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

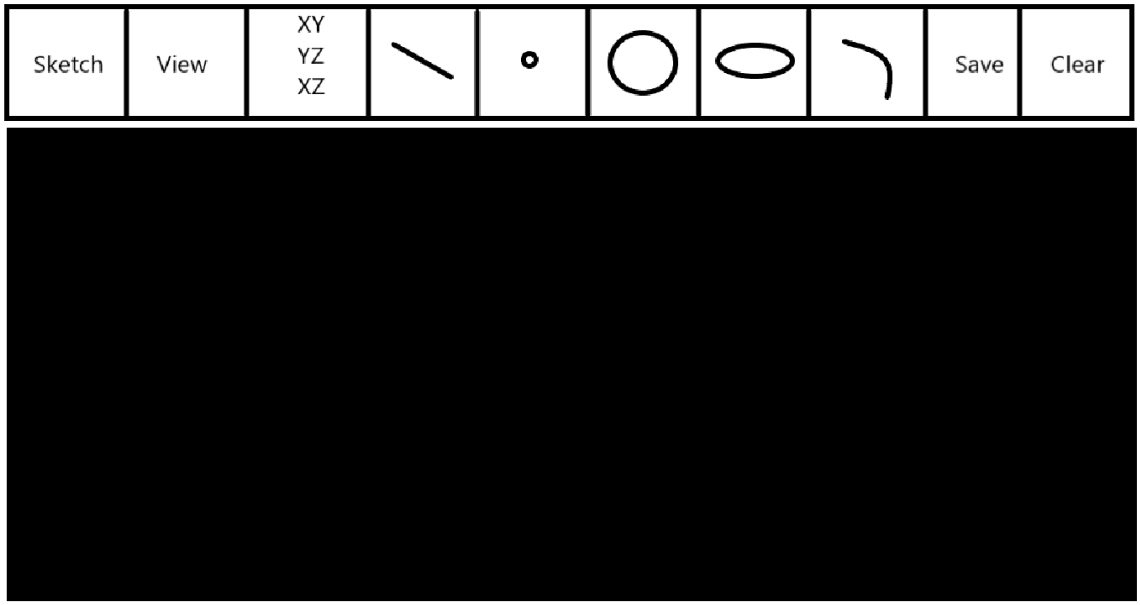
- C++ programming language for application development
- Visual Studio for the structuring part
- Open Scene Graph API
- Qt framework for GUI development
- OpenGL for real-time 3D rendering

5. Milestones and Timeline

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	Final Presentation and Demonstration	13 - 05 - 2024 07.00 PM

7	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.