

This project is a recreation of the classic arcade game Snake implemented on the NexysA7-100t FPGA. The FPGA will utilize 3 types of user-based inputs to interact with the game. This game uses a total of 4 switches, one push button, and an external keyboard. The FPGA's button will reset the game, the switches will change which color the snake is and it will progressively become brighter and darker as the game goes on, and finally, the external keyboard will control the direction of the snake's movement. Furthermore, the FPGA will utilize several outputs as visual indicators for the game. These include a VGA output to display the game on an external monitor, the built-in seven-segment displays to keep track of the score, and the RGB LEDs on the board to flash red when a lose condition occurs or green when a win condition occurs. The FPGA board is able to accomplish these feats due to its ability to handle timing problems and multiple separate clocks such as assigning the desired digits on its desired seven-segment displays and the clocks driving the different modules within it. Additionally, the board is capable of mimicking analog outputs using a concept called PWM short for pulse with modulation to affect the intensity of the RGB lights on the board. This snake game showcases some of the uses and abilities that this and other digital circuits can accomplish such as its ability to handle complex timing problems and mimic analog signals despite its digital output.