



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)

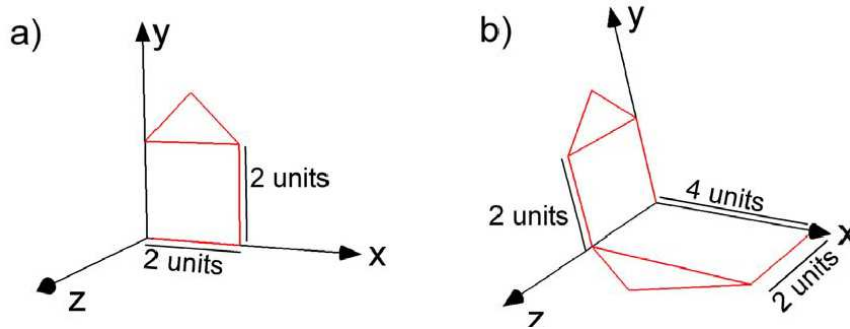
- a) Discuss projections as used in computer graphics (8 marks)
- b) Explain any four 2D Computer Graphics that are closely related to the six output functions of.
Graphical Kernel System (GKS) (6 marks)
- c) Describe three applications of fractal geometry in computer graphics (6 marks)

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)