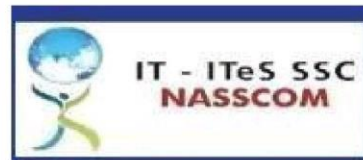# NALAIYATHIRAN

PROJECT BASED
EXPERIMENTAL LEARNING

TITLE OF PROJECT REPORT

IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION

BATCH ID: B11 – 5A1E

IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION

PROJECT REPORT

IBM NALAIYA THIRAN

Submitted By

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In partial fulfillment for the award of

the degree of

BACHELOROFENGINEERING

In

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

MAHENDRA ENGINEERING COLLEGE

(Autonomous)

Mahendhirapuri, Mallasamudram

Namakkal Dt. -637 503

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BONAFIDE CERTIFICATE

Certified that this project phase-I report titled **"IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION"** is the bonafide work of **"POOVARASAN (6113191041073), PRABAKARAN M (6113191041074), PRAVEEN M (6113191041080), and SRIDHAR A (611319104102)"** who carried out the project work under my supervision.

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1.INTRODUCTION

1.1 PROJECT OVERVIEW

The internet of things (IoT) refers to the set of devices and system that stay interconnected with real-world sensor and to the internet. During years' Child safety is under threat and it is very important to provide a technology-based solution which will help them under panic situations and monitor them using a smart gadget. The proposed system is equipped with GSM and GPS modules for sending and receiving call and SMS between safety gadget and parental phone, the proposed system also consists of Wi-Fi module used to implement IoT and send all the monitoring parameters to the cloud for android app monitoring on parental phone. Android application can be used to track the current location of safety gadget using its location coordinates on parental phone android app and also via SMS request from parent phone to safety gadget. Panic alert system is used during panic situations and automatic SMS alert and phone call is triggered from safety gadget to the parental phone seeking for help and also monitored for plug and unplug from hand, as soon the gadget is unplugged from hand a SMS is triggered to parental phone and the alert parameter is also updated to the cloud.

1.2 PURPOSE

Some previous studies have been included for designing the IoT-based child security smart band. It assists parents to monitor their children remotely. In case situations happen, notifications will be sent to parents so that actions can be taken. Through this, child safety can be ensured and crime rate will be reduced.

2. LITERATURE SURVEY

PROJECT TITLE: Iot Based Safety Gadget for childsafety monitoring and notification.

PROJECT DESCRIPTION

These days, crimes happen frequently. Children can also be affected by this scenario; it does not just apply to adults. Parents worry more about terrible crimes like kidnapping, rape, and missing children. Newspapers have reported on the crime that also involved schoolchildren. Even thoughthe school has guards on duty around the clock, it is just insufficient to keep an eye on the students. The approved must provide additionalsecurity measures to address these issues. "Some parents may not have the option to drop off or pick up their kids at school. Parents typically have complete faith in their children to arrange their own travel. These youngsters would have to commute by bus, bicycle, or foot. Children who

go by themselves to and from school without parental supervision are vulnerable to risk on the road". In addition, parents typically learn about their children's mishaps or involvement with criminal activity after the fact. Teachers and school administrators hold back their students until they arrive at class. They squander a lot of time as a result.

Development The use of IoT-based child monitoring in schools will assist parents in reducing their concerns. The system requirements for monitoring the youngster and outlining the feature implementation. If a low accuracy GPS is utilized in this system, a high accuracy GPS is needed to implement the system. The system can display an error for thatchild's location. In this system, we send the message TRACK to the device, and the GPS of that device sends the longitude and latitude to theGSM module. Once the GSM module receives the information about thelongitude and latitude of that child's location, this message is sent to the user in order to track the lost child's location.

TOOLS USED/ALGORITHM

This system's whole operation is controlled by a tiny micro controller called an Arduino. The notion for creating a user-friendly, high accuracy,low-cost system using Google Maps is presented in this paper. GPS accuracy can be increased with Google Maps. In this essay, research on the Child Tracking System is presented using Google maps. The excellentaccuracy of Google Maps is evidence of improvements. In order to assistparents in finding and keeping an eye on their kids, a smart Internet of Things (IoT) device for child safety and tracking has been developed. Thesystem is made with a Link It ONE board that has embedded C programming and is interfaced with temperature, heartbeat, touch, GPS, GSM, and digital camera modules.
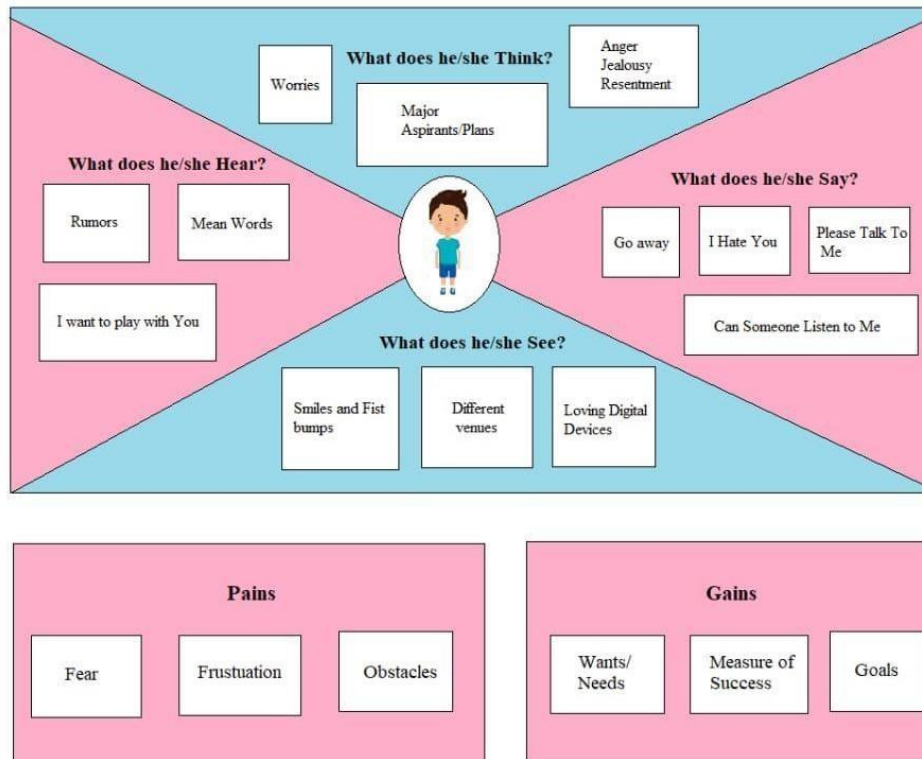
3. IDEATION AND PROPOSED SOLUTION

