

DEBUGGING FLOWCHART

Does your code compile?

CHECK: Click "Verify" (not "Upload") in Arduino IDE.

No

COMPILATION ERROR

Possible problem	What to do
Syntax error (typo in code)	Read the error message and look for misspelled words, missing semi-colons, undeclared variables, incorrect scope, wrong capitalization, etc.
Xiao pins labeled incorrectly	If you are using a Xiao, make sure your pin numbers begin with "D" or "A." Ex: "int ledPin = D1;" or int sensor = A0;"
Missing library	If you are using additional libraries, make sure they are declared properly at the top. Ex: ESP32Servo.h, Stepper.h, Wire.h, FastLED.h
Missing "setup() or loop()"	Make sure your code has exactly one "void setup()" and "void loop()" function

Yes

Does your code upload to the MCU?

CHECK: Does IDE say "Hard resetting via RTS pin..."?

No

UPLOAD ERROR

Possible problem	What to do
Incorrect board type	If you are using a Xiao, select "XIAO_ESP32C3." If you are using a ESP32 Dev Board, select "ESP32 Dev Module."
Incorrect port	Make sure port name looks like "/dev/cu.usbmodem" (not "Bluetooth" or "debug"). On Windows, unplug and replug to find correct "COM" number
Bootloader issue	Unplug MCU. Hold down boot button while plugging back in to computer. Upload code again. While code is uploading, press boot button.
Interference from components	Disconnect MCU from components (especially those using 3.3 or 5V) and re-upload.
Cable issue	Try a different USB cable.

Yes

Are your output devices working?

CHECK: Run simple example sketches (ex: Blink, Sweep, AccelStepper) for each output component.

No

OUTPUT DEVICE ERROR

Possible problem	What to do
Incorrect pin numbers	Check that your code's pin numbers match with the pinout numbers on your MCU, and that they can be used as output (GPIO).
Pin mode	Make sure you have declared pinMode() correctly in setup, using "OUTPUT"
Wiring	Check wiring, polarity, and resistor/capacitor values. Test solder connections with multimeter to make sure component is receiving power.
Broken component	Try a new output component.

Yes

Are your input devices working?

CHECK: Write code to print all input values to Serial Monitor. Do they make sense?

No

INPUT DEVICE ERROR

Possible problem	What to do
Incorrect pin numbers	Check that your code's pin numbers match with the pinout numbers on your MCU. (Remember to use "D" or "A" for Xiao)
Incorrect pin type	Make sure the input pins you are using are able to be used as analog input. (Xiao AO1/2, ESP32 ADC pins)
Pin mode	Make sure you have declared pinMode() correctly in setup, including "INPUT" or "INPUT_PULLUP"
Wiring	Check that your input device is wired correctly. Search up "[sensor_name] pinout" and follow a diagram if you are not sure.
Broken sensor	Try a new sensor component.

Yes

Is your code running correctly?

Yes

No

CODING ERROR

Possible problem	What to do
Inverted button	Make sure switch/button is reading HIGH when activated and LOW otherwise, not the other way around.
Blocking	Avoid using delay() in code. Use millis() instead.
Infinite loop	Add Serial.print() statements throughout code to see where it is getting stuck
Other	As a last resort, you may use ChatGPT to debug your code. But do not use it to write code from scratch!

If you have exhausted ALL of these cases and it still doesn't work, you may ask the teaching staff for help.