



# Scott Christian UNIVERSITY

## SCHOOL OF PROFESSIONAL STUDIES

### BACHELOR OF INFORMATION COMMUNICATION TECHNOLOGY

#### UNIT CODE/NAME: BCT 416: COMPUTER GRAPHICS

September – December 2019/2020 End Semester Exam - Time: 2 Hours

Instructions: Answer Question ONE (Compulsory) and any other TWO questions.

#### QUESTION ONE

(10 Marks)

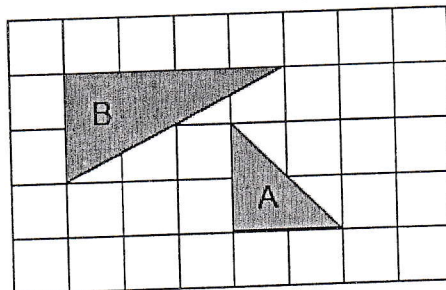
a) Differentiate between:

- 2D and 3D
- Frame buffer and resolution
- `glutInit(int *argc, char** argv)` and `glutCreateWindow(char *name);`
- PHIGS and CGM
- Pixmap and Bitmap

Bitmap uses two bit system and therefore only show black and white and pixmap uses 256 bits therefore show on coloured screen

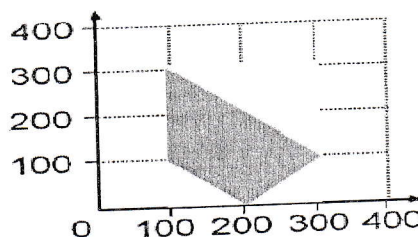
b) Explain any three 2D Computer Graphics that are closely related to the six output functions of. **Graphical Kernel System (GKS)** (6 Marks)

c) Consider the following fragment of JavaScript. Give the output that would be produced. Describe the transform needed to transform the triangle from A to B in Figure below (6 Marks))



d) Write an OpenGL sectional code to produce the following (8 Marks)

- Rectangle
- 



### QUESTION TWO

- a) Use the Cohen Sutherland algorithm to clip line P1 (70,20) and p2(100,10) against a window lower left hand corner (50,10) and upper right hand corner (80,40). (10 Marks)
- b) State five features in OpenGL (5 Marks)

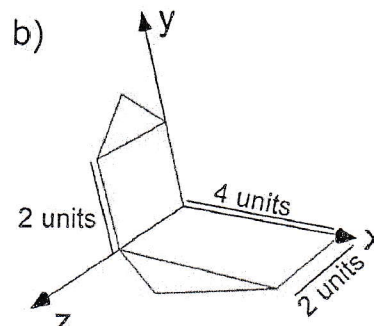
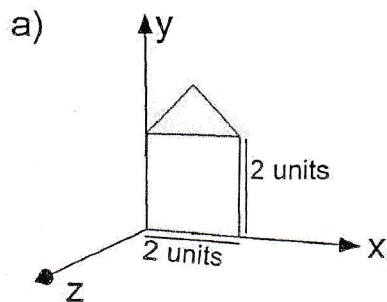
### QUESTION THREE

- a) Explain orthographic projections by using an example of a diagram of house (8 Marks)
- b) Draw the shape produced by the sectional code below (7 Marks)

```
GLfloat p1[3] = {0,0,1};
GLfloat p2[3] = {1,0,1};
GLfloat p3[3] = {1,1,1};
GLfloat p4[3] = {0,1,1};
glBegin(GL_POLYGON);
glVertex3fv(p1);
glVertex3fv(p2);
glVertex3fv(p3);
glVertex3fv(p4);
glEnd();
```

### QUESTION FOUR

- a) Explain the following abstractions in OpenGL (6 Marks)
- i. GLUT
  - ii. GLU
  - iii. GL
- b) Explain the application of computer graphics in the following the following
- i. CAD (3 Marks)
  - ii. In Movies (3 Marks)
- c) 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) (3 Marks)



### QUESTION FIVE

- a) Draw the output of the OpenGL code shown below: (6 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();
}

```

- b) Explain any three major operations that are performed in computer graphics **(3 Marks)**
- c) State the steps involved in the following stages of graphics
- i. Application Stage **(3 Marks)**
  - ii. Geometry Stage **(3 Marks)**