FPGA Surfers: Implementing a Popular Video Game with 3D Graphics

6.205 Final Project Abstract

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Abstract

Our project will aim to create a simplified version of the Subway Surfers mobile game [1]. In the game, a runner ducks, jumps, and switches lanes to avoid obstacles such as barriers and train cars (both stationary and incoming). We will focus especially on the 3D graphics behind the continuous forward-moving aspect of the game, trying to render them as smoothly and efficiently as possible.

The baseline goal of the project will be to take advantage of FPGA resources to allow for efficient 3D graphics rendering. We hope that the FPGA's capacity for parallel execution will allow for efficient execution of our 3D rendering, much like a GPU. Game logic such as ending the game when the runner crashes into obstacles and gravity against jumping will be implemented as close to the original mobile game as possible, with the FPGA buttons allowing for the various runner actions described. A minimum viable product would consist of a playable game with a greatly simplified 3D world.

Division of Work

The primary components required for this project are likely the game logic and 3D graphics. We anticipate 3D graphics to be extremely challenging, and we will collaborate on the rendering aspect of the game. Alan will also implement the game logic, which we anticipate to be the easier part of the project.

References

[1] MA Darlene Antonelli. How to play subway surfers. *WikiHow*, 2025.