Microcontroller Troubleshooting Guide Fall 2024 Not RP2040

Notes:
Possible microcontrollers that you might use in the lab:
Seed ESP323C this not the the same as ESP323S, (camera).
These links will provide you with pinouts, board installation instructions, etc.

Check with your instructor if the appropriate software is installed.

Be sure you have access to a multimeter

Hardware Setup - LED
- ☐ Verify your microcontroller is physically connected to your computer via USB cable
- ☐ Ensure you have the appropriate programming software installed (e.g., Arduino IDE)
    - ☐ Yes - proceed
    - ☐ No - speak to your instructor

How are you connecting to the microcontroller to the LED?
- ☐ Refer to your WOKWI simulation and how to setup your LED with the microcontroller
    - ☐ Yes proceed
    - ☐ No - create a simulation blinking a LED with your microcontroller using Wokwi
- ☐ Do you have a pinouts guide for your microcontroller?
    - ☐ Yes - proceed
    - ☐ No - See the microcontroller links above and screenshot the pinouts. You will need the pinouts for documetation
        - ☐ GPIO Pins refer to number (2)
        - ☐ Digital Pins refer to D and number (D2)
- ☐ Did you connect a LED?
    - ☐ LED has polarity
        - ☐ Long leg +
        - ☐ Short leg -
- ☐ Did you attach a resistor?
    - ☐ 100 to 500 ohm
- ☐ Did you attach the ground of the LED to the ground of the microcontroller

Test the LED setup

- ☐ Connect the 5 volts pin on the microcontroller to the + or long leg of the LED
- ☐ Does the LED light up
- ☐ Yes - proceed and discconnect the positive leg of the LED from 5 volts to another digital pin. Be sure to record the digital pin that you chose.
- ☐ No - check the following
    - ☐ Is your LED polarity correct?
        - ☐ Yes - proceed
        - ☐ No
    - ☐ Check your ground connection
        - ☐ Yes - proceed
        - ☐ No
    - ☐ Check your 5V connection
        - ☐ Yes - proceed
        - ☐ No
    - ☐ Check the resistance value of the resistor
    - ☐ Is it between 100 to 500 ohms?
        - ☐ Yes - proceed
        - ☐ No - change resistors
    - ☐ Swap out the LED
        - ☐ Yes - proceed
        - ☐ No - use a multimeter and repeat the troubleshooting sequence
    - ☐ If the LED still will not light up, reach out to your instructor
- ☐ Once the LED lights up, disconnect the LED from the 5 volt and connect it to another digital pin that can be programmed.

Testing with a Basic Blink Program
Loading the Blink Program
- ☐ Open your programming environment
- ☐ Load the basic Blink program
    - ☐ Example→Basics→Blink

Compilation Check
- ☐ Program compiles - proceed
- ☐ Program doesn't compile:

Verify Board Selection
- ☐ Go to Tools → Board
- ☐ Select the correct microcontroller model
- ☐ Try compiling again

If Still Not Compiling
- ☐ Check the error message in the console
- ☐ Look for syntax errors in your code
- ☐ Use AI tools or documentation to understand error messages
- ☐ Common issues include missing semicolons, brackets, or incorrect function names

Upload Process
If compilation succeeds but upload fails:

USB Connection Check
- ☐ Ensure USB cable is firmly connected
- ☐ Try a different USB port
- ☐ Try a different USB cable

COM Port Verification
- ☐ Check Tools → Port
- ☐ Your microcontroller should appear as a COM port, never COM port 1
- ☐ If no COM port is visible:
    - ☐ Check if board drivers are installed
    - ☐ Install required drivers from board manufacturer's website
    - ☐ Restart computer
    - ☐ Try connection again

Uploads succeeds and the light blinks in once second intervals

If yes - confirm program operation

- ☐ Change the blink duration in your code (e.g., from 1000ms to 500ms)
- ☐ Upload modified program

If the blink rate doesn't change:

- ☐ Check your programming code
- ☐ Check your hardware
- ☐ After checking your software and hardware, speak to your instructor.

Common Issues and Solutions

1. No COM Port Detected
   * Driver not installed
   * Faulty USB cable
   * Wrong USB port (some cables are charge*only)

2. Compilation Errors
   * Incorrect board selection
   * Missing libraries
   * Syntax errors in code

3. Upload Errors
   * Wrong COM port selected
   * Board not responding
   * Invalid board settings

4. LED Not Blinking
   * Missing or incorrect resistor
   * LED installed backwards
   * Wrong pin selected in code
   * Faulty LED

Next Steps
Once your basic blink program is working:
* Important: Modify the blink duration in the code (most microcontrollers come pre*programmed with a blink program, so changing the duration helps verify your changes are working)
* Experiment with different pins
* Add additional LEDs
* Move on to more complex projects

Safety Notes
* Always use current-limiting resistors with LEDs
* Don't exceed voltage ratings of your components
* Disconnect power before making circuit changes