Sri Lanka Institute of Information Technology

Fire Alarm Monitoring System

Distributed System (SE3020)

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Assignment 2

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Fire Alarm Monitoring System

Introduction

Human is not more sensible people because nowadays they were busy in their life. Therefore, they can't detect smoke and co2 level in environment. For that scientist are checking Co2 level and Smoke level in the environment by using fire alarm system. Also, it has worked automate and sense about the environment. Therefore, we can detect smoke level and co2 level in the environment. If co2 level or smoke level is high than recommended level then informs us by fire alarm system. For that show red light. But we use beep sounds by fire alarm system Instead of using actual Fire Sensor to get details, we implemented a FiresensorMain.java class in the Fire Sensor Project which generates sensor data and sends the status to the database via REST API in every 30 seconds. So, we choose the MySQL database to store data.

There is also have a desktop client which created in Java Swing GUI Desktop client get sensor data from database and display it in a data table. Users can view Sensor ID, Room No, Floor No, Sensor status CO2 level, Smoke level, Date, and time. The information is refreshed every 30 seconds. All sensor details will be returned, and it will be displayed on the main page.

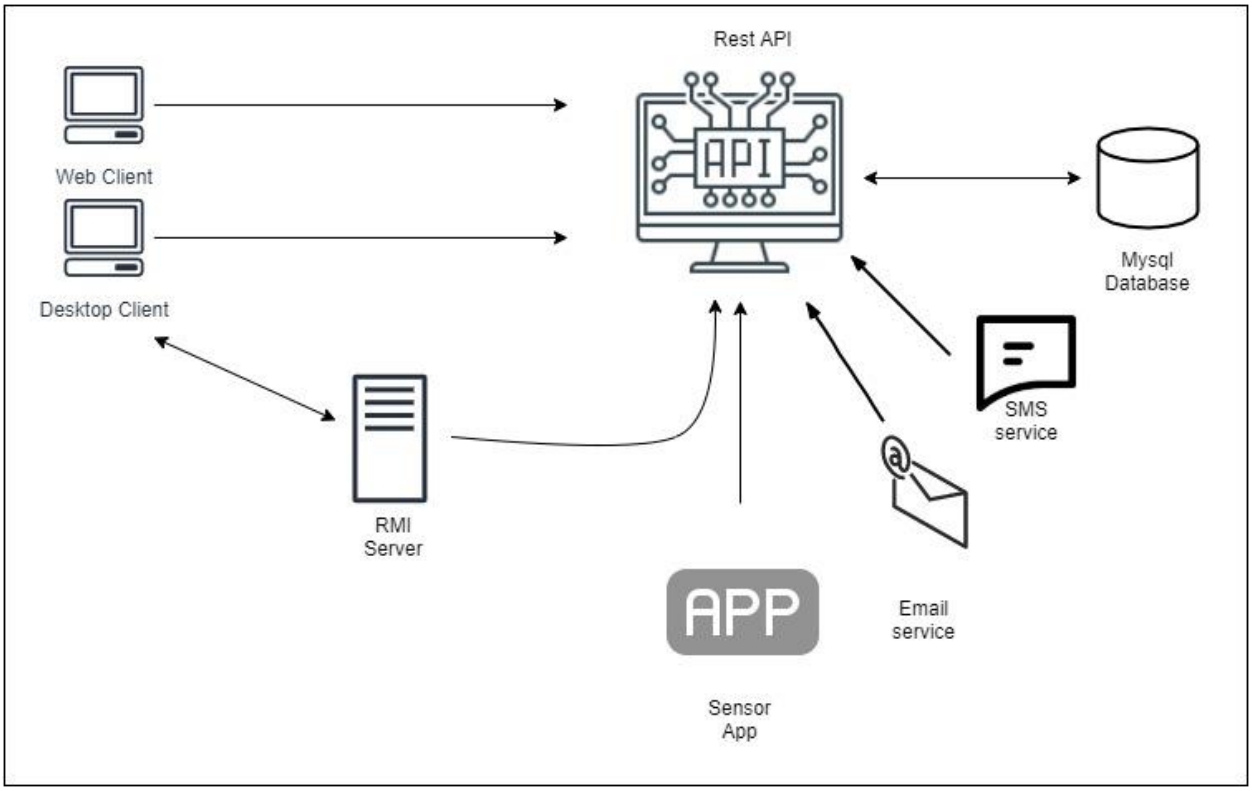
Admin can log in to the system using a given username and password. It is validating in the database and if it is correct admin can go to the admin dashboard. Admin can Add, Update Delete Sensor Details.

