CS6504 – COMPUTER GRAPHICS

Two Marks Question with Answers

Unit-I Introduction

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. 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. Write down the attributes of characters

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. What is seed 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.

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.

2. 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

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

4. 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.

5. 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.

6. 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.

7. 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.

8. 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

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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:
xwmin ≤ x≤ xwmax ywmin ≤ y≤ ywmax
where the edges of the clip window (xwmin ,xwmax, ywmin, ywmax) 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).

15. 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.

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 tospecify 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. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. What is view-plane normal vector?
This normal vector is the direction perpendicular to the view plane.

UNIT – IV ILLUMINATION AND COLOUR MODELS

PART-A

1. 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.

2. 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.

3. 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).

4. 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.

5. 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.

6. 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).

7. 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.

8. 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.

9. What are the two common sources of textures?
Shadows as Texture. Creating shadows with the use of a shadow buffer.

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

11. 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.

12. 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.

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

14. 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.

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

16. 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.

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

5. What is Fractals?
A Fractal is an object whose shape is irregular at all scales.

6. 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.

7. What is random fractal?
The patterns in the random fractals are no longer perfect and the random defects at all scale.

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

9. 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.

10. 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.

11. What is a Particle system?
A particle system is a method for modeling natural objects, or other irregularly shaped objects, that exhibit “fluidlike” properties. Particle systems are suitable for realistic rendering of fuzzy objects, smoke, sea and grass.

12. 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.