iBot Club Workshop Phase

Task Set 1.2: Output Interfacing

Coordinator Team

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PREREQUISITE

YOU MUST COMPLETE TASK SET 1.1 BEFORE STARTING THIS SET.

REQUIREMENT

Laptop with Arduino IDE is required.

1 Overview

This set focuses on actuating and displaying information. You will control sound, movement, and two different types of display screens.

2 Component Locations

Please note the specific locations for these components:

- **Arduino, Breadboard, Cables:** Middle Drawer.
- **Buzzer, OLED Display, Potentiometer: Middle Drawer**.
- **LCD 16x2 Display & Servos:** In the box on the **Centre Brown Table**.
- **Jumper Cables:** Box in the **Open Shelf**.

3 Task 1.2.1: The Piezo Buzzer

Objective

Generate sound using a piezo buzzer.

Instructions

1. Connect the Buzzer to the Arduino (ensure correct polarity if marked +).
2. Use the `tone(pin, frequency)` function to generate a sound.
3. **Goal:** Create a simple beeping pattern (e.g., On for 1 second, Off for 1 second).

4 Task 1.2.2: 16x2 LCD Display (Hello World)

Objective

Interface a standard 16x2 Liquid Crystal Display to show text.

Hardware Required

- LCD 16x2 Screen (Centre Brown Table)
- Potentiometer (Middle Drawer) - *Required for contrast adjustment.*
- Resistor (Middle Drawer) - *For backlight.*

Instructions

1. Wire the LCD to the Arduino.
2. **Wiring Note:** You must connect the Contrast Pin (V0) to the potentiometer wiper to see the text.
3. Use the standard `LiquidCrystal` library.
4. Print "Hello World" on the top row and your name (or "iBot Club") on the bottom row.

5 Task 1.2.3: I2C OLED Display

Objective

Interface a modern OLED display using the I2C protocol (SDA/SCL).

Hardware Required

- OLED Display Module (Middle Drawer)

Instructions

1. Connect the OLED display:
   - **SDA** → Arduino A4 (or SDA pin)
   - **SCL** → Arduino A5 (or SCL pin)
   - **VCC** → 5V (Check if your module is 3.3V or 5V!)
   - **GND** → GND
2. Install the necessary libraries (e.g., `Adafruit_SSD1306` and `Adafruit_GFX`).
3. Display "Hello World" and draw a simple shape (rectangle/circle) on the screen.

6 Task 1.2.4: Servo Motor Control

Objective

Control the angular position of a servo motor.

Hardware Required

- Servo Motor (Centre Brown Table - same box as LCDs)

Instructions

1. Connect the Servo:
   - **Brown/Black Wire** → GND
   - **Red Wire** → 5V
   - **Orange/Signal Wire** → PWM Pin (e.g., Pin 9)
2. Use the `Servo.h` library.
3. Write code to "Sweep" the servo: rotate smoothly from 0° to 180°, and then back to 0°.

7 Submission Guidelines

Submit via Google Form:

- **GitHub Link:** Repository containing folders for all 4 tasks.
- **Drive Link:**
  - Video of the **Buzzer** beeping.
  - Video of the **Servo** sweeping.
  - Photo/Video of the **OLED** and **LCD** showing "Hello World".

8 Cleanup (Strictly Enforced)

- **Return LCDs Servos** to the **Box on the Centre Brown Table**.
- **Return OLEDs, Buzzers, Potentiometers Arduino** to the **Middle Drawer**.
- **Return Jumpers** to the **Open Shelf**.
- Dismantle all circuits completely.