**“The Pong of One**” **Documentation**

**Introduction**

“The Pong of One” (TPOO) is a remake of one of the most popular classic arcade videogames Pong and it is designed to provide its user with entertainment to no end. Using a LED Matrix and a joystick, both powered by Arduino Uno microcontroller, this gadget can test how quick its user’s response time is and provide them fun little challenges.

**Project Overview**

This gadget consists of the following components:

* Arduino Uno: The Arduino board is the core of the TPOO
* The joystick provides the user with means of control
* The LED matrix provides the output of the system
* The breadboard is used for easier and less messy connection of the other components

**Hardware Requirements**

To build the TPOO, the following hardware components are required:

* Arduino Uno board
* Breadboard
* Joystick
* LED Matrix MAX7219
* USB cable
* Jumper cable

**Software Requirements**

To program the Arduino Uno board for the gadge, the following software tools are needed:

* Arduino IDE
* SPI.h library (included in Arduino IDE)
* MD\_MAX72xx.h library (third-party library for Arduino IDE)

**Circuit Diagram**

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**Code Explanation**

Libraries “MD\_MAX72xx.h” and “SPI.h” are used for LED matrix control

Horizontal and vertical position is recorded and changed for plate and for ball in VA, HA, BVA and BHA variables

Plate is limited from 0x1 to 7x7, and ball - from 0x1 to 7x23

If the ball touches a wall or plate, its direction changes by 90º along the corresponding axis

If the ball touches the far wall, a 100ms signal will be returned by LED 0x28 – 7x31, if it touches the door (the red wall) – it will be returned to its starting position

Pushing the joystick down will restart the game

**Step-by-Step instructions**

Follow these instructions to build the TPOO:

1. Assemble the hardware components on the breadboard
2. Connect the joystick and the LED matrix to the appropriate pins on the Arduino board, ensuring proper power and ground connections. (analog and digital for the joystick and digital for the matrix)
3. Upload the code from Arduino IDE to the Arduino board
4. Power on the system

**Testing and Troubleshooting**

To test the TPOO, follow these steps:

* Move and/or press the joystick to control what appears on the LED display

If any issues are encountered, consider doing the following:

* Check all connections and ensure they are properly secured
* Check the code for syntax errors or incorrect pin assignments

**Safety Considerations**

When building the TPOO, consider the following safety considerations:

* Be cautious while handling electrical components to avoid electric shocks.
* Disconnect power before making any changes to the circuit.
* Avoid exposing the components to moisture or extreme environmental conditions.

**Contributers**

Our team consists of:

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