



Cleanliness Monitoring System

Kshirsagar Sohan (180010016, kshirsagar.shrirang.18001@iitgoa.ac.in), Yuvraj Agrawal (180010031, yuvraj.agarwal.18001@iitgoa.ac.in), Viranch Patel (180010021, viranch.patel.18001@iitgoa.ac.in), and Shailesh Shahu (180020021, shailesh.shahu.18002@iitgoa.ac.in)

Introduction

The current maintenance council intends to have a monitoring system that will keep an eye on the punctuality of the cleaning staff also will assist them in keeping a record. For the ease of demonstration, we have reduced down the day duration to 10 secs. The designed system takes yes or no inputs from two wings daily. The system also has LEDs for each wing which will change color as soon as the wing is cleaned, this will help the cleaning staff in identifying the uncleaned wings. The weekly record of the wings will be sent to the Maintenance Secretary who will take the further required actions.

System Overview

Input System:

The system takes input through push button and the input is stored in different variables. Two LEDs Red and Green are connected to the input. The input is set to '0' by default (for each day) and Red LED is kept ON when the input value is set to '1' the Red LED will turn OFF and the Green one would light up.

Display System:

This part consists of a central clock that counts down daily and also displays the present day (1-Monday, 2-Tuesday . . . etc) on an LCD display and a counter which counts the number of times input is given in the ongoing week and displays it on a seven-segment display. At the end of each week, the weekly counter resets itself back to '0'.

Transmission System:

The system takes the count as 3-bit binary digits from the FPGA board and is used as input for the variables in the Arduino board which then sends the message according to the variables and number fed in the GSM module.

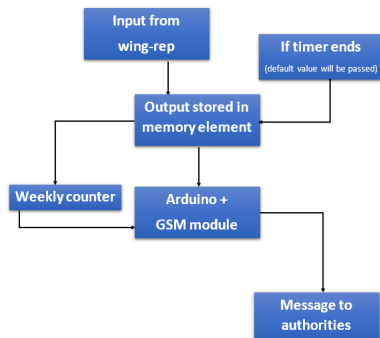


Fig. 1: System Overview

Implementation Details

Input System:

The input (from WR) is directly considered as Green (implying that cleaning is done) and the default for Red (Cleaning not done).

Display System:

To display day and the central clock we have used BCD counters (with different reset signals), up and down respectively as developed during the lab session which counts up from '0' to '9', and down from '9' to '0' respectively.

Transmission System:

The counted inputs are converted from integers to std_logic_vectors of 3-bit and each bit is transmitted individually to the Arduino board for each input and then converted back to integer values and fed as input to the three variables, for the wing and the GSM module uses these variables and the message is then sent accordingly.

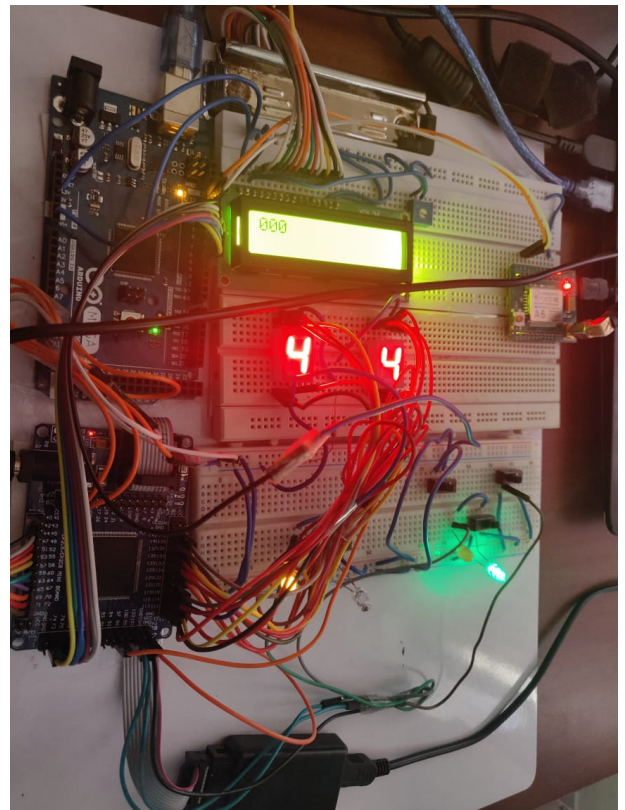


Fig. 2: Circuit Diagram

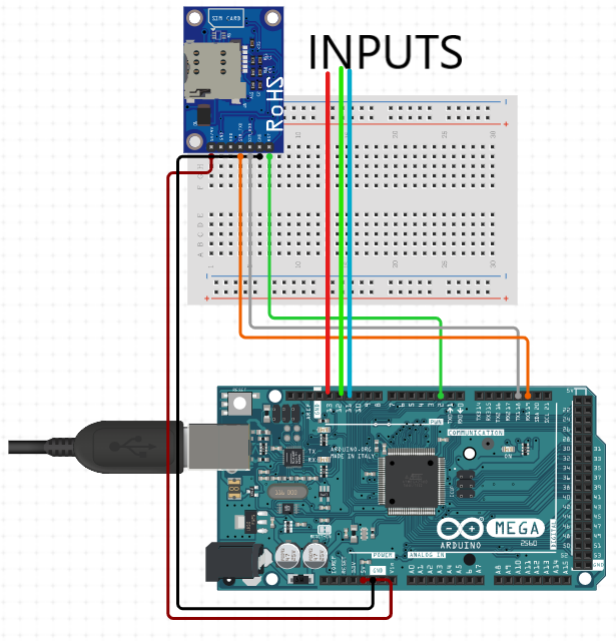


Fig. 3: Arduino connections

Results

The system sends the number of days cleaning has taken place for two different inputs i.e two different wings A and B to the concerned assigned phone number.

Conclusion

The project's working has nearly met our expectations and we have thoroughly enjoyed our time exploring new devices and understanding their working. We hope this project meets some real-life applications in future in some or other way and solve the issues it's making was intended for.

References

- [1] <https://lastminuteengineers.com/a6-gsm-gprs-module-arduino-tutorial/>
- [2] <https://www.arduino.cc/en/Tutorial/HomePage?from=Main.Tu>
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- [3] <https://www.circuito.io/app?components=512,11021>