CS/EE 120B Custom Laboratory

Project Report

WALLY

Juan Yepez
Jyepe007 - 862309267

High Level Description:

This will be a single player game where the player will have to position the ultrasonic sensor the correct distance that has been generated by the RNG and the nokia screen keeps track of how long it takes to guess the right distances for the 5 previous games.

Complexities:

- Using ultrasonic sensor to measure user distance
- Using Random number generator to generate a random distance that the user has to position the ultrasonic sensor
- Using Nokia 5110 LCD Screen to display game screen

Basic Functionality :

Baseline version: a player has to guess what distance the random generator chose and the 3 leds would help guide the player to the correct distance that was chosen. And the amount of seconds taken to guess the right distance

Pressing the Power button turns on the game and pushing the reset button resets the score of the past 5 previous games and the current game

A player will turn on the system which will immediately start the game. The user must use the leds to guide the positioning of the system(“wally”). Once the player has positioned Wally to the right distance from a wall. A new distance will be generated and the player must repeat that process to get the right distance. The Nokia Screen will be displaying the number of seconds it took the player to get the right distance for each level. Once the player has guessed all 5 of the

distances all three LEDS(red, green, blue) will blink. Then the player will have to reset the game to play again or hit the power button to shut it down.

Hardware Components:

Computing
- Elegoo Uno R3 microcontroller
- Arduinos Internal EEPROM

Inputs
- Supersonic sensor
- 2 x buttons(PULLUP)

Outputs
- Devmo 84 * 48 LCD module white backlight
- 3 leds to signal closer, farther or just right;

Software Libraries:

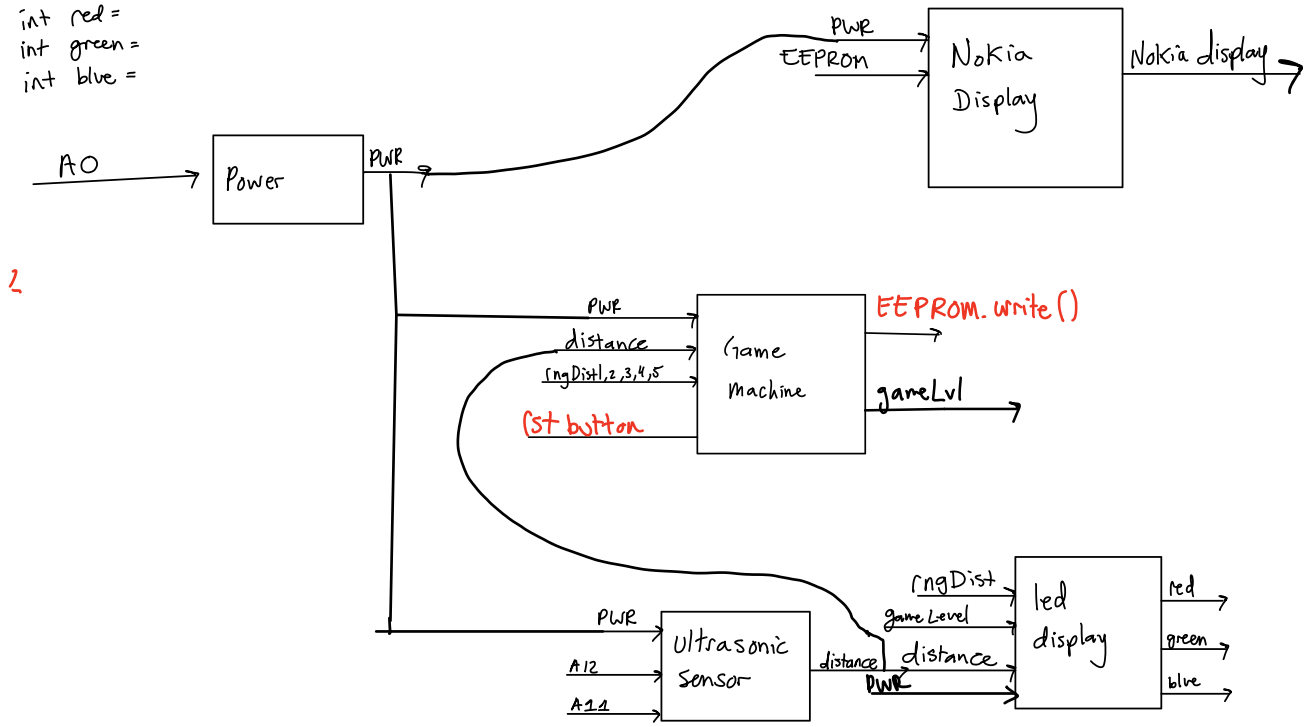
- **Stdlib**
  - This was used to convert float values into string values, so they could be displayed on the Nokia Screen
- **EEPROM**
  - This was not used as a complexity but it was an interesting feature to add to store the score values from the game played. Which could then be read in another program without having to interfere with the code for the custom lab

