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# MARMARA UNIVERSITY

# FACULTY of ENGINEERING

# COMPUTER ENGINEERING DEPARTMENT

CSE4197 Engineering Project I Proposal

Title of the Project

*"3D Geometry Drawing Software"*

Group Members

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## 1. Aim of the Project (*at least half page*)

We are trying to create a 3D design program. 3D design refers to using software to create a digital model of a three-dimensional shape or object. Organizations and professionals across industries use 3D design to communicate ideas, create products and customer experiences, teach concepts, and more.

What we want to put forward, unlike existing programs, is to be able to use our application interactively and more efficiently. Our reference point for this application is Cabri3D. Cabri3D, an application that enables the user to draw 3D objects without much effort, is a commercial geometry software. However, it's rather clunky and slow, and is almost considered abandoned. We plan to take lessons from it and create a much better 3D drawing software that has a better user experience with a much simplistic approach.

Also we try to solve some of the general 3D design program issues such as huge amount of hardware usage, compatibility with other programs, bad efficiency, low speed due to inefficient algorithmic approaches, etc…

## 2. Methodology (*at least half page*)

We intend to prepare an API for the operations that allow the user to translate, rotate and scale the objects they created. This API will make use of OpenGL and glm.

OpenGL (Open Graphics Library) is a cross-language, cross-platform application programming interface (API) for rendering 2D and 3D vector graphics. The API is typically used to interact with a graphics processing unit (GPU), to achieve hardware-accelerated rendering. OpenGL Mathematics (glm), is an header only C++ library that enables the user to easily operate on OpenGL data. It is generated based on GLSL (OpenGL Shading Language) so that it seamlessly operates on OpenGL.

After preparing this API, we plan to create a graphical user interface that the user can interact on. This graphical user interface will achieve this behavior by utilizing the API we made before this step. At this step we can add other programs to our system for developing user interface and/or connecting to API.

### 3. Software/Hardware Requirements

C++ language will be used to implement both the API and software.

OpenGL will be used for graphics rendering.

OpenGL Mathematics (glm) will be used for mathematics operations.

### 4. Draft Time Plan

API will be finished by the 7th week of the first semester. Remaining time will be used for implementing the user interface. Bi-weekly stand-ups will be held to reporting and discussion of the process.

### 5. References

- Wikipedia. (2023, September 24). OpenGL
  https://en.wikipedia.org/wiki/OpenGL
- Wikipedia. (2023, September 24). Cabri Geometry
  https://en.wikipedia.org/wiki/Cabri_Geometry
- GitHub. (2023, September 24). OpenGL Mathematics (GLM)
  https://github.com/g-truc/glm