

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Improvement), April-May 2018

B. Tech Computer Science Engineering, Semester IV

Roll No.....

CSE404: Foundation of Computer Graphics

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Assume suitable data wherever required and mention it clearly.
 3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
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Q.1A Objective type multiple choice questions (10 questions @ 1 mark) 10

- i. The object refers to the 3D representation through linear, circular or some other representation are called
a) Quadric surface b) Sweep representation c) Torus d) None of these
- ii. Sutherland Hodgeman algorithm works well for.....
a) Concave polygon b) Convex polygon d) Smooth curves d) Line segment
- iii. A transformation that slants the shape of an object is called
a) Reflection b) Shear c) Distortion d) Scaling
- iv. The region against which an object is clipped is called a
a) Clip window b) Boundary c) Enclosing rectangle d) Clip square
- v. The rectangle portion of the interface window that defines where the image will actually appear are called
a) Transformation viewing b) View port c) Clipping window d) Screen coordinate system
- vi. Forming products of transformation matrices is often referred as
a) Concatenation b) Composition c) both a&b d) None of above
- vii. controls the basic display properties of output primitives.
a) Attribute parameter b) setpixel c) getpixel d) None of the above
- viii. The quality of an image depend on
a. No. of pixel used by image b. No. of line used by image
c. No. of resolution used by image d. None
- ix. The intensity of a grayscale pixel is expressed within a given range between a minimum and a maximum
a) 1 and 2 b) 2 and 1 c) 0 and 1 d) 0 and 2
- x. The point about which an object is rotated is called
a) Fixed point b) Central point c) Pivot point d) None

Q.2 Short answer type questions (4 questions @ 2.5 marks)

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- i. Find out the aspect ratio of the raster system using 8 x 10 inches screen and 100 pixel/inch.
- ii. Differentiate between random and raster scan.

- iii. Define geometric transformation.
 - iv. Explain DDA algorithm. Also, write advantages and disadvantages.
- Q.3A How much time is spent scanning across each row of pixels during screen refresh on a raster system with resolution of 1280 X 1024 and a refresh rate of 60 frames per second? 05
- Q.3B Derive equations of Bresenham's Line algorithm. List advantages and disadvantages of Bresenham's line algorithm. 05
- Q.4A Consider the square A(1,0), B(0,0), C(0,1), D(1,1). Rotate the square ABCD by 45° clockwise about A(1,0). 05
- Q.4B Define resolution and persistence. Explain various components of CRT with diagram. 05
- Q.5A Explain animation? What are different kinds of animation techniques used in graphics system? 05
- Q.5B Describe flood fill and boundary fill algorithm. List 5 image formats. 05
- Q.6A Fill the closed polygon with the vertices (5, 6), (5, 12), (14, 12), (14, 6). Use scan line seed fill algorithm with (9, 9) as seed. Fill only two scan lines. 05
- Q.6B Illustrate 2D and 3D rotation matrix. Prove that two 2D rotation about the origin commutative i.e $R_1.R_2=R_2.R_1$. 05
- OR
- Q.6B Illustrate 2D and 3D scaling matrix. Prove that two scaling transformation are commutative i.e. $S_1.S_2 = S_2.S_1$ 05
- Q.7 (A) What are the uses of Bezier curves in computer graphics ? Draw a Bezier curve having the control points P1(0,0), P2 (2, 5), P3(5, 9), P4(10, 20). Calculate the co-ordinates of the points on the curve corresponding to parameter $u = 0.2, 0.4, 0.6$. Draw a rough sketch of the curve and show co-ordinates of various points on it. 10
- (B) Derive equations of Mid-point Circle algorithm with a neat sketch and algorithm.
- Q.8 (A) Use the Cohen Sutherland algorithm to clip line P1 (80,15) and p2(110,10) against a window lower left hand corner (40,10) and upper right hand corner (90,40). 30
- (B) Define Clipping. Explain Polygon clipping in detail by considering suitable example.
- (C) Describe hidden surface removal. Explain the application of Z-buffer algorithm.