SPRINT 4

TEAM ID	PNT2022TMID40888
PROJECT TITLE	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 33
#define mSTATE 44
#define mSTATE_5 5
#define mSTATE_6 6
#define mSTATE_7 7
#define mSTATE 88
#define mSTATE 99
#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 \geq 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
{}
```

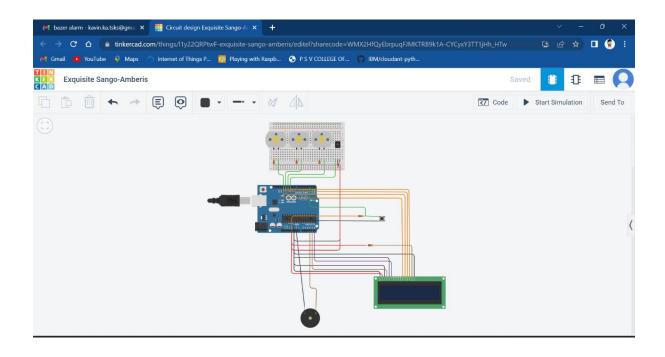
```
break;
default:
BUZZER = false;
MACHINE_STATE = mSTATE_1;
Buzzer(BUZZER, BUZZER_PIN);
void printLCDMesgFromStart(LiquidCrystal *lcd, const char* Message, unsigned int row, bool
lcdclear)
if(lcdclear)
lcd->clear();
switch(row)
case 1:
lcd->setCursor(0, 0);
break;
case 2:
lcd->setCursor(0, 1);
break;
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;
```

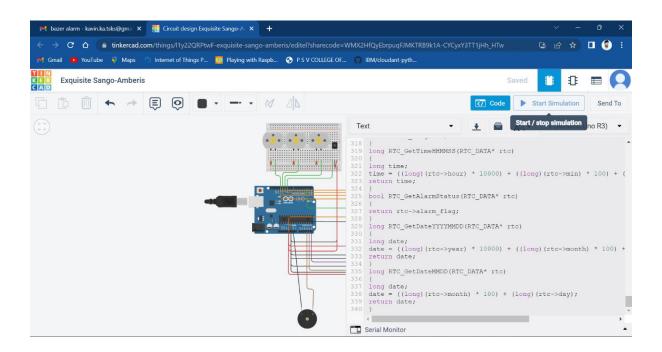
```
Temperature = Temperature * 100;
return Temperature;
void RTC(RTC_DATA* rtc)
static bool ALARM;
rtc->mls = rtc->mls + rtc->tick;
if(rtc->mls == 1000)
rtc->mls=0;
rtc->sec++;
if(rtc->sec>=60)
rtc->sec = 0;
rtc->min++;
if(rtc->min>=60)
rtc->sec = 0;
rtc->min = 0;
rtc->hour++;
if(rtc->min < 0)
rtc->sec = 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)
```

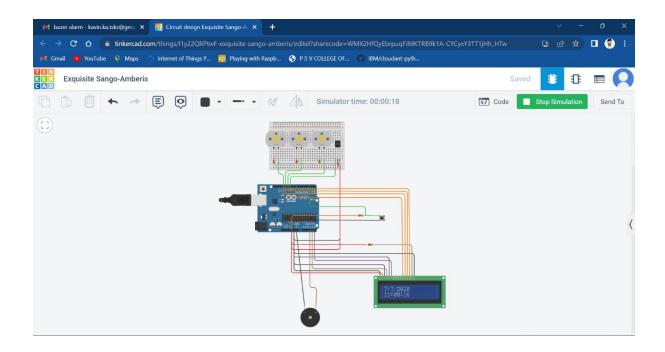
```
\{\text{rtc->day} = 1;
rtc->month++;
if(rtc->day < 1)
rtc->day = 31;
rtc->month--;
if(rtc->month == 2)
if(rtc->day == 29)
rtc->day = 1;
rtc->month++;
if(rtc->month == 3)
if(rtc->day < 1)
rtc->day = 28;
rtc->month--;
if(rtc->hour < 0)
rtc->hour = 23;
if(rtc->month > 12)
rtc->month = 1;
rtc->day=1;
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;
```

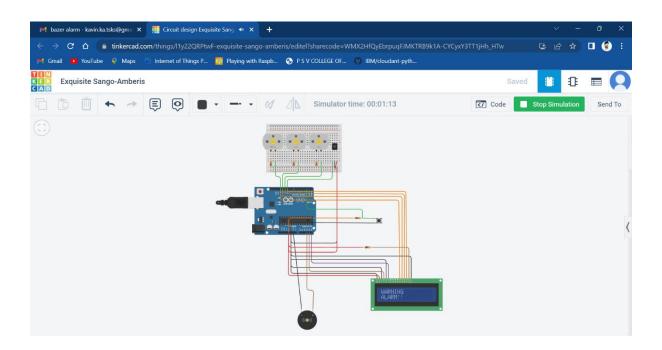
```
rtc->min = min;
rtc->hour = hour;
void RTC_SetDate(RTC_DATA* rtc, int year, int month, int day)
rtc->day = day;
