EASTERN UNIVERSITY, SRILANKA

DEPARTMENT OF MATHEMATICS

SPECIAL REPEAT EXAMINATION IN SCIENCE –2007/2008

THIRD YEAR, FIRST AND SECOND SEMESTER (Feb, 2010)

CS 301 – COMPUTER GRAPHICS

Answer all questions **Time allowed: 02 hours**

Q1

a) Briefly describe the following :

i. Raster-Scan Displays;

ii. Random-Scan Displays.

b) Define the following terms:

i. Modeling Coordinates;

ii. World Coordinates;

iii. Normalized Coordinates;

iv. Device Coordinates.

c) Explain **DDA** (Digital Differential Analyzer) algorithm to generate straight lines.

d) Briefly explain Advantages and Disadvantages of above algorithm.

Q2

a) Explain **Breshenham's** line drawing algorithm to generate straight lines with the slope le than one.

b) Describe how you could use your algorithm to draw straight lines with all cases of slope.

c) Illustrate **Breshenham's** line drawing algorithm for the line with endpoints (20, 10) an (30, 18).

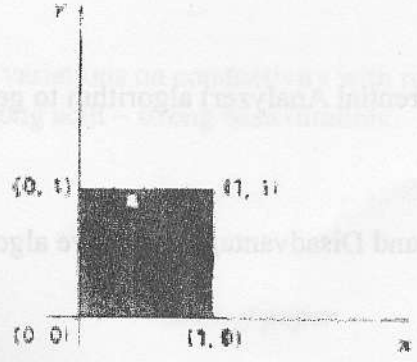
d) Using mid point circle algorithm compute successive points to plot in the display in orde to draw the first quarter of the circle from x=0 to x=y and radius r=10.

Q3

a) Describe the ***rotation*** of a point about origin and arbitrary pivot point that would be usefu in two dimensional graphics.

b) Illustrate a two dimension transformation sequence to produce ***rotating*** an object about specified pivot point (x_r, y_r) using the scaling matrix R (α).

c)



Convert a unit square into a parallelogram by using composite transformation matrix with $S_1 = 1$, $S_2 = 2$, $\alpha = 45^0$.

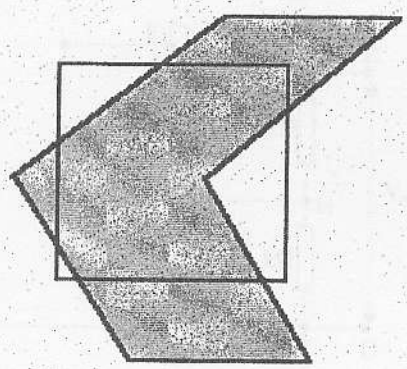
d) Briefly describe two dimensional **viewing transformation pipelines.**

Q4

a) What is meant by clipping in computer graphics and briefly explain the 3 clipping Primitive types.

b) Explain the **Cohen – Sutherland Line Clipping** algorithm.

c) Use the **Cohen – Sutherland Polygon Clipping** algorithm to clip the polygon given below.



d) Give the equation for three – dimensional rotation about z-axis by an angle θ.

e) Deduce the equations for rotations about x-axis and y-axis from the equations in part (d) by angles α and β, respectively.