DELIVERY OF SPRINT – 3

Team ID	PNT2022TMID17949
Project Name	Project –Smart Waste management System
Date	11 November 2022
Marks	4 Marks

Transferring the data from the sensors to the IBM IoT Watson cloud

I. Ino code :

```
#include <WiFi.h>                                   // library for wifi
#include <PubSubClient.h>                           // library for MQTT
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 20, 4);

//----------------------- credentials of IBM Accounts --------------
----------------

#define ORG "tn3xmm"                            // IBM organisation id
#define DEVICE_TYPE "rojjer"                    // Device type mentioned
in ibm watson iot platform
#define DEVICE_ID "240901"                  // Device ID mentioned in
ibm watson iot platform
#define TOKEN "dVDVCxWLOW7)W6vwa&"              // Token

//----------------------- customise 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 topic[] = "iot-
2/cmd/led/fmt/String";                                      // cmd
Represent type and command is test format of strings
char authMethod[] = "use-token-
auth";                                              // authentication
method
char token[] = TOKEN;
```

```
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":"
DEVICE_ID;                    //Client id

//-----------------------------------------------------------------
-------------------------------------------------

WiFiClient
wifiClient;                                                     //
creating instance for wificlient
PubSubClient client(server, 1883, wifiClient);

#define ECHO_PIN 12
#define TRIG_PIN 13
float dist;

void setup()
{
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
  //pir pin
  pinMode(4, INPUT);

  //ledpins
  pinMode(23, OUTPUT);
  pinMode(2, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(15, OUTPUT);


  lcd.init();
  lcd.backlight();
  lcd.setCursor(1, 0);
  lcd.print("");
  wifiConnect();
  mqttConnect();
}

float readcmCM()
{
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  int duration = pulseIn(ECHO_PIN, HIGH);
  return duration * 0.034 / 2;
```

```
}

void loop()
 {

  lcd.clear();

  publishData();
  delay(500);
  if (!client.loop())
    {
      mqttConnect();                                    // function
call to connect to IBM
    }
}


/* ---------------------------------retrieving to cloud--------------
---------------------------------------*/

void wifiConnect()
{
  Serial.print("Connecting to ");
  Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED)
    {
      delay(500);
      Serial.print(".");
    }
  Serial.print("WiFi connected, IP address: ");
  Serial.println(WiFi.localIP());
}
void mqttConnect()
  {
    if (!client.connected())
      {
        Serial.print("Reconnecting MQTT client to ");
        Serial.println(server);
        while (!client.connect(clientId, authMethod, token))
          {
            Serial.print(".");
            delay(500);
          }
        initManagedDevice();
        Serial.println();
      }
  }
void initManagedDevice()
```

```
  {
    if (client.subscribe(topic))
      {
        Serial.println("IBM subscribe to cmd OK");
      }
    else
      {
        Serial.println("subscribe to cmd FAILED");
      }
  }
void publishData()
{
  float cm = readcmCM();

  if(digitalRead(34))                                  //pir motion
detection
  {
    Serial.println("Motion Detected");
    Serial.println("Lid Opened");
    digitalWrite(15, HIGH);

  }
  else
  {
    digitalWrite(15, LOW);
  }

 if(digitalRead(34)== true)
 {
  if(cm <= 100)                                                  //Bin
level detection
  {
    digitalWrite(2, HIGH);
    Serial.println("High Alert!!!,Trash bin is about to be full");
    Serial.println("Lid Closed");
    lcd.print("Full! Don't use");
    delay(2000);
    lcd.clear();
    digitalWrite(4, LOW);
    digitalWrite(23, LOW);
  }
  else if(cm > 150 && cm < 250)
  {
    digitalWrite(4, HIGH);
    Serial.println("Warning!!,Trash is about to cross 50% of bin
level");
    digitalWrite(2, LOW);
    digitalWrite(23, LOW);
```

```
  }
  else if(cm > 250 && cm <=400)
  {
    digitalWrite(23, HIGH);
    Serial.println("Bin is available");
    digitalWrite(2,LOW);
    digitalWrite(4, LOW);
  }
    delay(10000);
    Serial.println("Lid Closed");
 }
 else
 {
   Serial.println("No motion detected");
 }
```

```
  if(cm <= 100)
{
digitalWrite(21,HIGH);
String payload = "{\"HighAlert !Trash bin is about to be full\":\"";
payload += cm;
payload += "\" }";
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str()))
 // if data is uploaded to cloud successfully,prints publish ok else
prints publish failed
{
Serial.println("Publish OK");
}
}
//////////////////////////

if(cm > 150 && cm < 250)
{
digitalWrite(22,HIGH);
String payload = "{\"warning! Trash is about to cross 50% of bin
level\":\"";
payload += cm;
payload += "\" }";
Serial.print("\n");
Serial.print("Sending distance: ");
Serial.println(cm);
```

```
if(client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
else
{
Serial.println("Publish FAILED");
}
}
//////////////////////////

if(cm > 250 && cm <=400)
{
digitalWrite(21,HIGH);
String payload = "{\"Bin is available\":\"";
payload += cm;
payload += "\" }";
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str()))
 // if data is uploaded to cloud successfully,prints publish ok else
prints publish failed
{
Serial.println("Publish OK");
}
}
//////////////////////////////

  float inches = (cm /
2.54);                                          //print on lcd
  lcd.setCursor(0,0);
  lcd.print("Inches");
  lcd.setCursor(4,0);
  lcd.setCursor(12,0);
  lcd.print("cm");
  lcd.setCursor(1,1);
  lcd.print(inches, 1);
  lcd.setCursor(11,1);
  lcd.print(cm, 1);
  lcd.setCursor(14,1);
  delay(1000);
  lcd.clear();
}
```

