# ENERGY MANAGEMENT

➢ This is project on energy management.
➢ The project helps to save energy.



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# Abstract

The Internet of Things (IoT) is the widely accepted technology that connect everyday objects to the internet for providing ease and various functionalities and the Smart Grid (SG) is defined as the power grid integrated with a large network of ICT. The SG is the combination of billions of smart objects: smart appliances, smart meters, actuators and sensors etc. This paper analyse the various accepted application requirements of Internet of Things deployed in Smart Grid and provides an effective proposal about diverse technologies and standards and of Smart Grid and it also provides an overview about several applications and driving factors of Smart Grid.

# Description

➢ First create IBM cloud account with e-mail address and password.



➢ Then create a IOT platform and node-red platform.

➤ We need to write a python code for it because it is a real time example.
➤ Create a MIT app.

❖ First create IBM cloud account with e-mail address and password

Go to google and search for IBM and create an account using email address and login to the page. we will get interface as IBM dashboard.

❖ CREATING IBM PLATFORM

After creating a IBM account there will a search option then we can able to see it.Type Internet of things there will be a platform called as the internet of thing in that u can able connect the so many service in that internet of things and the create a service in that it will ask u to launch it and for creating a internet of things u need some keys as API keys ,Device connects and so many things will should fill and u can able to see a option as the add device click on new device u can see the device has been created for that u need to keep the API keys, Device information safely in the note pad because it will help u at the need for connecting it.

new - Notepad

File  Edit  Format  View  Help

Organization ID
sgi1vv
Device Type
rizwannew
Device ID
1001
Authentication Method
use-token-auth
Authentication Token
1234567890

## ❖ WRITE PYTHON CODE

we are writing a python code because we are going to deal with a real time example so we need to use python.acutually our project is about the how much electricty is causing monthly and its extimation cost

In this we are writing about fan,light,washingmachine,tv,ac let s take some random values in that because we cant able to take the exact values and then we need to add all of the to know the charge and then we need to find out the extimation money for it. after complition of this code u can able to know the code is running.

we need to send it to IOT platform so we need to install pip by command promt and the write the code seperately u can able to run and sending information to IOT platform. For sending to IOT platform we need to give information in a note pad.

# python code

```python
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
organization= "sgi1vv"
deviceType= "rizwannew"
deviceId= "1001"
authMethod= "token"
authToken= "1234567890"

def myCommandCallback(cmd):
        print("Command received: %s" % cmd.data)
        if cmd.data['command']=='check':
                print("CHECK")
        elif cmd.data['command'] == 'dontcheck':
            print("DONT CHECK")
try:
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod, "auth-token": authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #...........................................

except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()
deviceCli.connect()

while True:
    fan=random.randint(40,80)
    light=random.randint(90,180)
    washingmachine=random.randint(40,80)
    ac=random.randint(40,80)
    tv=random.randint(40,80)
    charge=0;
    units=fan+light+washingmachine+ac+tv;
    print("The total no of units used is : ",units);
    if units<=120:
        charge=units*5.45;
        print("The total cost is : ",charge);
    elif units<=240:
        charge=654+(units-120)*6.7;
        print("The total cost is : ",charge);
    else:
        charge=654+804+(units-240)*7.7;
        print("The total cost is : ",charge);
    if charge<=1000:
        print("it is better to use grid");

    data = {'d':{'fan':fan,'light':light,'washingmachine':washingmachine,'ac':ac,'tv':tv,'units':units,'cost':charge}}
    def myOnPublishCallback():
        print('fan= %s %%' %fan,'light= %s %%' %light,'washingmachine= %s %%' %washingmachine,'ac= %s %%' %ac,'tv= %s %%' %tv,"units= %s %%"  %units,"cost= %s %%"  %charge,"to IBM watson'
    success = deviceCli.publishEvent("event", "json", data, qos=0, on_publish=myOnPublishCallback)
    if not success:
            print("Not connected to IoTF")
    time.sleep(1)

    deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

# python running code

File  Edit  Shell  Debug  Options  Window  Help

