

# CS M152A Lab 4 Proposal

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## Design description

For our final project for CS M152A, we will be creating the classic snake game with the FPGA board and a screen monitor. Users/players will be playing the game using the buttons on the FPGA board. Through the VGA port, the FPGA board will output the snake game display to be displayed on a screen monitor.

In our version of the snake game, the snake will be maneuvering in a set rectangular area surrounded by walls. User will use the up, down, right, and left buttons to control the direction of the snake. At every given time, a *food* will be placed at a random spot in the map not occupied by the snake. User will gain points by controlling the snake so the head of the snake “collides” with the food, thereby eating the food. Once the snake eats a food, it will grow longer. If the snake collides with its own body or runs into the wall, it dies and the game is over. The objective of the game is to survive long enough and gain more points.

## Design milestones and grading rubrics

- Display functionality (15%): the screen monitor should display properly via the VGA port.
- Score counting functionality (10%): the score should be increased every time the snake eats a food. At the end of the game, the current score and the high score should be displayed.
- Snake maneuvering functionality (30%): user should be able to control the snake’s movement with the buttons on the FPGA board. Since the snake has a specific length, the tail should be a fixed number away from head.
- Food displaying functionality (15%): every time the food is eaten, a new piece of food should be displayed at a location that is not already occupied by the snake’s body.
- Snake eating and growing functionality (10%): once the snake runs over the food, the snake’s length should grow.
- End of game functionality (10%): if the snake runs into itself or the wall, the game should end.
- Game pausing and restarting functionality (10%): user should be able to pause the game with the middle button; once the game ends, user should be able to restart the game by pressing the middle button