

### **Overview:**

For our final project, we will be creating a type of memorization game using the STM32L476 Discovery board. We will use a dot matrix module to display up, down, left, and right arrows and a Wii nunchuck for the player to use. The purpose of this game is to test the player's memorization skills and speed. By displaying a set of instructions on the module one by one and a certain speed, the player has to input the same directions in the same order on the Wii nunchuk before their time runs out in order to move on to the next round. The number of instructions will continue to grow as the player passes a round. If a player does not input the correct instruction or don't input the sequence within the amount of time they are given, then the player will lose one life. Once the player loses 3 lives, the game is over. The player can also choose the difficulty level which determines how fast the instructions appear on the module and the amount of time they have to input the sequence.

### **Peripherals and Protocols:**

- Wii nunchuck ( I2C option 2 )
- Dot matrix module ( SPI )
- Speaker ( If enough time )
- SD card for audio ( if enough time )

### **Software Design:**

For the dot matrix module, in order to display the set of instructions we can use a buffer that will initially hold a set. As the player moves past rounds, the size of the buffer will increase as more instructions are added. We will use I2C protocol to connect the Wii nunchuck with the Discovery board and dot matrix module. If the player inputs the wrong direction and messes up the sequence, an interrupt will be sent to the processor.

### **Goals:**

- The number of instructions increases after each round.
- Make the game more challenging as the difficulty level increases.
- Display "Game Over" on the LCD display if the player loses 3 lives.
- Display "Success" if the input sequence is correct.
- Display amount of time they have on LCD. ( If enough time )
- Add unique sounds that will play depending if the player is successful or not ( if enough time ).

### **Responsibilities:**

Nazar Rybii will be responsible for the dot matrix module and making sure it interfaces with the STM32 correctly using the SPI protocol. Antonio Medina will be responsible for the Wii nunchucks and making sure it connects properly with the STM32 board using I2C protocol. We will both be responsible for the software design of the memory game and implementation of the difficulty levels that will determine the speed the instructions will show up on the module and how much time the player has. We will also both be responsible for the website and weekly updates.

**Website:**

<https://sites.google.com/view/simonsaysgame/home>