Activity 5: OLED Display

Let's go through the steps to wire and program a Raspberry Pi Pico with an OLED display using MicroPython. We'll use the SSD1306 OLED display as an example. Ensure that you have an OLED display that is compatible with the SSD1306 driver.

Wiring:

1. OLED Display Wiring:

- Connect the OLED display to the Raspberry Pi Pico using the following connections:
  - OLED SDA to pin 2 (GP2) on the Raspberry Pi Pico.
  - OLED SCL to pin 3 (GP3) on the Raspberry Pi Pico.
  - OLED VCC to 3V3 (3.3V) on the Raspberry Pi Pico.
  - OLED GND to GND on the Raspberry Pi Pico.

Programming:

2. Install Thonny IDE:

- If you haven't already, install the Thonny IDE on your computer.

3. Connect Raspberry Pi Pico:

- Connect your Raspberry Pi Pico to your computer using a USB cable.

4. Install MicroPython Firmware:

- Make sure your Raspberry Pi Pico has the MicroPython firmware installed. If not, you can download the firmware from the [official MicroPython website](https://micropython.org/download/rp2-pico/) and follow the installation instructions.

5. Open Thonny:

- Open the Thonny IDE on your computer.

6. Install MicroPython Libraries:

- Install the MicroPython libraries for the SSD1306 OLED display. You can download the library from:

https://github.com/ump-stemlab/stemcube/blob/6fe30ce4f8d8bc2201b565d422e942a2a649c935/ssd1306.py

- Save the `ssd1306.py` file in the same directory as your project.

7. Create a New Script:

- Create a new Python script by selecting "File" > "New" in Thonny.

8. Write the Code for OLED Display:

- Copy the following code into the script:

```python
from machine import Pin, I2C
from ssd1306 import SSD1306_I2C
import utime

i2c=I2C(1,sda=Pin(2), scl=Pin(3), freq=400000)
oled = SSD1306_I2C(128, 64, i2c)

while True:

    # Clear the OLED display
    oled.fill(0)
    oled.show()

    utime.sleep(1)

    # Display text on the OLED display
    oled.text("Hello,", 0, 0) # Write text at postion 0,0 (x,y)
    oled.text("MicroPython!", 0, 20)# Write text at postion 0,20 (x,y)
    oled.show()

    # Wait for 5 seconds
    utime.sleep(5)
```

9. Save the Script:

- Save the script with a .py extension, for example, `main.py`.

10. Run the Script:

- Click on the "Run" button (green triangle) in Thonny to execute the script.

11. Observe the OLED Display:

- Observe the OLED display connected to your Raspberry Pi Pico. It should display the "Hello, MicroPython!" message for 5 seconds and then clear the display.

12. Understand the Code:

- Review the comments in the code to understand each step. The code initializes the OLED display, displays a message, waits for 5 seconds, and then clears the display.

13. Exercise:

- Modify the code to display 2 or 3 different messages, one after another.

This step-by-step guide should help you wire and program your Raspberry Pi Pico to work with an OLED display using MicroPython.