an intuitive interface?

The intuitive interface is one, which simulates the way a person would perform a corresponding operation on real object rather than have menu command.

8. What is Sprite?

A Sprite is graphics shape in animation and games programs. Each sprite provided in the system has its own memory area similar to but smaller than pixel

9. What is the UDC technique?

UDC stands for User Defined Character set. It is graphics animation trick, which is used in early microcomputer system.

10. What is computer graphics realism?

The creation of realistic picture in computer graphics is known as realism.It is important in fields such as simulation, design, entertainments, advertising, research, education, command, and control.

11. 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.

12.What is Fractals?

A Fractal is an object whose shape is irregular at all scales.

13. What is a Fractal Dimension?

Fractal has infinite detail and fractal dimension. A fractal imbedded in n-dimensional space could have any fractional dimension between 0 and n. The Fractal Dimension D= LogN / Log S Where N is the No of Pieces and S is the Scaling Factor.

14. What is random fractal?

The patterns in the random fractals are no longer perfect and the random defects at all scale.

15. What is geometric fractal?

A geometric fractal is a fractal that repeats self-similar patterns over all scales.

16. What is Koch curve?

The Koch curve can be drawn by dividing line into 4 equal segments with scaling factor 1/3. and middle 2 segments are so adjusted that they form adjustment sides of an equilateral triangle.

17. What is turtle graphics program?

The turtle program is a Robert 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 0 the angle from the x axis.

18. What is graftals?

Graftals are applicable to represent realistic rendering plants and trees. A tree is represented by a String of symbols 0, 1.

19. What is a Particle system?

A particle system is a method for modeling natural objects, or other irregularly shaped objects, that exhibit "fluid-like" properties. Particle systems are suitable for realistic rendering of fuzzy objects, smoke, sea and grass.

20. 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.

PART-B

1. Explain about fractals and self-similarity.
2. Give an account about Peano curves.
3. Explain the methods for crating images by means of iterated function systems.
4. Explain about the Mandelbrot set.
5. Explain about Julia sets.
6. Give a detailed account of random fractals.
7. Explain how to find the intersection of a ray with an object.
8. Give an account on adding surface texture.
9. Explain about reflections and transparency.
10. Explain the Boolean operations that can be performed on objects.