rtc->month = month;
rtc->year = year;
void RTC_SetAlarm(RTC_DATA* rtc, int hour, int min)
rtc->alarm_min = min;
rtc->alarm_hour = hour;
void RTC_EnableAlarm(RTC_DATA* rtc)
rtc->alarm_enable = 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:









CIRCUIT LINK:

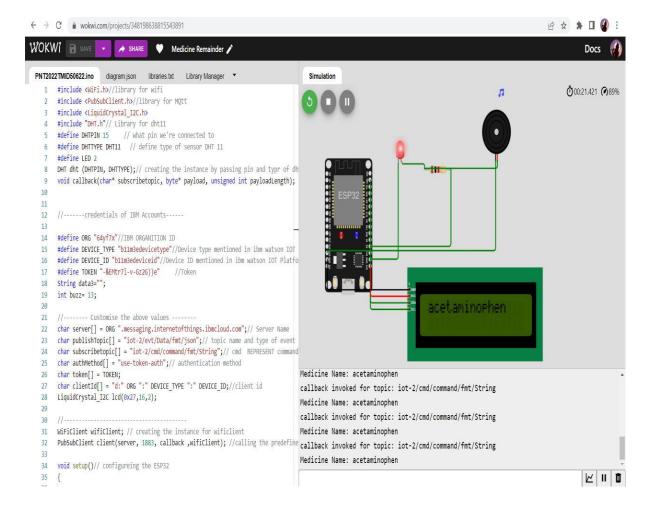
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Using Wowki:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#include <LiquidCrystal_I2C.h>
#include "DHT.h"// Library for dht11
#define DHTPIN 15 // what pin we're connected to
#define DHTTYPE DHT11 // define type of sensor DHT 11
#define LED 2
DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of
dht connected
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//----credentials of IBM Accounts-----
#define ORG "64yf7x"//IBM ORGANITION ID
#define DEVICE TYPE "b11m3edevicetype"//Device type mentioned in ibm watson
IOT Platform
#define DEVICE ID "b11m3edeviceid"//Device ID mentioned in ibm watson IOT
Platform
#define TOKEN "-&EMtr71-v-Gz2G))e" //Token
String data3="";
int buzz= 13;
//----- Customise the above values ------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of
event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENT
command type AND COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE TYPE ":" DEVICE ID;//client id
LiquidCrystal_I2C lcd(0x27,32,2);
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the
predefined client id by passing parameter like server id, portand
wificredential
void setup()// configureing the ESP32
 Serial.begin(115200);
  dht.begin();
```

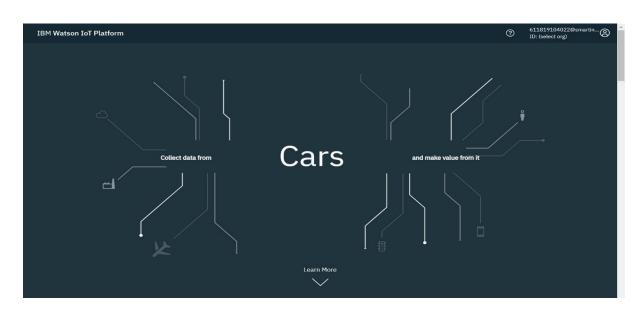
```
pinMode(buzz, OUTPUT);
 pinMode(LED,OUTPUT);
 delay(10);
 Serial.println();