```
it is better to use solar
fan= 63 % light= 94 % washingmachine= 58 % ac= 79 % tv= 51 % units= 345 % cost= 2266.5 % to IBM watson
The total no of units used is :  408
The total cost is :  2751.6000000000004
it is better to use solar
fan= 62 % light= 131 % washingmachine= 78 % ac= 60 % tv= 77 % units= 408 % cost= 2751.6000000000004 % to IBM watson
The total no of units used is :  421
The total cost is :  2851.7
it is better to use solar
fan= 53 % light= 155 % washingmachine= 64 % ac= 69 % tv= 80 % units= 421 % cost= 2851.7 % to IBM watson
The total no of units used is :  379
The total cost is :  2528.3
it is better to use solar
fan= 68 % light= 111 % washingmachine= 77 % ac= 74 % tv= 49 % units= 379 % cost= 2528.3 % to IBM watson
The total no of units used is :  319
The total cost is :  2066.3
it is better to use solar
fan= 71 % light= 100 % washingmachine= 40 % ac= 63 % tv= 45 % units= 319 % cost= 2066.3 % to IBM watson
The total no of units used is :  391
The total cost is :  2620.7
it is better to use solar
fan= 75 % light= 135 % washingmachine= 50 % ac= 63 % tv= 68 % units= 391 % cost= 2620.7 % to IBM watson
The total no of units used is :  427
The total cost is :  2897.9
it is better to use solar
fan= 52 % light= 154 % washingmachine= 70 % ac= 78 % tv= 73 % units= 427 % cost= 2897.9 % to IBM watson
The total no of units used is :  406
The total cost is :  2736.2
it is better to use solar
fan= 70 % light= 154 % washingmachine= 66 % ac= 48 % tv= 68 % units= 406 % cost= 2736.2 % to IBM watson
The total no of units used is :  298
The total cost is :  1904.6
it is better to use solar
fan= 52 % light= 90 % washingmachine= 59 % ac= 46 % tv= 51 % units= 298 % cost= 1904.6 % to IBM watson
The total no of units used is :  414
The total cost is :  2797.8
it is better to use solar
fan= 75 % light= 157 % washingmachine= 68 % ac= 64 % tv= 50 % units= 414 % cost= 2797.8 % to IBM watson
The total no of units used is :  331
The total cost is :  2158.7
it is better to use solar
fan= 48 % light= 102 % washingmachine= 60 % ac= 52 % tv= 69 % units= 331 % cost= 2158.7 % to IBM watson
The total no of units used is :  416
The total cost is :  2813.2
it is better to use solar
fan= 76 % light= 158 % washingmachine= 64 % ac= 76 % tv= 42 % units= 416 % cost= 2813.2 % to IBM watson
```
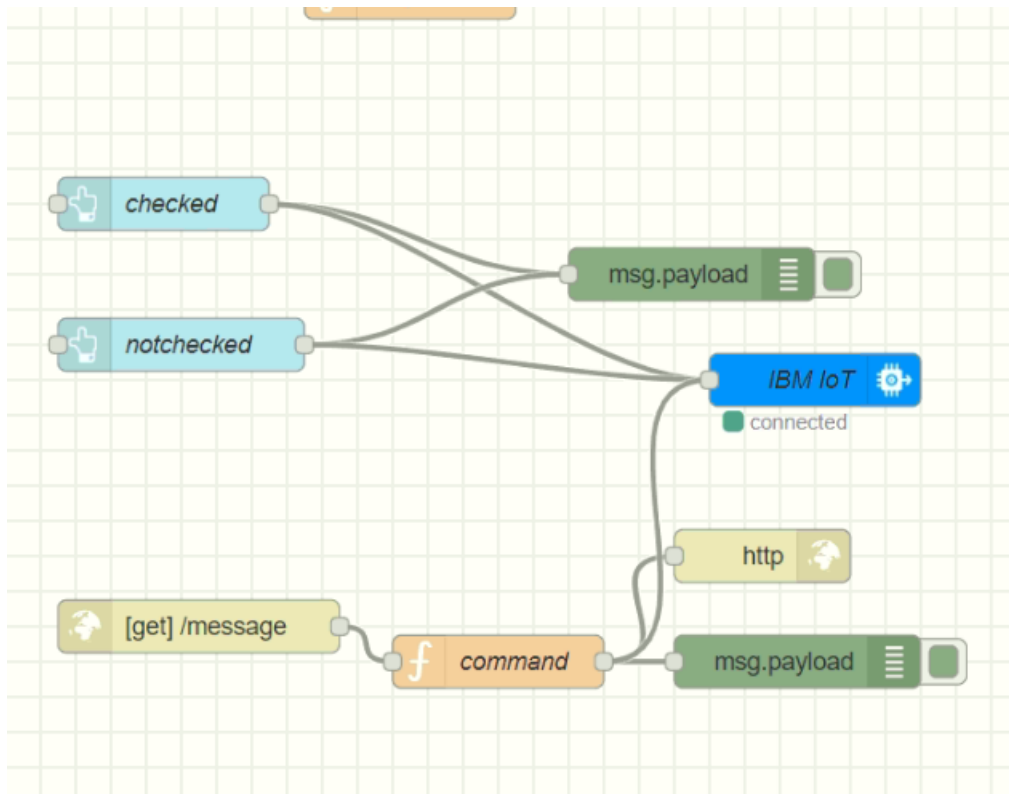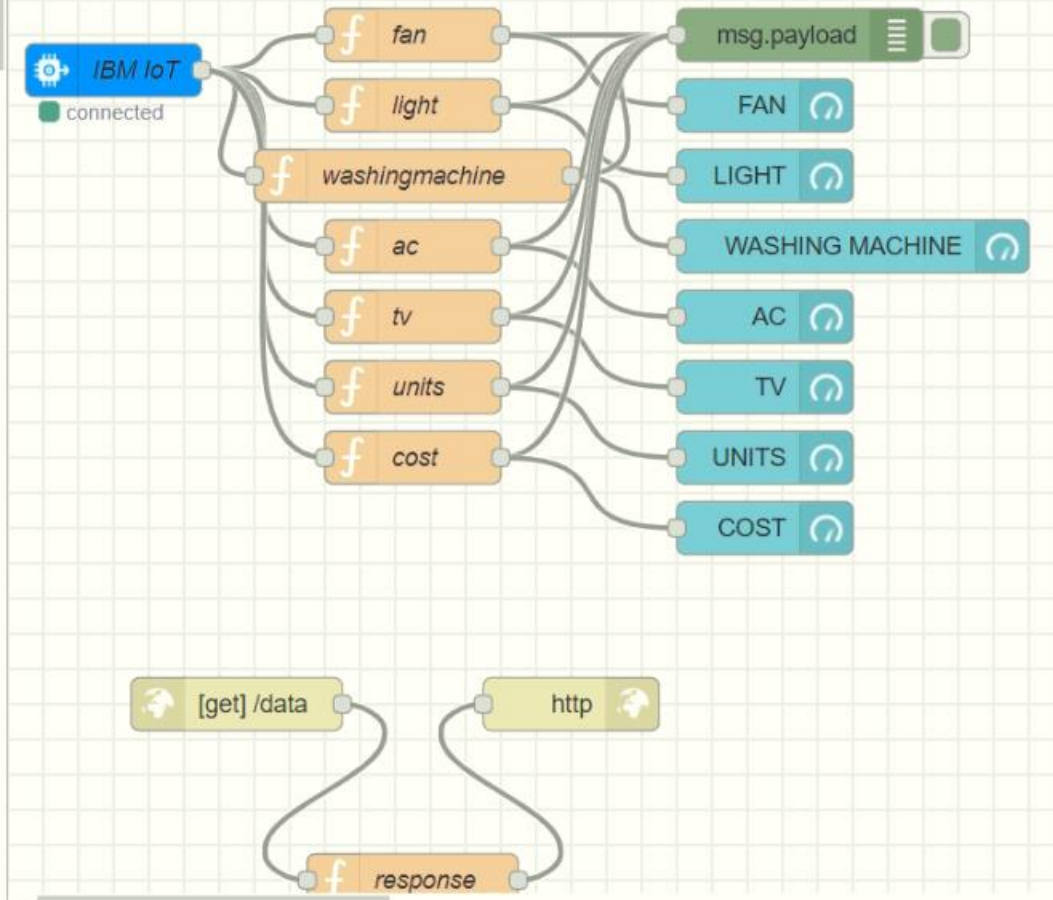
# Information in IOT platform

| ⌄ ☐ | 1001 | ⧅ Disconnected | rizwannew | Device | Dec 4, 2020 8:54 PM |
|---|---|---|---|---|---|

**Identity**    Device Information    Recent Events    State    Logs

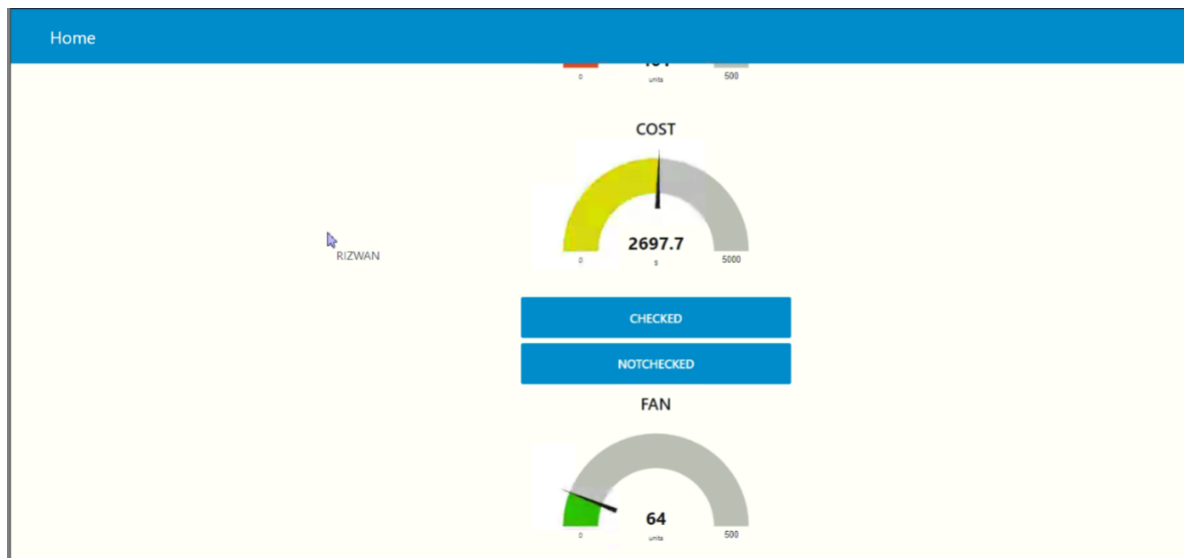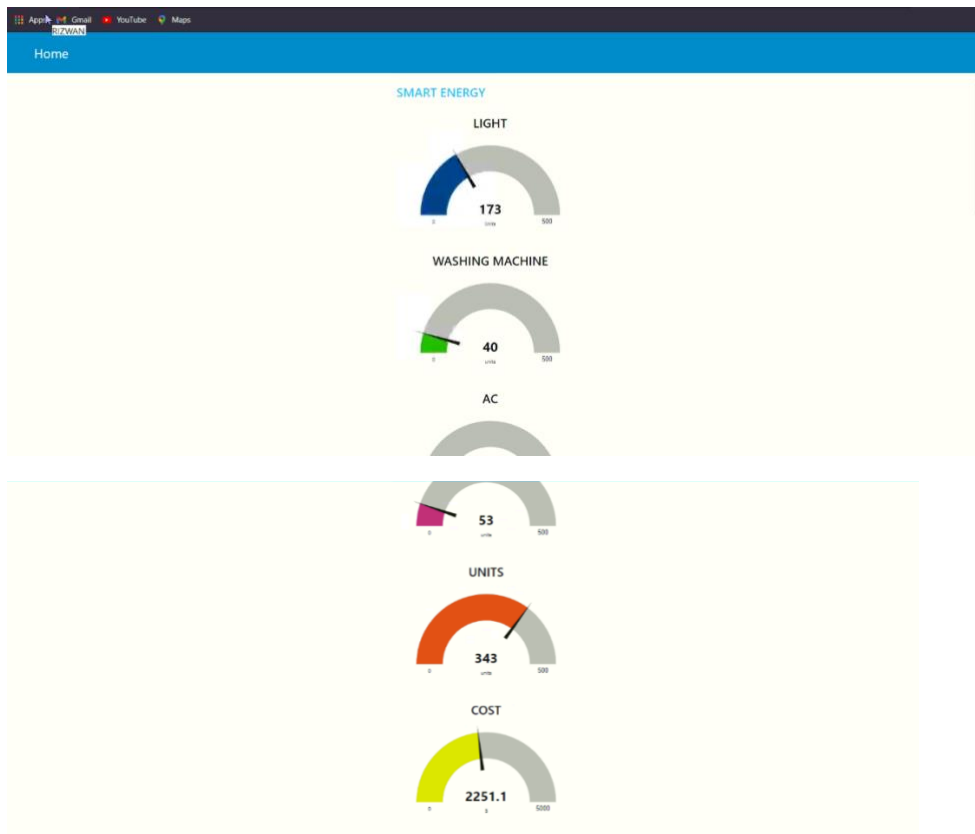| | |
|---|---|
| **Device ID** | 1001 |
| **Device Type** | rizwannew |
| **Date Added** | Dec 4, 2020 8:54 PM |
| **Added By** | rizwansyed12112001@gmail.com |
| **Connection Status** | **Disconnected**<br>Last Connected: Dec 6, 2020 4:27 PM<br>Client Address: 106.217.153.251 SecureToken<br>Duration: a minute<br>Data Transferred: 7.6 KB |

# Creating node-red platform

For creating a node red plat form we need to search in IBM as node red app then u can able to see the node app then create it as the local u can create node red is nothing but we will get the information in the form of flow chart.

we are need to install IOT in, IOT out will be in node red app itself and then u can able to use it for better ability and expernce we will use gauge tool and for the doing it in the web we will use the http in, http respondse and then we will use the payload option to print in and i will show u the flow chat i had created and when we run the program u can see the outputs are coming in the debug option.

## Flow 1



**Flow 1 nodes (top section):**

- IBM IoT (connected) connects to function nodes: fan, light, washingmachine, ac, tv, units, cost
- These connect to output nodes: msg.payload, FAN, LIGHT, WASHING MACHINE, AC, TV, UNITS, COST
- [get] /data → response → http

**Bottom section:**

- checked, notchecked → msg.payload, IBM IoT (connected)
- [get] /message → command → http, msg.payload

**Home**

**SMART ENERGY**

**LIGHT**

173

**WASHING MACHINE**

40
units

**AC**

53
units

**UNITS**

343
units

**COST**

2251.1
s

---

**Home**

**COST**

2697.7
s

| CHECKED |
| NOTCHECKED |

**FAN**

64
units

❖ Create a MIT app.

Search for MIT app an click on create apps.

First we should design the app page with alignments given on left side of MIT. with horizontal alignments drag them to the screen and edit those with suitable markings.

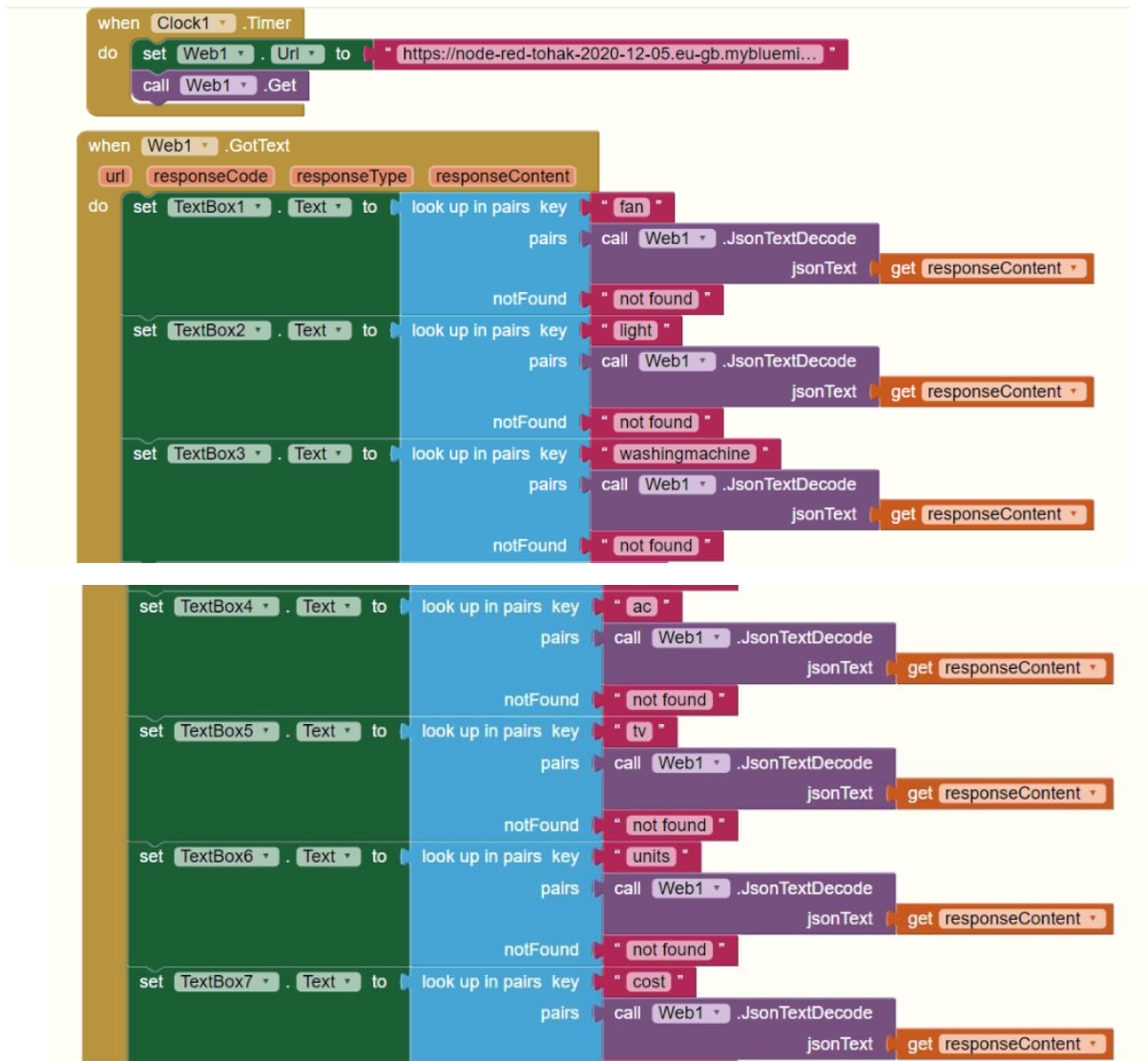And next insert text box to the screen. As we have taken energy management the as fan, ac, light, tv, etc.

Now insert 5 text boxes to the screen and assign the markings. Take two buttons one as checked and another as not checked.
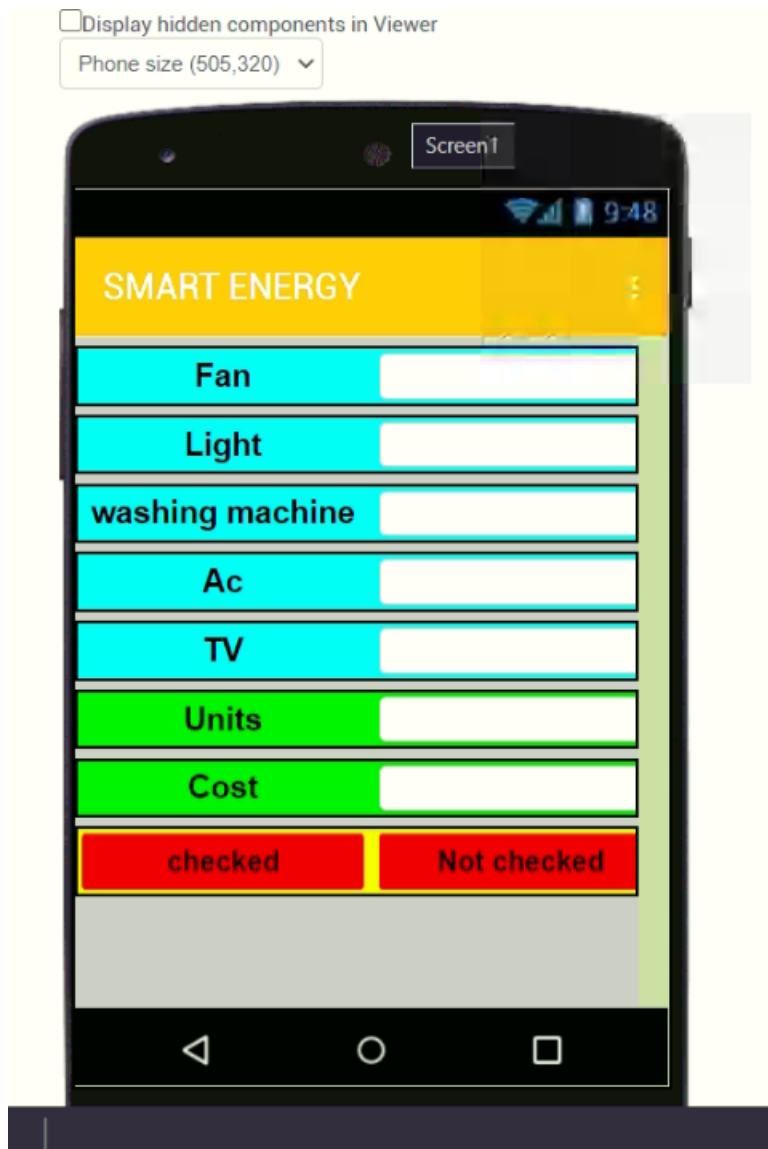
And the two text boxes with one as charge, it gives the charge of every applicant and another as cost, it gives the summation of all applicants.

