

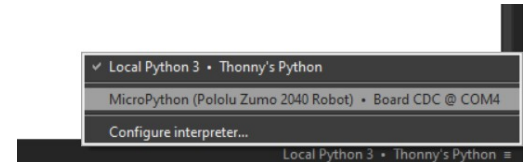
Mini-sumo with the Pololu Zumo 2040 Robot

January 6, 2024 at Pololu - Paul Grayson - pdg@alum.mit.edu - paul@pololu.com

<https://github.com/pdg137/sumo>

Using Thonny

1. Install from <https://thonny.org/> (Windows/Mac/Linux)
2. Go to “Tools > Manage plug-ins...”, install thonny-pololu, and restart
3. Connect the robot with USB-C cable, select Zumo in the lower-right:
4. Open files on the “MicroPython” drive.
5. Find my examples at <https://github.com/pdg137/sumo>



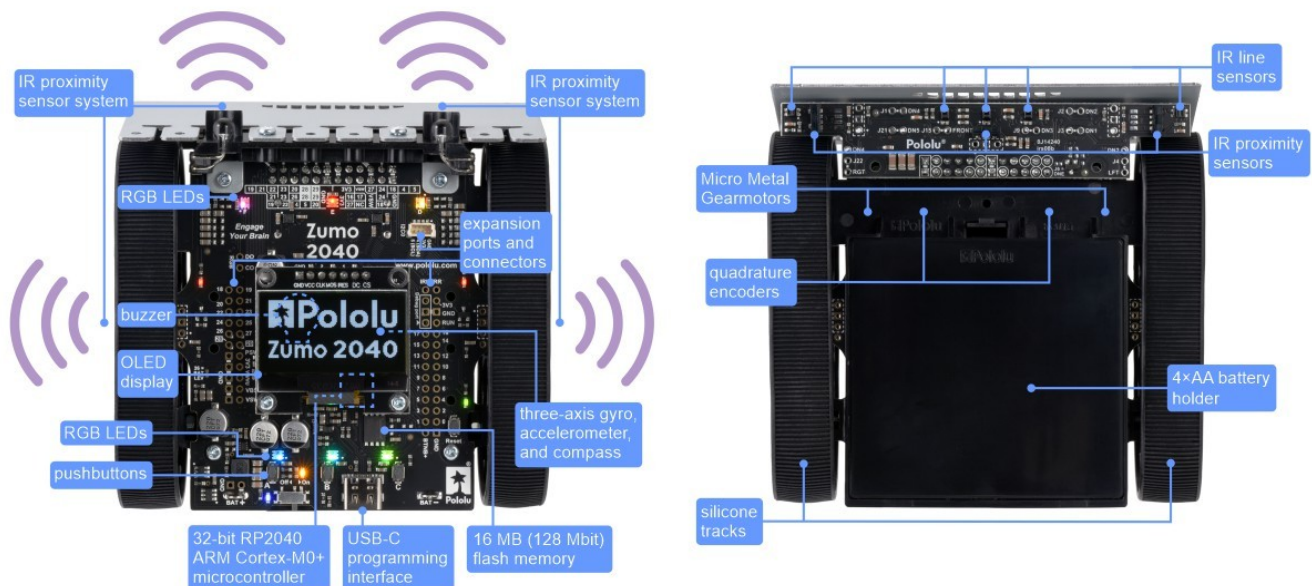
Tips:

- Click “Stop” to reconnect
- When you make progress “Save a copy” on your computer so you don’t lose your work!!!

The Pololu Zumo 2040 Robot

⚡ Static precautions! ⚡

- Avoid touching components and wires as much as possible
- Discharge yourself often (touch a metal door, etc.)
- When handing robot to another person, touch hands first 🙏 🙏



Using MicroPython

Standard MicroPython libraries: <https://docs.micropython.org/en/latest/library>

Pololu Zumo 2040 examples & libraries: <https://github.com/pololu/zumo-2040-robot>

Proximity sensing:

- Two sets of modulated IR emitters: left and right
- Three sensors (left, front, right) count reflected pulses
----> SIX sensing values.

For example, `proximity_sensors.counts[1][0]` gives the reading from the front sensor (1) when the left (0) LEDs are activated.

Structure of a robot program

1	<code>from zumo_2040_robot import robot</code>	1. imports
2	<code>import time</code>	
3		
4	<code>motors = robot.Motors()</code>	2. define variables
5	<code>proximity_sensors = robot.ProximitySensors()</code>	
6	<code>button_a = robot.ButtonA()</code>	
7	<code>display = robot.Display()</code>	
8	<code>buzzer = robot.Buzzer()</code>	
9		
10	<code>display.fill(0)</code>	3. setup
11	<code>display.text("Press A", 0, 0)</code>	
12	<code>display.show()</code>	
13	<code>buzzer.play("o5c32>c32")</code>	
14		
15	<code>while not button_a.check():</code>	
16	<code> pass</code>	
17		
18	<code>display.fill(0)</code>	
19	<code>display.text("Go!!!", 0, 0)</code>	
20	<code>display.show()</code>	
21		
22	<code>buzzer.play("c4r4c4r4")</code>	
23	<code>buzzer.play_in_background("g2")</code>	
24		
25	<code>while True:</code>	4. main loop
26	<code> proximity_sensors.read()</code>	
27		
28	<code> left = proximity_sensors.counts[0]</code>	
29	<code> front = proximity_sensors.counts[1]</code>	
30	<code> right = proximity_sensors.counts[2]</code>	
31		
32	<code> display.fill(0)</code>	
33	<code> display.text(str(list(left)), 0, 0)</code>	
34	<code> display.text(str(list(front)), 0, 10)</code>	
35	<code> display.text(str(list(right)), 0, 20)</code>	
36	<code> display.show()</code>	
37		
38	<code> if sum(front) > 2:</code>	
39	<code> motors.set_speeds(3000, 3000)</code>	
40	<code> elif sum(left) > 1:</code>	
41	<code> motors.set_speeds(-3000, 3000)</code>	
42	<code> elif sum(right) > 1:</code>	
43	<code> motors.set_speeds(3000, -3000)</code>	
44	<code> else:</code>	
45	<code> motors.off()</code>	