 wificonnect();
 mqttconnect();
}
void loop()// Recursive Function
{
 if (!client.loop()) {
   mqttconnect();
 }
}
/*....retrieving to
Cloud....*/
void PublishData(float temp, float humid) {
 mqttconnect();//function call for connecting to ibm
void mqttconnect() {
 if (!client.connected()) {
   Serial.print("Reconnecting client to ");
   Serial.println(server);
   while (!!!client.connect(clientId, authMethod, token)) {
     Serial.print(".");
     delay(500);
   }
    initManagedDevice();
    Serial.println();
 }
void wificonnect() //function defination for wificonnect
 Serial.println();
 Serial.print("Connecting to ");
 WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish
the connection
 while (WiFi.status() != WL_CONNECTED) {
   delay(500);
   Serial.print(".");
 }
```

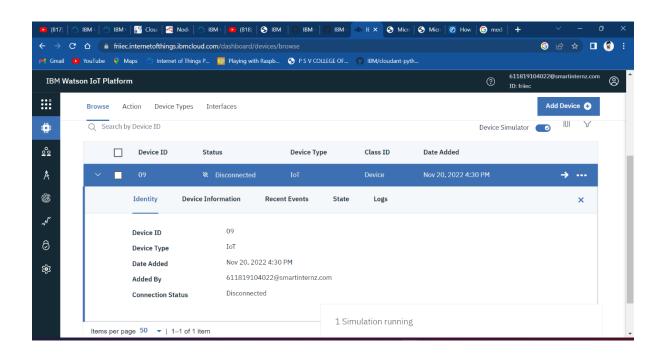
```
Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}
void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
   Serial.println("subscribe to cmd OK");
  } else {
   Serial.println("subscribe to cmd FAILED");
  }
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
  for (int i = 13; i < payloadLength-2; i++) {</pre>
    //Serial.print((char)payload[i]);
   data3 += (char)payload[i];
  }
  Serial.println("Medicine Name: "+ data3);
  if(data3 != "")
  {
    lcd.init();
    lcd.print(data3);
    digitalWrite(LED, HIGH);
    tone(buzz, 100, 1000);
    delay(2000);
   digitalWrite(LED,LOW);
   noTone(buzz);
   delay(1000);
  }
  else
digitalWrite(LED, LOW);
  }
data3="";
}
```

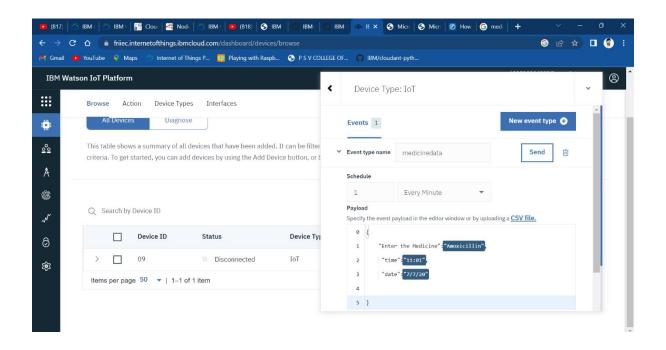


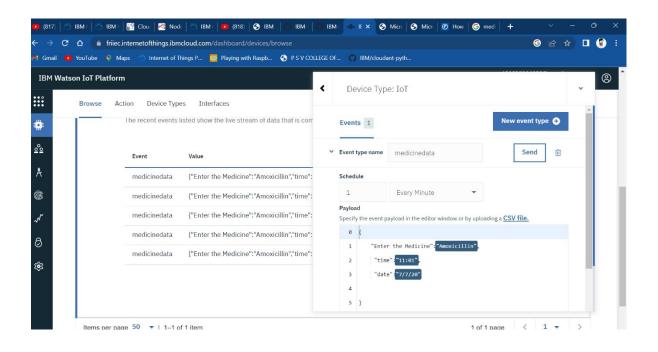
 software (create device in the iot watson platform, workflow for iot scenarios using local node red).

