GEBZE TECHNICAL UNIVERSITY

CSE101 TERM PROJECT GROUP-12

"HOT & COLD"

CONTENTS

1. PROBLEM DESCRIPTION

As a team, we decided to make a game called "Hot&Cold" after two appointments.

The game is played with 2 player and is basically a guessing game. Players are choosing their points one by one on the 8x8 dot matrix LED with their joystick and they are trying to guess their opponents point. To send information of selected points to other players arduino, we needed to make serial communication with two arduinos. First player to find the point wins. According to the distance of the predicted point from the actual point the instructions on the LCD screen and the sound from the buzzer, make the guessing process easier and fun.

Aim of the project was make fun and create an original and unique project while doing some collaborative work as a team.

2. HOW IT OPERATES AND DESCRIPTION OF SOLUTION

The code begins with including necessary libraries that provide functions for working with the LED matrix, LCD screen, and audio output. At the beginning defines several constants used at the the program, such as the pin numbers for the LED matrix and the joystick, and the number of devices in the LED matrix.

In the *setup()* function, the LED matrix and LCD screen are initialized using the MD_MAX72XX and LiquidCrystal_I2C objects. The passive buzzer is also set up to play sounds using the *tone()* and *noTone()* functions. The initial position of the pixel on the LED matrix is set to the center of the matrix using the x and y variables.

pixelMotion() function reads the joystick's position using the *analogRead()* function on the *VERT_PIN* and *HORZ_PIN* pins and updates the position of the pixel on the LED matrix by using the *setPoint()* function of the matrix object. The x and y variables are constrained to remain within the dimensions of the matrix (*maxX* and *maxY)* so that the pixel does not move off the screen.

The *randomPosition()* function is called once at the beginning of the game to select a random position on the matrix. The coordinates of the selected position are stored in the *randx* and *randy* variables. If this is the first time *randomPosition()* is called, it also sets the initial position of the pixel to a random location on the matrix using the x and y variables and stores the coordinates in first_x and first_y for later.

The distance between the pixel's current position and the target position is calculated using the *abs()* function and the Pythagorean theorem. If the pixel is within a certain distance of the target position, the program plays a "hot" sound using the *hotSound()* function and displays a message on the LCD screen. Otherwise, it plays a "cold" sound using the *coldSound()* function.

If the pixel reaches the target position, the program displays a message on the LCD screen and waits for the user to press the button connected to *digital pin 2* using the *digitalRead()* function before starting a new game.

