



Quiz 2

Quiz Date: July 27, 2022

Quiz Time: 24 hours from 3.00pm

Marks: 40

RULES:

When done, submit via Moodle:

- Submit all project, dependency, and source files (cpp, h, vcproj, sln, *etc.*)
- Do not delay the submission until the last minute! Even partial submission must still be uploaded.
- The submissions are allowed to be re-uploaded multiple times. The latest uploaded will be used for marking within the timeframe.

During the quiz you are allowed to have any online or other media resources about OpenGL and code samples you can lay your hands on, *etc.* BUT:

- You are not allowed to share any quiz related material anytime. At best, the penalties for giving and taking each other's quiz code will result in 0 grade by default. Later penalties may follow.
- You are not allowed to communicate with each other at all orally, electronically, or otherwise during quiz time. You are not allowed to seek any help from anywhere.
- Should you use some code from external resources, URLs to those resources must be present within the code that you submit as comments in the header.
- Your own code from A1 as well as Q1 is allowed to be used as it is assumed to be well documented and referenced (if it is not so, this is another chance to fix that).

Any form of Plagiarism will be strictly penalized.

TASKS:

Comments in the code are of paramount importance.

- Briefly (but identifiably) cite all the resources used (*e.g.*, online as URLs or offline as book or article titles, notes, own project *etc.*)
- Certain tasks need to be done in order, but some are not. Read through them all; do the sequences you absolutely need and the ones you are most comfortable with first, and then do as many as you can:

You will be building up on Quiz 1 and below mentioned requirements are already available to you through Quiz1 and A2 code.

Below mentioned requirements are in addition to the baseline code from Quiz 1.

- Replace the three axes X, Y, Z each with a stretched cube and a cone on top. Apply a texture to each of the axis matching their respective colors. Apply a texture to the ground mesh (you must make use of the Repeat texture parameter) as well. **(6 Pts)**
- Using Quiz 1 Timex approach, model and animate first 2 characters of your first name and last two digits of your student ID. For instance, David with an ID 2623456 should model and animate characters D5A6. Front face of each letter/digit must be transparent (Use a suitable alpha value). **(6 Pts)**
 1. The entire model should be centered at $x = 0$; $y = 0$; $z = 0$.
 2. The entire model should be on a skateboard which is to be modeled using cubes.
 3. Model one skateboard for the entire model which should help the model move.
 4. You are encouraged to use your cube utility functions/methods/classes from A1, Q1.
 5. Apply a distinct texture to each letter/digit and a metallic texture to the skateboard, and a glossy texture to the wheels.
- Apply a suitable texture to the sky cube (large cube modeled in Q1) from inside. **(2 Pts)**
- Add a light source (make sure it is a spotlight, using the Phong illumination model) and place it 30 units out on the z-axis facing the model. Allow for it to be turned on and off with 'L'. Ambient light is necessary to be turned on when the main light source at the top is off. **(4 Pts)**
- Add one camera onto the model's front; unobscured; disable/enable it using the key 'M' (first person view). Add another one at the back (opposite), with key 'B'. Now you have three cameras (the default main and the 2 with the model.). 'R' from Quiz 1 resets back to the main camera among other things. **(6 Pts)**
- Add another camera which will circle around the center of the scene using arrow keys. Attach a spotlight to this camera which will move with the camera and can be toggled using a key. Choice of type of light, material properties, and color is left to you. Circling camera's Y and the look at point must remain constant. **(5 Pts)**
- Render the scene's letters/digits and the new axes with shadows using two pass shadow algorithms. (Define a key to toggle it on and off). **(6 Pts)**
- The application must use OpenGL 4.1 and onwards and must include brief comments explaining each step. Grader will ask for a small modification to understand your grasp of your code. **(5 Pts)**

Submission:

Quiz must be submitted through Moodle. No other form of submission will be considered. Please create a zip file containing your C/C++ code, vertex shader, fragment shader, a readme file (.txt). The zip file should be named Assignment#_YourStudentID. In the readme file document, the features and functionality of the application, and anything else you want the grader to know *i.e.*, control keys, keyboard/mouse shortcuts, *etc.*

Bonus Feature(s):

You can achieve an extra 5 bonus points if you can create a random horizontal moving pattern for the spotlight facing the model. This bonus will be given at Grader's discretion.

Evaluation Procedure

You MUST demonstrate your program to the grader during a pre-scheduled session. You must run your code submitted before the deadline, demonstrate its full functionality, and answer questions about the OpenGL programming aspects of your solution. Major marking is done on the spot during the demo. Your code will be further checked for structure, non-plagiarism, *etc.* However, ONLY demonstrated submissions will receive marks. Other submissions will receive a zero score.