

Super FPGA Bros

Kevin Marengo & Douglas Albert

- Input Modules: these modules are responsible for taking user input and generating signals for controlling the video game logic
 - Video Capture Module: this module will take the incoming NTSC video feed from the external camera and perform the necessary image processing and storage
 - Demonstrate functionality by displaying video image to LCD
 - Gesture Module: Will take information from the video capture module and perform analysis to determine center of mass and gesture interpretation. Will be able to interpret gestures corresponding to each of the game inputs: direction, movement, and additional actions (jump, duck)
 - Demonstrate functionality by displaying center of mass information and reliably demonstrating interpretation of assigned gestures
- Game Logic: these modules are responsible for the game behavior and mechanics. As a whole, these module will be demonstrated with a quick playthrough of the game.
 - Level Creator: this module takes the level layout stored in the level rom and combines that information with the tile memory to create a visual representation of the game world.
 - Early demonstration of functionality can be performed separate from sprite generation and advanced graphics.
 - Level Rom: each instance of this module contains an index of tiles for creating a level
 - Demonstrated in conjunction with the level creator by displaying a completed level
 - Tile Memory: Holds pixel information for each of the 16x16 graphical tiles in the game
 - Early functionality of other modules with simple single color tiles. Later demonstrated by importing sprites ripped from the original Super Mario Bros as .coe files
 - Blob/Sprite Modules: these modules are responsible for sprite behavior, as well as storing information regarding these non-player objects.
 - The blob processor and FSM will be tested by demonstrating sprite movement and behavior inside the game world. Information about each sprite is stored in the sprite RAM.
- Output Modules: these modules take the internal information generated by the logic and generate video to be output to the attached LCD
 - Frame Buffer: provides a glitchfree output signal for the XVGA module. Stores data for every pixel in the original 256x240 image
 - Audio Output: stores audio samples and generates an AC97 output to be converted into an analog output signal

- Additional Modules: Time Permitting
 - 2 player functionality: A module will be created to provide a custom communication protocol between two labkits. Information about the player's game is sent to the opponent's labkit, allowing for a 2 player competitive race gametype.
 - Additional features/behaviors in the game engine: In addition to multiple levels, we can introduce multiple enemy types as well as other in game modifiers
 - Power-up items that change the behavior of the player
 - Coins the player can collect to increase his score
 - Dynamic representation of the player character: The gesture recognition module will also provide x and y coordinates of the player's arms and legs, allowing us to make a dynamic representation of the player inside the game that accurately reflects limb configuration.