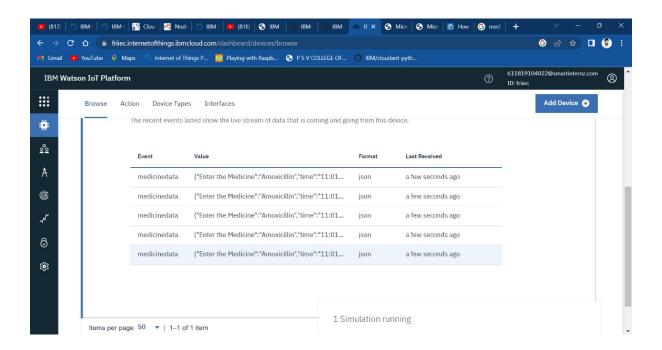
create device in the iot watson platform:

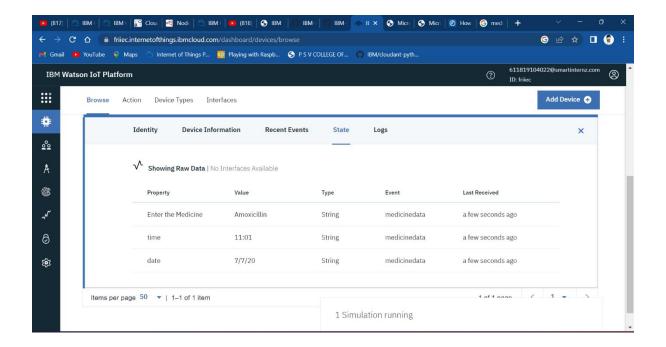




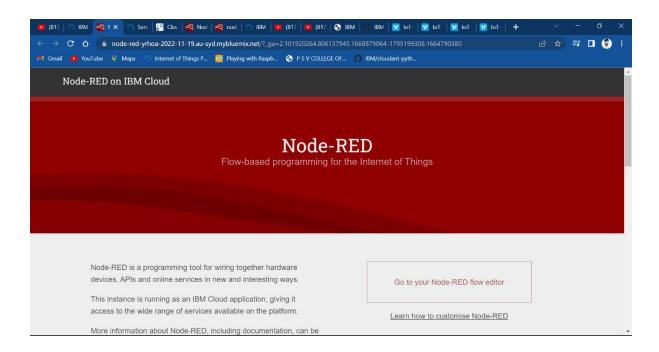


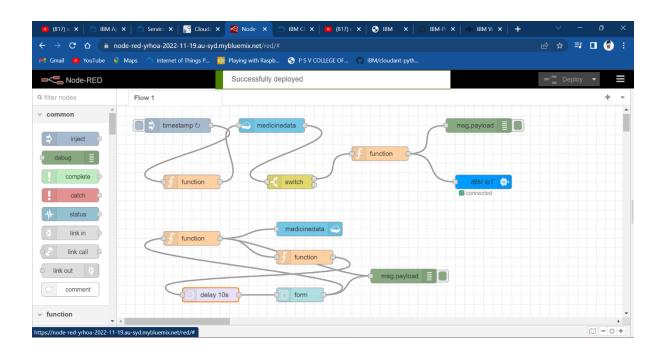


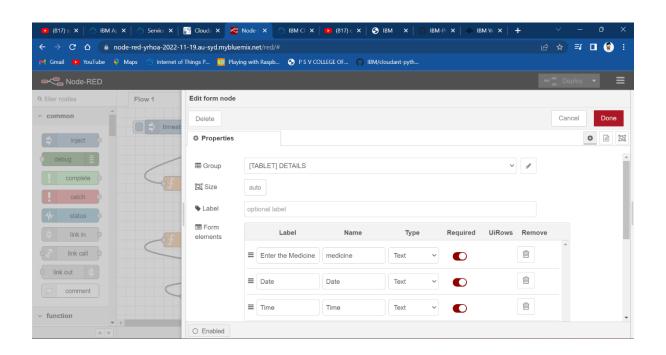


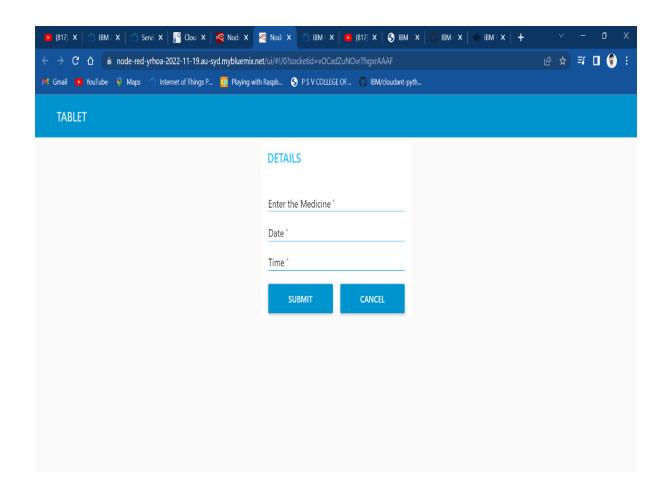


- Thus we created a device in that IoT platform, in this platform we store some medicine details, time and date.