II. Json file :


```
{
  "version": 1,
  "author": "Uri Shaked",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 1.29, "left": -
1.29, "attrs": {} },
    {
      "type": "wokwi-led",
      "id": "led1",
      "top": -43.97,
      "left": 296.62,
      "attrs": { "color": "limegreen" }
    },
    {
      "type": "wokwi-led",
      "id": "led2",
      "top": 15.48,
      "left": 299.36,
      "attrs": { "color": "yellow" }
    },
    {
      "type": "wokwi-led",
      "id": "led3",
      "top": 140.83,
      "left": 302.1,
      "attrs": { "color": "blue" }
    },
    {
      "type": "wokwi-led",
      "id": "led4",
      "top": 79.19,
      "left": 300.24,
      "attrs": { "color": "red" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r1",
      "top": -3.9,
      "left": 224.81,
      "attrs": { "value": "100" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r2",
      "top": 55.55,
      "left": 221.42,
```

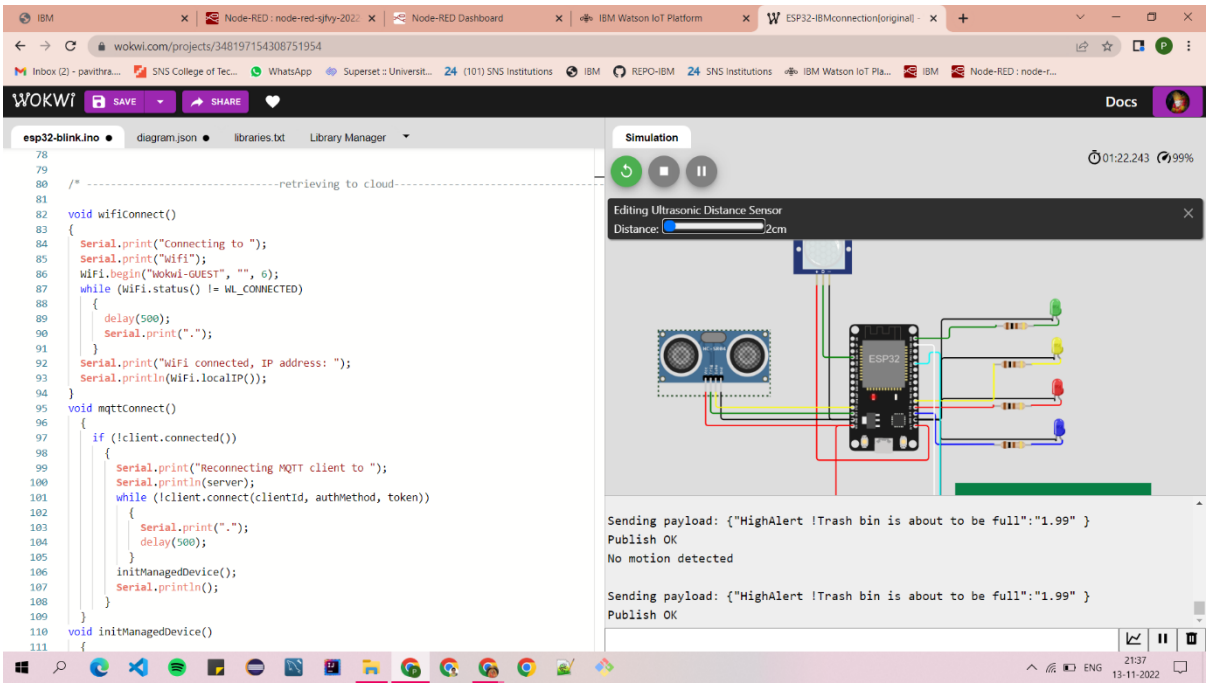
```
      "attrs": { "value": "100" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r3",
      "top": 179.36,
      "left": 221.1,
      "attrs": { "value": "100" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r4",
      "top": 119.28,
      "left": 220.77,
      "attrs": { "value": "100" }
    },
    {
      "type": "wokwi-lcd1602",
      "id": "lcd1",
      "top": 248.08,
      "left": 161.61,
      "attrs": { "pins": "i2c" }
    },
    {
      "type": "wokwi-hc-sr04",
      "id": "ultrasonic1",
      "top": 13.99,
      "left": -295.33,
      "attrs": { "distance": "248" }
    },
    {
      "type": "wokwi-pir-motion-sensor",
      "id": "pir1",
      "top": -147.86,
      "left": -88.23,
      "attrs": {}
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "led1:A", "r1:2", "green", [ "v0" ] ],
    [ "led2:A", "r2:2", "yellow", [ "v0" ] ],
    [ "led4:A", "r4:2", "red", [ "v0" ] ],
    [ "led3:A", "r3:2", "blue", [ "v0" ] ],
    [ "led1:C", "esp:GND.1", "black", [ "v-2.56", "h-170.98", "v116.48" ] ],
    [ "led2:C", "esp:GND.1", "black", [ "v-2.24", "h-173.72", "v91.96" ] ],
    [ "led4:C", "esp:GND.1", "black", [ "v-3.11", "h-174.6", "v27.59" ] ],
```

