Dungeon Explorer

Custom Project Final Report

Winter 2017

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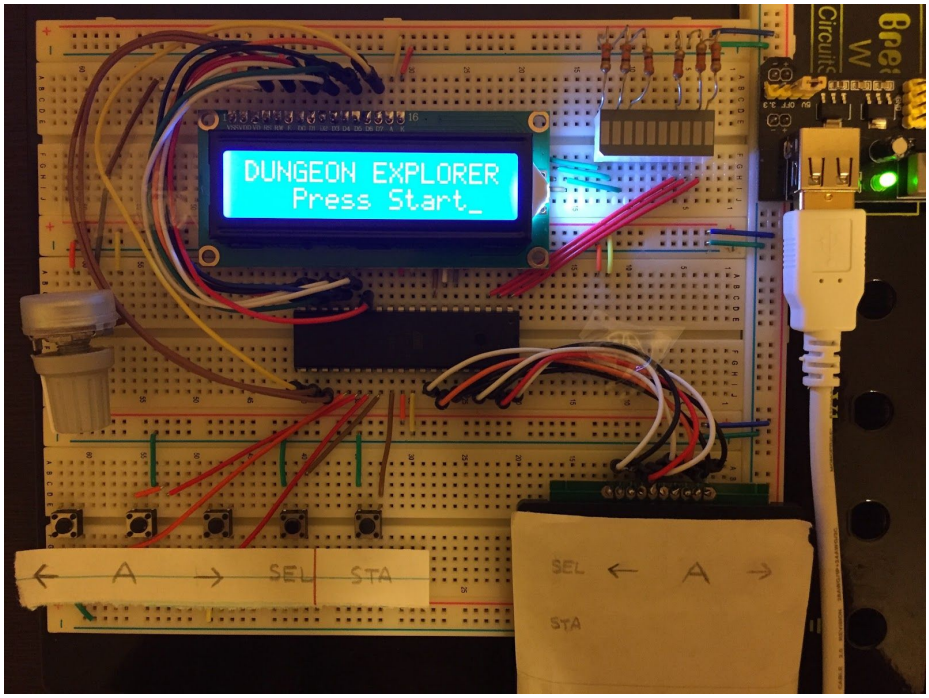
Introduction

Dungeon Explorer is a side-scrolling dungeon crawl game in which players must traverse randomly generated dungeon floors, fight enemies, and collect treasure. The game is displayed on the LCD screen. Players control the game via the buttons and the keypad. The 10 LED bar will be used to display the players' health. Upon completion of a level, the players will be given a chance to save their progress, which is accomplished via the EEPROM. The game features a menu system which will allow players to pause the game during gameplay, quit the game, or load a saved game.



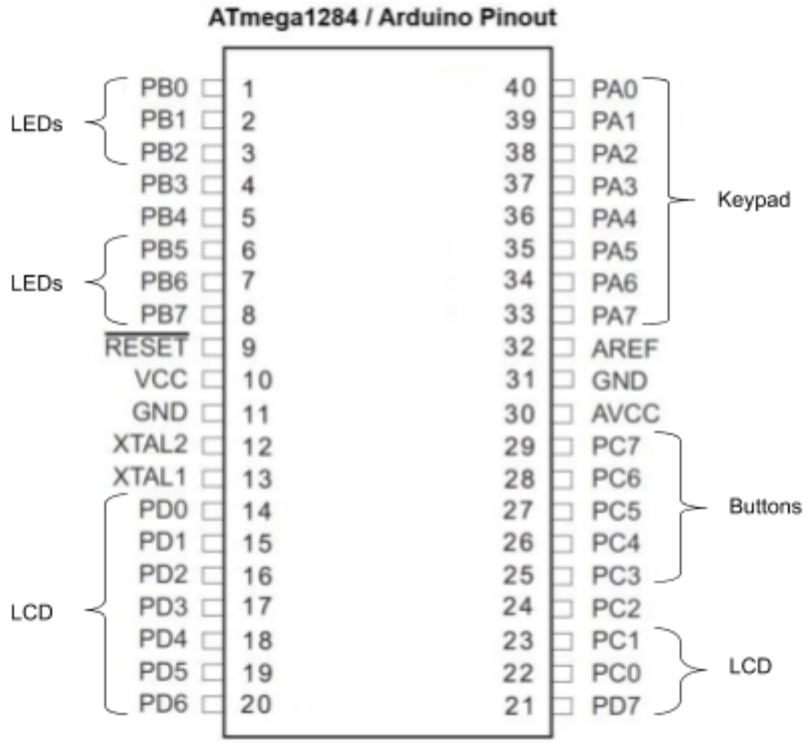
Hardware

Parts List

The hardware that was used in this design is listed below. The equipment that was not taught in this course has been bolded.