- Then using the node-red, we connect IoT platform.

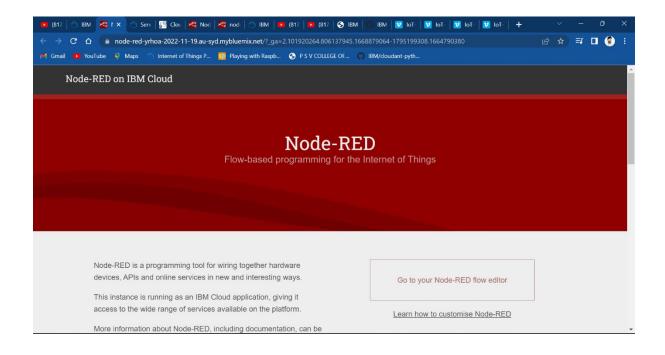


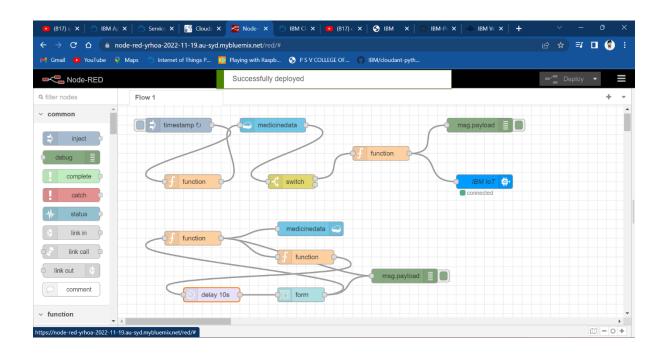


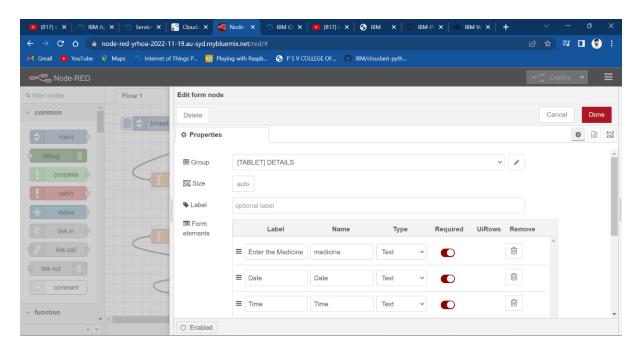


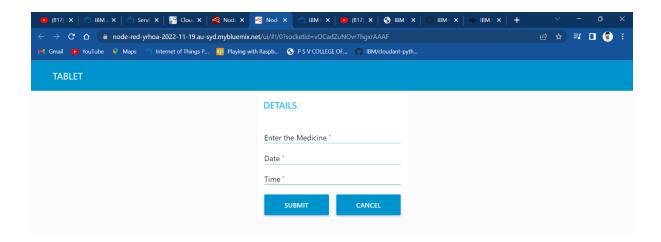


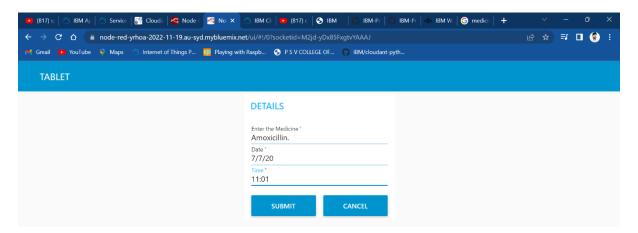
Node-red and Cloud database that store information:



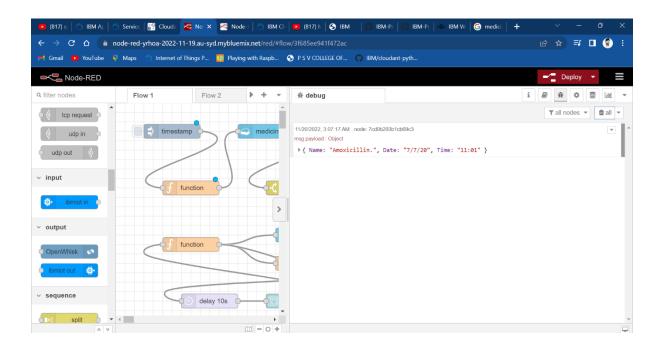




