

Department of Computer Science & Engineering
Numerical Question Bank
Computer Graphics & Multimedia (CS-504)
Semester: V

INSTRUCTIONS. 1. All questions with their solution are submitted till 27 October 2014.

Q1. Compute the following:

- (a) Size of 800*600 image at 240 pixels per inch.
- (b) Resolution of 2*2 inch image that has 512*512 pixels.
- (c) Height of the resized image 1024*768 to one that is 640 pixels wide with the same aspect ratio.
- (d) Width of an image having height of 5 inches and an aspect ratio 1.5.

Q2. For a 10*10 frame buffer Bresenham's Algorithm to find which pixel are turned on for the line segment between

- (a) (1,2) & (7,6)
- (b) (3,2) & (6,4)
- (c) (5,8) & (9,5)

Q3. Let R be the rectangular window whose lower left hand corner is at L(-3,1) and upper right hand corner is at R(2,6). Find the region codes for the points A(-4,2), B(-1,7), C(-1,5), D(3,8), E(-2,3), F(1,2), G(1,-2), H(3,3), I(-4,7) and J(-2,10). Find whether the line segments AB, CD, EF, GH and IJ require clipping or not.

Q4. Draw the square (0,0) (0,1) (1,1) (1,0). Form a new image transformed which will show the image rotated 45 degree counter clock wise and scaled by 0.5 from the last image displayed. The image should remain centered on the screen.

Q5. A mirror is placed such that it passes through (2,0) and (0,2). Find the reflected view of a triangle with vertices (3,4), (5,5) and (4,7) in this mirror.

Q6. What would be the approximate spot size in inches of 7 in high 525 line raster scan CRT that has a total vertical overscan of 20%?

Q7. Differentiate between Flood Fill and Boundary Fill algorithms. Apply the stack based seed fill algorithm to fill the polygon defined by the vertices (1,1), (1,4), (3,6), (8,6) and (8,1). The seed pixel is at (4,3) and polygon in boundary filled.

Q8. Clip line with endpoints (0,0) and (12,12) using Cohen Sutherland algorithm. The clipping rectangle is defined with bottom left edge as (1,1) and top right edge as (10, 10).

Q9. Consider the clipping window with diagonally opposite edges (1, -1) and (-1, 1). Using Cohen Sutherland line clipping algorithm, clip the line with endpoints (-3/2, -1) and (3/2, 2). Explain with a figure also.

Q10. Derive a general 2D-transformation matrix for rotation about the origin. Perform a 45° rotation of a square having vertices A(0,0), B(0,2), C(2,2), D(2,0) about the origin.

Q11. Draw a rough sketch of Bezier curve with the following control points: P1 (60,30), P2 (0, 30), P3 (80,25), P4 (80,0).

Q12. It is describe to rotate object clockwise through 30° about an axis passing through the origin and the point P(10, 10, 0). What are the sequences of transformation matrices that must be used to carry out the desired rotation?

Q12. Reflect the diamond-shaped polygon whose vertices are A(-1, 0), B(0, -2), C(0, 1) and D(0, 2) about the :

(a) Horizontal line $Y=2$

(b) Vertical line $X=2$

© Line $Y=X+2$

Q13. Reflect the polygon whose vertices are A(-1,0), B(0,-2), C(1,0) and D(0,2) about :

(i) The vertical line $x = 3$.

(ii) The line $y = x + 4$.

Q14. Find the transformation matrix that transform the given square ABCD to half of its size with center still remaining at the same position. The coordinates of square are A(1,1), B(3,1), C(3,3), D(1,3) and center at (2,2). Also find the resultant coordinates of square.

Q15. A triangle is defined by [2 4 4] find the transformed coordinates after reflection about $y=-x$ line.

Q16. Digitized a line from (10,16) to (16,12) using DDA algorithm.

Q17. Consider a line from (0,0) to (6,7).Using simple DDA algorithm,rasterize thisline.

Q18. Consider a line from (0,0) to (6,6).Using simple DDA algorithm,rasterize thisline.

Q19. Applying Bresenhams algorithm to draw a line from (4,4) and end point is (-3,0).

Q20. Plot a circle at origin having centre as (0,0) and radius=8 using Bresenhams circle algorithm.

Q21. Plot a circle using mid point algorithm whose radius=3 and center is at (0,0).

Q22. Digitize a line from (10, 12) to (15, 15) on a raster screen using Bresenhams straight line algorithm.

Q23. Calculate the pixel location approximating, the first octant of a circle having centre at (4, 5) and radius 4 units using Bresenhams algorithm.

Q24. A polygon has four vertices located at A(20, 10) B(60, 10) C(60, 30) D(20, 30). Calculate the vertices after applying a transformation matrix to double the size of polygon with point A located on the same place.

Q25. . Plot a circle using mid point algorithm whose radius=2 and center is at (0,0).