GOATracer

1. Introduction

The goal of this project is to develop GOATracer, a ray tracing application. GOATracer enables users to generate photorealistic 3D images with ease. It aims to simplify the complex process of ray tracing while delivering high-quality results.

2. Positioning

2.1 Problem Statement

The problem of	the complexity and slow performance of existing 3D rendering software
affects	the user
the impact of which is	frustration, reduced efficiency, and users often spend more time configuring tools than creating visual content;
a successful solution would be	a lightweight and easy-to-use ray tracer focused on rendering high-quality images efficiently.

2.2 Product Position Statement

For	users
Who	are frustrated by the complexity and overload of traditional 3D rendering software
The (product name)	GOATracer
That	provides a simple, efficient, and focused ray tracing experience
Unlike	large and feature-heavy rendering programs that require complex setup
Our product	is lightweight, user-friendly, and optimized for generating one high-quality image

3. Stakeholder Descriptions

3.1 Stakeholder Summary

Name	Description	Responsibilities
User	The person who wants to load 3D objects and use ray tracing to render them.	- Provide feedback on rendering performance and user experience. - Identify any missing features or areas for improvement.
standardization committee	Teams that work on individual versions of a raytracing program	- Create a file format in which all visually relevant data can be stored
Scrum Master	The individual is responsible for overseeing the project's overall development and timeline	- Ensure the project is completed on time - Monitor project progress and resolve any issues that arise. - Approve the final product.

Name	Description	Responsibilities
Customer	The individual that commissions or evaluates the project, ensuring that it aligns with the intended goals and expectations.	- Responsible for defining the project's overall objectives, reviewing its progress, and assessing the final product to confirm that it meets the agreed requirements and quality standards.
Product Owner	The individual who defines the requirements and overall vision of the ray tracer. Is in contact with the customer.	- Define and prioritize the features of the application. - Make decisions on new features, bug fixes, and updates. - Ensure that the application meets the needs of the target audience.

3.2 User Environment

- **Number of People Involved**:
  - **Core Team**: 6 developers (including 1 UI/UX designer, 1 Scrum Master, 1 Product Owner)
- **Scrum Cycle Duration**:
  - 2 weeks
- **Environmental Constraints**:
  - Development will occur on multiple platforms (Windows, Linux, macOS).
  - Remote or hybrid work environment, using tools like Discord, Jira & GitHub for collaboration.
- **Development Tools**:
  - Frameworks: OpenTK (Render preview), Avalonia (UI)
  - IDE: JetBrains Rider (Linux + Mac) / Visual Studio (Windows)
  - UML: StarUML
  - Project management: Jira
  - Version control: Git, GitHub

4. Product Overview

4.1 Features

Features	Priority	Planned Release
.obj import	High	On Release-Day
3D preview for view and lighting definition	High	On Release-Day
Ray Tracing: Image calculation through the application of ray tracing	High	On Release-Day
Image display on the monitor	High	On Release-Day
Viewport navigation: Free choice of perspective on the modeled object (WASD + mouse)	Medium	On Release-Day
storage in a common graphics format	Medium	On Release-Day

Texture support for the imported objects	Medium	On Release-Day
Performance	Low	On Release-Day
Stability	High	On Release-Day

5. Other Product Requirements

Requirement	Priority	Planned Release
Windows executable	High	On Release-Day
Image processing should be carried out as quickly as possible	Low	On Release-Day
Installation guide	High	On Release-Day