ACADEMIC YEAR: 2023-2024

PROJECT REQUIREMENTS

Project Posted: July 16, 2023

Project Due: August 11, 2023, before 11.59pm

Description:

The goal of this project is to enhance your understanding of computer graphics principles and your graphics programming skills. You will do this by designing and implementing a project which emphasizes certain aspects of computer graphics. You carry out the project in a team. Your team can choose from one of the three project themes briefly described on the next page. While you **MUST** choose from one of these suggested themes only, you are expected to make improvisations of your own within your chosen project.

You **must** submit a project implementation plan/outline in a week. This will be included in the final grading of the project. The outline should be a short, two to three page report describing what and how your team plans to carry out the project. It should also include a tentative timeline of at least five milestones. Instructors will review your project outline, and only if required, may make suggestions for uniformity in the level of complexity across all projects.

On project completion (last week of the course), you must submit a written report at least ten pages long, covering your objective, why it interested you, how you accomplished your objective, what you learned as a result, and the list of references and resources that you used. You will also have to present/demo your project to the instructors and TAs, in the last week of classes. The presentation should include slides (10 slides max, a video capture) and a live-demo.

The project is to be completed by a team of 5 students. In exceptional situations, 6 student teams will be permitted. The project implementation report should clearly state what each member of the group accomplished.

Submission:

Project files must be submitted only 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 Team#_YourTeamNumber. 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.*

Evaluation Procedure

You **MUST** demonstrate your project to the lab instructors and the teachers. All the team members **must** be present during the demo and should present his/her part. Questions will be asked to all the team members during the demo.

PROJECT TOPICS

1. Simulated Tennis Game

The goal of this project is to create a simulation of a tennis game using OpenGL. You will have to create a detailed scene with a court, a scoreboard, two rackets representing two players and a crowd. Ideally, players should be able to choose a singles or doubles game, however; it is not mandatory. The tennis rackets created in the assignments can be used and simulation of the game will have to be demonstrated through the scoreboard. You may add intricate details to enhance the user experience. You are allowed to borrow assets (like the crowd, trees, ball boys, sculptures and decorative items, textures, and so on) as needed to create an immersive environment. 3D Warehouse from google and turbosquid.com are a few sources for borrowing 3D models. However, please ensure that you credit the source properly. You are also allowed to use third party libraries such as irrKlang, DeviL, and AssImp, *etc.* for sound, images and 3D assets. Core components of the scene cannot be imported as models.

2. Walk Through a Procedurally Modeled World

The goal of this project is to create a graphics program using OpenGL for walking through a procedurally created virtual world, say a forest of trees, plants, bushes, *etc.*, or an urban city with roads, buildings, *etc.* All repeating items, like the trees in the virtual forest or the buildings in the virtual city, should be procedurally created, using a few user specified parameters, if necessary. The terrain has to be procedurally created. You are allowed to borrow digital assets for nonrepeating items, like a bridge, for textures, and so on, as needed in order to create the virtual world. However ensure that you credit the source properly. You should have simple interaction mechanisms to navigate through the virtual world and view it from different angles. During navigation, the user must not be allowed to pass through objects.

3. Song/Story Narrative

The goal of this project is to provide a 3-to-5-minute song/story narrative, say a nursery rhyme. This narrative has to be very visually appealing, must involve some animation, and could involve some user interaction. The choice of the song/story is left to you, and you may use assets and/or libraries like in the above-mentioned topics.

You may refer to videos available at: https://www.youtube.com/watch?v=AX4mvhrrMQA and https://www.youtube.com/watch?v=Bcu8k_8LTxY for some inspiration as well as for the use of your models from the assignments.