

CS/EE 120B

Custom Project: Side Scroller (“Getaway Swimmer: The Fish Thief”)

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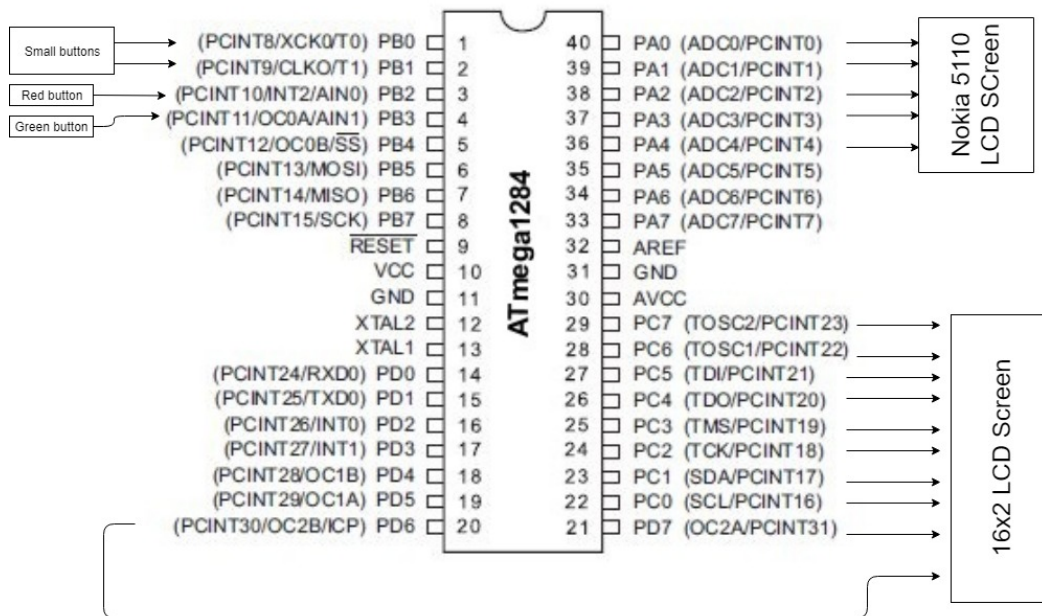
Introduction

This is a side scroller game where the screen automatically rolls across the 16x2 LCD. The player moves a character up and down to get as many points as possible before the timer runs out. Touching gems will give the player a point, up to 99, while touching demons will cost them a point. In addition, the player has a “stamina” meter, which dictates how many button presses are left. Each button press costs the player one stamina point, regardless of whether they actually move or not. Stamina points can be regenerated by touching a fruit also up to a maximum of 99 stamina points. Once a player runs out of stamina, they cannot move, and are forced to gain and lose points as they come until they hit a fruit and regenerate the stamina necessary to move again.

Hardware

- Parts list
 - Inputs:
 - Two small buttons wired to B0 and B1 to move player up and down, respectively
 - One red button wired to B2 to start the game
 - One green button wired to B3 to allow a “soft” reset
 - Outputs
 - Nokia 5110 LCD screen wired to A[4:0] to display the score, stamina, and remaining time, as well as instructions on startup
 - 16x2 LCD screen wired to D7, D6, and C[7:0] to display the actual game

