CT4510: 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.

- There'll be points deduction if there are insufficiencies compared to the reference binary in terms of function.

e.g. blinking of objects, afterimage, unreasonable speed of moving, no highlights, not holding the proper color during dragging, etc.

Programming Assignment #3

- Submission:
  - Due date: 23:59:59, Wednesday, May 23rd, 2018 (KST)
  - A zipped file with (file name should be “PA3_your student number_your name.zip”)
    - 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)
      - Your binary file will be checked on a windows system.
    - .dll files (NOTE: change the file extension, e.g., XX.dll -> XXX.dat)
    - .obj files (model) in a proper location(path)
    - Not any virus files (your final grade will be “F”)

** Make sure the binary file is working when it is opened.

- It means there should be no needs to do an extra job to run your program. (e.g., debugging, build, etc.)

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