CT5510: Computer Graphics

PA #3

BOCHANG MOON

Programming Assignment #3

- Problem specification (20 points)
  - Complete previous assignments (5 pts)
    - Change the title bar with your student ID (1 pt)
    - Load two models (teapot_smooth and armadillo) and properly arrange them using modeling transformation (2 pts) - your screen should visualize the two models
    - Support for the picking and selection (2 pts)
  - Object translation by mouse dragging (5 pts)
    - A user can select an object and drag it. You need to properly translate the object based on the mouse movement.
    - Note: the movement speed of the object should be reasonable with respect to the mouse movement.
  - Camera translation by keyboard inputs (5 pts)
    - A user can press ‘w’, ‘a’, ‘s’, ‘d’, ‘1’, ‘2’ as keyboard inputs and you should translate the camera position accordingly
    - ‘a’: go left, ‘d’: go right, ‘w’: go up, ‘s’: go down, ‘1’: move forward, ‘2’: move backward
    - Note: the camera speed should be reasonable (e.g., +- 0.1 unit).

Programming Assignment #3

- Continued…
  - Phong illumination model (5 pts)
    - Implement the ambient, diffuse, and specular reflection. You need to properly adjust some parameters to clearly show some highlights on objects. (3 pts)
    - Add two lights, a point light and directional light – (2 pts)
      - Adjust the light parameters so that they can introduce two different highlights on an object.
  - If you are unclear on some specifications, check out the reference binary.

Programming Assignment #3

- Submission:
  - Due date: 23:59:59, Wednesday, May 17th , 2017 (KST)
  - A zipped file with
    - Your source code (a zipped file only with .h, .cpp and .c)
    - A binary file (NOTE: change the file extension, e.g., XXX.exe -> XXX.dat)
      - I will check your binary file on a windows system.
    - Not any virus files (your final grade will be “F”)
  - Note: don’t use any absolute paths to load your models. If you do this, -1 point will be given.
    - Please test your binary at least on your computer.
  - A document file (MS word or PDF) is not necessary for PA#3, but your email should include your student ID and name.

Some Hints for PA #3

- check the reference binary
- void keyboard(unsigned char key, int x, int y) {
  - if (key == 'a')
    - // do your task related to camera positions
  - }
- void mouseDrag(int x, int y) {
  - // whenever the mouse drag event occurs, you can compute the difference between previous and current mouse positions.
    - double deltaX = x – g_oldX;
    - double deltaY = y - g_oldY;
  - }

Some Hints for PA #3

- // object transformation
  - You can modify the matrix of each object
    - e.g., g_armadillo2world, g_teapot2world
    - double m[16] in Matrix.h
    - $\begin{bmatrix} m[0] & m[4] & m[8] & m[12] \\ m[1] & m[5] & m[9] & m[13] \\ m[2] & m[6] & m[10] & m[14] \\ m[3] & m[7] & m[11] & m[15] \end{bmatrix}$
- // camera transformation
  - As a way, you can utilize the opengl function
    - gluLookAt(eyeX, eyeY, eyeZ, targetX, targetY, targetZ, upX, upY, upZ)
- // Phong illumination