Ranpo

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ECE 385 Final Project Proposal

**Ideas and Overview:**

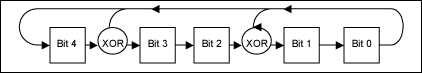
We propose to implement a similar version of the popular game Doodle Jump on the FPGA. Our game would revolve around using System Verilog to create most of the drawing and logic for the game on screen. We would use most of the code from lab 6.2 to take in a keycode from the user as they are pressing a button the keyboard. This code would use NIOS II and the platform designer, and we can just use the keycode coming in as a wire in on the System Verilog level. We should think about additionally using the hardware itself to have randomly generated platforms for our doodle. After doing some additional research this is called a LFSR.

Figure Source: <https://www.maximintegrated.com/en/design/technical-documents/app-notes/4/4400.html>

If time permits, we should also attempt implement the design to be able to be controlled using the joystick.

**Block Diagram:**

**List of Features:**

Our design would feature the doodle being able to be loaded in through sprite drawings that could interact with its environment. There are many platforms as part of the main environments in doodle jump, but generally the doodle can move up and go on top of them, but it cannot move back down. The doodle should be continuously moving and jumping up and down due to the laws of gravity, and collision detection must be implemented depending on the platform type. We seek to implement at least four platform types: please note all these images are form the doodle jump wiki and credit goes to them.

Diagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generatedA picture containing green, vegetable

Description automatically generated

Figure 2.3: Yellow platforms will continuously move around the screen after you step on them

Figure 2.2: White platforms will disappear after you jump on them

Figure 2.1: Blue platforms can move side to side, while brown platforms will allow for the doodle to keep falling

Figure : Green platforms have normal behavior and just stand still

As part of the original game, we should also add powerups that the doodle can use.

|  |  |
| --- | --- |
| **Power Up** | **Description** |
| Rocket ship | Go up 5,000 units |
| Shield | Allow for one hit for monsters |
| Trampoline | Flip the doodle around and go up 200 units |
| Spring | Go up 100 units |
| Spring shoes | Instead of increasing doodle by x units, increase by (some modifier) x |
| Helicopter head | Animation of helicopter and then move up by 600 units |
| Jetpack | Jetpack animation and move up by 1200 units |

A screenshot of a video game

Description automatically generated with medium confidence

We want to have a counter on the screen to show the score of the doodle as it is jumping. This would represent the current altitude of the doodle jump. After certain checkpoints of altitude, we should increase difficulties for the player to experience, such as fewer green platforms and more blue and brown ones.

After speaking with many of the TAs in office hours, it would also be beneficial to understand how a frame buffer would be utilized as well, to have the doodle be able to jump continuously.

**Expected difficulty and justification:**

We are unsure about the base difficulty of the project. We believe that the jump physics for the doodle will be difficult to implement, as the ball project in lab 6.2 was only able to go straight in a forward line. We will need to take into account gravity and the

**Proposed Timeline:**

April 15 – Have the very foundation of the game complete, with boxes serving as the doodle and the platforms being able to be used to jump on. Hopefully we can also implement the frame buffer by this time. We do not expect to have any springs or power ups at this point. We can also implement more base things like difficulty and death screen (without any of the logic).

April 22- Be able to use the sprite drawings to make the game look more game like.

April 29- We can implement more powerups and levels at this point.

May 6 – Final Project showcase.