



Alexandria Faculty of Engineering

Specialized Scientific Program

Electromechanical Department

Data Acquisition

Project 1

Home Automation

➤ **Minimum Tasks:**

- Turning on the light and the temperature system when there is someone inside the room (using IR sensor)
- Turning on and off the fan (Motor_1) depending on the reading of the temperature sensor
 - (Temperature reading < 20 C°, Turn off the fan)
 - (Temperature reading < 30 C°, Turn on the fan (LOW SPEED))
 - (Temperature reading < 40 C°, Turn on the fan (MEDIUM SPEED))
 - (Temperature reading >= 40 C°, Turn off the fan (HIGH SPEED))
- Turning on the lamps (Four LEDs) depending on the reading of LDR Sensor when there is someone inside the room.
 - (LDR Reading <20 % -> turn on four LEDs)
 - (LDR Reading <40 % -> turn on three LEDs)
 - (LDR Reading <60 % -> turn on two LEDs)
 - (LDR Reading <80 % -> turn on one LED)
 - (LDR Reading >80 % -> turn off the LEDs)
- Fire Fighting System (using Flame Sensor)
 - Turn on the buzzer (Buzzer_1)
 - Turn on the water pump (Motor_2)
- Security System
 - Setting and entering the password using Keypad to open the door (Motor_3)
 - The password consists of only six characters.

➤ **Minimum Requirements:**

- 1- Setting the password by using Keypad and displaying it on the LCD
- 2- Confirming the new password if it is right, the door will open until the IR detects someone enters the room then the door closes, if it is not right, repeating the first step.
- 3- Temperature Sensing System.
- 4- Light Control System
- 5- Fire Detection System
- 6- Get outside of the room (IR gives a reading that there is no one inside the room), then try to enter it again, you should type your password again, if the password is correct, open the room, and if the password is not correct, Enter the password again, if the user enters a wrong password three times, The room will be locked for two seconds and turn on the theft alert buzzer (Buzzer_2), after the two seconds pass, the system restarts.
- 7- Every change in the system should be displayed on the same LCD.

➤ **Test case:**

- Case: set the new password -> Confirm the new password -> vary the temperature reading to show the four ranges -> Vary the LDR Reading to show the five ranges- > Change the fire state to be on and wait a few seconds then turn it off -> Get outside the room -> Type the correct password -> Get outside the room again -> Type the wrong password twice and then type the correct password -> Get outside the room -> Type the wrong password three times -> wait one minute then ends the simulation.

➤ **Deliverables:**

- Hex File (.hex) or Elf file (.elf)
- Report (Cover page - Description - Any added ideas - Any assumptions you have to declare them here - Arduino Code - Simulation Screenshots)
- Simulation file (Proteus file)
- Sketch file (Arduino Code) (.ino)
- A video recording shows the mentioned test case.

➤ **Notes:**

- All the deliverables must be in one compressed file and you have to rename it to Name_ID
- Deadline of the project is on 15/4 at 9:00 PM
- The submission form will be available on 15/4 from 9:00 PM TO 9:30 PM, so be sure to be available to submit your task

➤ **Resources:**

- [Download the Arduino IDE:](#)
- [How to download and install proteus \(Recommended Version\):](#)
- [How to download and install the Arduino libraries for proteus:](#)
- [Flame Sensor Library for proteus:](#)
- [Infrared Sensor library for proteus:](#)
- [KeyPad Library for Proteus:](#)
- [KeyPad Tutorial:](#)
- [Screen Recording Software:](#)