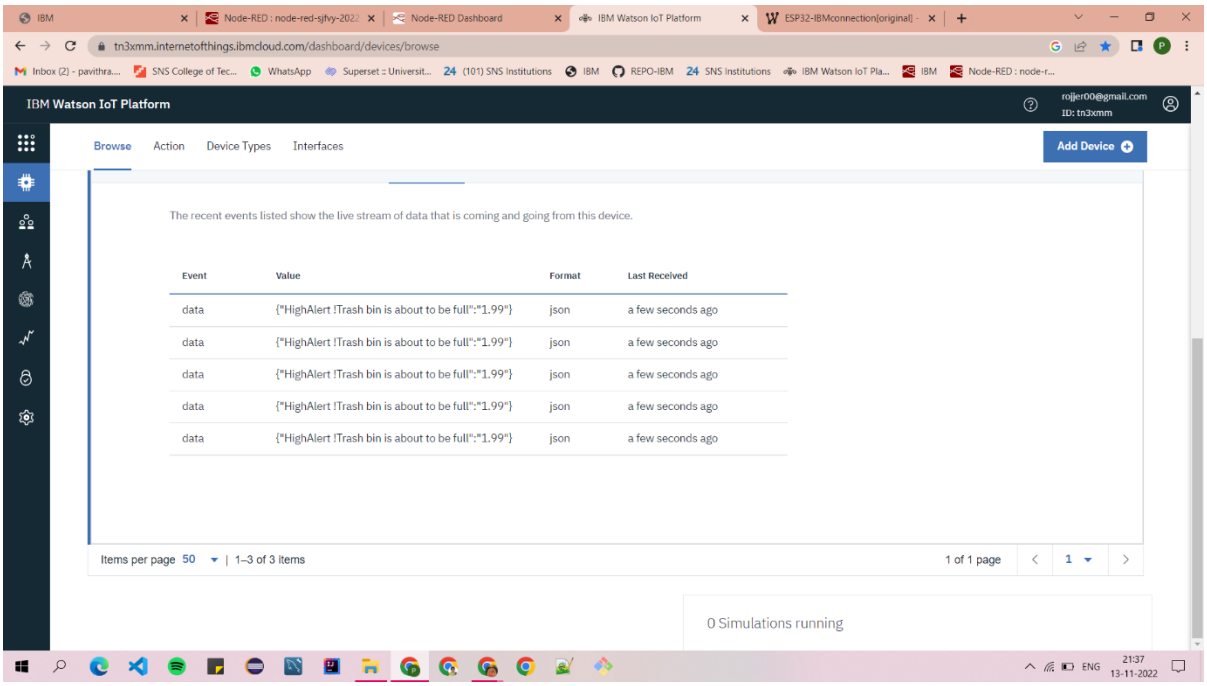
```
    [ "led3:C", "esp:GND.1", "black", [ "v-1.92", "h-177.99", "v-32.18" ] ],
    [ "r1:1", "esp:D23", "green", [ "v2.63", "h-71.91", "v19.92" ] ],
    [ "r3:1", "esp:D15", "blue", [ "v0.22", "h-89.65", "v-53.64" ] ],
    [ "lcd1:GND", "esp:GND.1", "black", [ "h-26.5", "v-129.82" ] ],
    [ "pir1:VCC", "esp:3V3", "red", [ "v268.96", "h172.77", "v-55.17" ] ],
    [ "pir1:GND", "esp:GND.2", "black", [ "v0" ] ],
    [ "pir1:OUT", "esp:D34", "green", [ "v0" ] ],
    [ "ultrasonic1:GND", "esp:GND.2", "black", [ "v0" ] ],
    [ "ultrasonic1:ECHO", "esp:D12", "yellow", [ "v0" ] ],
