□ Raspberry Pi Robotics Worksheet: Controlling Motors with L298N

Objective:
Learn how to control two DC motors using Python and a Raspberry Pi Pico with the L298N motor driver.

□ Wiring Summary

Component	L298N Output	GPIO Pin
Motor A - IN1	OUT1	GP6
Motor A - IN2	OUT2	GP7

Component	L298N Output	GPIO Pin
Enable A	ENA	GP8
Motor B - IN3	OUT3	GP4
Motor B - IN4	OUT4	GP3
Enable B	ENB	GP2

□ Starter Code with Comments

```
from machine import Pin         # Lets us control the Pi Pico’s pins
import time                     # Lets us pause the program

# Motor A (connected to OUT1 and OUT2 on the L298N)
In1 = Pin(6, Pin.OUT)           # Sets GPIO 6 as an output for Motor A direction
In2 = Pin(7, Pin.OUT)           # Sets GPIO 7 as an output for Motor A direction
EN_A = Pin(8, Pin.OUT)          # Sets GPIO 8 as output to enable Motor A

# Motor B (connected to OUT3 and OUT4 on the L298N)
In3 = Pin(4, Pin.OUT)           # Sets GPIO 4 as an output for Motor B direction
In4 = Pin(3, Pin.OUT)           # Sets GPIO 3 as an output for Motor B direction
EN_B = Pin(2, Pin.OUT)          # Sets GPIO 2 as output to enable Motor B

# Turn both motors ON by setting enable pins HIGH
EN_A.high()                     # Turns on Motor A
EN_B.high()                     # Turns on Motor B

# Function to move the robot forward
def move_forward():
    In1.high()                  # Motor A spins forward
```

```
    In2.low()
    In3.high()                # Motor B spins forward
    In4.low()

# Function to stop both motors
def stop():
    In1.low()                 # Stop Motor A
    In2.low()
    In3.low()                 # Stop Motor B
    In4.low()

# TODO: Write your own functions below!

def move_backward():
    # Hint: reverse both motors by switching the direction pins
    pass

def turn_left():
    # Hint: try stopping or reversing one motor
    pass

def turn_right():
    # Hint: try the opposite of turn_left
    pass

# Try it out!
move_forward()                # Move forward
time.sleep(2)                 # Wait for 2 seconds
stop()                        # Stop the robot
```

✍ Challenges

1. **Write the `move_backward()` function.**

- Hint: Reverse both motors by flipping the `.high()` and `.low()` values.

2. **Write the `turn_left()` function.**
   - Hint: You could stop the right motor, or reverse the right motor and keep the left moving forward.
3. **Write the `turn_right()` function.**
   - Hint: Try the opposite of your `turn_left()` function.

✔ Reflection Questions

- What happens when both motors spin in the same direction?
- What happens when one motor spins forward and the other spins backward?
- What could go wrong if both direction pins (IN1 and IN2) are set to HIGH at the same time?

Happy Coding!