A Web client app is created using ReactJS. Any user can view Sensor details such as Sensor ID, Room No, Floor No, Smoke Level, Co2 level, Date, and Time. If the CO2 level or smoke level goes above 5, it will be marked in red, and otherwise, it will be marked in green. Sensor details are refreshed every 40 seconds.

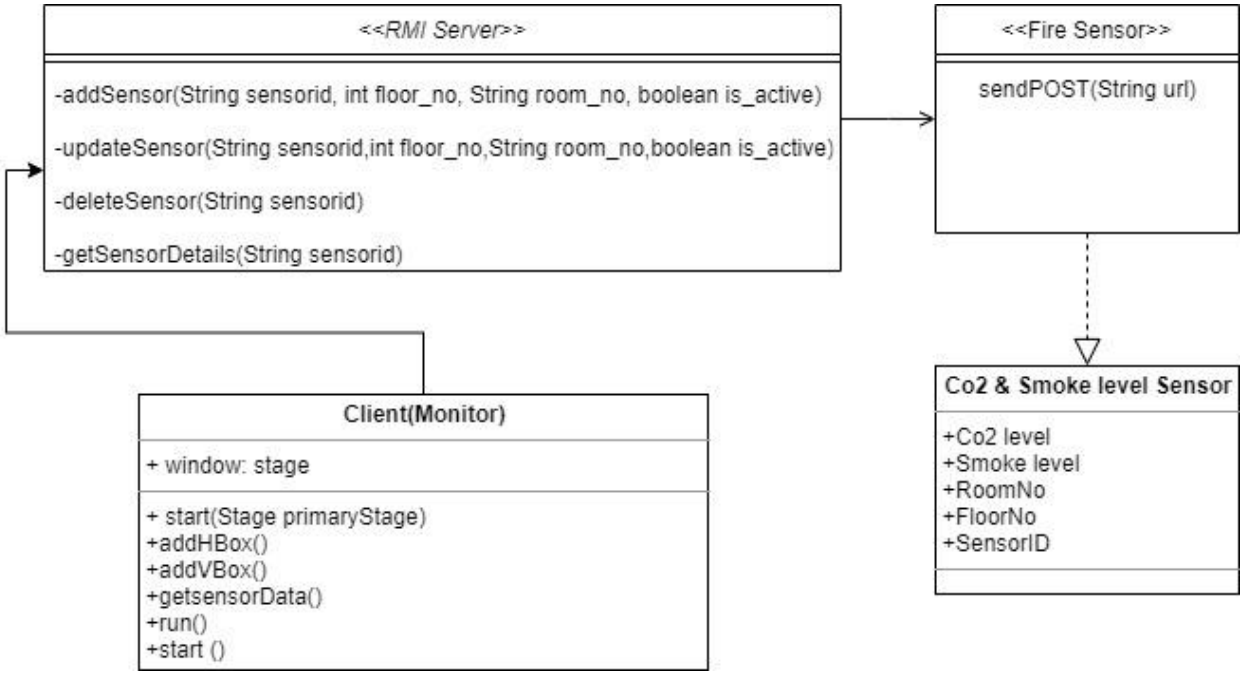
Additionally, Email sending features added. Once the CO2 Level or smoke level goes above 5 Email will be sent to the user.

