Exam – Computer Graphics
8 January 2010, 14-19

1   (a)   What characterizes a rotation matrix? *(0.3)*
    (b)   What is the most important advantage of representing transforms as matrices? *(0.4)*
    (c)   How is this advantage utilized in the design of a renderer*? (0.3)*

2   (a)   Explain how rasterization of triangle is done. *(0.5)*
    (b)   Exlplain how the shading of a rastrerized triangle is done? *(0.5)*

3   (a)   What is the visual difference between *flat shading* and *smooth shading. (0.3)*
    (b)   How do their implementations differ? *(0.7)*

4. (a)   What is a *cube map* and what is it used for? *(0.2)*
    (b)   How do you do lookup in a *cube map*? *(0.8)*

5   (a)   Describe what is drawn on the screen after a call to the function *draw*() below. *(0.8)*

```
def draw():
    glColor(1, 0, 0)
    glPushMatrix()
    glScale(2, 1, 1)
    glTranslate(-2, 0, 0)
    drawSquare()

    glColor(0, 1, 0)
    glTranslate(2, 3, 0)
    glPushMatrix()
    glRotate(90, 0,0,-1)
    glPushMatrix()
    glRotate(180, 0,0,1)
    glTranslate(-2, -1, 0)
    glPopMatrix()
    glPushMatrix()
    glScale(2, 2, 1)
    drawSquare()

    glColor(0, 0, 1)
    glPopMatrix()
    glPushMatrix()
    glRotate(90, 0,0,1)
    glTranslate(-1, 0, 0)
    drawSquare()

def drawSquare():
    glBegin(GL_QUADS)
    glVertex(0,0)
    glVertex(0,1)
    glVertex(1,1)
    glVertex(1,0)
    glEnd()
```

    (b)   OpenGL has a concept called *display list*? What is it and which problem does it solve? *(0.2)*

6   (a) Which relationships does the *rendering equation* express? *(0.6)*
       (b) Write down the equation and explain what each of its constituents means. Answer as detailed as you can *(0.4)*

THE END!