SPRINT 1

Date	**14 November 2022**
Team ID	**PNT2022TMID33781**
Project Name	**Personal Assistance for Seniors Who are self-reliant.**

Program:

```
#include <LiquidCrystal.h>
#include <stdio.h>
#define mSTATE_1    1
#define mSTATE_2    2
#define mSTATE_3    3
#define mSTATE_4    4
#define mSTATE_5    5
#define mSTATE_6    6
#define mSTATE_7    7
#define mSTATE_8    8
#define mSTATE_9    9
#define ALARM_SWITCH_PIN  2
#define BUZZER_PIN A3
typedef struct
{
        bool ALARM_SWITCH;
        bool RTC_ALARM;
        unsigned long RTC_TIME;
        unsigned long RTC_DATE;
        char RTC_TIME_C[20];
        char RTC_DATE_C[20];
}STATE_VAR;
typedef struct
{
        bool alarm_enable;
        bool alarm_flag;
        int alarm_min;
        int alarm_hour;
        int tick;
        int mls;
        int sec;
        int min;
        int hour;
        int month;
        int day;
        int year;
}RTC_DATA;
void get_input();
void fsm1(STATE_VAR *FSM_VAR);
```

```
void printLCDMesgFromStart(LiquidCrystal *lcd, const char* Message, unsigned int row, bool lcdclear);
void Buzzer(bool ON, int Buzzer_PIN);
float readTemperature(int TempSensor_PIN);
void RTC(RTC_DATA* rtc);
void RTC_Init(RTC_DATA* rtc, int tick);
void RTC_SetTime(RTC_DATA* rtc, int hour, int min, int sec);
void RTC_SetDate(RTC_DATA* rtc, int year, int month, int day);
void RTC_SetAlarm(RTC_DATA* rtc, int hour, int min);
void RTC_EnableAlarm(RTC_DATA* rtc);
void RTC_DisableAlarm(RTC_DATA* rtc);
bool RTC_GetAlarmStatus(RTC_DATA* rtc);
long RTC_GetTimeHHMMSS(RTC_DATA* rtc);
long RTC_GetDateYYYYMMDD(RTC_DATA* rtc);
long RTC_GetDateMMDD(RTC_DATA* rtc);
STATE_VAR FSM1_VAR;
RTC_DATA rtc;
LiquidCrystal lcd(A4, A5, 13, 12, 11, 10);
void setup()
{
  Serial.begin(9600);
  pinMode(ALARM_SWITCH_PIN, INPUT);
  lcd.begin(16, 2);
  lcd.setCursor(0, 0);
  RTC_Init(&rtc, 100);
  RTC_SetTime(&rtc, 11, 00, 0);
  RTC_SetDate(&rtc, 2020, 7, 7);
  RTC_SetAlarm(&rtc, 11, 36);
  RTC_EnableAlarm(&rtc);
}
void get_input()
{
          String Date;
          String Time;
    FSM1_VAR.ALARM_SWITCH = digitalRead(ALARM_SWITCH_PIN);
    FSM1_VAR.RTC_ALARM = RTC_GetAlarmStatus(&rtc);
    FSM1_VAR.RTC_TIME  = RTC_GetTimeHHMMSS(&rtc);
    FSM1_VAR.RTC_DATE  = RTC_GetDateYYYYMMDD(&rtc);
    if(FSM1_VAR.ALARM_SWITCH == 0)
          FSM1_VAR.ALARM_SWITCH = true;
          else
          FSM1_VAR.ALARM_SWITCH = false;
    if(rtc.min < 10 && rtc.sec < 10)
       Time = String(rtc.hour) + ':' + '0' + String(rtc.min) + ':' + '0' + String(rtc.sec);
          else if (rtc.min >= 10 && rtc.sec < 10)
       Time = String(rtc.hour) + ':' + String(rtc.min) + ':' + '0' + String(rtc.sec);
    else if(rtc.min < 10 && rtc.sec >= 10)
       Time = String(rtc.hour) + ':' + '0' + String(rtc.min) + ':' + String(rtc.sec);
    else
       Time = String(rtc.hour) + ':' + String(rtc.min) + ':' + String(rtc.sec);
       Date = String(rtc.day) + '/' + String(rtc.month) + '/' + String(rtc.year);
       strcpy(FSM1_VAR.RTC_TIME_C, Time.c_str());
       strcpy(FSM1_VAR.RTC_DATE_C, Date.c_str());
```

```
}
void loop()
{
        RTC(&rtc);
        get_input();
        fsm1(&FSM1_VAR);
        delay(100);
}
void fsm1(STATE_VAR *FSM_VAR)
{
   static int  MACHINE_STATE;
   static bool BUZZER;
   bool ALARM_SWITCH = FSM_VAR->ALARM_SWITCH;
        bool RTC_ALARM    = FSM_VAR->RTC_ALARM;
   long RTC_TIME = (FSM_VAR->RTC_TIME / 100);
   long RTC_DATE = FSM_VAR->RTC_DATE;
        Serial.print("DATE (YYYYMMDD): ");
        Serial.print(RTC_DATE);
        Serial.print("  TIME (HHMM): ");
        Serial.println(RTC_TIME);
   switch(MACHINE_STATE)
   {
    case mSTATE_1:
    Serial.println("mSTATE_1");
     if(!RTC_ALARM){
                printLCDMesgFromStart(&lcd, FSM_VAR->RTC_DATE_C, 1, false);
                        printLCDMesgFromStart(&lcd, FSM_VAR->RTC_TIME_C, 2, false);
        MACHINE_STATE = mSTATE_1 ;
      }
      else if(RTC_ALARM){
                printLCDMesgFromStart(&lcd, "WARNING", 1, true);
                        printLCDMesgFromStart(&lcd, "ALARM!!", 2, false);
        BUZZER = true;
        MACHINE_STATE = mSTATE_2;
      }
      else
      {}
      break;
    case mSTATE_2:
    Serial. println("mSTATE_2");
     if(!ALARM_SWITCH){
       MACHINE_STATE = mSTATE_2;
      }
      else if(ALARM_SWITCH){
                        RTC_DisableAlarm(&rtc);
                BUZZER = false;
                        printLCDMesgFromStart(&lcd, FSM_VAR->RTC_DATE_C, 1, true);
                        printLCDMesgFromStart(&lcd, FSM_VAR->RTC_TIME_C, 2, false);
        MACHINE_STATE = mSTATE_1;
      }
      else
      {}
```