- ATMega1284p microcontroller
- 16-button Keypad
- 10-LED bar
- Buttons
- LCD Screen

Pinout

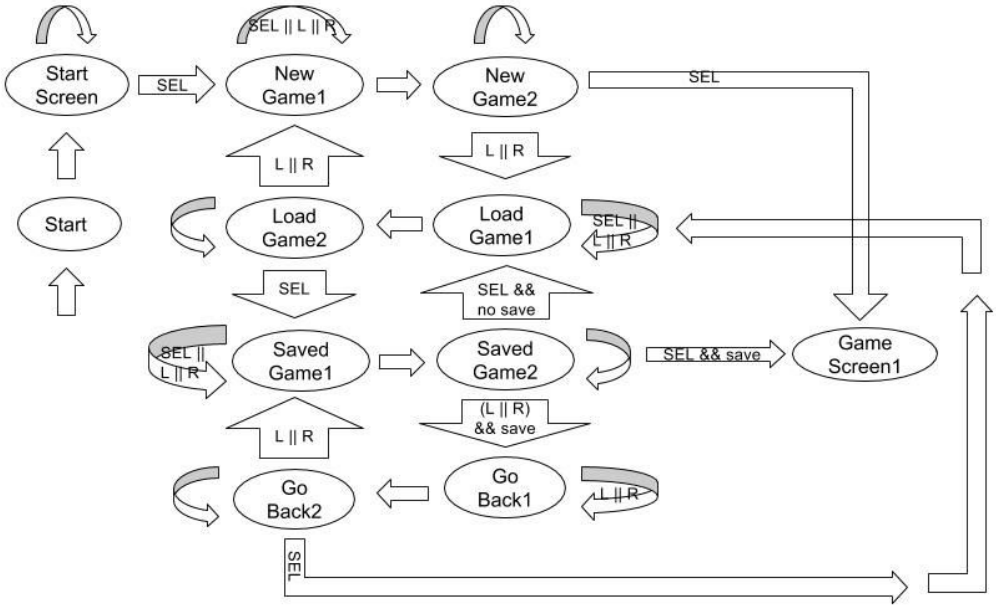

ATmega1284 / Arduino Pinout
LEDs
LEDs
LCD
Keypad
Buttons
LCD
PB0 1
PB1 2
PB2 3
PB3 4
PB4 5
PB5 6
PB6 7
PB7 8
RESET 9
VCC 10
GND 11
XTAL2 12
XTAL1 13
PD0 14
PD1 15
PD2 16
PD3 17
PD4 18
PD5 19
PD6 20
40 PA0
39 PA1
38 PA2
37 PA3
36 PA4
35 PA5
34 PA6
33 PA7
32 AREF
31 GND
30 AVCC
29 PC7
28 PC6
27 PC5
26 PC4
25 PC3
24 PC2
23 PC1
22 PC0
21 PD7

Software

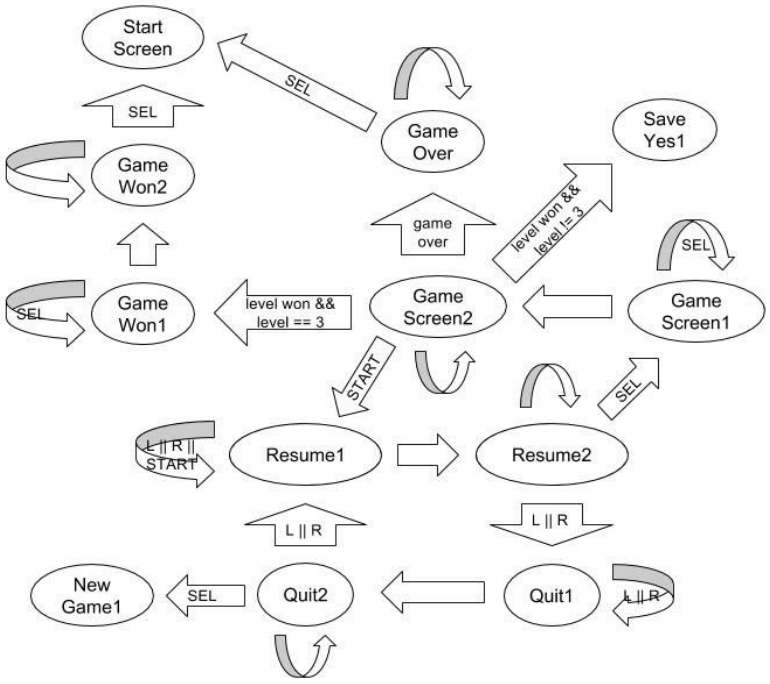
(All transitions without designated conditions are taken in lieu of any others i.e. else transitions. All transitions are de facto mutually exclusive.)