S.No.	Parameter	Description
1.	**Problem Statement (Problem tobe solved)**	**Parents who are engaged with with busy lifestyle who have no time to monitor their children and nowadays the misbehaviours against children are increasing at an exponential rate.They are under the threat of easily being kidnapped.So the parents needs a way to monitor their children continuously and detect early if there is any abnormal behaviour in their children surroundingsso that they can do their duties efficiently rather than worrying about their children, This will indeed reduce the worries of the parents and create a safe environment.**
2.	**Idea / Solution description**	**Parents need a way to monitor their children continuously and detect early ifthere is any abnormal behaviour in their children's surroundings so that they cando their duties efficiently rather than worrying about their children. This will indeed reduce the worries of the parentsand create a safe environment.**

3.	**Novelty / Uniqueness**	**Even though there are many existing solutions for this problem they failed to satisfy the needs of customer.Some of the solutions are only detecting some particular issues where some other failed to alert the parents and other solution with some delays.Our solution not only notify the parents but also notify the persons who are nearer to the childlike teachers so that they can take control over the situation and our solution will alert the persons who are closer to the child's parents.**
4.	**Social Impact / Customer Satisfaction**	**Our solution will be very helpful for the society and the people who are worrying about their child's safety.Our solution will prevent many problems which are faced by childrens and we can able to stop crime.Through this project the parents mental pressure will be reduced and it is very helpful to provide a safer environment for the children.**
5.	**Business Model (Revenue Model)**	**The main target of our solution is Parents who are worrying about their children so we planned to visit workplaces and explain about the positives of our product.So that they can be aware of the importance of this solution and use it.**
6.	**Scalability of the Solution**	**Our solution can be integrated for further future use because the solution we have provided will be lay on the basics or initial stage of any upgraded version**

3.1 EMPATHY MAP

The main purpose of the proposed child tracking system isto emit a signal when a violation of child safety is detectedby a specific sensor in the kid module. This signal will be sent from the microcontroller by the micro sensors and WFPS, which will then send it to the transmitter, which will send it to the parent module. The parent module will make the choice, and the violation handling process will start. Hardware between the child and parent models is required for the kid tracking system to function, and this hardware includes a driving circuit for the sensors' activation. This system provides a tracking solution for the parent to keep tracking their child's location outdoors by using GPS as it allows them to determine the exact locationof the child. It is therefore, helps to minimize this tragedy to reoccur in the future.

4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
1	Database	Stored in cloud for seamless connectivity. Parents and kids link with the distance andthelocation values obtained from the mobile devices are stored here. The values include parent id, kid id,distance, longitude, latitude etc.
2	Server	It connects the database and the frontend application. The backend server has been implemented to run as a service and is deployed in an IBM cloud instance. The backend server has been implemented to run as a service and is deployed in an IBM cloud instance.
3	Battery Life	If the child or parent forgets to charge the device for a whole day then also thedevice will work. That's why we aim tomake this device Blast the whole day with one charge. It should be long-lasting.
4	Location History	Location history will help to track the child's activity so that they aren't will be updated. Location history will be there for 30days. For example if the child gets missing with the help of location history they aren't can track down their child's activity and also can find their child.

4.2 NON-FUNCTIONAL REQUIREMENTS

Following are the non-functional requirements of the proposed solution.

No.	Non-Functional Requirement	Description
1	Usability	Device have GSM can help to inform the parents or relatives about the current situations of the child by deliver the message immediately to save the child.
2	Security	Make children parents more assure abouttheir kid's security, we have a feature in our device called Geo- Fence. Whenever your child crosses that specificarea, you will get an instant notification on your phone.
3	Reliability	Portable Easy to use Flexibility
4	Performance	Create a Child tracker whichhelps theparents with continuously monitoring the child's location. The notification will be sent according tothe Child's location totheir parents orcaretakers. The entire location data will bestored inthe database.
5	Availability	Track your child even in a crowd Get travel details of kids at any time Know the current location

5.PROJECT DESIGN
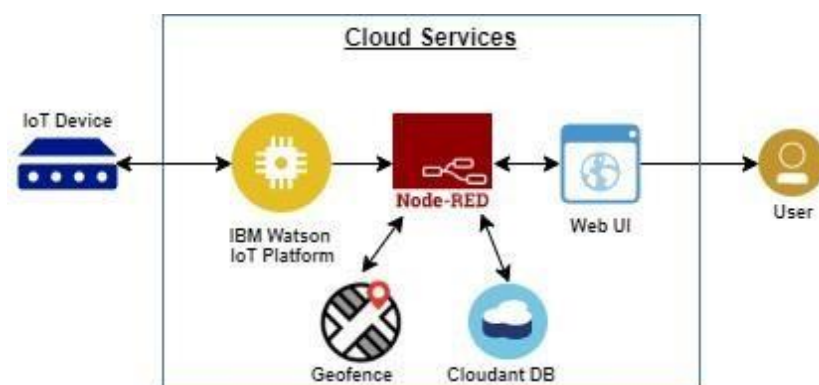
S.No	Component	Description	Technology
1.	User Interface	The point of human – computer inter action. e.g. watch.	RSSI technique
2.	Application Logic-1	The logical governing what a computer program istrying to accomplish.	Java / Python, c
3.	Application Logic-2	Since the logic is user device, any glitches will directlyaffect consumers	Children based on ad hoc network technologies
4.	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
5.	Database	Database system design with time series modificationfor child growth.	Backup monitoring
6.	Cloud Database	Database Service is uses the cloud storage to transferthe location of kids parents.	IBM analytics.
7.	File Storage	File activity monitoring software tools use deep packet inspection to see how users are interactingwith files throughout the network.	IBM Block Storage or Other StorageService or Local Filesystem
8.	External API-1	Collecting and analysing data about the performanceof API in order to identify problems the impact user.	REST API
9.	External API-2	PA Server Monitor has a simple API for automating some basic operations. Security. To protect the system from un-authorized requests	Aadhar API, etc.
10.	Machine Learning Model	Transmit a warning to the parent or guardian if a child is inadvertently in the car.	Artificial Intelligence.
11.	Infrastructure (Server / Cloud)	System database is geographically oriented which suits location based infrastructure.	4G, 5G cellular networks

