OSG based primitive CAD modeler



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1. Introduction

* Purpose
* The purpose of this software project is to develop an Open Scene Graph (OSG) based primitive CAD modeler.
* This application allows users to create and manipulate primitive shapes in a 3D environment through drag-and-drop interactions.
* The CAD modeler targets users who need a simple yet a powerful tool for creating basic 3D models.
* Scope
* The CAD modeler will provide a user-friendly interface for creating and visualizing primitive shapes such as point, line, circle, ellipse, arc.
* It will support basic operations like translation, rotation, and scaling, allowing users to arrange and manipulate shapes as needed.

2. System Overview

* The system includes features such as drag-and-drop functionality for adding primitive shapes, navigation controls for viewing the model.
* The graphics rendering component utilizes the Open Scene Graph (OSG) library.
* It handles the creation and rendering of the 3D scene, including all the primitive shapes added by the user.
* It allows users to add and remove shapes.

3. Functional Requirements

* **Rendering Primitives:**

The system should allow users to render primitive shapes such as points, lines, circles, ellipses, and arcs.

Each primitive shape should be rendered accurately.

* **Drag and Drop Interaction:**

Users should be able to create and manipulate primitive shapes using drag-and-drop interactions.

* **Point Rendering:**

Users should be able to render individual points using drag-and-drop on the canvas.

* **Line Rendering:**

Users should be able to draw lines using drag-and-drop on the canvas.

* **Circle Rendering:**

Users should be able to draw circles using drag-and-drop on the canvas.

* **Ellipse Rendering:**

Users should be able to draw ellipses using drag-and-drop on the canvas.

* **Arc Rendering:**

Users should be able to draw arcs using drag-and-drop on the canvas.

4. Tools

* C++ programming language for application development
* Visual Studio for the structuring part
* Open Scene Graph API
* Qt framework for GUI development
* OpenGL for real-time 3D rendering

5. Milestones and Timeline

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| --- | --- | --- |
| **Sr. No.** | **Milestones** | **Date and Time** |
| 1 | Project Problem Definition | 06 - 05 - 2024  02.30 PM |
| 2 | SRS Presentation & Approval | 07 - 05 - 2024  02.30 PM |
| 3 | Discussion on User Interface | 08 - 05 - 2024  07.00 PM |
| 4 | Implementation of User Interface | 08 - 05 - 2024  07.00 PM |
| 5 | Implementation of OSG based CAD Modeler | 10 - 05 - 2024  07.00 PM |
| 6 | Testing and Debugging | 11 - 05 - 2024  07.00 PM |
| 7 | Final Presentation and Demonstration | 13 - 05 - 2024  07.00 PM |
| 8 | Project Completion and Submission | 13 - 05 - 2024  07.00 PM |

6. UI



7. Conclusion

* The Open Scene Graph (OSG) based primitive CAD modeler aims to provide a user-friendly interface for creating 2D shapes by leveraging the capabilities of OSG.
* The project facilitates the rendering of basic geometric primitives such as points, lines, circles, ellipses, and arcs through intuitive drag-and-drop interactions.
* Tools such as C++, Visual Studio, Open Scene Graph, Qt and OpenGL will be employed for development.
* The project's success will be evaluated based on accuracy and visual quality, with implications for this project and avenues for future research.