    [ "ultrasonic1:TRIG", "esp:D13", "green", [ "v0" ] ],
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v0" ] ],
    [ "r4:1", "esp:D2", "red", [ "v0" ] ],
    [ "r2:1", "esp:D4", "yellow", [ "v0" ] ],
    [ "lcd1:SDA", "esp:D21", "cyan", [ "h-27.12", "v-252.33", "h-16.71",
"v17.15" ] ],
    [ "lcd1:SCL", "esp:D22", "white", [ "h-36.27", "v-3.67" ] ],
    [ "lcd1:VCC", "esp:VIN", "red", [ "h-187.87", "v-129.69" ] ]
  ]
}
```


III. Libraries file:

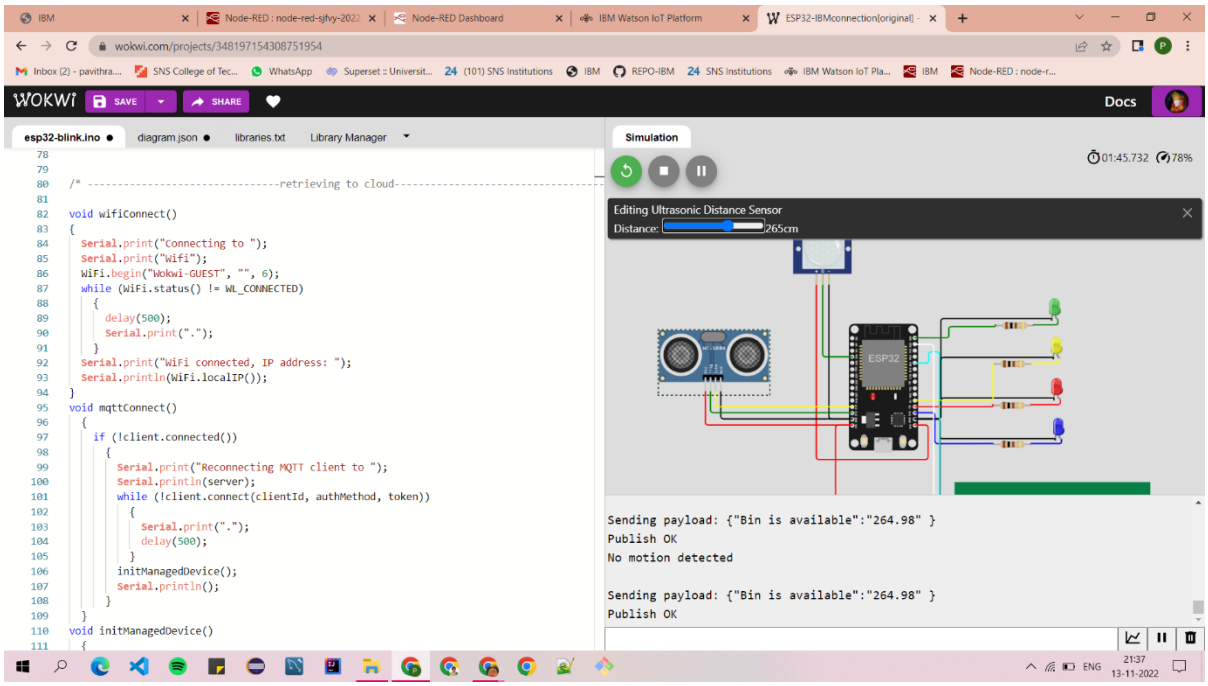
```
# Wokwi Library List
# See https://docs.wokwi.com/guides/libraries

WiFi
PubSubClient
LiquidCrystal I2C
```