Besides the software part, game works with two arduino bords to make communication described at above and it powered from USB port. Design of the circuit is given at the *Part 3. NECESSARY DRAWINGS.*
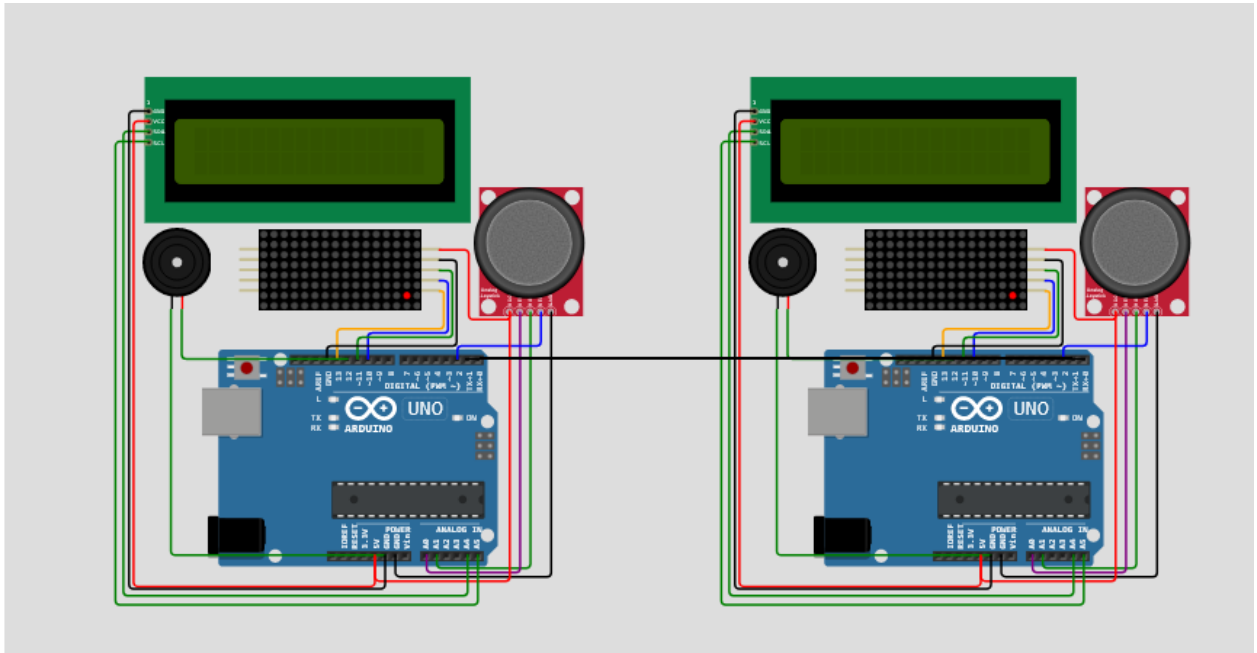
We made a box design to make the product look nice from the outside with 3D printer. Design of the box is also given in the *Part 3.NECESSARY DRAWINGS*
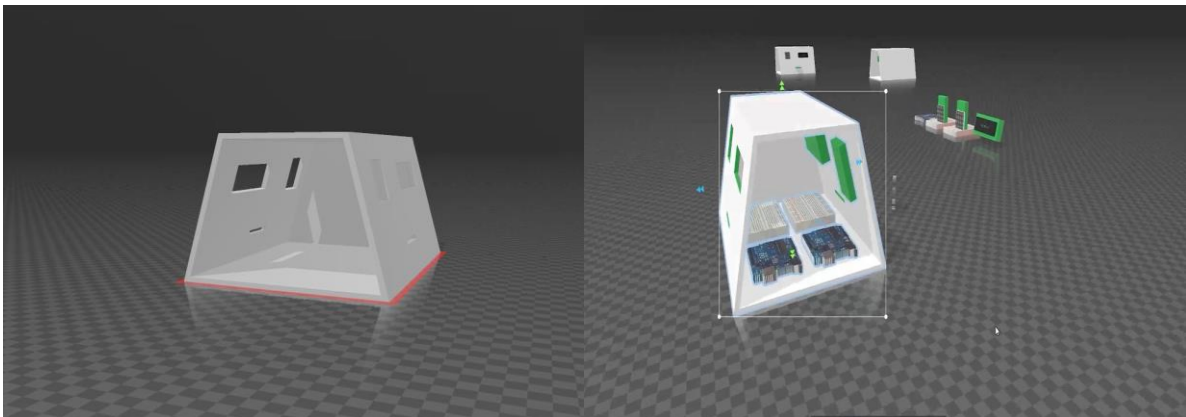
3. NECESSARY DRAWINGS