Architecture of the Fire Alarm Monitoring System

System Architecture Diagram



Class Diagram



Appendix

Frontend

React Web App

sensorWeb.js

```
import React from 'react'

const Sensor = ({ sensordata }) => {
  const danger = {
    color: "red"
  };
  const normal = {
    color: "green"
  };


  return (
    <div className={"container"}>
      <table class="table table-dark">

        <thead>
        <tr>
```

```
            <th>Sensor ID</th>
            <th>Floor Number</th>
            <th>Room Number</th>
            <th>Smoke Level</th>
            <th>CO2 Level</th>
            <th>Date</th>
            <th>Time</th>
          </tr>
          </thead>
          <tbody>
          {sensordata.map((sensord) => (
            <tr style={sensord.smokeLevel > 5 ? danger : normal}>
              <td>{sensord.sensor.sensorid}</td>
              <td>{sensord.sensor.floorNo}</td>
              <td>{sensord.sensor.roomNo}</td>
              <td style={sensord.smokeLevel > 5 ? danger : normal} >{sensord.smokeLevel}</td>
              <td style={sensord.co2Level > 5 ? danger : normal}>{sensord.co2Level}</td>
              <td>{sensord.date}</td>
              <td>{sensord.time}</td>
            </tr>
          ))}
          </tbody>
        </table>
      </div>
    )
};

export default Sensor
```

Backend

SpringBoot Part

Model

Sensor.java

```
package com.techprimers.db.springbootmysql.resource;

import com.techprimers.db.springbootmysql.NotifyUser.SendEmail;
import com.techprimers.db.springbootmysql.model.SensorData;
import com.techprimers.db.springbootmysql.model.Users;
import com.techprimers.db.springbootmysql.repository.SensorDataRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
```

```
@CrossOrigin
@RequestMapping(value = "/rest/sensordata")
public class SensorDataResource {

   @Autowired
   SensorDataRepository sensorDataRepository;

   @GetMapping(value = "/all")
   public List<SensorData> getAll(){
      return sensorDataRepository.findAll();
   }

   @PostMapping(value = "/load")
   public List<SensorData> persist(@RequestBody final SensorData sensorData){


      if(sensorData.getCo2Level() >5 ){
         SendEmail.sendEmailtoUser();
      }
      if(sensorData.getSmokeLevel() > 5 ){
         SendEmail.sendEmailtoUser();
      }


      sensorDataRepository.save(sensorData);
      return sensorDataRepository.findAll();
   }

}
```

SensorData.java

```
package com.techprimers.db.springbootmysql.model;

import javax.persistence.*;

@Entity
public class SensorData {

   @Id
   @Column(name = "sensordataid")
   private String sensordataid;

   @ManyToOne
   private Sensor sensor;

   @Column(name = "smokeLevel")
   private int smokeLevel;

   @Column(name = "co2Level")
   private int co2Level;

   @Column(name = "date")
   private String date;

   @Column(name = "time")
   private String time;
```

```
    public SensorData() {
    }

    public Sensor getSensor() {
        return sensor;
    }

    public void setSensor(Sensor sensor) {
        this.sensor = sensor;
    }

    public int getSmokeLevel() {
        return smokeLevel;
    }

    public void setSmokeLevel(int smokeLevel) {
        this.smokeLevel = smokeLevel;
    }

    public int getCo2Level() {
        return co2Level;
    }

    public void setCo2Level(int co2Level) {
        this.co2Level = co2Level;
    }

    public String getDate() {
        return date;
    }

    public void setDate(String date) {
        this.date = date;
    }

    public String getTime() {
        return time;
    }

    public void setTime(String time) {
        this.time = time;
    }

    public String getSensordataid() {
        return sensordataid;
    }

    public void setSensordataid(String sensordataid) {
        this.sensordataid = sensordataid;
    }
}
```

User.Java

```java
package com.techprimers.db.springbootmysql.model;

import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.GeneratedValue;
import javax.persistence.Id;

@Entity
public class Users {

    @Id
    @GeneratedValue
    @Column(name = "id")
    private Integer id;
    @Column(name = "name")
    private String name;

    @Column(name = "type")
    private String type;

    @Column(name = "password")
    private String password;


    public Users() {
    }

    public Integer getId() {
        return id;
    }

    public void setId(Integer id) {
        this.id = id;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getType() {
        return type;
    }

    public void setType(String type) {
        this.type = type;
    }

    public String getPassword() {
        return password;
    }

    public void setPassword(String password) {
        this.password = password;
    }
}
```

SendEmail.Java

```
package com.techprimers.db.springbootmysql.NotifyUser;
import java.util.Properties;

import javax.mail.Message;
import javax.mail.MessagingException;
import javax.mail.PasswordAuthentication;
import javax.mail.Session;
import javax.mail.Transport;
import javax.mail.internet.InternetAddress;
import javax.mail.internet.MimeMessage;

public class SendEmail {

   public static void sendEmailtoUser(){
      // Recipient's email ID needs to be mentioned.
      String to =  "receiver@gmail.com";

      // Sender's email ID needs to be mentioned
      String from = "sender@gmail.com";

      // Assuming you are sending email from through gmails smtp
      String host = "smtp.gmail.com";

      // Get system properties
      Properties properties = System.getProperties();

      // Setup mail server
      properties.put("mail.smtp.host", host);
      properties.put("mail.smtp.port", "465");
      properties.put("mail.smtp.ssl.enable", "true");
      properties.put("mail.smtp.auth", "true");

      // Get the Session object.// and pass username and password
      Session session = Session.getInstance(properties, new javax.mail.Authenticator() {

         protected PasswordAuthentication getPasswordAuthentication() {

            return new PasswordAuthentication("sender@gmail.com", "xxxxxxxxxxx");

         }

      });

      // Used to debug SMTP issues
      session.setDebug(true);

      try {
         // Create a default MimeMessage object.
         MimeMessage message = new MimeMessage(session);

         // Set From: header field of the header.
         message.setFrom(new InternetAddress(from));

         // Set To: header field of the header.
         message.addRecipient(Message.RecipientType.TO, new InternetAddress(to));

         // Set Subject: header field
```

```
        message.setSubject("Warning!");

        // Now set the actual message
        message.setText("Co2 level or Smoke level is above 5");

//          System.out.println("sending...");
        // Send message
        Transport.send(message);
        System.out.println("Sent message successfully....");
      } catch (MessagingException mex) {
        mex.printStackTrace();
      }
    }

}
```

SensorDataResource.java

```
package com.techprimers.db.springbootmysql.resource;

import com.techprimers.db.springbootmysql.NotifyUser.SendEmail;
import com.techprimers.db.springbootmysql.model.SensorData;
import com.techprimers.db.springbootmysql.model.Users;
import com.techprimers.db.springbootmysql.repository.SensorDataRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@CrossOrigin
@RequestMapping(value = "/rest/sensordata")
public class SensorDataResource {

    @Autowired
    SensorDataRepository sensorDataRepository;

    @GetMapping(value = "/all")
    public List<SensorData> getAll(){
        return sensorDataRepository.findAll();
    }

    @PostMapping(value = "/load")
    public List<SensorData> persist(@RequestBody final SensorData sensorData){


        if(sensorData.getCo2Level() >5 ){
            SendEmail.sendEmailtoUser();
        }
        if(sensorData.getSmokeLevel() > 5 ){
            SendEmail.sendEmailtoUser();
        }


        sensorDataRepository.save(sensorData);
        return sensorDataRepository.findAll();
    }
```

```
}
```

SensorResource.java

```
package com.techprimers.db.springbootmysql.resource;

import com.techprimers.db.springbootmysql.model.Sensor;
import com.techprimers.db.springbootmysql.model.SensorData;
import com.techprimers.db.springbootmysql.repository.SensorDataRepository;
import com.techprimers.db.springbootmysql.repository.SensorRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@CrossOrigin
@RequestMapping(value = "/rest/sensor")
public class SensorResource {

   @Autowired
   SensorRepository sensorRepository;

   @GetMapping(value = "/all")
   public List<Sensor> getAll(){
      return sensorRepository.findAll();
   }

   @PostMapping(value = "/load")
   public List<Sensor> persist(@RequestBody final Sensor sensor){

      System.out.println(sensor.getFloorNo());
      System.out.println(sensor.isActive());

      sensorRepository.save(sensor);
      return sensorRepository.findAll();
   }

   @PostMapping(value = "/all")
   public List<Sensor> getAll(@RequestBody final Sensor sensor){
      return sensorRepository.findAll();
   }


   @DeleteMapping(value ="/delete/{sensorid}")
   void deleteEmployee(@PathVariable String sensorid) {
      sensorRepository.deleteById(sensorid);
   }

   @GetMapping(value ="/getsensor/{id}")
   Sensor one(@PathVariable String id) throws Exception {
      return sensorRepository.findById(id)
            .orElseThrow(() -> new Exception(String.valueOf(id)));
   }

}
```