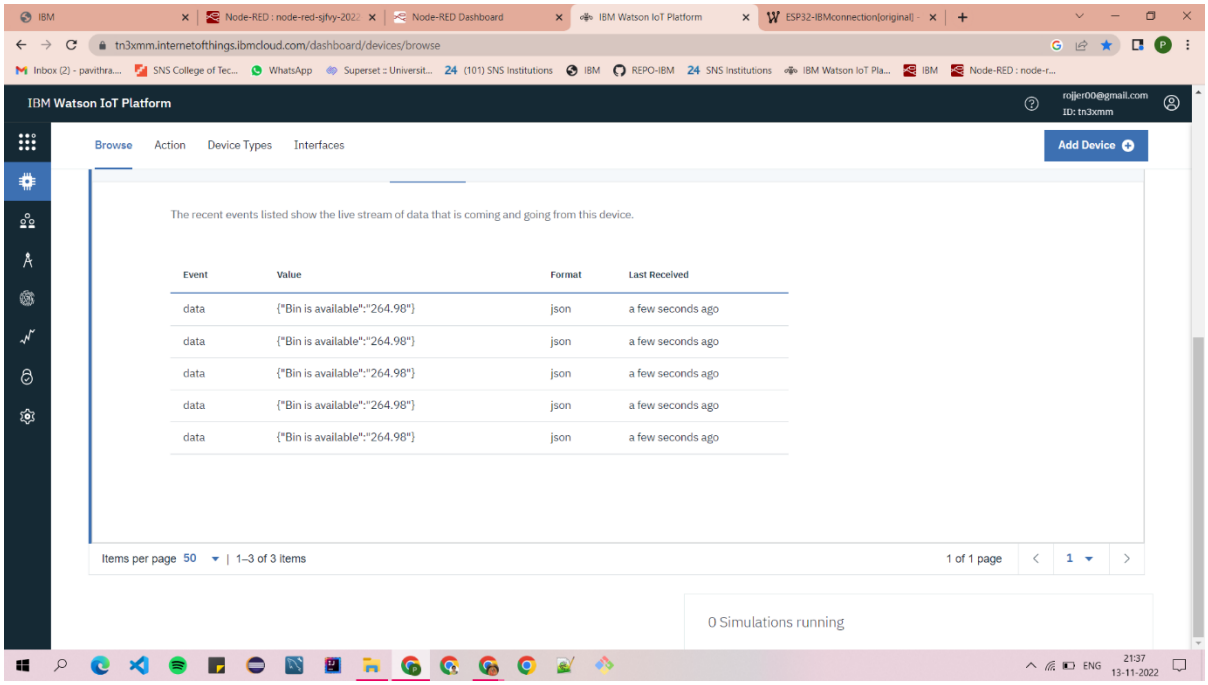
IV. Output on cloud, when Bin is fulled/ about to get filled





V. Output on cloud, when Bin is Empty





VI. Output on cloud, when Bin is about to cross 50% of storage