Project 1 Login System :

HW needed : LCD + KEYPAD+ DIO+ ULTRASONIC + RELAY + TIMER

Requirements:

1. When Ultrasonic detects that user is within range from 0 - 15 cm ,it displays the Authentication message .

2. When user tries to Enter system should ask for password by displaying this message on LCD “Please Enter Password”

3. User Enters password through keypad.

4. If user enters a correct password, system will display a successful login message Ex: “welcome Ahmed”. And relay will open.

5. If user enters a wrong password, the system should display this message, “wrong password, and please try again”.

6. The user has a maximum of 3 times to try to enter a correct password after that the system will lock for 2 minutes.

7. After a successful login, the system displays this message:
   1- Leds ON
   2- Leds OFF
   user can choose to control leds using keypad.

Project 2 Configurable Duty Cycle and Frequency :

HW needed : LCD + KEYPAD+ DIO+ TIMER + H-bridge + MOTOR

Requirements:

1. System should ask the user to enter duty cycle , then read it using keypad .

2. System should ask the user to enter frequency , then read using keypad

3. Using this Duty cycle and frequency you should produce a PWM with these parameters.

4. Drive a DC motor with this PWM .

5. System should be able to accept a new duty cycle and frequency and should change the speed and frequency during RunTime.

Project 3 Small OS:

HW needed : LEDs + DIO+ Timer

Requirements:

1. You Have 3 Tasks:

   Task 1 : this task should blinks RED LED every 1 sec

   Task 2: this task should monitor PB1 state if it is pressed , it should toggle the BLUE LED, it runs every 500 msec .

   Task 3: this task should blink the Green LED every 3 sec.
2. Every task must have a pointer to function.
3. Scheduler Needs to Run every 500 msec, and it calls the task that needs to Run.
4. If 2 tasks Need to Run at same time The Ready Tasks will have a Ready queue.