

Q2

- a. What is differentiate between view port and window [4marks]
- b. What is aliasing? Discuss ant three ant aliasing methods [3 marks]
- c. Discuss any three forms of transformation [6 marks]
- d. Define a frame buffer. Explain factors to consider when choosing frame buffer [4 marks]
- e. The OpenGL call, `glRotatef(θ , x, y, z)`, rotates by θ degrees around the vector (x,y,z) through the origin. The rotation is right handed, so if (x,y,z) points toward you, the rotation is counter-clockwise. Write out the 4x4 transformation matrices for `glRotatef(θ , 1, 0, 0)`, `glRotatef(θ , 0, 1, 0)` and `glRotatef(θ , 0, 0, 1)` [3 marks]

Q3

- a. Briefly describe the following shading methods [2 marks]
 - III. Gouraud shading
 - IV. Phong shading
- b. Discuss the rasterization process using appropriate diagram [4 marks]
- c. Outline the general requirements of line drawing algorithms [3 marks]
- d. Write a OpenGL code to draw a cylinder [5 marks]
- e. Difrentiate between a bitmap and pix map [1 marks]
- f. Cite the cololou of the openGL functions below [5 marks]
 - I. `glColor3f(0.5, 1, 1);`
 - II. `glColor3f(1, 0, 0);`
 - III. `glColor3ub(1, 0, 0);`
 - IV. `glColor3ub(255, 0, 0);`
 - V. `glColor4f(1, 0, 0, 0.5)`

Q4

- a. Outline the similarities between DDA and bresenham's algorithm [2marks]
 - b. Use DDA Algorithm to draw a line from (2,3) to (9,8) [5 marks]
 - c. What is hidden surface removal [2 marks]
 - d. Write a OpenGL code for generating an arc [3 marks]
 - e. Discuss historical development of computer graphics [3 marks]
 - f. Explain how the vertex array are paired to render and triagle below [5 marks]
- ```
float coords[] = { -0.5, -0.5, 0.5, -0.5, 0.5, 0.5, -0.5, 0.5 };
```

```
glBegin(GL_TRIANGLE_FAN);
glVertex2fv(coords);
glVertex2fv(coords + 2);
glVertex2fv(coords + 4);
glVertex2fv(coords + 6);
glEnd();
```

Q5

- a. Using a diagram differentiate between concave and convex polygons [2 marks]
- b. explain why scan conversion in computer graphics [5 marks]

- c. Outline the steps to cohen- Sutherland algorithm, [5 marks]
- d. The human visual system is trichromatic. That means that the perceived color from any visible spectrum may be described by three coordinates. Describe the physiological basis of trichromatic color vision in humans [3 marks]
- e. Draw the output of the 3D code below [5 marks]

```
void square(float r, float g, float b) {
 glColor3f(r,g,b); // Set the color for the square.
 glBegin(GL_TRIANGLE_FAN);
 glVertex3f(-0.5, -0.5, 0.5);
 glVertex3f(0.5, -0.5, 0.5);
 glVertex3f(0.5, 0.5, 0.5);
 glVertex3f(-0.5, 0.5, 0.5);
 glEnd();
}
```