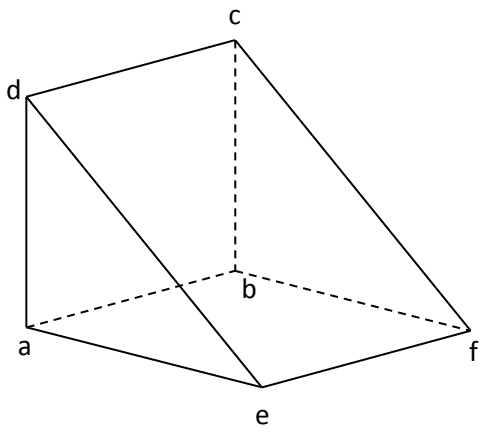
EE5808 Assignment

Total 100 marks. You would get a bonus marks of 5% in your coursework if you get 100 marks in this assignment and so on.

Qn 1



The vertex coordinates are

a (0, 0, 0) b (0, 10, 0) c (0, 10, 5) d (0, 0, 5) e (15, 0, 0) f (15, 10, 0)

a) Represent the above object, except the two triangles, by a quadrilateral mesh. To save time, you are only required to draw a 2D array and put the alphabet (e.g. a) to each of the vertex of the array to show your idea. (20 marks)

b) Find the plane equation of □ efcd. (20 marks)

Qn 2

The non-parametric form of an elliptic hyperboloid is

$$\frac{X^2}{a^2}+\frac{Y^2}{b^2}-\frac{Z^2}{c^2}=1$$

Convert it into parametric form. (20 marks)

Qn 3

A cylinder with radius 30 and height 40 is drawn by the following OpenGL commands:

pObj1 = gluNewQuadric ( );
gluCylinder (pObj1, 30, 30, 40, 10, 10);

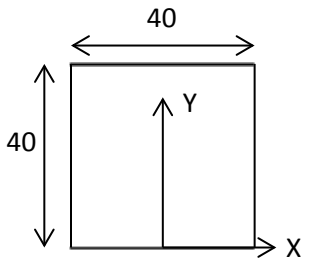
The cylinder is realized using 10 x 10 quadrilateral mesh.

```
#define GRIDSIZE     10

typedef struct point{ // define a structure for 3D point (x, y, z)
        GLfloat x;
        GLfloat y;
        GLfloat z;
} vertex;

vertex cylinder [GRIDSIZE][GRIDSIZE];
```

Write C code that would put the correct values into the *cylinder* array. (20 marks)

Qn 4

a) Write a C function *Cube ( )* which would draw a cube with side 40 and the coordinate system as shown.

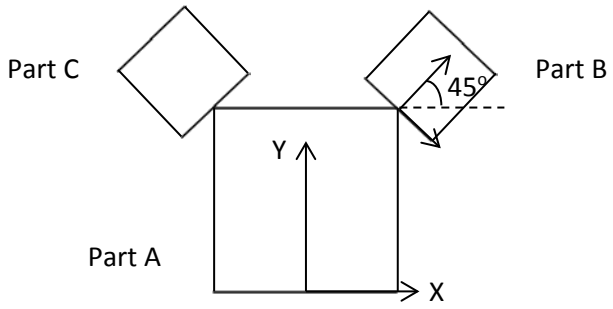


Z is pointing outside of paper

(10 marks)

b) Write OpenGL code such that Part A is *Cube ( )* above. Part B is Part A scaled down by 0.5 and rotated 45^{o}, and Part C is Part B reflected about the Y axis, as shown

(10 marks)



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