3.1. Flowchart
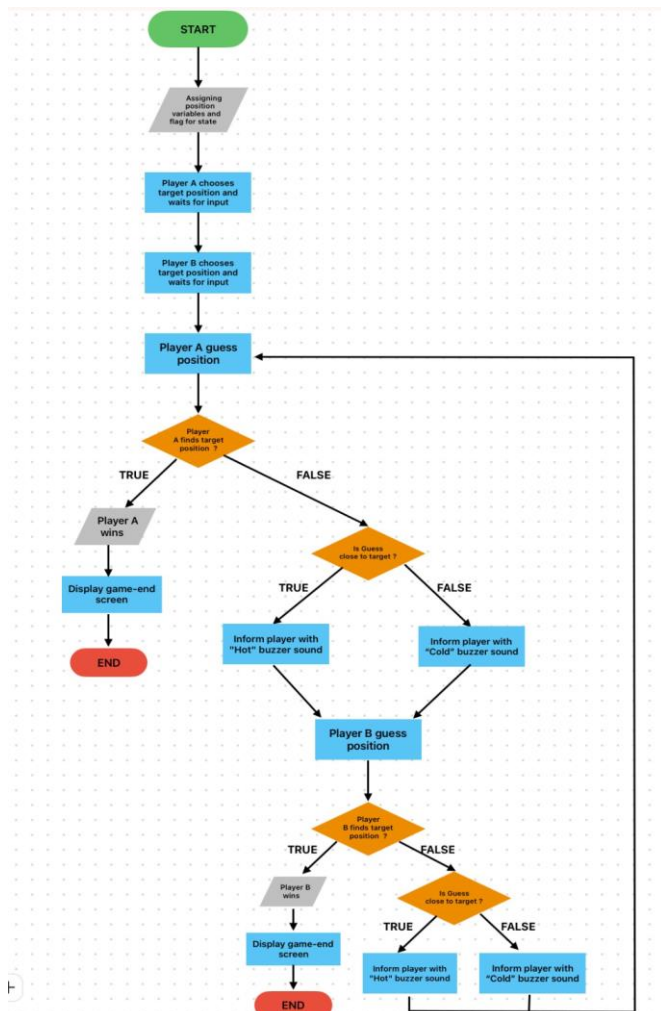
3.2.   Circuit Design

3.3.   Box Design

4. INPUTS AND OUTPUTS

4.1. INPUTS

4.1.1. Budget Management & Shopping:

2x Matrix LED, 2x Joystick (200 TL)

Filament and 3D Printing (300 TL)

4.1.2.Equipments:

2x 16x2 LCD

2x I2C MODULE

2x JOYSTICK

2x 8x8 Dot Matrix LED

2x Arduino Uno

2x Breadboard

1x Passive Buzzer

+500 g Filament

4.2. OUTPUTS

4.2.1.Simulations and Tests

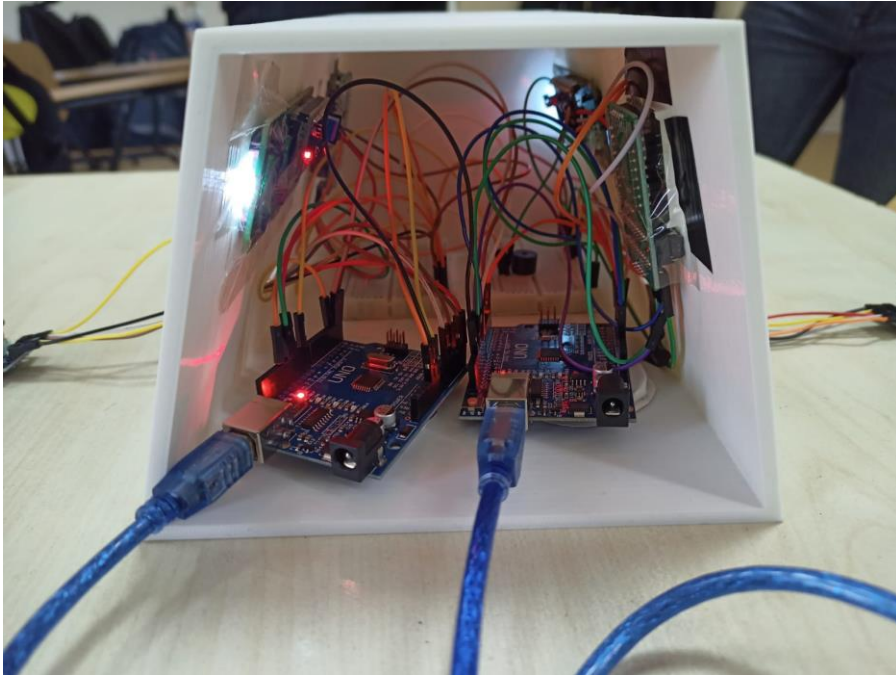https://github.com/ieayvaz/cse101-proje/blob/main/first%20player (code for first player)

https://github.com/ieayvaz/cse101-proje/blob/main/second%20player (code for second player)

