Project Proposal: Battleship

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Overview/Goal/Purpose

The goal of this project is to recreate the board game battleship on the stm32 board. We got our insight from the GO game in the previous years’ projects for using 8x8 dot LED displays for the ‘board’ of the game and using Wii nunchuks to control the pieces.

Peripherals

-2 MAX7219 8x8 Dot Matrix Red LED Display
-2 Wii Nunchuk Controller
-Termite terminal

Serial interface protocols

-I2C (Wii Nunchuk)
-SPI (8x8 Dot Matrix Red LED Display)
-UART (Termite terminal)
Block diagram

![Block diagram diagram](image)

Figure 1: Block diagram

Responsibility list

Eric: Display, website
Anna: Nunchuk, termite
Both: game logic

Software structure

Files needed: nunchuk.c, display.c, spi.c, i2c.c, main.c, sysTick.c

Program flow

1. Initialize I2C for Wii nunchuk
2. Initialize SPI for 8x8 Dot Matrix LED displays
3. Initialize UART for Termite terminal
4. Set up PWM to be used to toggle the player’s cursor with systick interrupt
5. Randomly initialize ship locations
6. Do game logic (recalculate displays)
7. When reach win condition, show winning prompts
State diagram

Figure 2: State diagram

Game state description

<table>
<thead>
<tr>
<th>State</th>
<th>player1 display</th>
<th>player2 display</th>
</tr>
</thead>
<tbody>
<tr>
<td>selecting1</td>
<td>SELECTED1</td>
<td>OWN2</td>
</tr>
<tr>
<td>hitting1</td>
<td>HITTED1</td>
<td>OWN2</td>
</tr>
<tr>
<td>selecting2</td>
<td>OWN1</td>
<td>SELECTED2</td>
</tr>
<tr>
<td>hitting2</td>
<td>OWN1</td>
<td>HITTED2</td>
</tr>
</tbody>
</table>

Display description

Each player will have 3 kinds of display arrangements available which will be stored in six 2D int arrays:
1. Shows your current ships that hasn’t been taken down (OWN)
2. Shows the enemy ship locations that have been targeted before (SELECTED)
3. Shows the enemy ship locations that were actually hit before (HITTED)

Game controls

Wii nunchuk joystick: move the player’s selection position when in the SELECTING state
Wii nunchuk C: toggle between HITTED and SELECTED display when player is selecting
Wii nunchuk Z: select the position to hit
Website

https://yi-hsien.github.io/153b_anna_eric/

Stretch goals

- player selecting the location of ships
- using LCD display instead of termite terminal for showing game prompts
- programming a winning screen on 8x8 matrix