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Project Proposal EECE

Snake Game

Our current project idea is to implement the classic game of Snake using our VGA board. The game will follow the classic rules and game play principles of the original, with some new modifications of our own. In Snake, the user controls a constantly moving “snake” that would increase it’s length anytime the it “eats an apple”. The game would continue until the user collides the growing snake with itself, causing a game over state.

Our implementation of the project will involve an FSM which considers the four directions the user can control the snake, with an additional two states where the game is first initiated and a “game over” state when the player crashes into itself. For the direction states, we will use the four directional buttons on our board, with the middle button causing a “reset” of the game whenever the user enters the “game over” state. The visuals of the game will be driven by the VGA port on the board, with the background and snake being black and white, while the “apple” will be red. This means that the RGB pins will be driven together, while the horizontal and vertical sync pins will be driven by counters and synchronizers.

Our project will also include several different “settings” states where the user can change the difficulty and game play mechanics. For the difficulty, the user can go from an easy, medium, or hard state, with the difficulty being based on the length gained per apple eaten. Meanwhile, we intend to implement an option for the user to have either solid or wrapping walls, with the former option causing a game over state when the snake has collided with the wall while the latter will transition you to the other side allowing for the game to continue. We will use a two state FSM for these two options, while the difficulty settings will use a three state FSM. To control these options, we will use the seven-segment display to show the user the difficulty and wall settings, with them using the up button to scroll between them and center button to select them.

We also intend to have a score counter, where users can keep track of their success at the game by looking at the seven-segment display. The scoring will be calculated by a difficulty modifier based on the user’s selection and the number of apple’s eaten. The scores will be directly correlated to the snake’s length, with harder difficulties causing the length to increase by a higher rate.