DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

MID SEMESTER EXAMINATION, FEBRUARY 2018

IT254: COMPUTER GRAPHICS

Class: IV SEM B.TECH (IT)
Date: 05/02/2018

Time: 1 $^1/_2$ Hrs.
Marks: 40

Register No. | | | | | | | |

NOTE: Answer all the Questions to the Point only.

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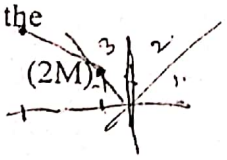
1. (a) Consider a raster monitor of resolution 640*480 pixels. A scanning is used with horizontal retrace time of 5 microseconds and vertical retrace time of 20 microseconds respectively. Assume a scan rate of 40 frames per seconds. Calculate the time available to display a pixel for both cases of (i) non-interlaced and (ii) interlaced. (6M)

   (b) Consider display list consists of instruction in random-scan display and average time to execute an instruction is 33.33 microseconds. If the frame rate is 30fps, obtain the maximum number of instruction that can be present in the display list. (2M)



2. (a) Write the pixels to be considered to draw a line between (-1, 1) and (-3, 6) using mid-point line drawing algorithm. Mention the initial values of the required parameters as well as the change in values of the necessary parameters. Also list the drawbacks of DDA algorithm? (8M)

   (b) Trace the Midpoint circle algorithm with the radius 6 and centre at (3, -4). Also list the problem in this algorithm. (8M)

3. (a) What should be the size of the frame buffer, if screen resolution 1280*1024 and displays 256 colors? (2M)

   (b) A customer wants to display fast animations and complex graphics on his display. What kind of display will you suggest explaining it? (4M)

4. (a) Suppose we want to draw an arc with the major axis 5, and minor axis 7. Suggest an algorithm and derive its decision parameters and create an arc with the given points. (8M)

(b) What should be the minimum size of lookup table with 24 bit plane color frame? Also explain the use of lookup table. (2M)

-----ALL THE BEST-----

DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

MID SEMESTER EXAMINATION, FEBRUARY 2017

IT254: COMPUTER GRAPHICS

Class: IV SEM B.TECH (IT)
Date: 14/02/2017

Time: 1½ Hrs.
Marks: 50

Register No. | 1 | 5 | 1 | T | 2 | 4 | 1 |

NOTE: 1. Answer all questions

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1. a) A customer wants to display crisp text, vivid colors, fast animations, and complex graphics in his display what kind of display will you suggest. Denote with reasons and its working. (3M)

   b) A shopkeeper wants to display his shop name with the help of displays for low cost. What kind of display will you suggest explain it. (3M)

2. a) In order to represent a 3D scene in screen what are the steps carried out by GPU? (3M)

   b) Create a visual representation of Architecture of a raster graphics system with frame buffer. (3M)

3. a) Trace the points (3,8)& (9,12) using Midpoint Line drawing algorithm (3M)

   b) Trace the given point (2,3) with a radius of 5. What kind of algorithm is used and derive its decision parameters? (7.5M)

4. a) "Order of transformation is important" -the given statement is true or false. Defend your answer with proper explanation. (5M)

   b) Consider a triangle with coordinates a=(2,2);b=(4,6);c=(6,2). Perform the combined transformation having following:

   i) Translation to a distance of (6,4)

   ii) Scaling at the left most bottom point by a factor of 3

   iii) Rotating the left most bottom point by an angle of 30 degree.

Represent the composite transformation diagrammatically and also provide the calculations. **(7.5M)**

5. What kind of display device would you choose if you want to create a display which requires no refreshing and a complex picture without flicker? Justify. **(5M)**

6. Suppose we wanted to create an arc with major axis (9) and minor axis (6) at origin. What kind of algorithm would you suggest?why? Derive its decision parameters and create an arc with the given points. **(10M)**

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ALL THE BEST

noun phrases approach
common class pattern approach.

(i) Classification
(a) issue w.r.t OOAD
(b) challenges → arbitary / hardwork
→ One object in many classes.

(ii) Different Approaches for identity class.
- noun phrase Approach - look for noun phrases in the case, interview requirement specification & then form a list, divide into 3 categories.
Relevant, fuzzy & irr.
- Look for N.P
- Some class are for general known
- All class must serve application do
- Avoid computer implementation
- Use

DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

END SEMESTER EXAMINATION, APRIL 2017

IT254: COMPUTER GRAPHICS

Class: IV SEM B.TECH (IT)
Date: 27.4.2017

Time: 3 Hrs.
Marks: 80

Register No. | 1 | 5 | 1 | T | 2 | 4 | 1 |

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1. a) What is shadow pattern? How it is applied? **3M**

   b) Diffrentiate Gourad and phong shading with example. **3M**

2. a) When we want an animation system with fast moving frames what kind of motion specification will you suggest ? Why? **3M**

   b) An object moves in a constant speed what will its acceleartion and time spacing in any animation be?Why? **3M**

   c) Define Generation of In-Betweens with an example. **3M**

3. How does window differ from viewport represent with an example? **3M**

4. a) To remove hidden surafce in spheres and curved surfaces which is the best method?Defend your answer. **3M**

   b) In practice,testing each point in a polygon to determine whether it is inside or outside is extremely inefficent. What are the general statergies that could be pursued to avoid point-by-point testing? **3M**

   c) Diffrentiate the image and object space approaches for hidden surface removal.Explain z-buffer method for hidden surface removal. When does this algorithm fail? **5M**

