Graphics Assignment - 3

(1) Problem Statement

The goal of this assignment is to enhance the concept of 3D viewing, and create the special effects using the basic geometric transformations. The realization of 3D viewing environment through your implementation will make you better understand some of the most important features of the graphics applications in 3D scenes display and rendering.

(2) Algorithm & Implementation

In this assignment we try to adjust the position of camera by changing the lookout function. Lookout function takes 9 arguments which are (x,y,z) co-ordinates of camera, (x,y,z) of the object and (^x,^y,^z) of the upvector. We also use the perspective projection in this assignment unlike the ortho projection which we were using earlier assignments. Perspective projection also projects the depth of the object on the screen, Like farther objects look smaller compared to the objects which are close to the camera. I have build the object which was given in the question using a series of push and pop matrixes and adding objects like cylinder, sphere inside these matrixes

[For Perpective projection]

```
gluPerspective(90.0f, (float)windowWidth (float)windowHeight, 0.1f, 1000.0f);
```

[For LookAt]

```
gluLookAt (300.0 + global_x, 0.0 - global_y, 0.0 + global_z, 0, 0, 0.0, 0.0, -1.0, 0.0);
```

Bonus:

I have also implemented the arbitrary movement of camera to cover the complete world. This is done by changing the camera (lookat position) in all the 3 axis which are present in the world.

(3) How to run the code

Make and run ./transform executable file to run the program.

Key	Functionality
R	Rotate the object as mentioned in the question
x	Zoom out camera in X direction
X	Zoom in camera in X direction
y	Zoom out camera in Y direction
Y	Zoom in camera in Y direction
z	Zoom out camera in Z direction
Z	Zoom in camera in Z direction

Mouse middle click on the screen to get the following options.

1. Roll+, Roll-
2. Yawn+, Yawn-
3. Pitch+ , Pitch -
4. Slide+, Slide -

(4) ScreenShots