

## ECE59500 Computer Graphics Assignment 2

### Question 1:

1. To emphasize the importance of understanding how the order of transformations influences the way a model is moved in the world. Consider the following three transformations:

```
glRotatef (30.0, 0.0, 1.0, 0.0);  
glRotatef (45.0, 0.0, 0.0, 1.0);  
glTranslatef (0.0, 0.0, -0.5);
```

There are six possible orderings of the above commands. Discuss the position of the teapot in the scene if `glutSolidTeapot()` were executed as a final command in each of the six cases. Write a simple OpenGL program to see the exact results.

2. Implement two commands yourself: `myRotatef(...)` and `myTranslatef(...)`, which perform the same transformations as `glRotatef(...)` and `glTranslatef(...)`, respectively. You may use the function `void glmultMatrixf(const GLfloat *m)` from OpenGL to implement these two commands.

Write an OpenGL program to implement the six cases indicated in the step 1 by using the transformations:

```
myRotatef (30.0, 0.0, 1.0, 0.0);  
myRotatef (45.0, 0.0, 0.0, 1.0);  
myTranslatef (0.0, 0.0, -0.5);
```

### Question 2:

1. Write an OpenGL program to display a teapot in the middle of the window with appropriate `gluLookAt(...)` and `glPerspective(...)`.
2. Implement two commands yourself: `myPerspective(...)` and `myLookat(...)`, which perform the same function as `gluPerspective(...)` and `gluLookAt(...)`. Display a teapot in the middle of the window.
3. Revise the program in step 2 by adding a flexible camera control option for user to slide, pitch, roll or yaw the camera. Use the keys S, P, R, and Y to control the camera respectively.

**Notes:** Provide source code listings, with documentation explaining what your code does.