6.PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANING AND ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirmingmy password.	2	High	1
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	1
Sprint-1		USN-3	As a user, I can register for the application through Gmail	2	Low	2
Sprint-1		USN-4	As a user, I can log into the application byentering email & password	2	Medium	2
Sprint-1	Login	USN-5	As a User, I can Navigate to the Dashboardafter successfully Login to the Application.	1	High	3
Sprint-2	Support	USN-6	As a User, I can connect with Experts for clearing Queries and facing any Challengesby interact they can help to overcome that.	3	Medium	4
Sprint-3	Admini strator	USN-7	As an Administrator, I can enter my Details as phone number, Gmail, and So on while Registration or Login Process. As an Administrator, I will Manage the Recycle Bin, Backup and Security. As an Administrator, I can Set the Geofence Location Limit. As an Administrator, I am able to View the Notifications from the Gadget.	3	High	4

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date(Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6Days	14 Nov 2022	19 Nov 2022	20	14 Nov 2022

7. CODING AND SOLUTIONS

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridgesthe gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of thesoftware to project stakeholders.

- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed, and delivered.

Example - Solution Architecture Diagram:

IBM

Watson Iot

Node RED service

Web
application
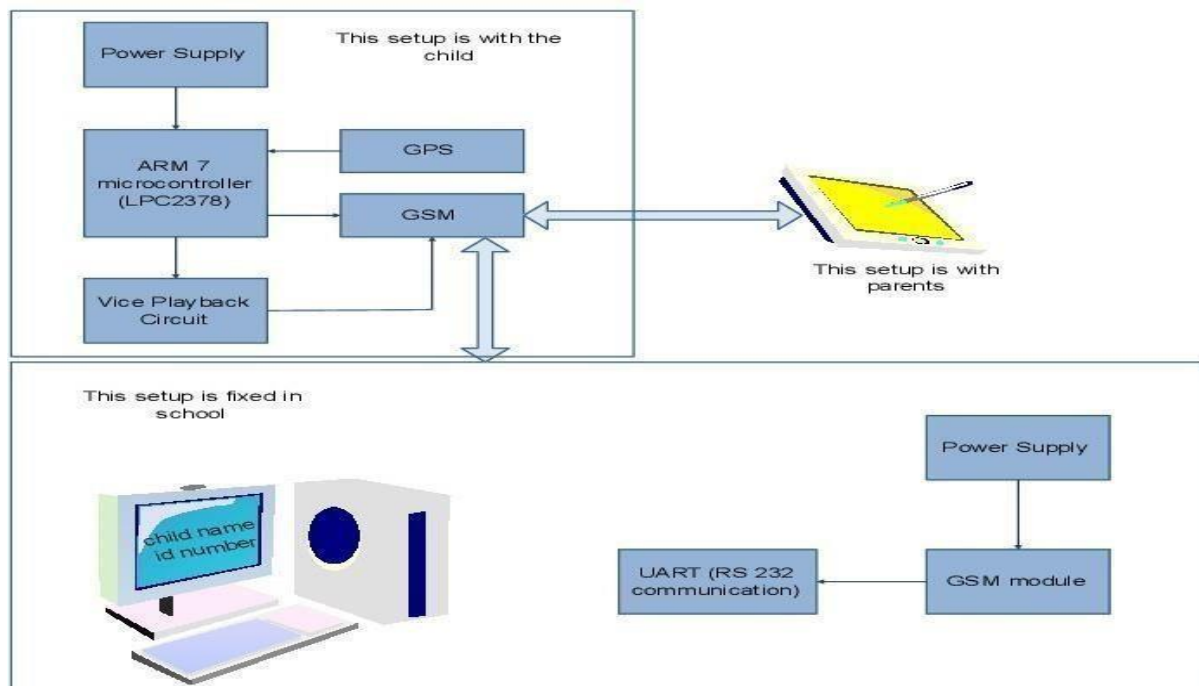
9. RESULT

1) Live Location Tracking: GPS is installed on gadget to track its current location can be tracked on android app and via SMS request sent from parent phone to safety gadget.

2) Panic Alert Systems: Panic alert system on gadget is triggered during panic situation, automatic call and SMS are triggered to parental phone. The alert is also updated to the cloud for purpose of app monitoring.

3) Stay Connected Feature: Stay connected feature is used to trigger call and pre-defined SMS anytime from gadget to parental phone by just pressing a button and also parent can make SMS and call to the gadget anytime.

4) Health Monitoring System: Health monitoring system is implemented using heart beat sensor.

10. ADVANTAGES

It gives safety for the individual and improves, security,We can spend less time on tasks by automating them Even though we are far from our actual location, information is still readily available and constantly updated.

11. CONCLUSION:

This study shows how san IoT devices can be used to track and protect children while also assisting parents in finding and keeping an eye on them. SMS and phone call are sent to the parents' mobile phones if the sensor detects any unusual readings. Additionally, a cloud-based update to the parental control app. The system has GSM and GPS modules that allow calls and SMS to be sent and received between the safety device and the parent's phone. In order to integrate lol, the system also includes a Wi-Fi module that transmits all of the observed parameters to the cloud for parental phone android app monitoring. When a panic attack occurs, a panic alert system is utilized to send notifications to the parent's phone and update the alert settings to the cloud.