5. a) Using Mid-point line drawing algorithm plot the intermediate points between (5,4) and(15,19). **3M**

   b) Plot a circle using Mid-point circle drawing algorithm with a radius r = 12 which is centered at (3,5). **5M**

6. Answer the following

   i. Two successive mirror concatination in x- axis cancel each other. Is the

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given statement true? Justify your answer with an example **2.5M**

ii. Two successive rotation transformation are additive. Is the given statement true ?Justify your answer with an example. **2.5M**

7. a) How to calculate the illumination of basic light source model? Brief about its types. **5M**

b) What are the different reflections used in Phong lighting model? Compare and suggest the best reflection model for realistic lighting and explain how to achieve this? **5M**

8. a) What type of projection preservers the size and shape of the object face which is parallel to the projection plane? Write down its variations. **3M**

b) Among perspective and parallel projection which provides realistic view? Explain and derive the perspective transformation equation and represent it in matrix form. **5M**

9. a) Discuss the Sutherland Hodgeman polygon clipping procedure with an example. What are the limitations of this algorithm. **5M**

b) For a clipping boundary (xmin, xmax, ymin, ymax) and an arbitrary line (x1,y1) to (x2,y2), write Cohen Sutherland (CS) line clipping algorithm. **15M**

Further,

i. What happens when the line is -vertical and passing through a point on clipping boundary, horizontal and passing through a point on clipping boundary.

ii. Consider the case where one end point of the line is in left region and the other is in the bottom region and the line is outside clipping region.At what stage would such a line be rejected?

iii. Compare the CS line clipping algorithm with Liang-Barsky line clipping algorithm.

iv. How does Nicholl-Lee-Nicholl line clipping algorithm differ from CS line clipping algorithm?

----------ALL THE BEST----------

DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

END SEMESTER EXAMINATION, APRIL 2018

IT254: COMPUTER GRAPHICS

Class: IV SEM B.TECH (IT) Time: 3 Hrs.
Date: 27/04/2018 Marks: 80

Register No. | 1 | 6 | I | T | 2 | 0 | 2 |

NOTE: Answer all the Questions to the Point only.

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1. (a) Draw a line between (3,-4) and (7, -10) using the DDA algorithm. Also list the drawbacks of this algorithm? (5M)

   (b) Illustrate local extremum in scan-line polygon fill algorithm and also explain inside-outside test in the polygon. (6M)

2. (a) Consider a shopkeeper wants to display his/her shop name with the help display for low cost. Which display will you suggest and explain it? (3M)

   (b) What are subtractive colors? (2M)

3. (a) Explain different types of Axonometric orthographic projections. (6M)

   (b) Illustrate the vanishing point for the projection of a transparent object. (3M)

   (c) Explain the advantage of seed fill algorithms over scan-line polygon fill algorithm with an example. (5M)

4. (a) Write a pseudo code of Depth-buffer algorithm. What is the drawback of this method and how can you improve it? (6M)

   (b) What is the idea behind back face culling method, and why it is used as a pre-processing step for another method? (4M)

5. (a) Discuss the limitation of Sutherland Hodgeman polygon clipping procedure with an example and how it can be handled. (5M)

(b) Given a clipping window A(10,0), B(360,60), C(360,280) and D(10,230), find the visible portion of the lines PQ[(-180,595),(170, 255)] and XY[(5,8),(595,595)] against the given window, using Cohen-Sutherland algorithm. (6M)

6. (a) Show the sweep representation of a solid with an example and also show how it affects your system by altering the quality of image in this representation. (5M)

(b) For a transparent object surface, which surface detection method will you suggest and why? (2M)

(c) What are the pros and cons of octree representation of solid? (4M)

7. (a) Differentiate between Flat, Gourand and Phong shading Models. (6M)

(b) Show how X-shear transformation may be expressed in terms of rotation and scaling. (5M)

8. (a) Give a single 3 × 3 homogeneous coordinate transformation matrix for each of the following transformation sequences:

i) Rotate counterclockwise about the origin by Π/ 2 and then scale the x-direction to be one-half as large.

ii) Scale the y coordinate to make the image twice as tall, shift it down 1 unit, and then rotate clockwise by Π/ 6 (5M)

(b) Show how the line Y=X can be converted to line Y= -X by scaling operation. (2M)

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