UserResource.java

```
package com.techprimers.db.springbootmysql.resource;

import com.techprimers.db.springbootmysql.model.Users;
import com.techprimers.db.springbootmysql.repository.UsersRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping(value = "/rest/users")
public class UsersResource {

   @Autowired
   UsersRepository usersRepository;

   @GetMapping(value = "/all")
   public List<Users> getAll(){
      return usersRepository.findAll();
   }

   @PostMapping(value = "/load")
   public List<Users> persist(@RequestBody final Users user){
      usersRepository.save(user);
      return usersRepository.findAll();
   }

   @PostMapping(value = "/auth")
   public Users authUSer(@RequestBody final Users user) throws  Exception{
      List<Users> us =usersRepository.findAll();
      for(Users u:us){
         if(u.getName().equals(user.getName()) && u.getPassword().equals(user.getPassword())){
            return u;
         }
      }
      throw new Exception("User not found");
   }

}
```

SpringBootMysqlApplication.java

```
package com.techprimers.db.springbootmysql;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.data.jpa.repository.config.EnableJpaRepositories;

@EnableJpaRepositories(basePackages = "com.techprimers.db.springbootmysql.repository")
@SpringBootApplication
public class SpringBootMysqlApplication {
```

```
  public static void main(String[] args) {
    SpringApplication.run(SpringBootMysqlApplication.class, args);
  }

}
```

application.yml

```
spring:
 datasource:
  driverClassName: com.mysql.jdbc.Driver
  url: jdbc:mysql://localhost:3306/firesensorDB?serverTimezone=UTC
  username: 'root'
  password: ''
 jpa:
  hibernate.ddl-auto: update
```

FireSensorMain.java

```
import org.apache.http.client.methods.CloseableHttpResponse;
import org.apache.http.client.methods.HttpPost;
import org.apache.http.entity.StringEntity;
import org.apache.http.impl.client.CloseableHttpClient;
import org.apache.http.impl.client.HttpClients;
import org.apache.http.util.EntityUtils;

import utils.Utils;

import java.io.IOException;
import java.time.LocalDateTime;
import java.time.format.DateTimeFormatter;
import java.util.concurrent.ThreadLocalRandom;

public class FireSensorMain {
  public static void main(String[] args) {

    try {
      while (true) {

        String result = sendPOST(Utils.SENDPOSTSENSORDATAURL);

        System.out.println(result);

        try {
          Thread.sleep(30 * 1000);
        } catch (InterruptedException e) {
          e.printStackTrace();
        }
      }

    } catch (IOException e) {
      e.printStackTrace();
    }
  }
```

```
  private static String sendPOST(String url) throws IOException {

    String result = "";
    HttpPost post = new HttpPost(url);

    post.addHeader("content-type", "application/json");

    DateTimeFormatter date = DateTimeFormatter.ofPattern("dd/MM/yyyy");
    DateTimeFormatter time = DateTimeFormatter.ofPattern("HH:mm:ss");
    LocalDateTime now = LocalDateTime.now();


    String sensorID = "sensor4";
    int floorNo = 2;
    String roomNo = "12";
    boolean isActive = true;
    int smokeLevel = ThreadLocalRandom.current().nextInt(0, 10 + 1);
    int co2Level = ThreadLocalRandom.current().nextInt(0, 10 + 1);




    String dt = date.format(now);
    String tm = time.format(now);
    String sensor = "{\"sensorid\":\"" + sensorID + "\"}";
    StringBuilder json = new StringBuilder();
    json.append("{");
    json.append("\"sensordataid\":\"" + sensorID + ":" + dt + ":" + tm + "\",");
    json.append("\"sensor\":" + sensor + ",");
    json.append("\"floorNo\":\"" + floorNo + "\",");
    json.append("\"roomNo\":\"" + roomNo + "\",");
    json.append("\"isActive\":\"" + isActive + "\",");
    json.append("\"smokeLevel\":\"" + smokeLevel + "\",");
    json.append("\"co2Level\":\"" + co2Level + "\",");
    json.append("\"date\":\"" + dt + "\",");
    json.append("\"time\":\"" + tm + "\"");
    json.append("}");

    System.out.println(json);

    post.setEntity(new StringEntity(json.toString()));

    try (CloseableHttpClient httpClient = HttpClients.createDefault();
         CloseableHttpResponse response = httpClient.execute(post)) {

      result = EntityUtils.toString(response.getEntity());
    }

    return result;
  }

}
```