WATY

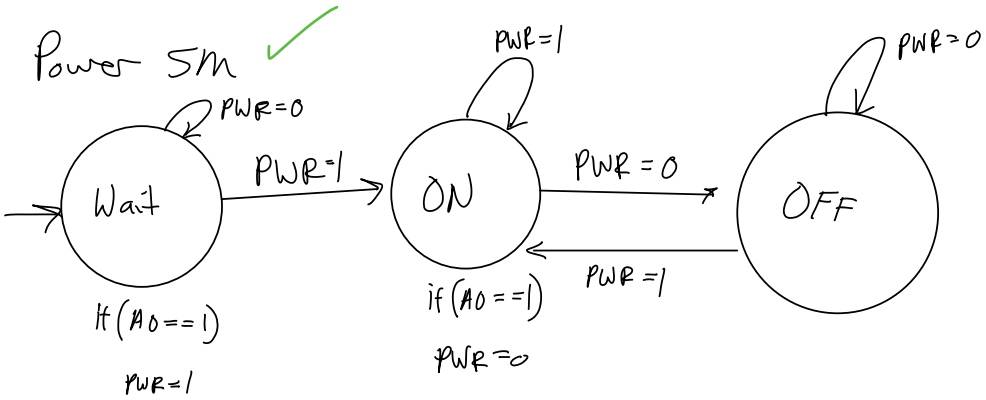
Task Diagram & State Machines

Global Variables

```
int pwr;
int reset;
int rngDist;
int red =
int green =
int blue =
```



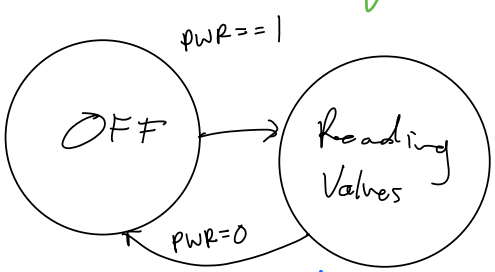
2



Period : 300 ms

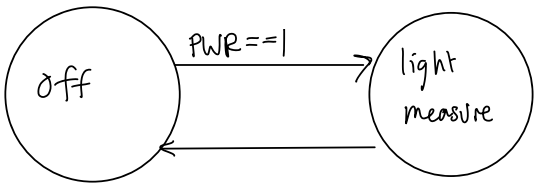
UltranSonic Sensor SM

Period : 500 ms



distance = reading from sensor

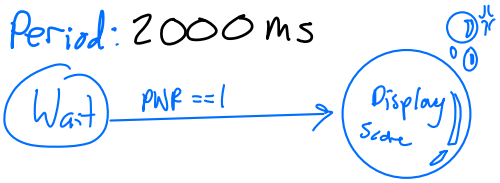
Led Display SM Period = 1000 ms




```
if (gameLvl == 6){
    light blue = 1
    light red = 1
    light green = 1
}
else  if (Read > Curr)
    light blue = 1
    light red = 0
    light green = 0
  else if (Read < curr)
    light blue = 0
    light red = 1
    light green = 0
  else if (Read == curr)
    light blue = 0
    light red = 0
    light green = 1
```

Nokia SM

Period: 2000 ms

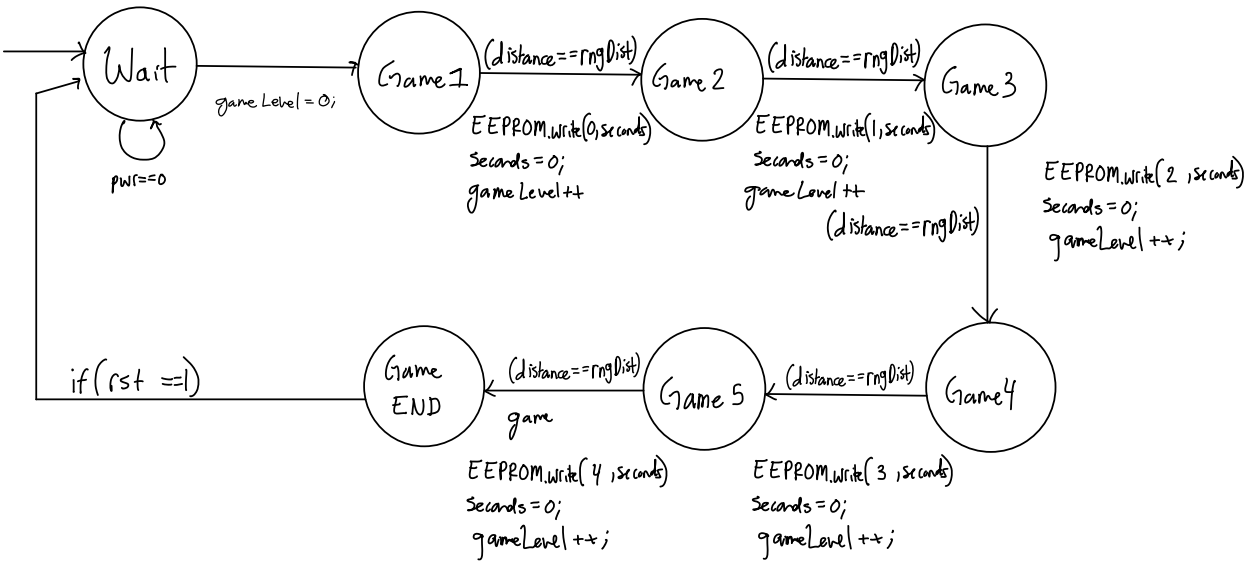



```
//print scores
//read addresses of EEPROM
display:
```

