Project Proposal

Project Title: *Maze Runner – A WebGL-Based 3D Maze Game*

Group Members

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Project Introduction

Maze Runner is a 3D WebGL game where the player controls a ball inside a walled maze environment. The goal is to reach the finish point as quickly as possible, after briefly viewing the entire maze from a top-down camera. The player navigates from a third-person view, collecting temporary bonus items to reduce their final completion time. The game features interactive lighting, textured 3D objects, and full user-controlled camera movement.

Project Description

The core idea of the project is to create an interactive 3D maze game implemented using WebGL. The scene consists of a flat ground surface surrounded by four boundary walls, forming a play area that contains an inner maze. The maze layout is created using 3D rectangular wall objects. At the center of the scene is a controllable ball that the user will navigate through the maze using keyboard input.

When the application loads, the camera will initially show the entire maze from an angled top-down perspective for 10 seconds, giving the player a limited chance to memorize the path. After that, the camera will automatically transition behind the ball, giving the user a third-person perspective for gameplay. From this point on, the user will control the movement of the ball in 3D space using the keyboard. The camera can also be moved and rotated freely via user input, allowing full 3D exploration of the environment.

There will be at least three different object types in the scene with distinct morphologies: the ball, the maze walls, and collectible bonus items (e.g., stars, cubes, or gems). Each of these object types will have different textures applied. Bonus items will appear at specific locations in the maze and remain visible only for a short duration. If the player collects them in time, their final time to reach the finish point will be reduced, adding a reward element to gameplay.

The game will include at least one dynamic light source, which will clearly affect the appearance of the scene. The light's position and brightness can be changed by the user in real time, demonstrating interactive lighting in WebGL.

Time will be recorded from the moment the third-person gameplay begins until the player reaches the designated finish area. Upon arrival, the total time (adjusted for collected bonuses) will be displayed to the player.

This project aims to demonstrate knowledge of WebGL, including object creation, transformations, camera control, lighting, texture mapping, and user input handling. The result will be a fully interactive and engaging 3D experience.

References

- WebGL Fundamentals: https://webglfundamentals.org
- Mozilla WebGL Guide: https://developer.mozilla.org/en-US/docs/Web/API/WebGL_API
- Three.js Examples: https://threejs.org/examples/
- Inspiration from "Marble Madness" and "Ballance" classic games