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## Rendering Rainbow Road

**Design Goal:** Apply rendering, modeling, and user-interaction techniques learned in this course to create a sophisticated interactive racing game.

**High Level Description:** We will create an interactive racing game where the user races a go-kart that moves along a procedurally generated sweep. The user will race against a computer player, using power items and speed-ups to gain an advantage. We will utilize the foundations built in assignments 2 and 8 to create our application.

### Core Design Features:

#### Advanced Layout:

Track - Our track will utilize environment mapping, decorative meshes, and glowing/sparkling effects to create an overall effect similar to “Rainbow Road” in Mario Kart.

Track Editor - We will create a track editing application that allows users to create their own sweep that they can race on.

Background Environment - Behind the track will be a background with interesting elements such as shooting stars and dynamically changing lighting.

Shaders - The racers, track, and surrounding environment will have either phong shading or toon/cel shading applied.

#### Sophisticated Gaming Experience:

Items and Power-ups - Multiple items with varied gameplay and graphical effects, including projectiles, speed boosts, and rainbow invincibility will be available to players to obtain.

Computer AI - A simple AI agent will compete against the user by racing along the track and using items as necessary.

Collision Detection - Collisions between karts and other karts, karts and projectiles, and collisions between karts and item-holding crates will be monitored.

#### Intuitive User Interaction:

Interaction - Keyboard interaction will control items as well as the speed and direction of the kart, with the kart's trajectory guided by the sweep.

“Mini-Map” - The user will be able to see where they are in relation to the rest of the track and the computer player by viewing a miniature version of the entire map.

First Person View - The user will have the option to see his car racing from a first person viewpoint.

Other Interface Elements - A small timer and list of current available power-ups will also be shown.