

CS 174A Project Proposal: PROTON

Team Rocket:

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Theme:

The theme for our project is a simulated rocket launch. The simulation will run through each step of a rocket launch, beginning with it remaining stationary on the launch platform, to taking off, to each stage of the rocket's separations, and finally ending when the rocket is in space. Throughout this process, the user is given control over initiating each step of the launch. If the user fails to input anything while the rocket is midair, the rocket will eventually exhaust its fuel for those thrusters and plummet back to Earth; this is physically simulated. Furthermore, the user may rotate the camera at any time as it follows the rocket; this will allow the user to view different angles of the rocket and its reflections. As for effects, there will be smoke and fire effects on top of the rocket being reflective. The background will also change as the rocket rises in elevation, passing through a cloud layer and the sky, which eventually disappear when the rocket exits the atmosphere and enters space, where the Earth, sun, moon, and stars will be visible.

The rocket is planned to be modeled as a more simplistic “toy-style” version of the Russian PROTON rocket (images below). It's material will utilize something close to polished chrome so that the viewer can more clearly see the reflections of the rocket's surroundings through each stage of the rocket.

Topics learnt in the course used:

- Modeling objects using polygons
- Animation of objects using transformations
- GLSL shaders to render objects
- Lighting from different types of light sources such as the sun and rocket boosters

Interactivity:

- User controlled camera (movement around rocket)
- User controlled launch steps and stage separations

Advanced features:

- Reflections using environment maps/custom reflective surface shaders
- Smoke and fire effects using GLSL shaders
- Physically based animation, including collision detection for the rocket stages and planet