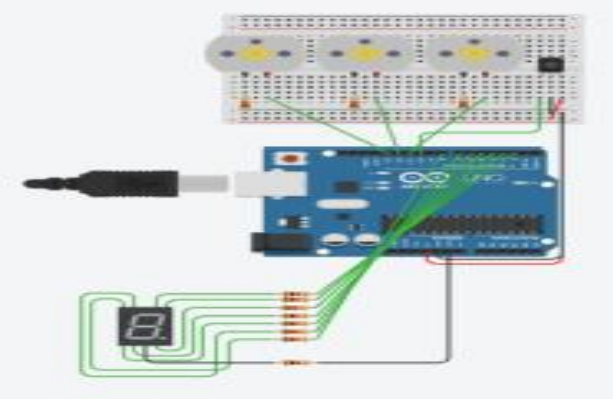
```
      break;
     default:
      BUZZER = false;
      MACHINE_STATE = mSTATE_1;
   }
  Buzzer(BUZZER, BUZZER_PIN);
}
void printLCDMesgFromStart(LiquidCrystal *lcd, const char* Message, unsigned int row, bool lcdclear)
{
 if(lcdclear)
   {
    lcd->clear();
   }
   switch(row)
   {
    case 1:
       lcd->setCursor(0, 0);
       break;
    case 2:
       lcd->setCursor(0, 1);
       break;
    default:
       lcd->setCursor(0, 0);
   }
   if(Message != NULL)
   {
    lcd->print(Message);
   }
}
void Buzzer(bool ON, int Buzzer_PIN)
{
 static bool ON_STATE;
 if (ON_STATE == false && ON == true)
 {
  ON_STATE = true;
  tone(Buzzer_PIN, 2000);
 }
 else if (ON == false)
 {
  ON_STATE = false;
  noTone(Buzzer_PIN);
 }
 else
 {}
}
float readTemperature(int TempSensor_PIN)
{
 float Temperature;
 Temperature = (float) analogRead(TempSensor_PIN);
 Temperature = (Temperature * 5.0) / 1024.0;
 Temperature = Temperature - 0.5;
 Temperature = Temperature * 100;
```

```
  return Temperature;
}
void RTC(RTC_DATA* rtc)
{
  static bool ALARM;
  rtc->mls = rtc->mls + rtc->tick;
  if(rtc->mls == 1000)
  {
          rtc->mls = 0;
          rtc->sec++;
  }
  if(rtc->sec >= 60)
  {
    rtc->sec = 0;
    rtc->min++;
  }
  if(rtc->min >= 60)
  {
    rtc->sec = 0;
    rtc->min = 0;
    rtc->hour++;
  }
  if(rtc->min < 0)
  {
    rtc->sec = 0;
    rtc->min = 59;
    rtc->hour--;
  }
  if(rtc->hour >= 24)
  {
    rtc->sec  = 0;
    rtc->min  = 0;
    rtc->hour = 0;
    rtc->day++;
  }
  if(rtc->month != 2 && (rtc->month % 2) == 1)
  {
    if(rtc->day == 32)
    {
      rtc->day = 1;
      rtc->month++;
    }
    if(rtc->day < 1)
    {
      rtc->day = 30;
      rtc->month--;
    }
  }
  if(rtc->month != 2 && (rtc->month % 2) == 0)
  {
    if(rtc->day == 31)
    {
```

```
      rtc->day = 1;
      rtc->month++;
    }
          if(rtc->day < 1)
    {
      rtc->day = 31;
      rtc->month--;
    }
  }
  if(rtc->month == 2)
  {
    if(rtc->day == 29)
    {
      rtc->day = 1;
      rtc->month++;
    }
  }
   if(rtc->month == 3)
   {
          if(rtc->day < 1)
    {
      rtc->day = 28;
      rtc->month--;
    }
  }
  if(rtc->hour < 0)
  {
    rtc->hour = 23;
  }
  if(rtc->month > 12)
  {
    rtc->month = 1;
    rtc->day = 1;
    rtc->year++;
  }
  if(rtc->alarm_enable == 1 && rtc->alarm_flag == 0)
  {
          if(rtc->min == rtc->alarm_min && rtc->hour == rtc->alarm_hour)
          {
      rtc->alarm_flag = 1;
          }
  }
}
void RTC_Init(RTC_DATA* rtc, int tick)
{
  rtc->tick = tick;
  rtc->alarm_flag   = 0;
  rtc->alarm_enable = 0;
}
void RTC_SetTime(RTC_DATA* rtc, int hour, int min, int sec)
{
  rtc->sec  = sec;
```

```
  rtc->min  = min;
  rtc->hour = hour;
}
void RTC_SetDate(RTC_DATA* rtc, int year, int month, int day)
{
  rtc->day   = day;
  rtc->month = month;
  rtc->year  = year;
}
void RTC_SetAlarm(RTC_DATA* rtc, int hour, int min)
{
  rtc->alarm_min  = min;
  rtc->alarm_hour = hour;
}
void RTC_EnableAlarm(RTC_DATA* rtc)
{
  rtc->alarm_enable = 1;
  rtc->alarm_flag = 0;
}
void RTC_DisableAlarm(RTC_DATA* rtc)
{
  rtc->alarm_enable = 0;
  rtc->alarm_flag = 0;
}
long RTC_GetTimeHHMMSS(RTC_DATA* rtc)
{
  long time;
  time = ((long)(rtc->hour) * 10000) + ((long)(rtc->min) * 100) + (long)(rtc->sec);
  return time;
}
bool RTC_GetAlarmStatus(RTC_DATA* rtc)
{
  return rtc->alarm_flag;
}
long RTC_GetDateYYYYMMDD(RTC_DATA* rtc)
{
  long date;
  date = ((long)(rtc->year) * 10000) + ((long)(rtc->month) * 100) + (long)(rtc->day);
  return date;
}
long RTC_GetDateMMDD(RTC_DATA* rtc)
{
  long date;
  date = ((long)(rtc->month) * 100) + (long)(rtc->day);
  return date;
}
```