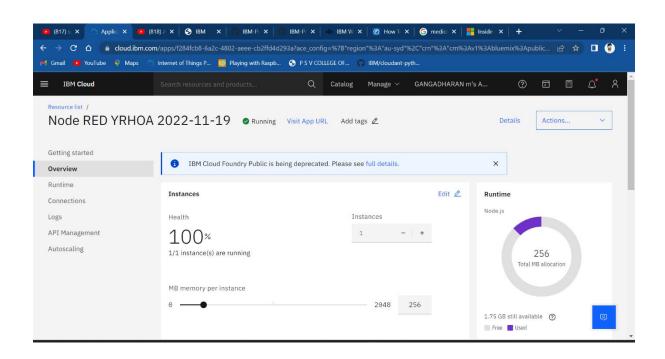


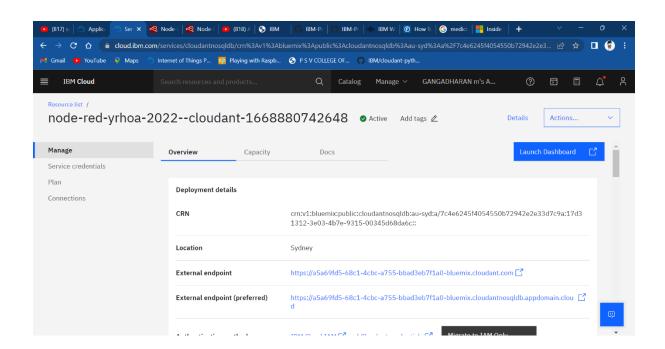


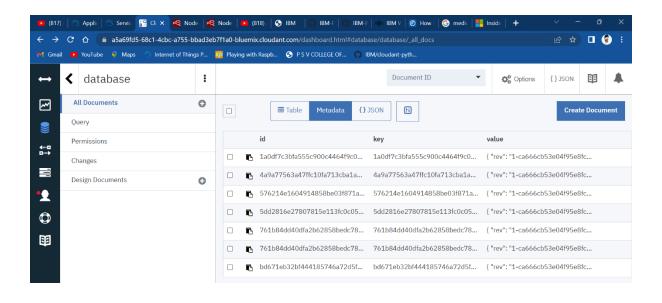
• Here we created a form to store details of the medicine and what time we want to take medicine.

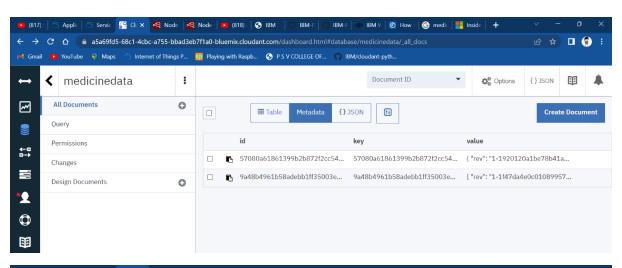


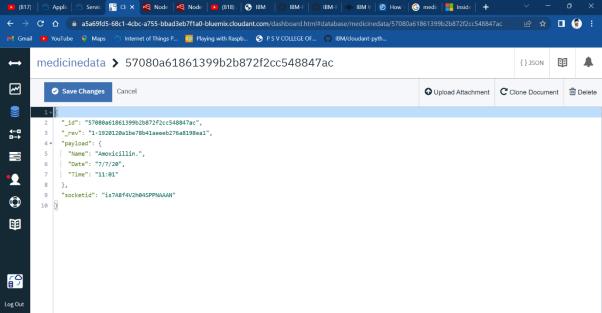
The information are stored in database.











Application for User:

