IT 356 – Introduction to Computer Graphics
Project Proposal Spring 2023

The proposal (typically 2 - 3 pages) must include sections for the following:

1. **Name**

   Khoi Pham

2. **Topic**

   3D Vehicle simulator

3. **Rationale for the topic**

   Describe why you want to do the project on this topic (why you are interested in the topic). Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision.

   No particular reasons.

4. **Current Knowledge Level**

   Summarize and describe your current knowledge and experience level relative to the topic. What have you done previously that is related to this topic?

   I don't really have a background about graphics design before joining this course. While I have some knowledge about C/C++ language, I need to focus a lot to get a decent result since C/C++ skill is not that good.

5. **Project statement**

   Briefly describe your project in terms of project goals and objectives. Provide the primary questions you are trying to answer with computer graphics. What would you like to learn and accomplish? List the benefits. What is the outcome of your project?

   Develop a 3D C++ based vehicle simulator utilizing OpenGL API.
   For now, the vehicle pool will be limited to just 1 tank model. User can freely change/move perspective to explore the map.

6. **Must-have features**

   Vehicle models: 2 available but the program can only run one at a time. To change between the models, you must go to .sln file and change the code.

Model translation: Rotate around x and y-axis using hotkeys (Q for x-axis, R for y-axis). Using the same hotkey to stop the rotation. Reset the model back to the original position by pressing F.

Camera: User can move around using WASD keys. Unlock/lock mouse movement by pressing M.

Lighting: Blinn-Phong lighting with/without Gamma correction. (Pressing G).

Floor and cubemap using 2D texture maps.

7. Optional features

Perspectives: 3rd person POV: user can move around inside/together with the vehicle. Some collisional interactions. (Vehicle vs environment, user vs environment, user vs vehicle).

8. Activity Plan

Collecting models: 15th April.
Setting up environmental models: 21st April
Implementing vehicles model into environmental setup: 28th April
Polishing/Debugging until the deadline

9. Information/Tool Sources

Identify sources of information on the topic (books, manuals, web resources) giving proper bibliographic references. If you will do hands-on work, also identify the specific tool and where you have access to that tool.

The 3D vehicle models in my program are from www.sketchfab.com. I have found more than just 2 models, but I am not familiar with the file format of those models. In the end, I could only convert 2 into .obj format without messing up the texture of the models using Blender 3.5.

For the 2D textures (cubemaps, floors, etc.,), I mostly use ones I get from the lectures, with only 1 external texture from www.the3rdsequence.com.

References

2D soil texture - soil.png/soil.jpg: *https://www.the3rdsequence.com/texturedb/texture/244/gray+dirty+soil/*

3D T90 model - T90.obj/T90.mtl: Karnage, *https://sketchfab.com/3d-models/t90-8f577602505248f79e2b8a95f24b33fb*

3D Harley motorcycle model – Harley.obj/Harly.mtl: Alex Ka, *https://sketchfab.com/3d-models/harley-davidson-seventy-two-hd-fxt-2015-15e67a3076494bb99ba7504c9913ceb5*