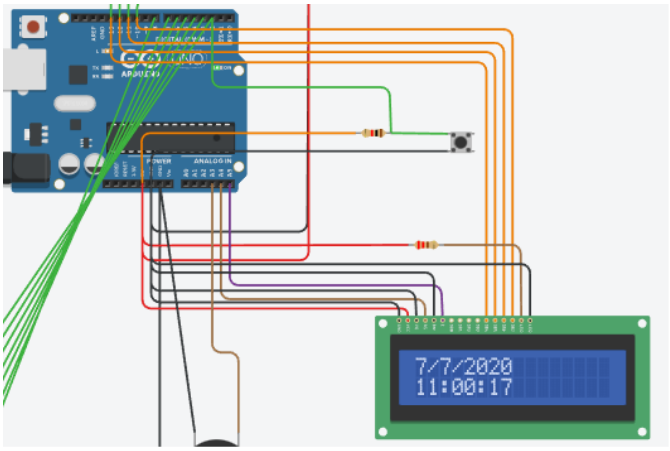
Circuit Diagram 1:



In this circuit Diagram,

- The first step is, the resistors and the digital clock connected to the aurdino uno through the connecting wires.
- The Second Step is, connecting of 3 dc motors to control the speed of the current.
- The Third step is, use the bread-board for the temporary circuits for display the running time on the 7 segment display screen.

Circuit Diagram 2:



In this circuit diagram,

- After connecting, all those required components, the LCD is connected to the circuit to

Display the timing and alert messages for the medicines according to their time scheduling given.

- Through the entire circuit, the alert messages and the sound produced in the buzzer.

Full Circuit Diagram: