

# **PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF-RELIANT**

**TEAM ID: PNT2022TMID29810**

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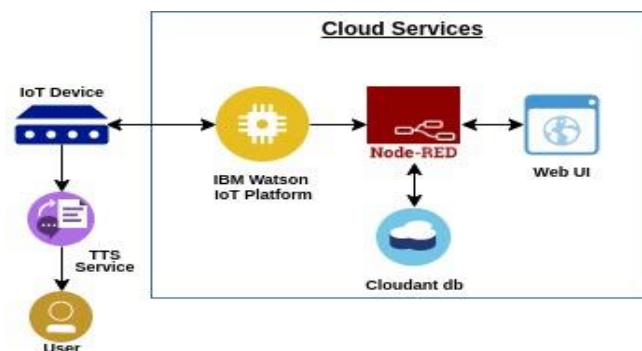
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# Chapter - 1

## INTRODUCTION

### Project overview

Sometimes elderly people forget to take their medicine at the correct time. They also forget which medicine He / She should take at that particular time. And it is difficult for doctors/caretakers to monitor the patients around the clock. To avoid this problem, this medicine reminder system is developed. An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB. If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform. The device will receive the medicine name and notify the user with voice commands.



IBM watson Iot platform A fully managed, cloud-hosted service with capabilities for device registration, connectivity and data storage. Node red is a programming tool for wiring together hardware devices. Cloudant db handle software and hardware provisioning. Web UI a modern frame for fulfilling your designing needs. TTS service a type of assistive technology that reads digital text aloud.

## **1.2 Purpose**

Medication reminders serve as a good way to stay on track and uphold an appropriate schedule. It is a strategy for engaging with patients and caregivers to create a complete and accurate medication list .It is designed to assist the patient who forgets to take medicine,patients will no longer have to worry about daily medication. The application will remaind when it's time to take medicine. The mobile application is used for keeping the record in medicine details and reminding the schedule of medicine. Real-time remote monitoring via connected IoT devices and smart alerts can diagnose illnesses, treat diseases and save lives in case of a medical emergency. Smart sensors analyze health conditions, lifestyle choices and the environment and recommend preventative measures, which will reduce the occurrence of diseases and acute states. IoT reduces costly visits to doctors and hospital admissions and makes testing more affordable. Accessibility of electronic medical records allow patients to receive quality care and help healthcare providers make the right medical decisions and prevent complications. IoT devices help track the administration of drugs and the response to the treatment and reduce medical error. Using IoT devices, healthcare authorities can get valuable information about equipment and staff.

## **Chapter - 2**

### **LITERATURE SURVEY**

#### **1.REFERENCE PAPER:**

Automatic Medicine Reminder Using Ardino

**AUTHOR:**

Waleed Humaid

**DESCRIPTION:**

This framework comprises of an ATMEGA328P micro controller with an inbuilt EEPROM and a continuous circuit. Every one of the passages made on the keypad are simultaneously and at the same time showed on the LCD board of the gadget. It will give an alert and the LCD will show the drug to be taken at the updated time.

#### **2.REFERENCE PAPER:**

IOT Based Pill Reminder and Monitoring System

**AUTHOR:**

Sultan Ahmad, Mahamudul Hasan

**DESCRIPTION:**

The proposed system consists of an IoT enabled device and an android application. Patients will no longer worry about daily medication. In the mobile application, medicine details are recorded and reminders are sent about medicine schedules. The device can sense whether a patient has taken medicine or not with the help of the infrared (IR) sensor.

### 3.REFERENCE PAPER:

A Case Study of Medication Reminder System

AUTHOR: Mohammad Alhaj ,Abdullah Nizar

#### DESCRIPTION:

Medication management can include everything from using the devices that issue reminders to patients to take their medications. To fill the pill cases for patients and to mark the lid of each compartment to indicate the content to patients. We use HW/SW Co-design approach to allow the hardware and software of the system. It is designed and implemented to make sure that the non-functional properties are met.

## PROBLEM STATEMENT:

In a world with an accelerated population aging, there is an increasingly interest in developing solutions for the elderly living assistance. The Internet of Things is a new reality that is completely changing our everyday life, and promises to revolutionize modern healthcare by enabling a more personalized, preventive and collaborative form of care. Aiming to combine these two important topics, this system is about an IoT -ready solution for the elderly living assistance which is able to remind them. An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB. If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform. The device will receive the medicine name and notify the user with voice commands. This result will help the elderly patients to manage their health care properly



## Chapter – 3

### IDEATION & PROPOSED SOLUTION

#### 3.1 EMPATHY MAP CANVAS:



## **3.2 Ideation**

### **TOP 3 IDEAS**

- ❖ With IOT, it enables the Arduino UNO to take medicines 1 or 2 or 3 times a day. The time slot can be selected using push buttons. When user selects desired slots by pressing push buttons, the user input will be recorded.
  
- ❖ An ATMEGA328P microcontroller with an inbuilt EEPROM and a continuous circuit. It will give sound alert. In addition to the fact that it has an alert framework, yet additionally a LCD which shows the drug to be taken at the updated time.
  
- ❖ An IOT enabled device and an android application. The mobile application is used for keeping the record in details and reminding the schedule of medicine. The device can sense whether a patient has taken medicine or not with the help of the infrared (IR) sensor

## Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Sometimes the elderly forgets to take their medication at the appropriate time. And it is difficult for doctors/caretakers to monitor the patients around the clock. To avoid this problem, this automatic medicine reminder system is developed.
2.	Idea / Solution description	An app is built for the user which enables him to set the desired time and medicine. If the medicine time arrives the web application will send the medicine name to the IOT device through the IBM IOT platform.
3.	Novelty / Uniqueness	The uniqueness of the project is to notify the user with the voice commands.
4.	Social Impact /Customer Satisfaction	It promotes safe independent living, leading to happier and healthier cared for individuals.
5.	Business Model (Revenue Model)	We can sell it as subscription service.
6.	Scalability of the Solution	Without the user also, this system will provide voice commands to the updated time.

# PROBLEM SOLUTION FIT

Define CS, fit into	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> Who is your customer? <div>The persons who need another person (caretaker) to monitor them to take the pills are my customers. Eg: elderly people of 65+ years</div>	<b>6. CUSTOMER</b> <span>CC</span> What constraints prevent your customers from taking action or limit their choices of solutions? I.e. spending power, budget, no cash, network connection, available devices. <div>The only constraint that prevents the customers from taking pills is when the pills are over.</div>	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? I.e., pen and paper is an alternative to digital notetaking <div>There are some solutions through an app the person's health will be monitored. People in the past had no monitoring equipment's their caretakers reminds them with a call.</div>	Explore AS,
	Focus on J&P, tap into BE, understand	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span> Which job-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. <div>I will address my customers to arrange some caretakers. I will built an application where it reminds with a call or a notification message.</div>	<b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> What is the real reason that this problem exists? What is the back story behind the need to do this job? I.e., customers have to do it because of the change in regulations. <div>The real reason behind this problem is some of the elders take wrong pills instead of the correct one. So this leads to under or over dosing. It will also has some side effects and health issues when we took the wrong one.</div>	
Identify strong TR & EM		<b>3. TRIGGERS</b> <span>TR</span> <div>To take the pills regularly at the correct time triggers the people to use the automatic medicine reminder system</div>	<b>10. YOUR SOLUTION</b> <span>SL</span> <div>An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB. If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform. The device will receive the medicine name and notify the user with voice commands.</div>	<b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span> 8.1 ONLINE <div>The user need to login to the web application to check the pills are over or not.</div> 8.2 OFFLINE <div>The user and the volunteers can spread awareness to the people regarding the web application usage using which they can check the availability of pills.</div>
	<b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span> <div>Before the people had a fear of forgetting the pills to be taken before the meal or after the meal. After using the reminder system the people's fear about the pills is resolved</div>			

## Chapter - 4

### REQUIREMENT ANALYSIS

#### 4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Access Cloud services	Access the cloud service with the correct credentials Store the details in the database
FR-4	IOT configuration	Fine Tuning the IOT device based on Access to the Cloud DB via the device Manage the request and response effectively

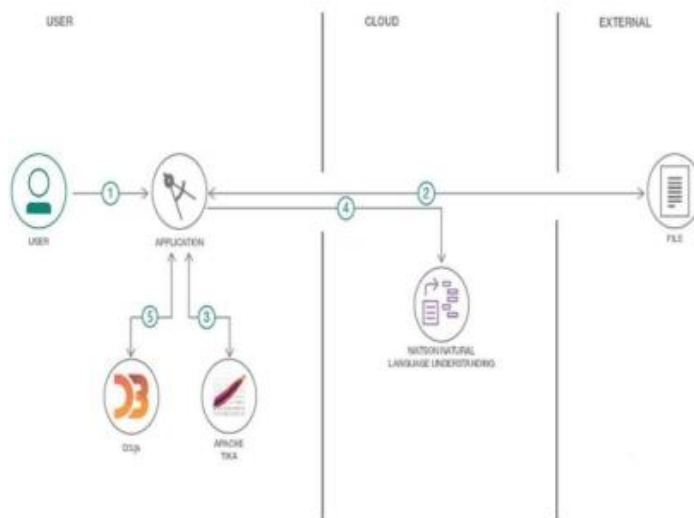
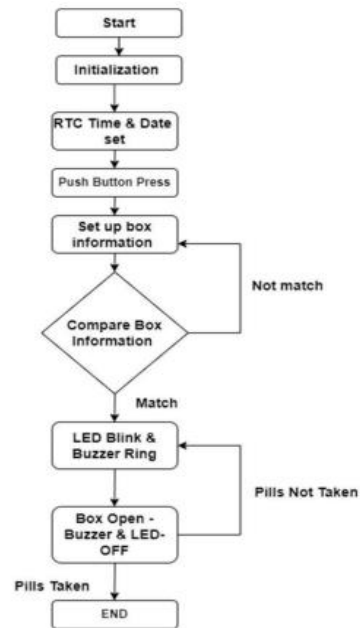
#### 4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	App can be used by anyone who has knowledge about internet and computer
NFR-2	Security	For security, TFA is enabled and biometrics are also added for user safety
NFR-3	Reliability	Highly reliable since, It uses Trusted cloud services like IBM
NFR-4	Performance	Performance is better compared to other market products
NFR-5	Availability	Available on mobile app
NFR-6	Scalability	Using Cloud services, makes the scalability higher the using traditional database

# CHAPTER 5

## PROJECT DESIGN

### 5.1 Data Flow Diagrams

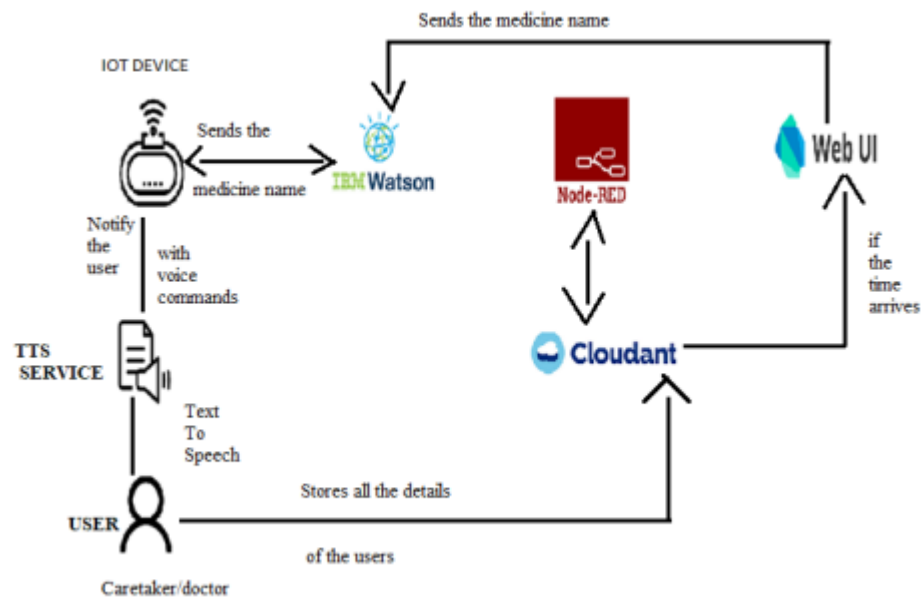


## 5.2USER STORIES

User Type	Functional Requirement(Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Senior citizen)	Caretaker	USN-1	As a user, I want to take Medicines on time and monitor my health	I want to Take Medicines On time	High	Sprint-1
Customer (Alzheimer's patient)	Smart medicine box	USN-2	As a user, I want to take my tablets on time by voice command	I want to take my tablets on time by voice commands	High	Sprint-1
Customer (Mentally idled patient)	Caretaker	USN-3	As a user, my patient needs to take medicines on time and monitor the activity	My patient needs to take medicines on time	Medium	Sprint-2
Customer (Coma patient)	Caretaker	USN-4	As a user, my patient medication time and prescription should load in a database for the upcoming week	My patient medication time and prescription should be in the database list	Low	Sprint-4
Customer (Disabled people)	Smart medicine box	USN-5	As a user, I need to take my medicine in nearby places with light notification	I need to take my medicine in nearby places with light notification	Medium	Sprint-3

### 5.3 SOLUTION ARCHITECTURE:

Sometimes elderly people forget to take their medicine at the correct time. They also forget which medicine He / She should take at that particular time. And it is



block. To avoid this, a system is built for the medicine. These notifications are sent when the time arrives through the IBM Watson service to the user with



## 5.4 TECHNOLOGY STACK (ARCHITECTURE & STACK)

### 5.4.1 COMPONENTS & TECHNOLOGIES

S. NO	COMPONENT	DESCRIPTION	TECHNOLOGY
1	User Interface	Mobile App	HTML, CSS, JavaScript, Python
2	Application Logic-1	Mobile App to enter the Medicine Details weekly	HTML, CSS, JavaScript, Python
3	Application Logic-2	Gets the medication data from database	IBM Watson IOT API Call data
4	Application Logic-3	Converts the text to speech to pronunciation for the user	IBM Watson Assistant
5	Database	Medication time and tablets name	MySQL
6	Cloud Database	Call the data IBM Cloudant is used and user login credentials	IBM DB2, IBM Cloudant
7	File Storage	App code and IOT credentials are stored and API keys	IBM Block Storage
8	External API-1	To get the medicine box status Open or not	IBM box status API
9	External API-2	To get the login credentials in IBMDB2	Username and Password API
10	Machine Learning Model	To convert the text into speech for voice command the tablet details	Text to speec
11	Infrastructure (Server / Cloud)	To host the server and application	Cloud Foundry ,Node Red

## 5.5APPLICATION CHARACTERISTICS

S. No	Characteristics	Description	Technology
1	Open-Source Frameworks	To develop the application interface, we use MIT App Inventor	MIT App Inventor
2	Security Implementations	To secure the users login credentials and personal information	SHA-256, OWASP
3	Scalable Architecture	To scale the application database	IBM Auto scaling
4	Availability	To make use the application and data are available 24/7	IBM Cloud load balancer
5	Performance	To increase the performance the application In hosted in the high performance instance	IBM instance

## Chapter - 6

### PROJECT PLANNING & SCHEDULING

#### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement	User Story Number	User Story / Task	Story points	Priority	Team member
Sprint 1	Set Alarm	USN-1	As a user, I can set an alarm to alerting a medicine through medicine remainder system	10	High	Megavardhini S pooja S
Sprint 1		USN-2	As a user, I can Activate and Deactivate the alarm	10	High	Megavardhini S Sri swetha S
Sprint 2	notification	USN-3	As a user once I can the set the alarm then I can gets the notification	10	High	Megavardhini S Vasumathi S
Sprint 2		USN-4	As a user, If I requires this system then a notification will be sent into his device.	10	High	Megavardhini S pooja S Sri swetha S
Sprint 3	medication details	USN-5	As a user, I have multiple medications each day, I can put each pill in the box for the corresponding day.	10	High	Sri swetha S Megavardhini S Vasumathi S
Sprint 3		USN-6	As a user, between setting an alarm and using a pillbox, I will be able to stay on top of your medications and not miss a dose	5	Low	Megavardhini S Vasumathi S Pooja S
Sprint 3		USN-7	As a user, I can store the name of the medicine with its description	10	High	Megavardhini S pooja S Sri swetha S
Sprint 4	GPS tracking	USN-8	As a user, they can also help large hospitals and clinics manage their inventory more effectively	5	Low	Sri swetha S Megavardhini S Vasumathi S
	sensor	USN-9	As, a user they used for keeping the record in medicine details the reminding the schedule of medicine. We have used the IOT enabled Arduino device for Monitoring the system	10	High	Megavardhini S Vasumathi S Pooja S

## 6.2 Sprint Delivery Schedule

<b>Sprint</b>	<b>Total Story Points</b>	<b>Duration</b>	<b>Sprint StartDate</b>	<b>Sprint EndDate (Planned)</b>	<b>Story Points Completed (ason Planned End Date)</b>	<b>Sprint ReleaseDate (Actual)</b>
Sprint-1	20	8Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	10	8Days	31 Oct 2022	05 Nov 2022	10	05 Nov 2022
Sprint-3	20	8Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	10	8Days	14 Nov 2022	19 Nov 2022	10	19 Nov 2022

# Chapter - 7

## CODING

```
#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 "yxins0"//IBM ORGANITION ID
#define DEVICE_TYPE "b11m32deviceid"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "123456"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"      //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[] = "token";// 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()// configuring 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 definion 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++) {
        //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="";
  }

```

WOKWI

ESP32 NTP Example.ino

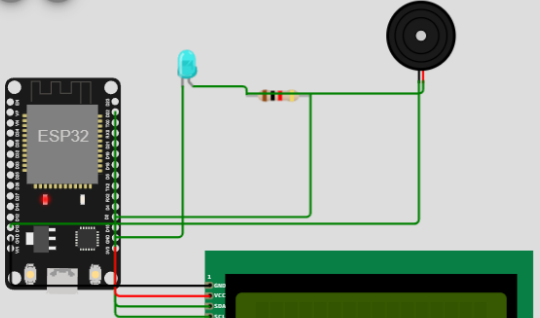
```

104 Serial.print("callback invoked for topic: ");
105 Serial.println(subscribetopic);
106 for (int i = 13; i < payloadLength-2; i++) {
107   //Serial.print((char)payload[i]);
108   data3 += (char)payload[i];
109 }
110
111 Serial.println("Medicine Name: " + data3);
112 if(data3 != "")
113 {
114   lcd.init();
115
116   lcd.print(data3);
117   digitalWrite(LED,HIGH);
118   tone(buzz, 100, 1000);
119   delay(2000);
120   digitalWrite(LED,LOW);
121   noTone(buzz);
122   delay(1000);
123 }
124
125 else
126 {
127   digitalWrite(LED,LOW);
128 }
129
130 data3="";
131 }
132 }

```

Simulation

00:02.516 84%



Connecting to ...  
 WiFi connected  
 IP address:  
 10.10.0.2  
 Reconnecting client to yxins0.messaging.internetofthings.ibmcloud.com

26°C Sunny 10:37 20-11-2022



## CHAPTER 8

# 8. IBM CLOUD AND WATSON

## 8.1 IBM CLOUD

The image shows a screenshot of a web browser displaying the IBM Cloud login page and dashboard. The browser's address bar shows the URL `cloud.ibm.com/login`. The login page features the IBM Cloud logo, a "Log in to IBM Cloud" heading, a "Forgot password?" link, and a login form with a "Password" field and a "Log in" button. Below the login form, there is a copyright notice: "© Copyright IBM Corp. 2014, 2022. All rights reserved."

Below the login page, the dashboard is visible. The dashboard has a header with the "IBM Cloud" logo, a search bar, and navigation links for "Catalog", "Manage", and "Megavardhini Saravana...". The main content area is titled "Dashboard" and includes a "For you" section with several cards:

- Build**: Explore IBM Cloud with this selection of easy starter tutorials and services.
- Explore IBM Cloud Shell**: Try a command-driven approach for creating, developing, and deploying a web project. (Getting started, 2 min)
- Visit the IBM Cloud catalog**: Explore our unique product catalog that contains 190+ services and software for your business solutions. (Getting started, 1 min)
- Build a web app with Watson Speech to Text**: Deploy a conversational interface compatible with any application, device, or channel. (Getting started, 15 min)
- Get Started with Watson Studio**: Get started with using AI and Cloud Object Storage in 15 minutes. (Popular, 2 hr)
- Build a Cloud (**: Upgrade to create protect Cloud. (Getting started, 1 min)

At the bottom of the dashboard, there are sections for "News" (SLSA Support in IBM Cloud Continuous Delivery) and "Planned maintenance". The browser's taskbar at the bottom shows the system clock as 19:10 on 15-11-2022.

## 8.2 IBM WATSON

The screenshot displays the IBM Cloud console interface for the 'Internet of Things Platform-B4' service. The top navigation bar includes the IBM Cloud logo, a search bar, and user information. The main content area shows the service details, including a 'Manage' sidebar with options like 'Plan' and 'Connections'. The central panel features a 'Let's get started with IBM Watson IoT Platform' section with a 'Launch' button and a 'Ready for the next level?' section with a progress bar showing 'Lite', 'Non-Production', and 'Production' stages.

Below the service details, the 'IBM Watson IoT Platform' dashboard is visible. It includes a 'Browse' tab and a search bar. A table lists the devices, with one device selected and its details expanded in a modal window.

Device ID	Status	Device Type	Class ID	Date Added
12345678	Disconnected	NodeMCU	Device	Nov 14, 2022 10:26 AM

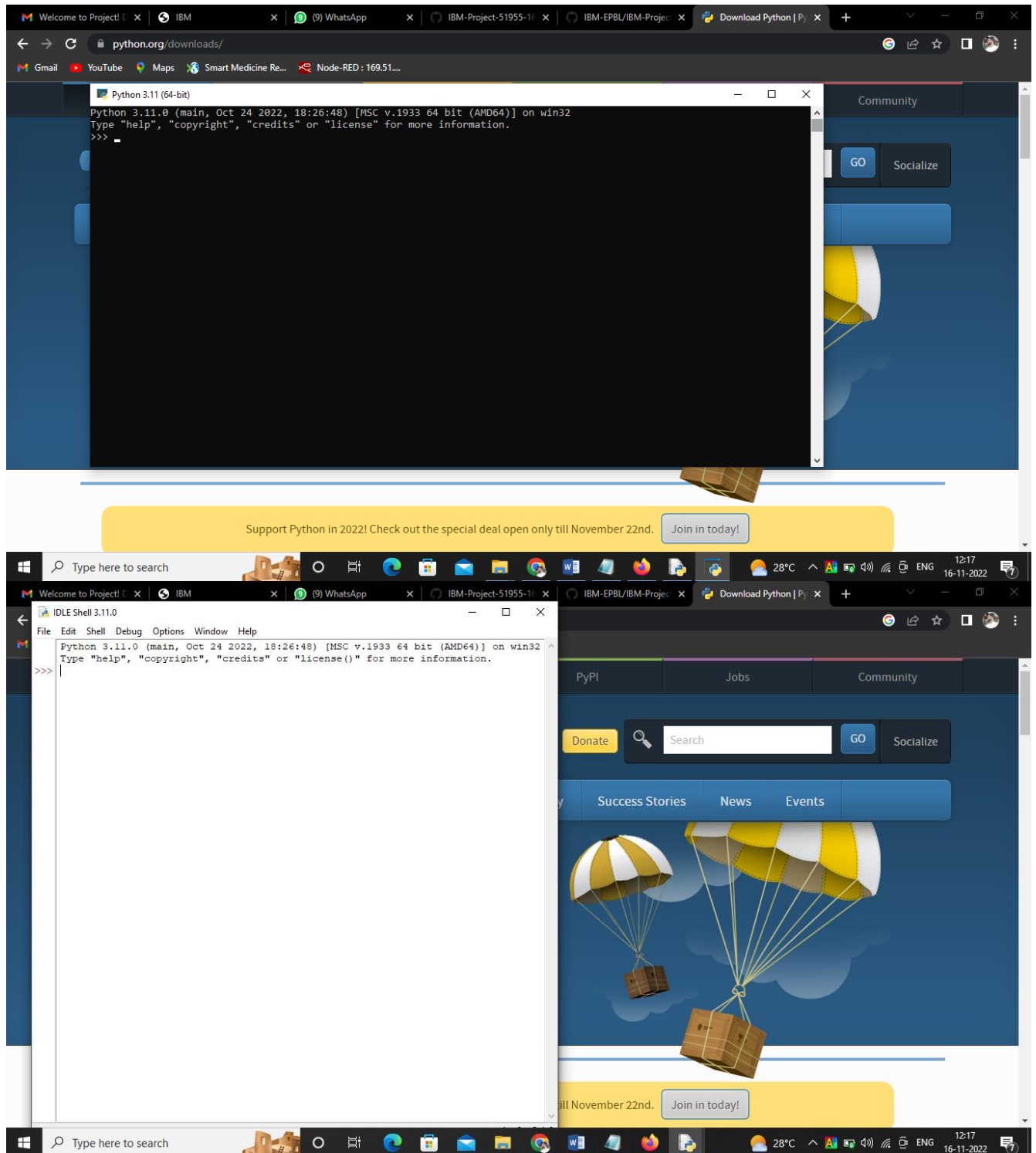
Identity	Device Information	Recent Events	State	Logs
Device ID	12345678			
Device Type	NodeMCU			
Date Added	Nov 14, 2022 10:26 AM			
Added By	megavardhini061.cse@dgct.ac.in			
Connection Status	Disconnected			

# CHAPTER 9

## 9.1 NODE RED AND MIT APP INVENTOR

The image displays two web interfaces side-by-side. The top interface is 'Node-RED on IBM Cloud', showing a red header with the 'Node-RED' logo and the tagline 'Flow-based programming for the Internet of Things'. Below this, there is a brief description of Node-RED as a programming tool for wiring hardware, APIs, and online services. A button labeled 'Go to your Node-RED flow editor' and a link 'Learn how to customise Node-RED' are also visible. The bottom interface is the 'MIT App Inventor' web application. It features a 'Palette' on the left with various UI components like 'HorizontalArrangement', 'Label', 'Player', 'Translator', 'VerticalArrangement', 'VideoPlayer', and a 'User Interface' section with 'Button', 'CheckBox', 'DatePicker', 'Image', 'Label', 'ListView', 'Notifier', and 'PasswordTextBox'. The central 'Viewer' shows a mobile app preview titled 'Login and Signup Form' with input fields and 'LOGIN'/'SIGNUP' buttons. On the right, the 'Components' pane lists the app's structure, including 'Screen1', 'VerticalArrangement2', 'Label4', 'VerticalArrangement1', 'Label1', 'Label2', 'TextBox1', 'PasswordTextBox1', 'Label3', 'LOGINBTN', 'SIGNUPBTN', and 'FirebaseDB1'. The 'Properties' pane on the far right shows settings for 'VerticalArrangement1', such as 'AlignHorizontal', 'AlignVertical', 'BackgroundColor', 'Height', 'Width', 'Image', and 'Visible'.

## 9.2 PYTHON



# CHAPTER 10

## TESTING

### 10.1 IBM WATSON

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar is present with the text 'Search by Device ID'. A table lists devices, with one device selected: ID 12345678, Status Disconnected, Device Type NodeMCU, Class ID Device, and Date Added Nov 14, 2022 10:26 AM. Below the table, the 'Identity' tab is active, showing details for the selected device.

Device ID	Status	Device Type	Class ID	Date Added
12345678	Disconnected	NodeMCU	Device	Nov 14, 2022 10:26 AM

Identity	Device Information	Recent Events	State	Logs
Device ID	12345678			
Device Type	NodeMCU			
Date Added	Nov 14, 2022 10:26 AM			
Added By	megavardhinis061.cse@dgct.ac.in			
Connection Status	Disconnected			

### 10.2 NODE RED

The screenshot shows the Node-RED interface. The left sidebar contains a 'filter nodes' search bar and a list of node categories: function, network, input, output, sequence, parser, storage, IBM Watson, and dashboard. The main workspace displays a flow named 'Flow 1' with the following nodes and connections:

- An 'inject' node connected to a 'function' node.
- The 'function' node connected to a 'medicinedata' node.
- The 'medicinedata' node connected to a 'switch' node.
- The 'switch' node connected to another 'function' node.
- This second 'function' node connected to an 'IBM IoT' node (labeled 'connected').
- A 'msg.payload' node connected to the 'IBM IoT' node.
- A 'Function to store the data in Cloudant' node connected to a 'medicinedata' node.
- A 'Function to clear the data' node connected to the 'medicinedata' node.
- A 'delay 14s' node connected to a 'Medicine Reminder' node.
- The 'Medicine Reminder' node connected to a 'msg.payload' node.

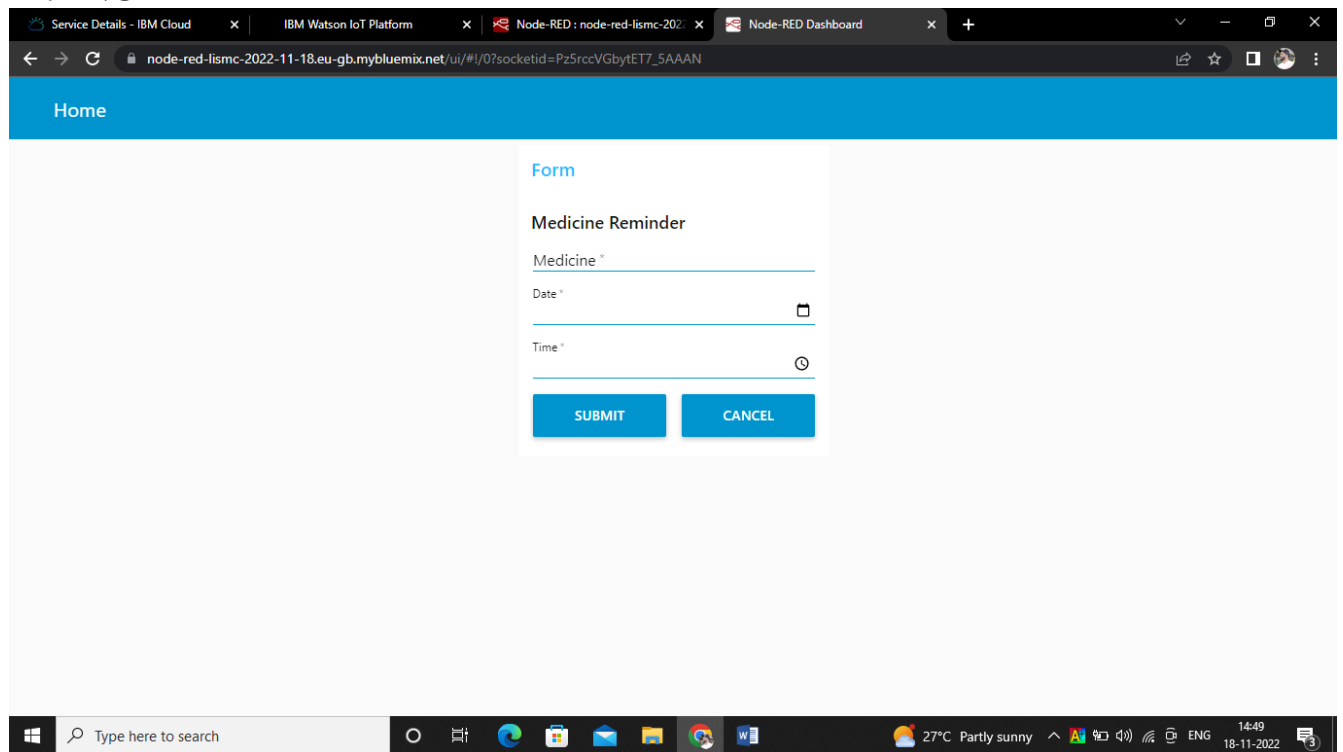
## 10.3 MIT APP



# Chapter – 11

## OUTCOME

### 11.1 NODE RED



### 11.2 MIT APP



## **CHAPTER 12**

# **ADVANTAGES & DISADVANTAGES**

### **12.1 ADVANTAGES**

Real-time remote monitoring via connected IoT devices and smart alerts can diagnose illnesses, treat diseases and save lives in case of a medical emergency.

Smart sensors analyze health conditions, lifestyle choices and the environment and recommend preventative measures, which will reduce the occurrence of diseases and acute states.

IoT reduces costly visits to doctors and hospital admissions and makes testing more affordable.

Accessibility of electronic medical records allow patients to receive quality care and help healthcare providers make the right medical decisions and prevent complications.

IoT devices help track the administration of drugs and the response to the treatment and reduce medical error.

Using IoT devices, healthcare authorities can get valuable information about equipment and staff



## 12.2 Disadvantages:

**Security and privacy:** Security and privacy remain a major concern deterring users from using IoT technology for medical purposes, as health monitoring solutions have the potential to be breached or hacked. The leak of sensitive information about the patient's health and location and meddling with sensor data can have grave consequences, which would counter the benefits of IoT.

**Risk of failure:** Failure or bugs in the hardware or even power failure can impact the performance of sensors and connected equipment placing healthcare operations at risk. In addition, skipping a scheduled software update may be even more hazardous than skipping doctor's or checkup.

**Integration:** There's no consensus regarding IoT protocols and standards, so devices produced by different manufacturers may not work well together. The lack of uniformity prevents full-scale integration of IoT, therefore limiting its potential effectiveness.

**Cost:** While IoT promises to reduce the cost of healthcare in the long-term, the cost of its implementation in hospitals and staff training is quite high.

## **CHAPTER 13**

### **CONCLUSION**

It is an advanced digital era, we can also opt for expert agencies without thinking much about the distance. For example, suppose we stay in the European region. In that case, we can look for a healthcare app development company in the USA or a healthcare mobile app development firm in other states. IoT is already practicing most of these technologies to assist healthcare in developing, and this development will proceed. Promptly than later, healthcare and the Internet of Things will become intertwined, ultimately modifying how we approach our healthcare.

## **CHAPTER 14**

### **FUTURE SCOPE**

IoT has a lot of potentials and it's not only in healthcare. In future challenges of IoT in healthcare, many companies are working on new ways to solve the challenges with the help of this technology to help our medical world. It can reach every patient from all over the world and connect doctors with patients. There is no denying that IoT has already made a huge impact and is only set to grow further. It is a matter of time before the future use of IoT in healthcare medical industry will be run mostly by IoT technology and will be treating patients in less time and low cost of treatment.









