EXPERIMENT 16: HUMAN FOLLOWING ROBOT

Objective: The objective of this experiment is to create a robot that can follow a person by detecting their presence and making turns based on infrared sensor inputs.
Setup:

- Assemble the Chelonia Bot hardware following the instructions in Section 2.1.
- Connect the Chelonia Bot to the Arduino IDE as explained in Section 2.3.
- **Motor Connections:**
- Connect the motors to the Chelonia Bot:
  - Connect motor1A (IN1) to pin 8.
  - Connect motor1B (IN2) to pin 9.
  - Connect motor2A (IN3) to pin 10.
  - Connect motor2B (IN4) to pin 11.
- **Infrared Sensor Connections:**
  - Connect the left IR sensor to digital pin 2 (LSP).
  - Connect the right IR sensor to digital pin 6 (RSP).
- **Ultrasonic Sensor Connections:**
  - Connect the Trig pin of the ultrasonic sensor to digital pin 4.
  - Connect the Echo pin of the ultrasonic sensor to digital pin 5.
  - For doubts in the connection please refer to the link provided :Ultrasonic sensor with arduino
- **Power Supply:**
  - Ensure that the robot is powered appropriately.

Code Example: Human Following Robot
Usage Instructions:

- **Upload the Code:**
  - Upload the provided Arduino code to the Arduino board.
- **Serial Monitor:**
  - Open the Arduino IDE Serial Monitor (Tools -> Serial Monitor).
  - Set the baud rate to 9600.
- **Testing:**
  - Place the robot in an accessible area.
  - Ensure the ultrasonic sensor has a clear view.
  - Observe the Serial Monitor for distance readings and sensor status.
- **Interpreting Sensor Readings:**
  - Distance: Displays the distance measured by the ultrasonic sensor.
  - RSD (Right Sensor Detection): 0 if an object is detected, 1 otherwise.
  - LSD (Left Sensor Detection): 0 if an object is detected, 1 otherwise.
- **Robot Behavior:**
  - **Stop:** If an object is too close (distance < 10), the robot stops moving.
  - **Right Turn:** If only the right sensor detects an object.

    - **Left Turn:** If only the left sensor detects an object.
    - **Forward:** If both sensors detect an object or the distance is within a specified range.
    - **Stop:** If none of the above conditions are met.
- **Adjustment:**
    - Modify MIN_DISTANCE and MAX_DISTANCE to adjust the distance range for straight movement.

Expected Results: The robot should respond to obstacles and sensor inputs by making turns or stopping accordingly.

FAQ (Frequently Asked Questions):

Q: The robot is not responding to obstacles. What could be the issue?
A: Ensure that the infrared sensors are connected correctly. Check the wiring and adjust the sensitivity.

Q: Can I modify the distance range for straight movement?
A: Yes, you can adjust the MIN_DISTANCE and MAX_DISTANCE variables in the code