PARKING SENSOR

INTERNET OF THINGS

Time: 60 mins

Introduction

In this class, the students will learn to program the ESP32 board and create a parking sensor.

New Commands Introduced

- No new commands introduced

Vocabulary

- **Parking Sensors** are proximity sensors for road vehicles designed to alert the driver of obstacles while parking.

Learning Objectives

Student/s should be able to:
- *Recall* how to program the LCD and buzzer.
- *Explain* how distance is calculated using the ultrasonic sensor.
- *Demonstrate* the creation of a parking sensor.

Activities

1. **Class Narrative:** *(3 mins)*

   - Brief the student/s that the next challenge is to create a machine that helps in parking a vehicle.

2. **Concept Introduction Activity:** *(4 mins)*

   - Let the student/s undertake the explore-activity to observe the working of the parking sensor.

   - Using the slides, explain that the student/s will learn:

     - to display the distance

     - to sound a warning

     - to create the parking sensor

3. **Activity 1: Display the Distance** *(16 mins)*

● Help the students recall how to connect the LCD.

   Student Activity: *(16 mins)*

● Guide the student/s to connect the LCD and display the distance on the LCD.

4. **Activity 2: Sound a Warning** *(10 mins)*

   ● Explain when the warning should be activated.

   Student Activity: *(5 mins)*

   ● Guide the student/s to program the ESP32 board to sound the warning by adding a buzzer and activating the buzzer when the distance is too short.

5. **Activity 3: Create a Parking Sensor (***12 mins)*

   ● Explain to the student/s that the distance to be maintained while parking a vehicle is atleast 1.2 meters.

   ● Inform the students that the proximity is calculated in cm as the sensors used in wokwi sense the distance in cm.

   Student Activity: *(6 mins)*

   ● Guide the students to create a parking sensor by adding another LED, setting the LED, and displaying the closeness.

6. **Introduce the Post class project:** *(2 min)*

   ● Create a water level monitoring system.

7. **Test and Summarize the class learnings:** *(5 mins)*

   ● Check for understanding through quizzes and summarize learning after respective activities.

   ● Summarize the overall class learning towards the end of the class.

8. **Additional activities:**

   ● Encourage the student/s to use a line to represent the distance on the LCD.

   ● Encourage the student/s to add one more sensor to sense and display the distance on the right and left side of the vehicle on the LCD.

9. **State the Next Class Objective:** *(1 min)*

   ● In the next class, student/s will learn how to create a temperature sensor using the ESP32 board.

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	Parking Sensor	
Explore Activity	Parking Sensor	https://wokwi.com/projects/385251666776200193
Student Activity 1	Display the Distance	https://wokwi.com/projects/385250727123052545
Teacher Reference: Student Activity 1 Solution	Display the Distance	https://wokwi.com/projects/385250034076115969
Student Activity 2	Sound the Warning	https://wokwi.com/projects/385251599406234625
Teacher Reference: Student Activity 2 Solution	Sound the Warning	https://wokwi.com/projects/385250899922101249
Student Activity 3	Create the Parking Sensor	https://wokwi.com/projects/385252527201069057
Teacher Reference: Student Activity 3 Solution	Create the Parking Sensor	https://wokwi.com/projects/385251666776200193
Student's Additional Activity 1	Display Distance with Line	https://wokwi.com/projects/386537641174888449
Teacher Reference: Student's Additional Activity 1 Solution	Display Distance with Line	https://wokwi.com/projects/386535195061829633
Student's Additional Activity 2	Duel Parking Sensor	https://wokwi.com/projects/386546303776449537
Teacher Reference: Student's Additional Activity 2 Solution	Duel Parking Sensor	https://wokwi.com/projects/386537967738187777
Post Class Project	Water Level Monitor	https://wokwi.com/projects/387329431339100161
Teacher Reference: Post Class Project Solution	Water Level Monitor	https://wokwi.com/projects/385343358477054977