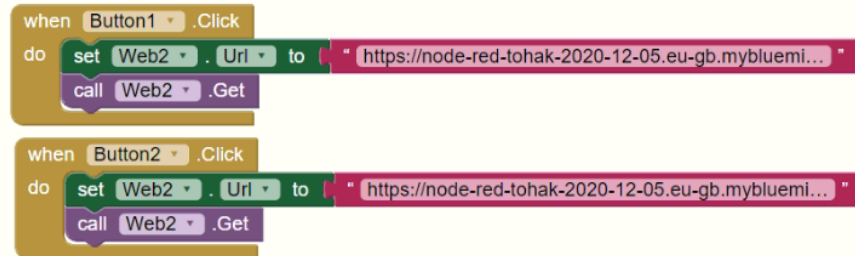This is done and next tap to blocks button. In that create the blocks with URL.

https://node-red-tohak-2020-12-05.eu-gb.mybluemix.net/data

Paste the URL which we have I IBM as:

➢ https://node-red-tohak-2020-12-05.eu-gb.mybluemix.net/command=checked

➤ https://node-red-tohak-2020-12-05.eu-gb.mybluemix.net/command=notcheck<sub>e</sub>d



Now tap on build option and get the QR code and scan the code you will receive an apk file and install the file and app.

Now the click on the checked button now the values, cost, charges will be displayed on the screen in their respective blocks.

## Conclusion

By applying Internet of Things (IoT) technologies, various intelligent services can be created. The development of most aspects of the smart grid would be enhanced by applying IoT. There are many driving factors that increases interest to switch from conventional power grid system to smart grid system as it provides very effective measures of delivering electric power to various consumers.

## Acknowledgment