

S.E. (Comp.) (Second Semester) EXAMINATION, 2010

COMPUTER GRAPHICS

(2008 COURSE)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answers to the two Sections should be written in separate answer-books.

(ii) In Section I attempt Question Nos. 1 or 2, 3 or 4, 5 or 6 and in Section II Question Nos. 7 or 8, 9 or 10, 11 or 12.

(iii) Neat diagrams must be drawn whenever necessary.

(iv) Figures to the right indicate full marks.

(v) Assume suitable data, if necessary.

SECTION I

1. (a) Explain DDA line algorithm and further explain how it can be extended to generate a thick line of thickness ' w '. [8]

(b) What is meant by resolution of an image and an image's aspect ratio ? [4]

(c) Find the refresh rate of a 512×512 frame buffer, if the access time for each pixel is 200 nanoseconds(ns). [4]

Or

2. (a) Using Bresenham's line algorithm, find out which pixel would be turned on for the line with end points (4, 4) to (12, 9). [8]
- (b) List and explain any *two* antialiasing methods. [4]
- (c) What are the major adverse side effects of Scan Conversions ? [4]
3. (a) Explain Scanline algorithm for polygon filling and explain how it can be extended for hidden line removal. [10]
- (b) Describe viewing transformation. [6]

Or

4. (a) Explain Cohen-Sutherland outcode algorithm with example. [10]
- (b) Explain *two* methods for testing whether the point is inside the polygon or not. [6]
5. (a) Consider the square A(1, 0), B(0, 0), C(0, 1) and D(1, 1). Show the steps to rotate the given square by 45 degrees clockwise about point A(1, 0). [10]
- (b) Explain the concepts of parallel and perspective projections. [8]

Or

6. (a) What is the need of homogenous coordinates ? Give the homogenous coordinates for translation, rotation and scaling. [10]
- (b) Prove that 2D-rotations about the origin commutes, i.e. $R_1 R_2 = R_2 R_1$. [8]

SECTION II

7. (a) Give the structure of segment table and explain the segment creation and deletion operation with suitable example. [10]
- (b) Brief the basic guideline of animation. [6]

Or

8. (a) What is Animation ? Discuss the different methods of controlling animations. [8]
- (b) Discuss the concept of segmentation used in cricket animation with suitable example. Assume your animation is having at least 3 to 4 segments in it. [8]
9. (a) Explain Warnock algorithm. Why this algorithm is also called as area subdivision algorithm ? [8]
- (b) List and explain any *one* two color models. [8]

Or

10. (a) Explain binary space partitioning tree used to detect hidden surfaces. [8]
- (b) Describe diffuse illumination and point source illumination. [8]
11. (a) Compare Bezier and B-spline curves. [6]
- (b) Why is cubic form chosen for representing curve ? [6]
- (c) Discuss the topological and fractal dimensions. [6]

12. Write short notes on any *three* of the following : [18]

(a) Interpolating algorithm

(b) True curve generation

(c) Hilbertz curve

(d) Fractal surfaces.