12. FUTER SCOPE

This system can be further enhanced by installation of minicamera inside smart gadget for better security so that live footage can be seen on parental phone during panic situations.The system can be modified by installation of small solar panels for charging the battery of smart gadget to gain maximum battery backup.

SPRINT – 2

Sprint 2: is about login with mail and password used forregistration
Coding:

registration

Coding:

```java
package com.example.geofence;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle; import
androidx.annotation.NonNull;
    import androidx.appcompat.app.AppCompatActivity;import
      android.content.Intent;
import android.os.Bundle; import
android.text.TextUtils; import
android.widget.Button; import
android.widget.TextClock; import
android.widget.TextView; import
android.widget.Toast;

import com.google.android.gms.tasks.OnCompleteListener; import
com.google.android.gms.tasks.Task;
import com.google.android.material.textfield.TextInputEditText;import
com.google.firebase.auth.AuthResult; import com.google.firebase.auth.FirebaseAuth;

public class LoginActivity extends AppCompatActivity {


        TextInputEditText etLoginEmail;
        TextInputEditText etLoginPassword;TextView
        tvRegisterHere;
Button btnLogin;

        FirebaseAuth mAuth;

        @Override
        protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState); setContentView(R.layout.activity_login);

            etLoginEmail = findViewById(R.id.etLoginEmail);etLoginPassword
  = findViewById(R.id.etLoginPass);
  tvRegisterHere = findViewById(R.id.tvRegisterHere);                          btnLogin
  = findViewById(R.id.btnLogin);

            mAuth = FirebaseAuth.getInstance();
```

```
btnLogin.setOnClickListener(view -> {loginUser();
```

```java
                    });
            tvRegisterHere.setOnClickListener(view ->{startActivity(new
Intent(LoginActivity.this, RegisterActivity.class));
                    });
        }

        private void loginUser(){
            String email = etLoginEmail.getText().toString(); String password =
            etLoginPassword.getText().toString();

            if (TextUtils.isEmpty(email)){ etLoginEmail.setError("Email cannot be
empty");                        etLoginEmail.requestFocus();
}else if (TextUtils.isEmpty(password)){
                etLoginPassword.setError("Password cannot be empty");
etLoginPassword.requestFocus();
            }else{ mAuth.signInWithEmailAndPassword(email,password).addOnCompleteListener(new
OnCompleteListener<AuthResult>() {
@Override
                        public void onComplete(@NonNull Task<AuthResult> task)
{
                            if (task.isSuccessful()){ Toast.makeText(LoginActivity.this, "User logged
  in successfully", Toast.LENGTH_SHORT).show();
                                startActivity(new Intent(LoginActivity.this,
MapsActivity.class));
                            }else{
                                Toast.makeText(LoginActivity.this, "Log in
Error: " + task.getException().getMessage(), Toast.LENGTH_SHORT).show();
                            }
                        }
                });
            }
        }

}
```

Output :

Login

Page

SPRINT - 3
Create Cloudant DB:

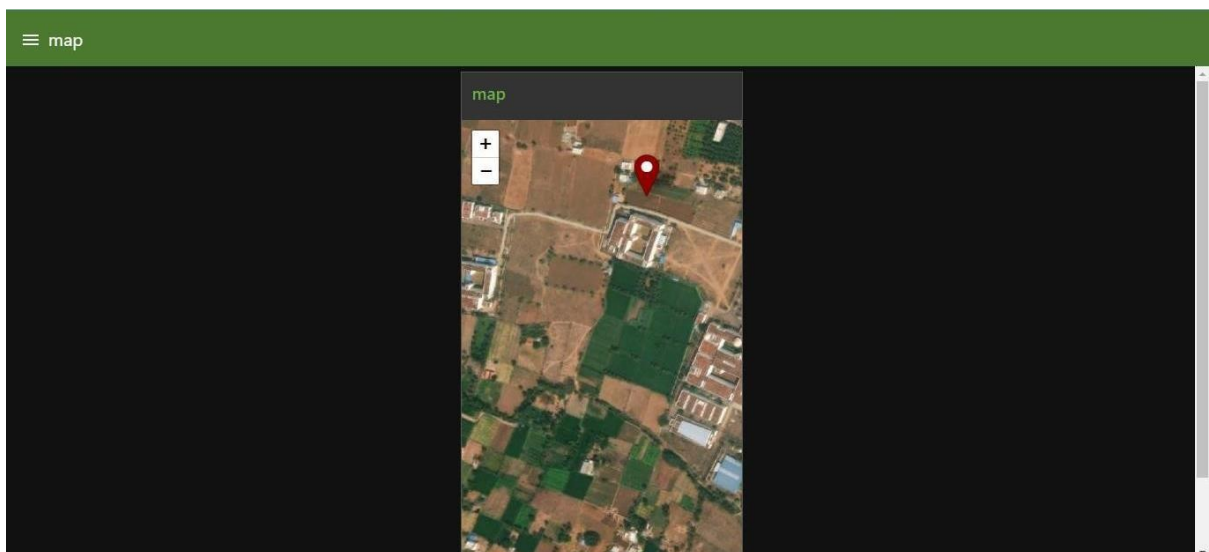## Node-Red Service with Clodant DB:
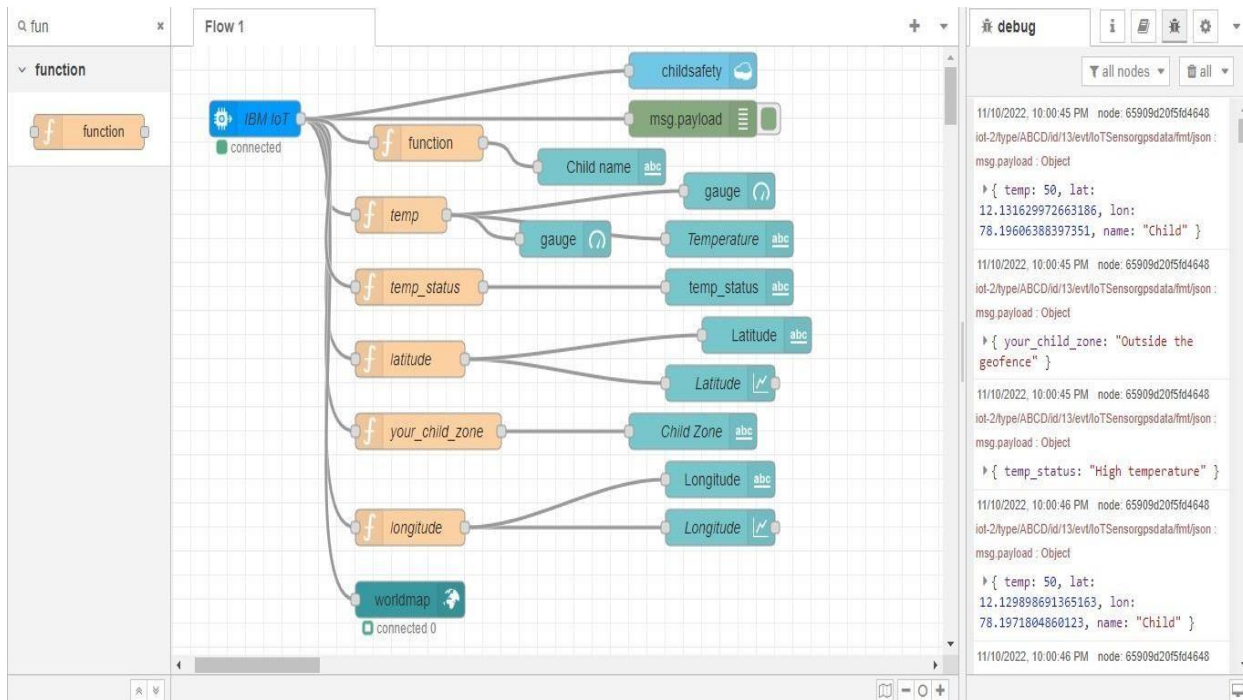
Create App in MIT app inventor:
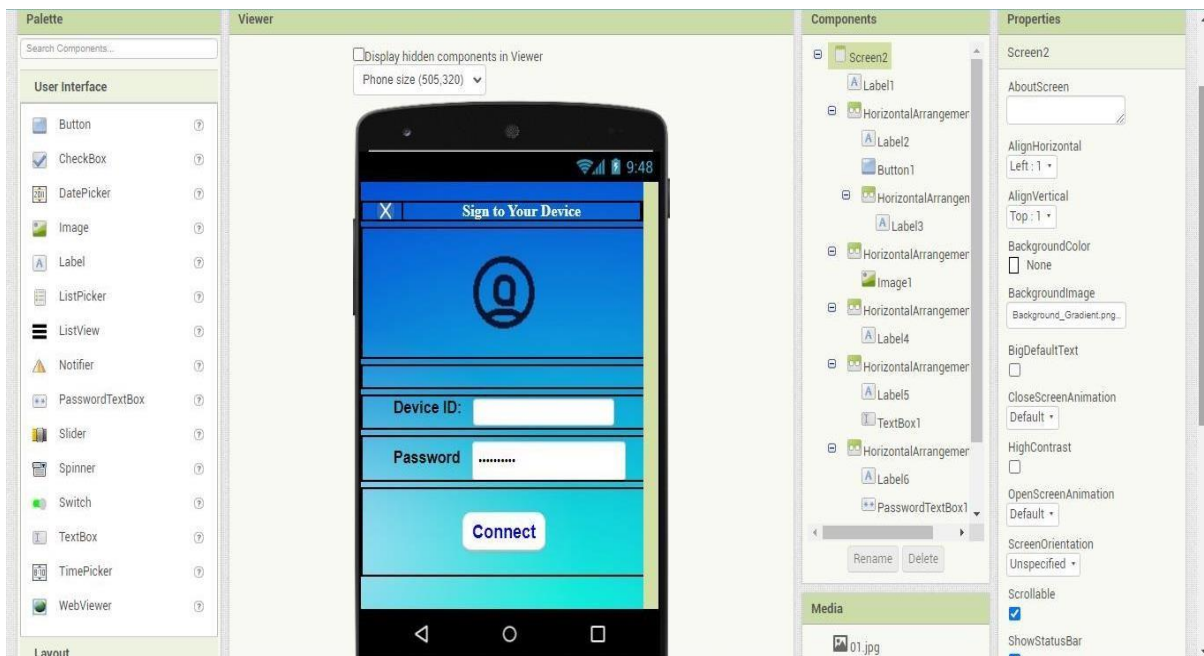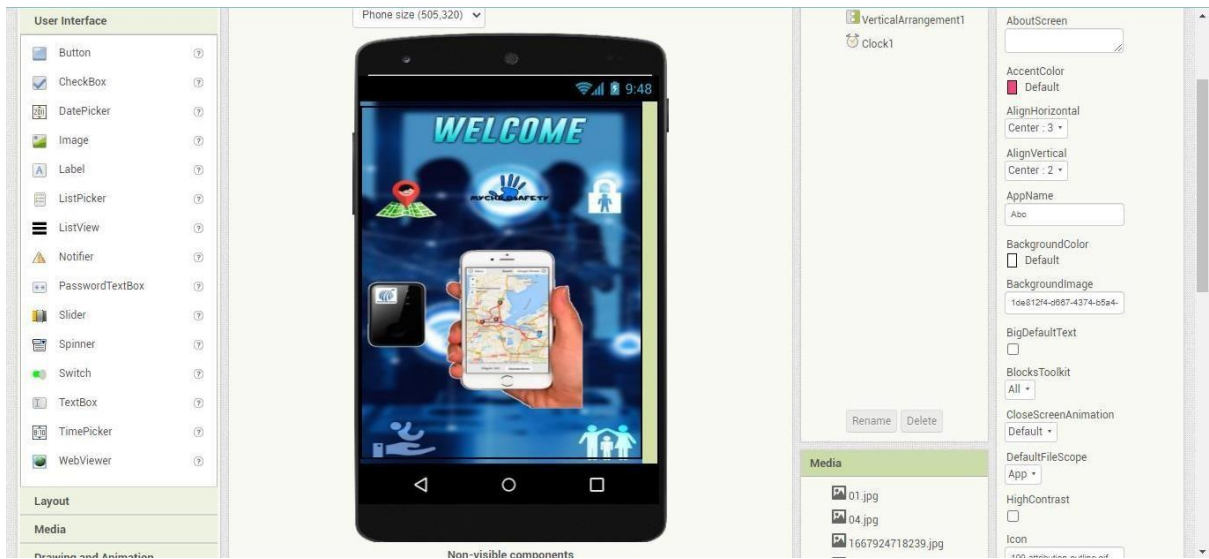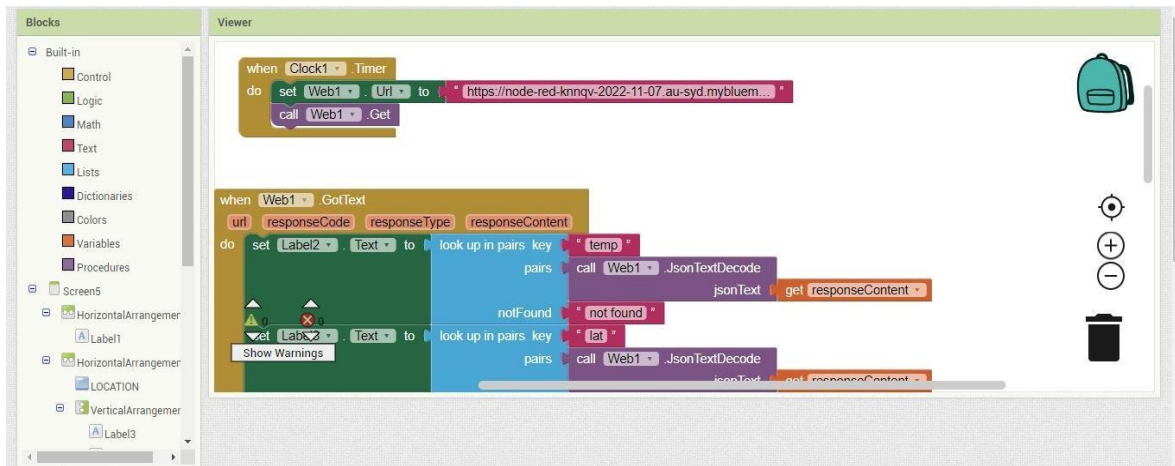
SPRINT – 4