- Pinout

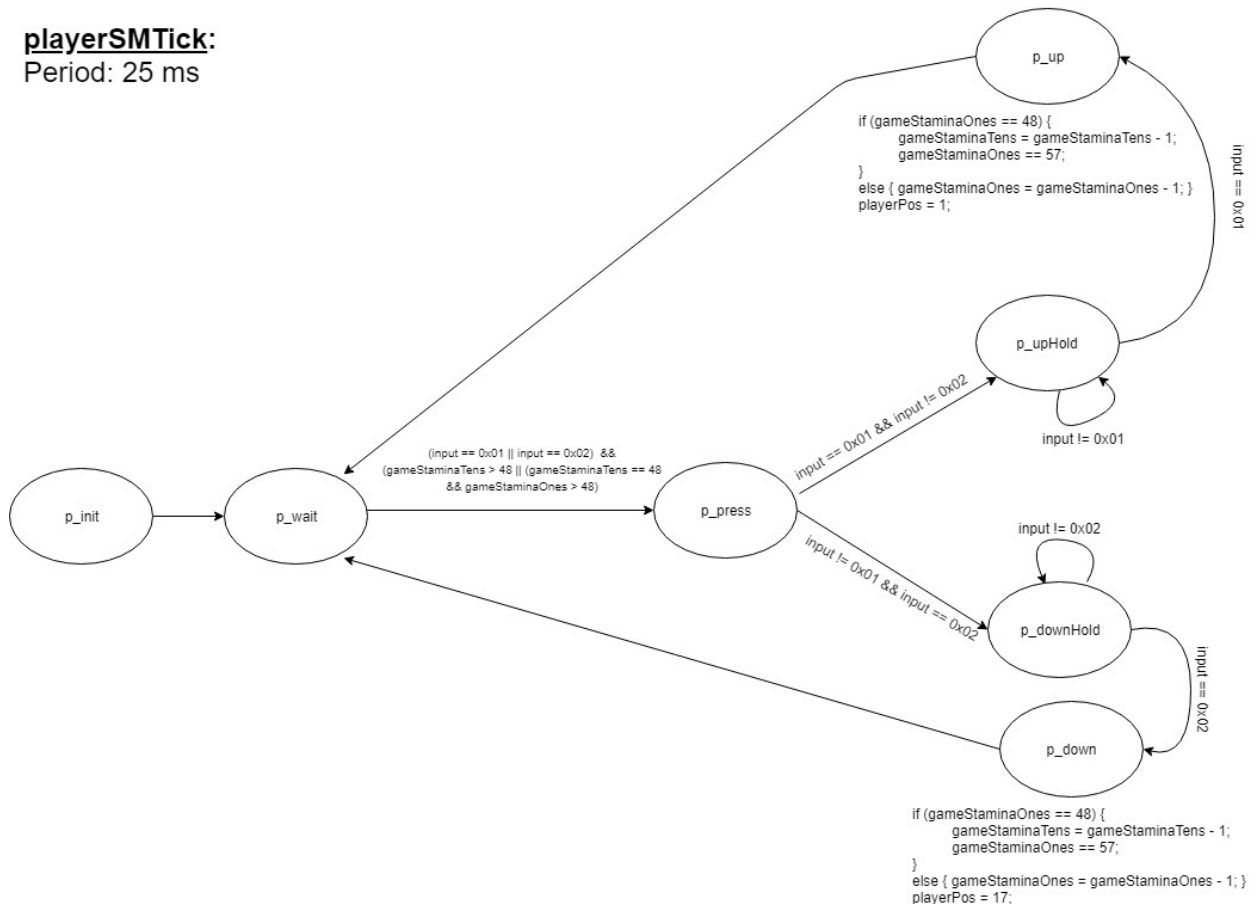


Software

GitHub link: <https://github.com/deadmemeconnoisseur42/CS120B-Custom-Project>

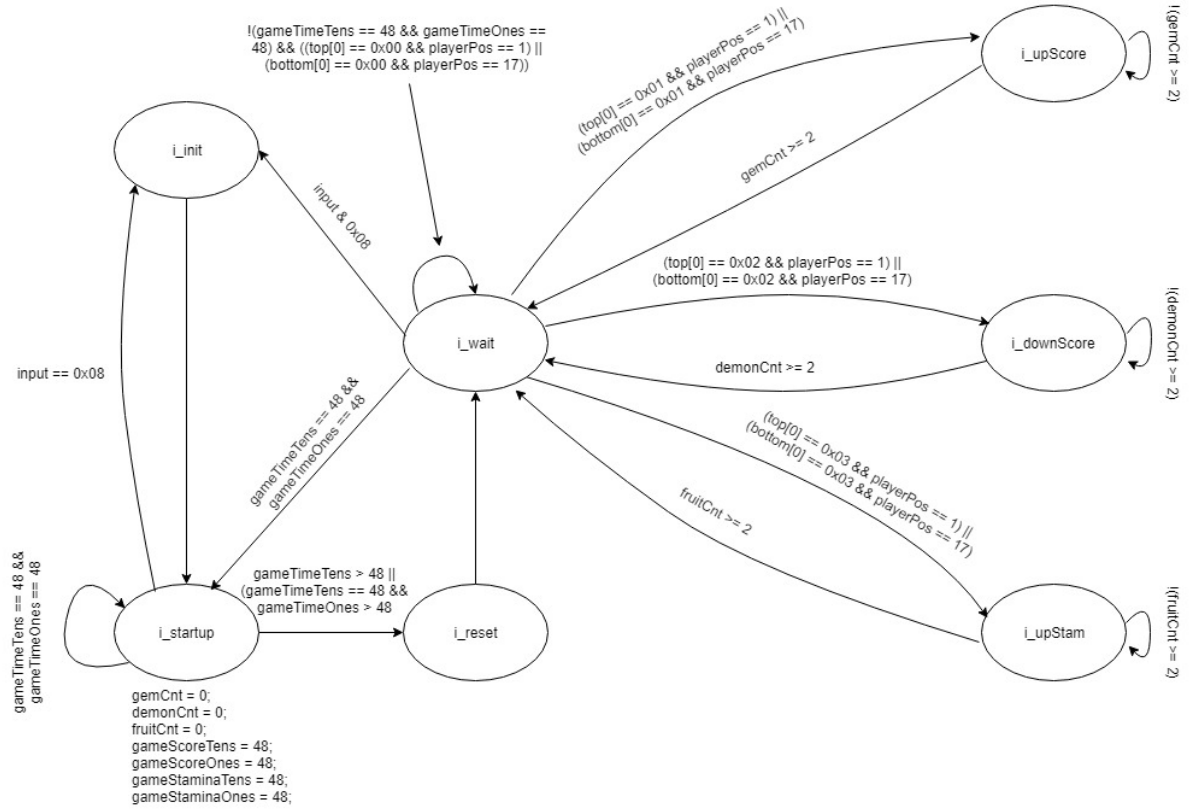
playerSMTick:

Period: 25 ms



itemSMTick:
Period: 25 ms

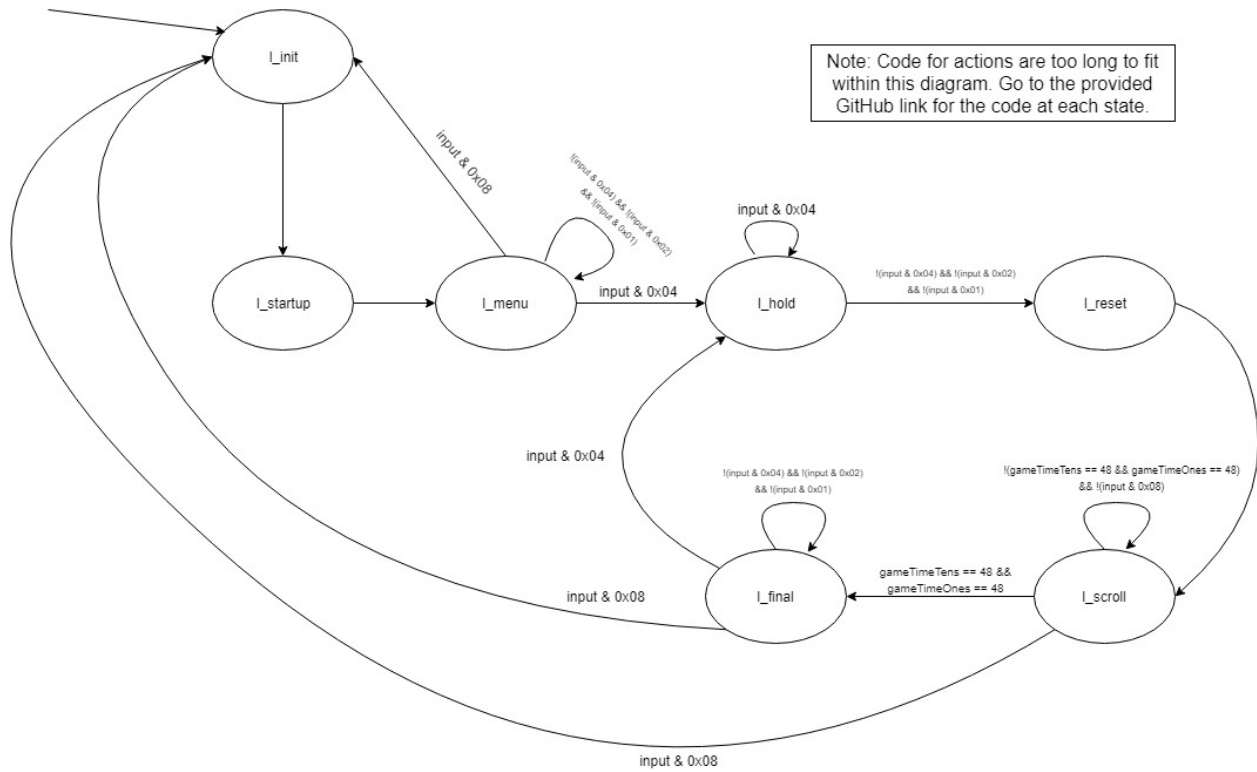
Note: Not all code is present in this diagram,
as code for some states were too big to
place here. Go to the provided GitHub link
for the rest of the code.



lcdSMTick:

Period: 150 ms

Local variables: unsigned char it, static unsigned char sourcePos

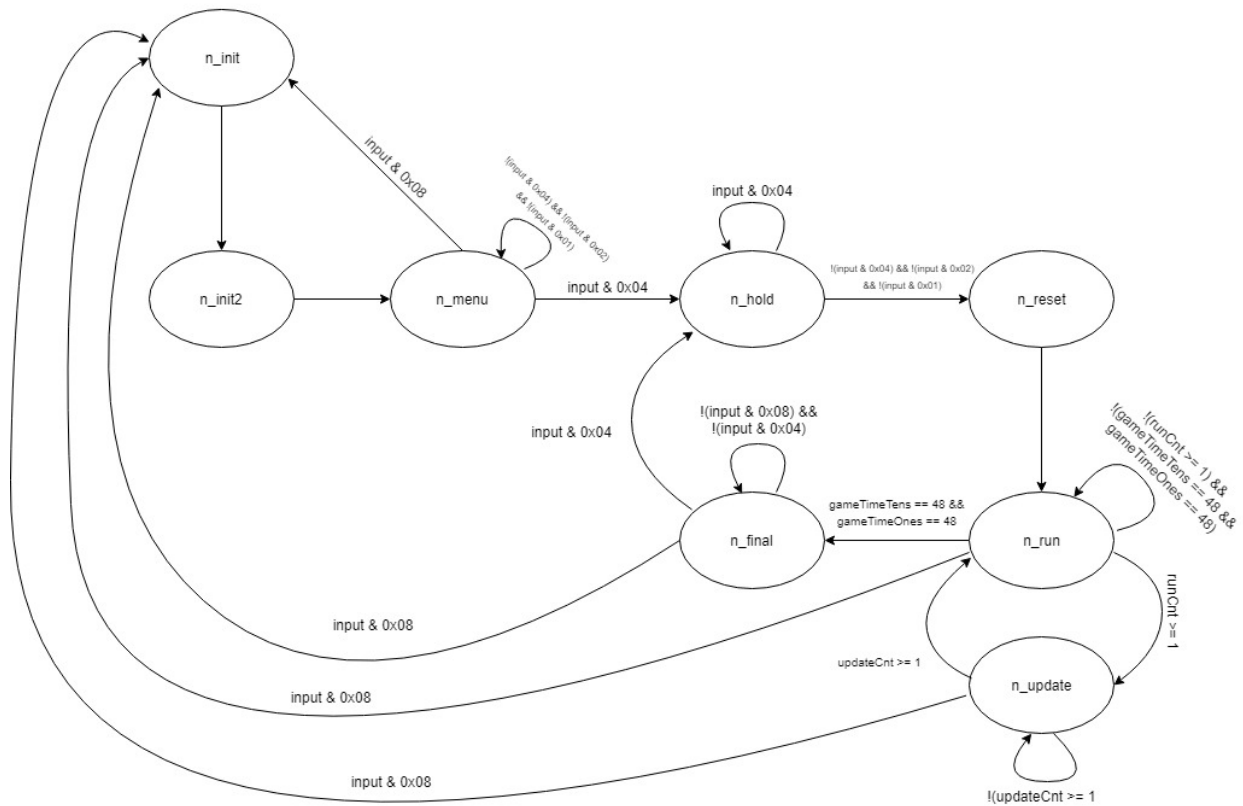


nokiaSMTick:

Period: 150 ms

Local variables: unsigned char eeScore

Note: Code for actions are too long to fit within this diagram. Go to the provided GitHub link for code at each state.



Complexities

All complexities listed below have been completed:

- Setting up the Nokia screen to display stats
- Creating custom characters for the 16x2 LCD screen
- Adding extra game logic to account for score maintenance
- Using EEPROM to save the player score

Youtube Link

<https://youtu.be/69hb8KFv6qU>

Bugs and Shortcomings

My button inputs have a slight amount of lag. When I press to move, it takes slightly longer for it to move, even when I have enough stamina points to do so. While not necessarily a

bug, I also feel that I may have more states than I really need. I didn't notice while I was working on the project, but looking at it now, I think that some of my state machines may be unnecessary.

I wanted to be able to implement left and right movement as well, up to about halfway up the 16x2 LCD Screen. However, I figured that if I focus on that, I wouldn't be able to test if my game would work completely or not. Because of time constraints, I was not able to work on adding additional movement options for my character.

Future Work

Currently, I have no plans to continue working on this project. If I ever do come back to it, I think I should first figure out how to reduce my states and reduce input lag. I would also like to be able to add additional movement options and get the game to work on a screen bigger than the provided 16x2 LCD.