

| | |
|---------------------|--|
| Program: | CPA2 |
| Course: | INFO3111 – C++ Graphics – Summer 2021 |
| Professors: | Michael Feeney |
| Project # 1: | Basic 3D scene of loaded, transformed models |
| Weight: | 10% of your final mark (depending on the number of projects) |
| Due Date: | Saturday, May 29th (section 2) or Sunday, May 30th (section 1) At 11:59 PM (i.e. it's due 48 hours after your final is due.) |

Description and Purpose

You are to create a 64 bit Win32 (Windows 7/8/10) + OpenGL 4.x application that displays a “sensible” static (or dynamic) 3D scene using external models that have been translated in the scene using transformations, and either coloured or lit using a basic GLSL shader. You will have to be able to interactively manipulate (i.e. “move”) the camera to view the scene.

Details

Topics include:

- Display of various models showing various transformations
- Basic point lighting using multiple lights
- Control over object materials (“colours”)
- Different drawing modes (wireframe and fill)
- Use of interactive keyboard control

Your application must:

- Display a number of different objects into a static (or dynamic) scene
- The models that are being used can be changed (by changing the model file/files)
- There must be at least **twenty (20)** models of **four (4)** different models present in the scene and the scene must display some sort of *specific, deliberate, and sensible* transformations (translate, rotate, and scale); in other words, you can't just randomly throw a bunch of models on the screen and leave it at that - I'm looking to see that you have mastery over placement, scale, selection of models, etc.
- The camera needs to be interactively controllable by the user (for exploring the scene)
- Be “**sensible**”. What I'm looking for is something that you've spent some time on, not just randomly thrown together. While the scene can be “silly” or “fantastic”, it still has to “look like” something – think: “*If I showed this to someone, like a child, would they understand what's going on in the scene?*”
 - Note: I'm not going to be drawn into a pointless argument about “sensible” is; the final decision about what is “sensible” (or not) will ultimately fall to me.
- Show the use of at least five (5) point lights which clearly show:
 - That they are individual lights (like it's not just a wash of light).
 - They are of different attenuations
 - At least one has to **not** be white (RGB:1,1,1)
- The keyboard control has to be able to:
 - Change at least one of the models from “wireframe” to “solid”
 - Change two (2) things about at least one (1) light: the attenuation, colour, etc. (this should be obvious)
 - Switch between three (3) pre-set camera angles

You will submit:

- **Your entire solution** (PLEASE remove the “extra” files from it, making it smaller), and compress it.
- **A video demonstrating your application.** This can be using OBS or zoom or FRAPs or even your cell phone camera but has to *clearly* show:
 - You launching the application from visual studio
 - CLEARLY showing some identifying information, like a comment in the code with your student name and number
 - What you are doing (buttons being pressed, etc.) as it is happening.

Additional requirements:

- While you may freely “borrow” mine (or anyone other) code but your code should be “sufficiently” different from mine in terms of the output on screen. See the “plagiarism” test, later in this document, for more details.
- Further, you cannot simply use an existing game engine (or part of a game engine), even if it's a “from source” engine (i.e. you have the entire source) to complete this assignment; it should be either completely new or significantly modified. This includes, but is not limited to: Unity, Unreal, Cry, Anarchy, XNA, Cocos, Ogre, the framework from the OpenGL text, etc.

Related to plagiarism/cheating and not doing much work:

- If you simply submitted the in class code, then you invested zero time, so you did no work, so you get a mark of zero (in that case, it is a clear case plagiarism/cheating, and an academic offence would also be submitted).
- If you took the in class code and made some trivial changes - like replaced the teapot model with the rabbit model, slightly repositioned them, and maybe changed their colour - you might not have actually “cheated”, but you did essentially no work: “How long would it take me - your instructor - to make those changes?” If it's something that would take 10 minutes, you won't get many marks for that
- It has to be something that a random “typical” person would say “yes, that's significantly different” in order to “be different”.
- If your code does not even compile, I will not mark it. Since it can't run, you would get a mark of zero.
- If your code does not build (i.e. linker error) and run (i.e. no crazy run-time crash that is unexpected), I may investigate this further, but only if there is some simple problem and/or very slight and/or very obvious (and easy to fix) configuration error or last minute typo.

Project Corrections

If any corrections or changes are necessary they will be posted to the course web site and you will be notified of any changes in class. It is your responsibility to check the site periodically for changes to the project. Additional resources relating to the project may also be posted.

75/10-year old “squinty eye” plagiarism test:

I have very little tolerance for plagiarism, but many students are unclear about what it is.

Basically, it’s submitting somebody else’s work as your own.

There is sometimes some confusion over this because you could argue nothing is actually “unique” (see: <http://everythingisaremix.info/> for a fascinating overview of this).

The whole point of assignments/tests/projects in this course (or any course, really) is to try to see if you are actually able to **do** the coding that’s asked of you. In other words: How competent are you? Handing me someone else’s code and/or making a trivial change isn’t good enough.

Also, it’s illegal:

- <http://www.plagiarism.org/ask-the-experts/faq/>
- <http://definitions.uslegal.com/p/plagiarism/>
- <http://en.wikipedia.org/wiki/Plagiarism>
- <https://www.legalzoom.com/articles/plagiarism-what-is-it-exactly>

In other words, I’m not going to be drawn into a giant debate over how “different” your code is from mine or anyone else’s, if any sensible person (including me) would conclude that the code/application is pretty much the same thing, then it is. It is up to my discretion to decide this.

- While you may freely “borrow” mine (or anyone other) code **but** your code should be “sufficiently” different from mine (you might want to replace the word “sufficiently” with “significantly”).
- In other words, you **cannot** simply use an existing game engine (or part of a game engine) to complete this assignment; it should be either completely new or **significantly** modified.
- How will I determine this?
 - If I showed your application and/or your source code to either a pragmatic 75-year-old mother, or a typical 10-year-old, or even some random person walking down the hallway (i.e. a non-expert), and they looked at it, tilted their heads, squinted their eyes, and said “you know, they look the same,” then they **are the same**.
 - Another test would: How much time it would take for a “competent programmer” (for example, *me*) to make the changes you are submitting? The point here is that I don’t “care” if you tell me “But it took me *weeks* to make the changes!” Fine, but if I can make those same changes in 10 minutes, then not a lot of work has been done (certainly **not** sufficient work – these projects should show take **days** of work having been done).