RMI

AlarmServer.java

```
import java.io.IOException;
import java.io.UnsupportedEncodingException;
import java.rmi.AlreadyBoundException;
import java.rmi.RemoteException;
import java.rmi.registry.LocateRegistry;
import java.rmi.registry.Registry;
import java.rmi.server.UnicastRemoteObject;

import org.apache.http.client.methods.CloseableHttpResponse;
import org.apache.http.client.methods.HttpGet;
import org.apache.http.client.methods.HttpPost;
import org.apache.http.entity.StringEntity;
import org.apache.http.impl.client.CloseableHttpClient;
import org.apache.http.impl.client.HttpClients;
import org.apache.http.util.EntityUtils;

public class AlarmServer extends UnicastRemoteObject implements AlarmService{

      protected AlarmServer() throws RemoteException {
            super();
        }

        @Override
        public String addFireAlarmSensor(String sensorId, int floorNumber, String
 roomNumber, boolean active) throws RemoteException {

            String result = "";
            HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/load"
);


            post.addHeader("content-type", "application/json");

            StringBuilder json = new StringBuilder();
            json.append("{");
            json.append("\"sensorId\":"+sensorId+",");
            json.append("\"floorNumber\":\""+floorNumber+"\"");
            json.append("\"roomNumber\":\""+roomNumber+"\"");
            json.append("\"active\":\""+active+"\"");
            json.append("}");
```

```
            System.out.println(json);

            // send a JSON data
            try {
                post.setEntity(new StringEntity(json.toString()));
            } catch (UnsupportedEncodingException e1) {
                e1.printStackTrace();
            }

            try (CloseableHttpClient httpClient = HttpClients.createDefault();
                 CloseableHttpResponse response = httpClient.execute(post)) {

                result = EntityUtils.toString(response.getEntity());
            }catch (Exception e) {

            }

            System.out.println(result);

            return result;


        }

        @Override
        public String updateFireAlarmSensor(String sensorId, int floorNumber, Str
ing roomNumber, boolean active) throws RemoteException {

            String result = "";
            HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/load"
);


            post.addHeader("content-type", "application/json");

            StringBuilder json = new StringBuilder();
            json.append("{");
            json.append("\"sensorId\":"+sensorId+",");
            json.append("\"floorNumber\":\""+floorNumber+"\"");
            json.append("\"roomNumber\":\""+roomNumber+"\"");
            json.append("\"active\":\""+active+"\"");
            json.append("}");

            System.out.println(json);

            // send a JSON data
```

```
            try {
                post.setEntity(new StringEntity(json.toString()));
            } catch (UnsupportedEncodingException e1) {
                e1.printStackTrace();
            }

            try (CloseableHttpClient httpClient = HttpClients.createDefault();
                 CloseableHttpResponse response = httpClient.execute(post)) {

                result = EntityUtils.toString(response.getEntity());
            }catch (Exception e) {

            }

            System.out.println(result);

            return result;

        }

        @Override
        public String deleteFireAlarmSensor(String sensorId) throws RemoteExcepti
on {
            String result = "";
            HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/delet
e/"+sensorId+"");


            try (CloseableHttpClient httpClient = HttpClients.createDefault();
                 CloseableHttpResponse response = httpClient.execute(post)) {

                result = EntityUtils.toString(response.getEntity());
            } catch (IOException e) {
                e.printStackTrace();
            }

            System.out.println(result);

            return result;



        }

        @Override
```

```
        public String getFireAlarmSensorDetails(String sensorId) throws RemoteExc
eption {



            String result = "";
            HttpGet get = new HttpGet("http://localhost:8080/rest/sensor/getsenso
r/"+sensorId+"");


            try (CloseableHttpClient httpClient = HttpClients.createDefault();
                 CloseableHttpResponse response = httpClient.execute(get)) {

                result = EntityUtils.toString(response.getEntity());
            } catch (IOException e) {
                e.printStackTrace();
            }

            System.out.println(result);

            return result;

        }

        public  String Login(String uname, String pwd) throws RemoteException {
            String res="";
            try {
                res =sendPOSTAdminLogin(uname,pwd);
            } catch (IOException e) {
                e.printStackTrace();
            }

            return res;
        }

        public static void main(String[] args) {
            System.setProperty("java.security.policy", "file:allowall.policy");

            try{
                AlarmServer svr = new AlarmServer();
                // Bind the remote object's stub in the registry
                Registry registry = LocateRegistry.getRegistry();
                registry.bind("AlarmService", svr);

                System.out.println ("Service started....");
```

```
            }
            catch(RemoteException re){
                System.err.println(re.getMessage());
            }
            catch(AlreadyBoundException abe){
                System.err.println(abe.getMessage());
            }
        }



        private static String sendPOSTAdminLogin(String uname, String pwd) throws
 IOException {

            String result = "";
            HttpPost post = new HttpPost("http://localhost:8080/rest/users/auth")
;


            post.addHeader("content-type", "application/json");

            StringBuilder json = new StringBuilder();
            json.append("{");
            json.append("\"uname\":"+uname+",");
            json.append("\"pwd\":\""+pwd+"\"");
            json.append("}");

            System.out.println(json);

            // send a JSON data
            post.setEntity(new StringEntity(json.toString()));

            try (CloseableHttpClient httpClient = HttpClients.createDefault();
                 CloseableHttpResponse response = httpClient.execute(post)) {

                result = EntityUtils.toString(response.getEntity());
            }

            System.out.println(result);

            return result;

        }

        @Override
        public String getSensorDetails() throws RemoteException {
```

```
            String result = "";
            HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/all")
;


            post.addHeader("content-type", "application/json");

            StringBuilder json = new StringBuilder();
            json.append("{");
            json.append("}");

            System.out.println(json);

            // send a JSON data
            try {
                post.setEntity(new StringEntity(json.toString()));
            } catch (UnsupportedEncodingException e) {
                // TODO Auto-generated catch block
                e.printStackTrace();
            }

            try (CloseableHttpClient httpClient = HttpClients.createDefault();
                 CloseableHttpResponse response = httpClient.execute(post)) {

                result = EntityUtils.toString(response.getEntity());
            } catch (IOException e) {
                e.printStackTrace();
            }

            System.out.println(result);

            return result;




        }


}
```

