
***Faculty of Computer Applications & Information Technology***

# BCA PROGRAMME

Semester III Project

Report for

240301306 Introduction to Embedded Systems Project

Definition

" Automated Dispenser For Harmful Chemicals"

Submitted by:

Group No. : 22

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## PROJECT TITLE

Project Title – AUTOMATED DISPENSER FOR HARMFUL CHEMICALS

## GROUP MEMBERS

| Year | Div | Name | Enrollment Number |
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## ABSTRACT

• This project presents an automated, touchless dispenser system specifically designed for harmful chemicals and liquids that are unsafe for direct human handling. The system integrates Arduino UNO, Ultrasonic Sensor, Relay Module, Air Pump, LCD Display.

• When an object (like a beaker or container) is detected by the ultrasonic sensor, the Arduino activates the relay-controlled air pump to dispense a fixed quantity of liquid. During the process, the LCD displays real-time messages such as “DISPENSING…”. ensuring clarity and confirmation for the user.

• This system ensures safety, hygiene, and automation in handling harmful liquids, preventing human contact, contamination, and accidents.

## OBJECTIVE

• To design a touchless, automated chemical dispenser.

• To ensure safety by eliminating direct contact with harmful chemicals.

• To provide real-time LCD display messages.

• To make a low-cost, scalable, and safe solution for laboratories and industries

## COMPONENTS

1. Hardware Components:
   - Arduino Uno
   - Ultrasonic Sensor (HC-SR04)
   - Relay Module (HC-05)
   - Air Pump
   - LCD (16x2)
   - Battery
   - Liquid Container, Tubes, and Nozzles

2. Software Components:
   - Arduino IDE
   - Embedded C code

## COMPONENTS FUNCTIONALITY

1. **Hardware Components Functionality:**
   - Ultrasonic Sensor: Detects object/container.
   - Arduino Uno: Processes data and controls output.
   - Relay Module: Acts as a switch to control the pump.
   - Air Pump: Dispenses liquid safely.
   - LCD Display: Shows project name, process

("Dispensing…"),Object distance (display the distance how far it is).

- Battery: Provides required power supply.

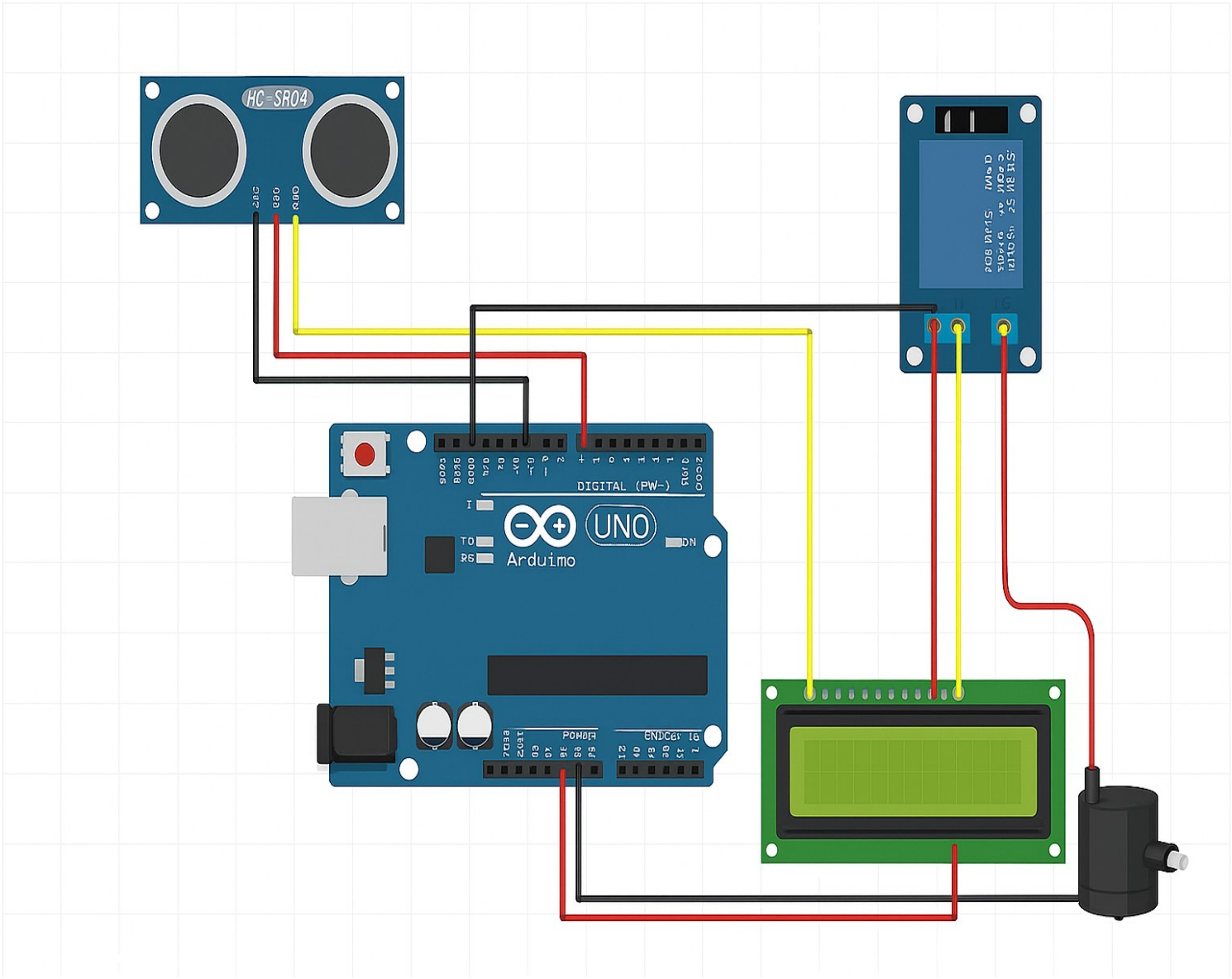
2. **Software Components Functionality:**
   - Arduino IDE: Code development and uploading.
   - Embedded C/C++: Logic for sensing, control, and display.

## WORKING OF SYSTEM

- The ultrasonic sensor continuously monitors distance.
- When an object comes within the threshold range, the Arduino activates the relay-controlled air pump.
- The LCD displays “DISPENSING…” and also display the distance of object during the process.
- The system resets and waits for the next object.

## FUNCTIONALITY OF SYSTEM

- Touchless detection and dispensing.
- Real-time LCD display for process and output.
- Safe handling of harmful chemicals.
- Adjustable detection range and dispensing time.
- Portable and battery-powered.
- Cost-effective and reliable solution for labs, industries, and sanitation purposes.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UNO
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