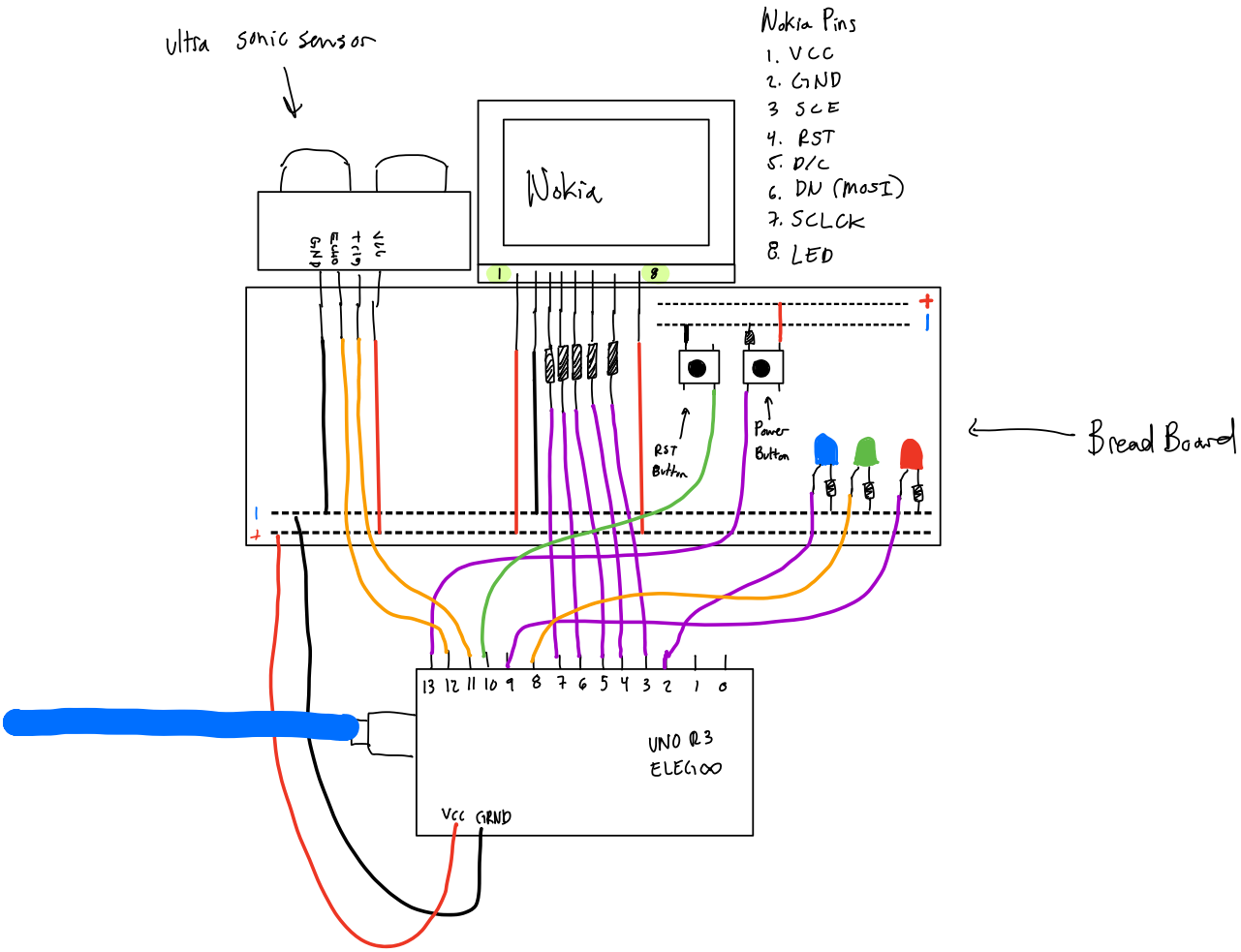
Wally Scores
1. xxx
2. xxx
3. xxx
4. xxx
5. xxx

Game System SM

Period = 1000 ms



Wiring Diagram



Pictures of Wally System