Buzzer_Challenge_6__Student

This is the **student version** of **Challenge 4: Sudden Stop Buzzer Alert**.

Follow the instructions to complete the challenge on your own.

```
In [ ]:  import rclpy
         from omni_robot_controller import OmniWheelControlNode   # Import control nod

         # Initialize ROS2 node
         rclpy.init()
         node = OmniWheelControlNode()
```

ℹ ROS2 Node Initialization

This cell includes the correct libraries and initializes the `OmniWheelControlNode` for use with the challenges. **Make sure ROS2 is installed and sourced in your environment.**

Challenge 4: Sudden Stop Buzzer Alert

Objective

Detect when the robot **suddenly stops** due to an obstacle and trigger a **buzzer alert**.

Instructions

1️⃣ Detect a Sudden Stop

- Use the **LiDAR sensor** to monitor the front distance.
- Check if the **front distance** is **less than the critical distance** (`node.critical_distance`).
- If the robot is **too close to an obstacle**, trigger the alert.

2️⃣ Trigger the Buzzer Alert

- If the condition is met, the buzzer should **beep 5 times** to signal the sudden stop.
- Use the **buzzer function** to play a short beep.
- Add a **brief pause** between beeps for clarity.

Available Functions & How to Use Them

** Read Distance from the LiDAR Sensor**

Use the `front_distance` variable to check the distance ahead:

`node.front_distance`
The critical threshold is:

`node.critical_distance`

** Play a Buzzer Sound**

`node.play_buzzer(frequency, on_time, off_time, repeat)`
Parameters:

- `frequency` : The beep frequency in Hz (e.g., `1000`).
- `on_time` : How long the buzzer stays ON (in seconds).
- `off_time` : How long the buzzer stays OFF before repeating.
- `repeat` : Number of times the buzzer plays.

** Pause Between Beeps**

`time.sleep(0.2)`
Adds a short delay between buzzer sounds.

Hints

Use an `if` condition to check `front_distance < critical_distance` .
Beep **5 times** if an obstacle is too close.
Use `time.sleep(0.2)` to add a pause between alerts.
Test different values to find an appropriate alert duration.

** Example (Not a Solution)**

"If the robot detects an obstacle closer than 10 cm, it should beep rapidly 5 times to warn the user."

```
In [ ]:  # Write your solution here
```