https://wokwi.com/projects/352326835246798849

https://wokwi.com/projects/352299077763052545

4.2.2. Videos and Images

https://www.youtube.com/watch?v=zoDZ3X8Gaco&feature=youtu.be
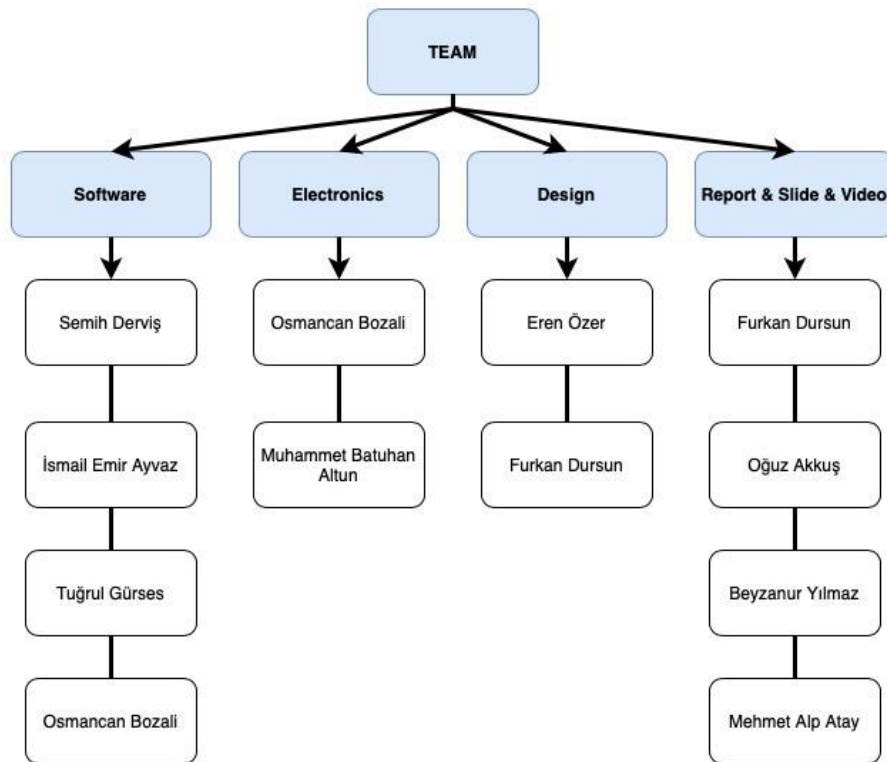
5. TEAM MEMBERS & DISTRUBUTION OF ROLES

Osmamcan Bozali: He was the project leader. Was responsible for electronic design, assembling the circuit and serial comminication.

Oğuz Akkuş: He did video editing and prepared the presantation.

Beyzanur Yılmaz: Was responsible for preparing the presentation and she presented the project. She did the shopping.

Mehmet Alp Atay: Was responsible for report and drawed the flowchart.

Eren Özer: Was responsible for 3D design. He printed the box, provided some hardware parts.

İsmail Emir Ayvaz: Was responsible for coding. Programmed the game with Semih.

Tuğrul Gürses: Was responsible for code review. He soldered the LCD and helped for assembling the circuit.

Furkan Dursun: Was responsible for prepare the report. He helped for assembling the project and design.

Semih Derviş: Was responsible for coding. Programmed the game with İsmail, prepared early demos of the project. Fixed the bugs

Muhammet Batuhan Altun: Was responsible to design hardware.

6. RESULTS AND CONCLUSION

At first, we determined the course of the project and created our plan. Then we did the distribution of roles. By sticking that plan we completed our project.

For a brief summary "Hot&Cold" is a two-player guessing game where players take turns guessing each other's chosen point on an 8x8 dot matrix LED using a joystick. The game uses two Arduino boards for serial communication between players and an LCD screen and a buzzer for feedback on the distance between the guessed point and the actual point. The aim of the project is to create an original and fun project while working as a team. The solution operates by using libraries for the LED matrix, LCD screen, and audio output. The game begins by randomly selecting a target point on the matrix and players take turns guessing its location. To present our product we made a custom box with using 3D printer. After we create our report and presentation we completed our project succesfully.

7. SOURCES AND REFERENCES

https://github.com/MajicDesigns/MD_MAX72XX/tree/main/examples

https://wokwi.com/

https://www.electroniclinic.com/serial-communication-between-two-arduino-boards/