Laser Golf (“Ten”-Pager)

Cover Page:

Story Summary:

A team of high-energy optical physicists at Caltech were conducting an experiment using lasers and they got a little distracted. The team lead, being a fan of golf, decided to turn the experiment into a golf-like game where they tried to direct the laser beams into the receivers using the fewest number of mirrors.

Controls:

- A menu at the bottom of the screen allows the player to switch between drawing mirrors and drawing black bodies.
- To draw a mirror or black body, the player clicks and drags from the desired start point to the desired end point of the mirror or black body. Mirrors are shown in white, black bodies are shown in black.
- To change the angle of a mirror or black body the player has previously drawn, first press the “Rotate Mode” button at the bottom of the screen. Then click on the mirror or black body you want to rotate and drag up to rotate it counter-clockwise about its midpoint or drag down to rotate it clockwise about its midpoint.
- To remove a mirror or black body the player has previously drawn, right-click on it.
- A button will be provided on-screen that the player clicks to fire the laser. Clicking the same button turns the laser off. While the laser is on, no more mirrors or black bodies can be drawn or adjusted.
- A button will be provided on-screen that the player can click to restart a level. Upon click, all the mirrors and black bodies drawn by the player will be removed from the screen and current level.
- A button will be provided on-screen that the player can click to quit a level. Upon click, the current level will be closed and the player will be returned to the main menu.

Gameplay Overview

Laser Golf is a puzzle/arcade game where the player's primary objective is to guide coloured lasers through a variety of complex levels from emitters to correspondingly coloured receivers such that all receivers are being struck by the correct colour simultaneously. The player can draw as many mirrors or black-body-surfaces as they like to achieve this, but the catch is that in order to attain a higher score, the player must use fewer surfaces. Each level has a set "par" of mirrors which represents the primary solution, but in many cases the level can be completed with fewer than the par of mirrors, resulting in large score-rewards.

Gameplay Experience:

The player will start with very straight-forward puzzles to solve. These could include shooting the laser directly from the emitter to the target, or puzzles that only require the placement of one or two mirrors in relatively obvious locations to complete. As the player progresses through levels they will feel more challenged, and they will be given a score based on the efficiency of their solutions. Some amount of frustration could happen, as is common with many puzzle games. The scenery will also change as the player progresses through levels, so it makes them feel as if they are progressing towards something.

Objects on the Playfield:
All levels will include at least one source, which emits the laser beam, and at least one goal. The player wins the level by hitting every goal in the level with a laser beam of the appropriate color. In addition, some levels may include some of the following additional playfield elements:

- Mirrors: A laser that strikes a mirror reflects off it. Since all of the mirrors in Laser Golf are flat, the laser's new direction can be determined using the formula $angle\ of\ incidence = angle\ of\ reflection$. Mirrors already on the playfield at the start of the level cannot be modified by the player but otherwise function the same as mirrors placed by the player.
- Black bodies: A laser that strikes a black body is absorbed by it. Black bodies already on the playfield at the start of the level cannot be modified by the player but otherwise function the same as black bodies placed by the player.
- Explosives: If a laser beam hits a crate of explosives, the player loses the level, regardless of whether all goals were hit.
- Color filters: A color filter changes the color of a laser beam passing through it to the color of the filter.
- Beam splitters: A beam splitter consists of a sensor and two or more emitters. When a laser beam strikes the sensor, it causes each emitter connected to the beam splitter to fire a laser pulse. The pulses fired by the beam splitter may be of the same color as the beam that struck the sensor or may be of different colors.
- Lenses: A lens causes a laser beam passing through it to be redirected at a different angle.

Conflict/Challenge (Enemies and Bosses)

The primary challenge arises from the player needing to cleverly guide the laser around obstacles in the level; maintaining a balance of effectively solving the puzzle while also aiming for the fewest possible surfaces placed.

Levels will frequently have an “obvious” solution that the player is likely to derive themselves, but will frequently be laid out (almost always, unless the level primarily exists to teach the player a mechanic) such that it can be solved in several different ways.