Practice 2: Button & Joystick Robot Control

Objective:
In this practice, students will extend the high-level movement function concept from Practice 1 and integrate manual button control and joystick-based control with speed constraints.

Part A: Task 1 – Button-Based Direction Control

Using the movement functions created in Practice 1:
- void move_forward(int speed);
- void move_backward(int speed);
- void turn_left(int speed);
- void turn_right(int speed);
- void stop_robot();

Implement button-based control:
- UP button → move_forward(50)
- DOWN button → move_backward(50)
- LEFT button → turn_left(50)
- RIGHT button → turn_right(50)

If no button is pressed → stop_robot()

Speed is fixed at 50 for this task.

Part B: Task 2 – Joystick Mode (Speed 0–100)

Modify the program to support joystick-based movement control.

Requirements:
- Joystick Y-axis → Forward / Backward
- Joystick X-axis → Turn Left / Turn Right
- Apply dead zone near center position
- Speed must be constrained between 0 and 100
- Convert percentage speed to PWM value

Robot motion must dynamically respond to joystick movement.

Part C: Task 3 – Adjustable Maximum Speed (Default 50)

In this task, implement adjustable maximum speed logic:

- Initial maximum speed = 50
- UP button → increase maximum speed by +5
- DOWN button → decrease maximum speed by -5
- Maximum speed must remain between 0 and 100

Important Rule:
The joystick-controlled speed must not exceed the current maximum speed value.

Example:
If maxSpeed = 60, joystick full forward should produce 60 speed.
If maxSpeed = 40, joystick full forward should produce 40 speed.