LCD state machine

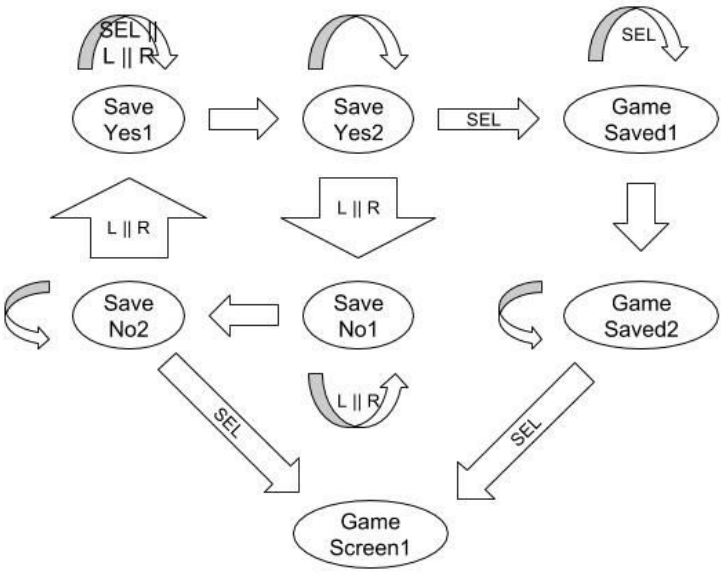
Main menu



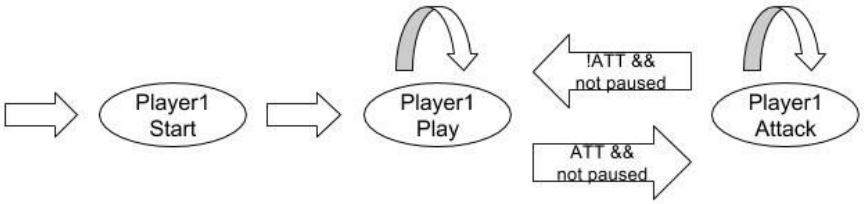
Gameplay



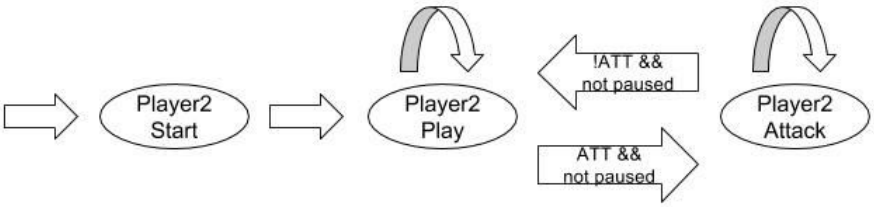
Save screen



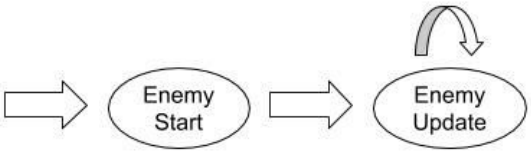
Player 1 state machine



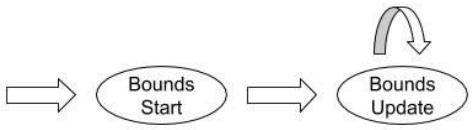
Player 2 state machine



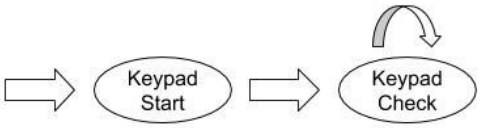
Enemy state machine



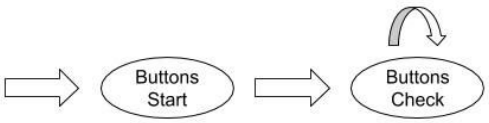
Bounds state machine



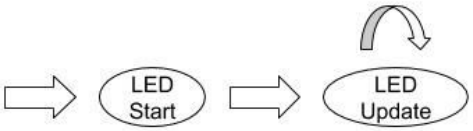
Keypad state machine



Buttons state machine



LED state machine



Complexities

Completed Complexities:

- Enemy characters that act autonomously and can interact with players
- Multiplayer capabilities allowing two players to act independently of each other
- Using EEPROM to save the players' progress and health
- Creating custom characters on the LCD screen

Incomplete complexities:

- N/A

Known Bugs and Shortcomings

- Issue with taking multiple transitions when exiting gameplay after a win or loss. Most likely a problem with state machine logic.
- Players are currently able to walk off-screen if the other player does not move. This can be fixed by altering the existing player movement logic.

Future work

Potential improvements include the implementation of the speaker system to provide accompanying sound effects to augment gameplay. Random level generation and the addition of a tutorial are also potential additions.