PROXIMITY DETECTION SYSTEM

Team member details:

S.no	Name	Roll number
1	Vaibhav Tiwari	102117089
2	Harsiddak Singh Bedi	102117091
3	Uday	102117102
4	Apoorva	102117104
5	Harkirat Singh	102117111
6	Garv Grover	102117114

Objectives:

- Obstacle Detection: The primary objective is to detect the presence of objects or obstacles in the vicinity of the ultrasonic sensor. This is crucial for preventing collisions in autonomous robots, vehicles, or automated machinery.
- Distance Measurement: The system can measure the distance between the sensor and the detected object. This information can be useful in applications like parking assistance, object tracking, or determining the position of an object relative to the sensor.
- User Alert: The system uses a buzzer to provide an audible alert to the user or operator when an object is detected within the specified range. This can be helpful in scenarios where visual feedback might not be sufficient or practical.
- Customization: Depending on the application, the system can be customized to set specific detection thresholds, trigger distances, and alert patterns. It allows flexibility to adapt to various use cases.

Need Analysis:

The need for a Proximity Detection System arises from the following considerations:

- Safety: In robotics and autonomous systems, a proximity detection system is

vital for ensuring the safety of both the machinery and the surrounding environment. It prevents accidents and collisions.

- Efficiency: In industrial automation and manufacturing, the system helps in optimizing processes by enabling machines to detect and respond to the presence of objects efficiently, reducing downtime and improving productivity.
- Security: Proximity detection is essential for security systems, such as intrusion detection or access control. Unauthorized entry can trigger the proximity sensor, activating an alert.
- Navigation: Autonomous vehicles and drones rely on proximity detection to navigate and avoid obstacles, making them suitable for applications like aerial photography, package delivery, and search and rescue operations.
- Assistance: Proximity detection can assist individuals with visual impairments by detecting obstacles and providing auditory feedback to help them navigate safely.
- The working methodology of a Proximity Detection system using Arduino, an Ultrasonic Sensor, and a Buzzer involves several steps to detect objects or obstacles in the proximity of the sensor and provide an audible alert. Here's a general overview of how the system works:

Working Methodology:

1. Ultrasonic Sensor Setup: Connect the Ultrasonic Sensor to the Arduino. The sensor typically has four pins: VCC, GND, Trigger (Trig), and Echo. Connect them as follows:
    - VCC to 5V on Arduino.
    - GND to GND on Arduino.
    - Trig to a digital pin on Arduino (e.g., D2).
    - Echo to another digital pin on Arduino (e.g., D3).
2. Buzzer Setup: Connect the Buzzer to the Arduino. Connect one pin of the buzzer to a digital pin (e.g., D8) and the other pin to GND on the Arduino.
3. Object Detection: As the code runs in a loop, the Ultrasonic Sensor continuously sends out ultrasonic pulses, and the Arduino calculates the distance to the detected object based on the time it takes for the echo to return.
4. Alert Activation:When the measured distance falls below the set threshold, the Arduino activates the buzzer to provide an audible alert. This indicates the presence of an object or obstacle within the specified range.