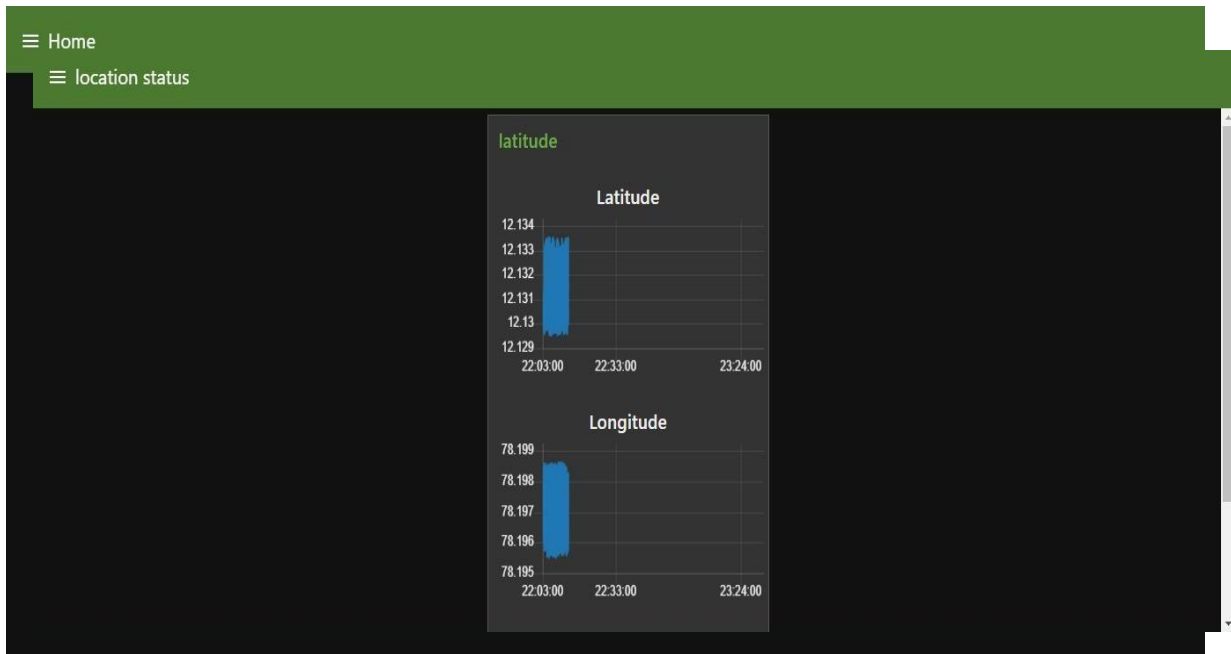## Connect the app with Node-Red Serivce:
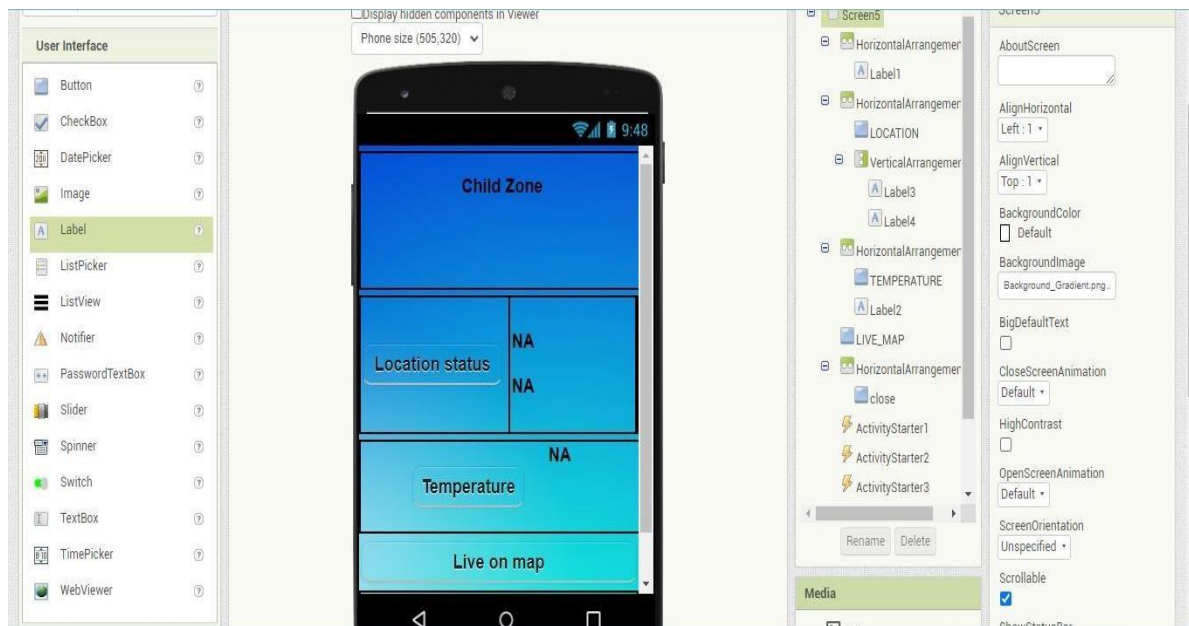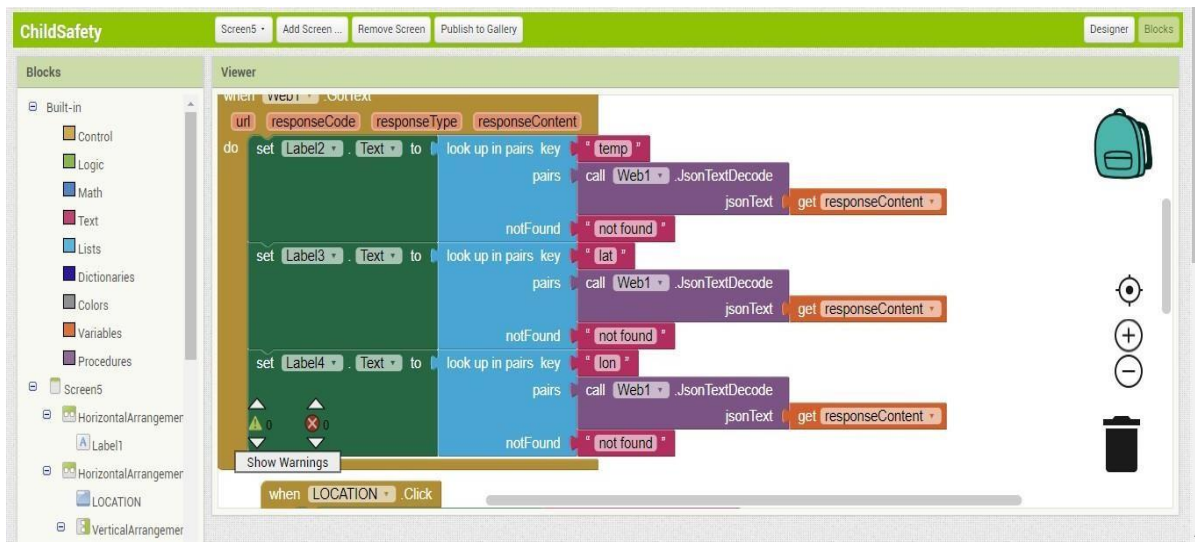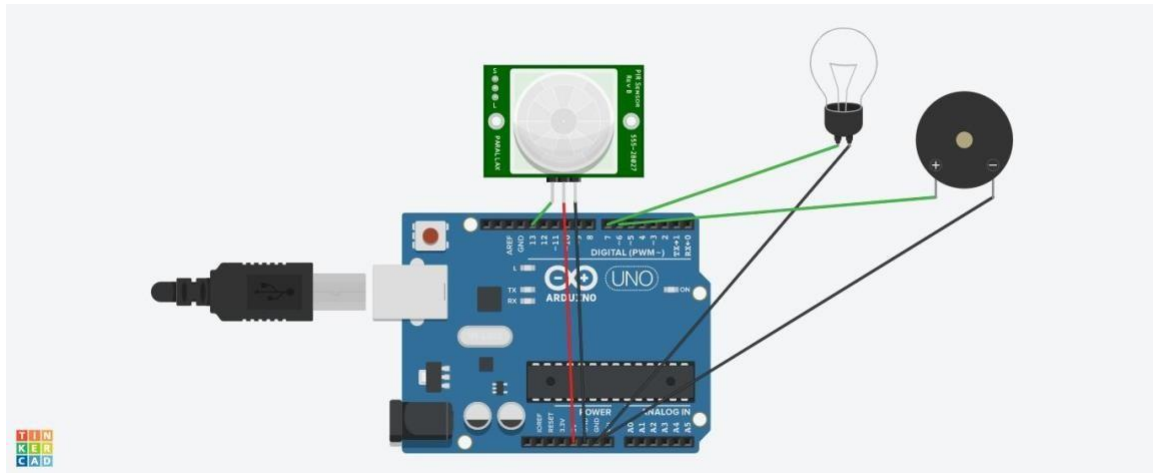
Web UI:

ASSIGNMENT 1

SMART HOME AUTOMATION

```
Void setup()

  {

 pinMode(13, INPUT);

 pinMode(7, OUTPUT);

 pinMode(6, OUTPUT);

 }

 void loop()

 {

digitalWrite(7,digitalRead(13)); digitalWrite(6,digitalRead(13));

 }
```

ASSIGNMENT 2

Build a python code, assume that temperature andhumidity values generated with random function to a variable and write a condition to continuously detect alarm in case of high temperature.

Program:

```
import randomwhile(True):
    a=random.randint(10,120)
    b=random.randint(10,120)

        if(a>35 and b>60):

        print(" high temperature and humidity of:",a,b,"%
                                alarm is on")elif(a<35

        and b<60):

        print("Normal temperature and humidity of:",a,b,"%
                            alarm is off")

        break
```

OUTPUT:

```python
import random
while(True):
    a=random.randint(10,120)
    b=random.randint(10,120)
    if(a>35 and b>60):
        print(" high temperature and humidity of:",a,b
            ,"% alarm is on")
    elif(a<35 and b<60):
        print("Normal temperature and humidity of
            :",a,b,"% alarm is off")
        break
```

```
high temperature and humidity of: 93 71 % alarm is on
 high temperature and humidity of: 102 114 % alarm is on
Normal temperature and humidity of: 26 16 % alarm is off
>
```

```python
import random
while(True):
    a=random.randint(10,120)
    b=random.randint(10,120)
    if(a>35 and b>60):
        print(" high temperature and humidity of:",a,b
            ,"% alarm is on")
    elif(a<35 and b<60):
        print("Normal temperature and humidity of
            :",a,b,"% alarm is off")
        break
```

```
high temperature and humidity of: 70 95 % alarm is on
high temperature and humidity of: 82 108 % alarm is on
 high temperature and humidity of: 62 91 % alarm is on
 high temperature and humidity of: 82 70 % alarm is on
Normal temperature and humidity of: 28 40 % alarm is off
>
```

```python
import random
while(True):
    a=random.randint(10,120)
    b=random.randint(10,120)
    if(a>35 and b>60):
        print(" high temperature and humidity of:",a,b
            ,"% alarm is on")
    elif(a<35 and b<60):
        print("Normal temperature and humidity of
            :",a,b,"% alarm is off")
        break
```

```
Normal temperature and humidity of: 32 58 % alarm is off
>
```

ASSIGNMENT 3

Python Programming

Question-1:

Write python code for blinking LED and Traffic lights for Raspberry pi.

Solution:

```python
import RPi.GPIO as
GPIOimport time
import
signalimport
sys


# Setup
GPIO.setmode(GPIO.BC
M)GPIO.setup(9,
GPIO.OUT)
GPIO.setup(10,
GPIO.OUT)
GPIO.setup(11,
GPIO.OUT)


# Turn off all lights when its
enddef allLightsOff(signal,
frame):
        GPIO.output(9,
        False)
        GPIO.output(10,
        False)
        GPIO.output(11,
        False)GPIO.cleanup()
        sys.exit(0)
```

```
signal.signal(signal.SIGINT,
allLightsOff)
```

```python
# Loop for led
lightwhile True:
        # RED LIGHT
        GPIO.output(9, True)
        time.sleep(3)

        # RED AND YELLOW
        GPIO.output(10, True)
        time.sleep(1)

        # GREEN LIGHT
        GPIO.output(9, False)
        GPIO.output(10, False)
        GPIO.output(11, True)
        time.sleep(5)

        # YELLOW LIGHT
        GPIO.output(11, False)
        GPIO.output(10,  True)
        time.sleep(2)

        #YELLOW OFF (red start from first
        loop)GPIO.output(10, False)
```
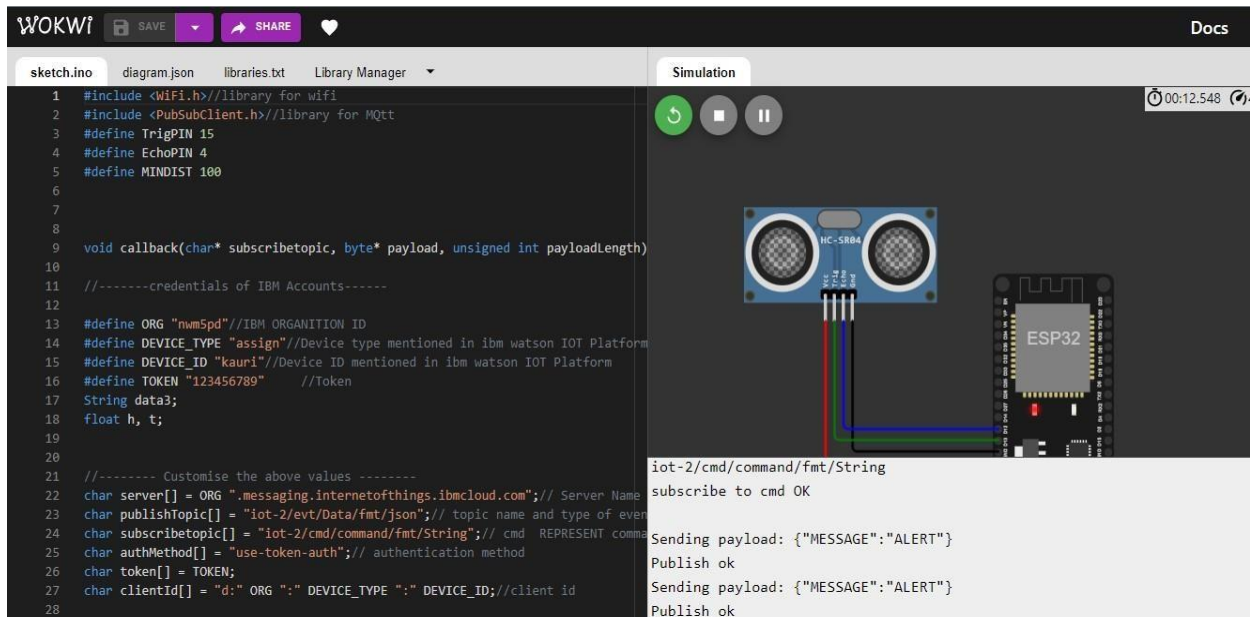
ASSIGNMENT – 4

Question:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distanceis less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

Link: https://wokwi.com/projects/346784574540350036

Circuit Diagram:

OUTPUT:

GITHUB LINK: **https://github.com/IBM-EPBL/IBM-Project-52707-1661141691**