# **Final Project Description**

## Snake Game

### Inputs:

* Five buttons for snake control, and game reset
* Switches for other resets, pausing, and on/off control

### Outputs:

* VGA to display the game
* Audio jack for the game sound

### Description:

I would like to make a snake game with a 40x56 grid where each square is 10x10 pixels wide so in total, the grid will be 400x560 pixels wide on the screen. The snake’s head will have a different design compared to its body and the snake’s tail will also have a different design. The body will be composed of simple squares. The food/target will be a red circle. The playable area will be marked with four walls and gridlines. The rest of the screen will show a background as well as the current score on the top left corner of the screen but outside the playable area.

The player will use four buttons on the FPGA board to control the movement of the snake’s head. Whenever the player changes direction, the program will play a sound and visually change the movement of the snake. The snake will grow by one square whenever it eats the food. The food will be randomly generated on a square of the grid that is not occupied by the snake’s body. The snake will move at a constant speed that is not controlled by the player. The program will always play a short loop of music as background music.

The winning condition is when the snake has completely occupied all spaces of the 40x56 grid. If this condition is reached, the program will play a celebrating sound and write “YOU WON!” on the screen. The losing conditions are when the snake head runs into the walls of the playable area, or when the snake head runs into the body or the tail. If these conditions are reached, the program will play a losing sound and write “TRY AGAIN!” on the screen. When the player presses the middle button for a few seconds, the game will reset. If a stop switch is high, the game will be paused but still show the game on the screen and write the text “PAUSED”. There will be an on/off switch that will turn the screen off and reset the game when it is low.