Forman Christian College (A Chartered University)
Embedded Systems (CSCS306)
Assignment 2

Group of two students is allowed in this assignment. You can discuss the working of assignment with your class fellows. Sharing any part of your assignment is strictly prohibited. Any such attempt will result in zero marks in this assignment.
Date of Submission: Friday Dec 02, 2022 in class. Any submission after the specified data and time will be considered late. A penalty of 20% marks deduction per day will be applicable on late submission.

Grading Criteria
Working hardware: 50%
Report: 30%
Neat wiring: 20% (Loops of jumper wires that clutter the display will not earn you this 20%)

Task-1

In this task we will first simulate control unit for a smart dust bin, and then will implement our simulated code / hardware on a physical dust bin. Note that the dust bin to be used should have a movable lid.
Requirement is that whenever we want to throw some trash into the bin, the lid should be automatically moved away and once trash is thrown inside the bin, the lid should move back. Further if the bin is filled with trash, a red LED placed on top of the bin should glow to indicate about it. Your control should also ensure that once "bin is filled" indicator is ON; the lid should not be moved and should not let more trash into it.
You can use sonar sensor and a servo motor to implement your logic.


Task-2

In this assignment we will work with the following sensors:

- LDR
- Motion Sensor
- Relay module

You are required to code and implement stair case light control system.

Assume we have an LDR installed outside where it is exposed to direct sun light. We also have interfaced a PIR motion sensor in our stair case with the same Arduino.

Our control system senses presence of human being in the stairs within its range, and based on ambient light sensed by the LDR decides whether the light fixture installed on stair case should be ON or OFF. Suppose its dark outside and presence is sensed, the control unit will make the light ON and keep it that way for at least 30 seconds (or more) and if it further senses motion during this period, it will keep the light ON for another 30 seconds until no more motion is sensed. Once 30 seconds duration has gone past and no motion is sensed during this period, control unit will turn the light OFF.

Physically AC light can be turned ON or OFF using a relay. For the sake of this assignment, we will use an LED connected through a relay to simulate an AC light fixture. (**DO NOT try to play with AC power**)

Submission:

You should submit the working hardware on the given date and time, along with a neat and properly formatted report. Make sure you use Times New Roman in your document with appropriate font size for text, heading and sub headings. Code must have Courier font style.

Your report should carry following sections:

1. A title page displaying
    - FCC logo
    - Assignment number
    - Assignment title
    - Group members names and roll numbers.
2. An Introduction page that should have
    - Brief introduction about the assignment.
    - Components used
3. Circuit diagram. Hand drawn diagram will not get full marks. Try to use a software like Fritzing.
4. Image of the working hardware
5. Code
    - Proper indentation and comments are required.
6. Assignment handout
7. References