MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 305: COMPUTER GRAPHICS

DATE: 24/9/2019 **TIME: 2:00 – 4:00 PM**

INSTRUCTIONS:

Answer question **ONE** and **Any** other **Two** among the four selective questions

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Graphically produce a circle (6 marks)

b) Discuss any four applications of Computer Graphics (8 marks)

c) Using appropriate illustrations, explain the three text clipping (6 marks)

d) Draw the output of the openGl program shown below (8 marks)

```
#include<GL/glut.h>
#include<stdio.h>
void display()
{
glClear(GL_COLOR_BUFFER_BIT);
glColor3f(1.0,0.0,0.0);
glPointSize(2.0);
glBegin(GL_POINTS);
glVertex2f(0.0,0.0);
glVertex2f(0.0,0.5);
glEnd();
glBegin(GL_LINES);
glVertex2f(0.0,0.0);
glVertex2f(0.0,0.5);
```

```
glEnd();
glBegin(GL_POLYGON);
glVertex2f(0.0,0.0);
glVertex2f(0.0,0.5);
glEnd();
glFlush();
}
void myinit()
 {
glClearColor(0.0,0.0,0.0,1.0);
gluOrtho2D(-1.0,1.0,-1.0,1.0);
 }
void main(int argc, char **argv)
{
glutInit(&argc,argv);
glutInitDisplayMode(GLUT_RGB|GLUT_SINGLE);
 glutInitWindowSize(500,500);
 glutInitWindowPosition(0,0);
 glutCreateWindow("Simple demo");
myinit();
glutDisplayFunc(display);
glutMainLoop();
}
```

QUESTION TWO (20 MARKS)

a) Discuss projections as used in computer graphics (8 marks)

b) Explain any four 2D Computer Graphics that are closely related to the six output functions of. **Graphical Kernel System** (GKS) (6 marks)

c) Describe three applications of fractal geometry in computer graphics (6 marks)

QUESTION THREE (20 MARKS)

a) Using a square demonstrate the following transformations (12 marks)

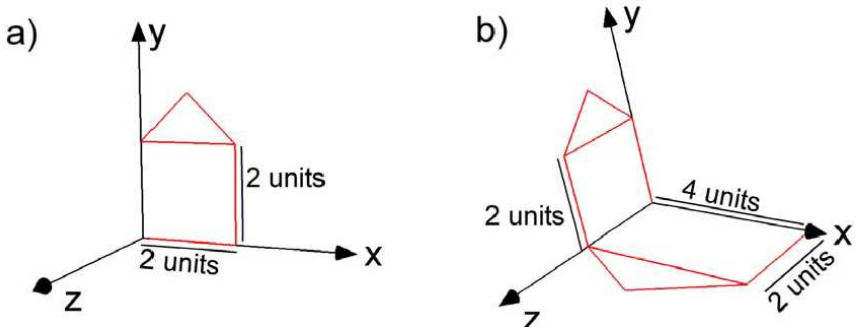
i. Reflection
ii. Rotation
iii. Shear
iv. Translation

b) Using relevant diagrams, describe Cohen Sutherland algorithm (8 marks)

QUESTION FOUR (20 MARKS)

a) Explain three advanced elements for drawing in computer graphics (6 marks)

b) Given is a function *drawHouse()* which draws a wire frame house in the xy-plane as shown in part (a) of the image below. Write OpenGL transformations for converting (a) into (b) (4 marks)



c) Discuss any three degree of continuity in graphics using illustrations (6 marks)

d) Discuss the following stages of graphics and rendering pipeline

i. Geometry Stage (2 marks)

ii. Rasterization Stage (2 marks)

QUESTION FIVE (20 MARKS)

a) Explain the following (6 marks)
   i) Mid Circle Drawing algorithm
   ii) DDA algorithms

b) Discuss the effect of the following to graphical images (8 marks)

   i) Hidden surfaces

   ii) Light and shading

   iii) Reflective surfaces

   iv) Texture and color

c) Discuss programming tools required for computer graphics (6 marks)