Asssignment-1

Note: Solve problem-1 and any one from problem-2 to problem-3.

Problem 1: Suppose a system has **a sensor**, **two push button (INC & DEC)** for user input, and **one switch** for selecting the system in either "*Program mode or Run mode*", and **3 LEDs** as output. One can select **A Number** by the abovementioned two buttons (INC & DEC) while the system resides in "Program mode" and it can be observed from two digit 7 segment display. In "Run mode" the 1st LED will be ON initially. The counting value will start from 0 and can be increment by each sensing from the sensor. If the counting value *equals* to the U**ser Selected Number** then the 1st LED will be off immediately and 2nd LED will turn ON. After 2 seconds the 2nd LED will turn off and the 3rd LED will turn on. Similarly after 2 seconds the 3rd LED will turn off and the 1st will turn ON. The function will repeat again and again. Sketch a suitable circuit and develop a program to solve the problem.

Problem 2: Consider a system can operate in two mode. Those are *"Programming mode* and *Run mode*". The system has three parameters those are **ON time**, **OFF time** and **Number of channels.** In programming mode a user can set these three parameters **sequentially** and it can be observed from two digit 7 segment display. There will be **total 16 outputs or LED** which will be controlled by using a decoder/a different microcontroller and 4 pins from the microcontroller. In programming mode there will be no OUTPUT or the 16 LEDS will remain in OFF state. In Run mode first LED out of 16 will goes HIGH state for the **ON time** and rest of the pins will be in LOW state. After the **OFF time delay** the second pin/LED will turn ON and the rest of the LEDS will be in off state. As a result, the system will keep running until the **number of channels** is reached. The selected Number of channels can be up to 16.

Problem 3: Suppose that you are assigned to keep your room safe. The system can identify **GAS Leakage**, **Smoke** as well as it can observe **Temperature** and **Humidity** of the room and these parameters can be seen from a **16*2 LCD Display**. Now develop a system so that the system can monitor your room in absence of you. It will show your room temperature and humidity condition in the LCD display. If any Smoke or GAS is identified by the system, it will turn on a LED as an alarm. In case of LED you can use a buzzer also. Now sketch a suitable circuit and develop a program to solve the safety problem of your home.