M.C.A. Semester – 3 Examination Nov / Dec - 2017

Paper Code: 3608 Paper Title: Computer Graphics

Time: 2:30 Hours Marks: 70

Q1 Answer any FIVE from the following:

a. What do you mean by "Refreshing" in CRT monitors? Why refreshing is required?

b. Consider the point P with Cartesian co-ordinate (x,y). State the formula to convert it into polar co-ordinate (r, θ).

c. Explain the library functions: getpixel() and putpixel().

d. Write only formula to initialize decision parameter (p) in mid-point circle drawing algorithm, and mid-point ellipse drawing algorithm.

e. What do you mean by the term "transformation"?

f. Let P(x,y) be a point in window (wx1,wy1,wx2,wy2), and the P is mapped to P'(x',y') in viewport (vx1,vx2,vy1,vy2). Therefore, x' = _____, and y' = _____.

g. Explain in brief : Parallel Projection.

Q2 Answer any FIVE from the following:

a. Write brief note on DVST.

b. Explain co-ordinate systems used in 3D geometry.

c. Explain the library functions: line(x1,y1,x2,y2), lineto(x2,y2) and linerel(dx,dy).

d. How characters are represented in memory?

e. Give conversion formulae for shear about vertical line x=a, and horizontal line y=b

f. Let A(x1,y1) and B(x2,y2) be endpoints of a line segment, where x1<wx1, and x2 >wx2. What shall be the values of x1,y1,x2, and y2 after clipping about x=wx1 (Left side of window) and x=wx2 (Right side of window)?

g. What do you mean by "Surface rendering" and "Depth cueing"?

Q3 Answer any FIVE from the following: [25]

a. Write a brief note on LED and OLED display.

b. How keyboard and mouse are useful in computer graphics? Differentiate: Mouse and spaceball.

c. Write and explain: Mid-point circle drawing algorithm.

d. Explain boundary-fill and flood-fill without writing program or algorithm.

e. Discuss : Different types of mirroring (reflections).

f. Consider the two points P1(100,150) and P2(100,50). Calculate the co-ordinates of P1' and P2' after applying the scaling as under:
   - Apply scaling on P1 and P2 about origin with Sx=Sy=0.5
   - Apply scaling on P1 and P2 about fixed point (200,100) with Sx=Sy=0.5

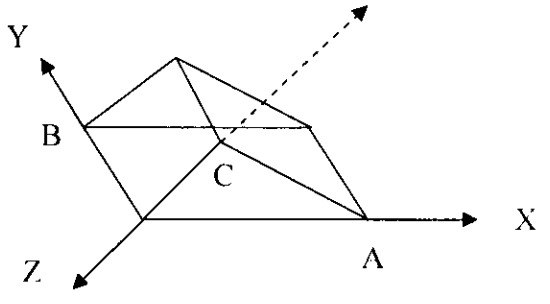
g. Consider the integer arrays x[10] and y[10]. Write a function to apply rotation on all the elements of the array. Pass the following parameters:
   - Pointers to both the arrays
   - Integers xp and yp, where (xp,yp) is povot point for rotation
   - double theta, (theta is angle of rotation in radian)

Q4 Answer any TWO from the following: [20

a. Discuss the concept of graphics standards and graphics libraries. Explain PHIGS functions for line attributes and area-fill attributes.

b. Write detailed note on line-clipping, curve-clipping and text-clipping.

c. Explain the representation of 3D object in form of set of vertices, set of edges and set of surfaces. Design the above sets to represent the following 3D object:




Write code to declare and initialize the arrays to store above 3D object.

Assume that the object is open from top side and bottom side, and Co-ordinates of the points are A(150,0,0), B(0,50,0), and C(0,0,-100).