AlarmService.java

```
import java.rmi.Remote;
import java.rmi.RemoteException;

public interface AlarmService {

    public String addFireAlarmSensor(String sensorId, int floorNumber , String ro
omNumber , boolean i) throws RemoteException;
    public String updateFireAlarmSensor(String sensorId, int floorNumber , String
 roomNumber , boolean active) throws RemoteException;
    public String deleteFireAlarmSensor(String sensorId) throws RemoteException;
    public String getFireAlarmSensorDetails(String sensorId) throws RemoteExcepti
on;
    public String Login(String uname, String pwd) throws RemoteException;
    public String getSensorDetails() throws RemoteException;


}
```

Desktop App

AdminPanel.java

```
import com.google.gson.Gson;
import com.google.gson.JsonObject;
import javafx.collections.FXCollections;
import javafx.geometry.Insets;
import javafx.geometry.Pos;
import javafx.scene.Scene;
import javafx.scene.control.*;
import javafx.scene.control.Alert.AlertType;
import javafx.scene.layout.GridPane;
import javafx.scene.layout.HBox;
import javafx.scene.text.Font;
import javafx.scene.text.FontWeight;
import javafx.stage.Modality;
import javafx.stage.Stage;

import java.net.MalformedURLException;
import java.rmi.Naming;
import java.rmi.NotBoundException;
import java.rmi.RemoteException;

import org.json.JSONException;
import org.json.JSONObject;

public class AdminPanel {
```

```
public static void displayAdminPanel(String name) {

  Stage window = new Stage();
  window.initModality(Modality.APPLICATION_MODAL);
  window.setTitle("Admin Panel");
  window.setWidth(1200);
  window.setHeight(600);


  GridPane grid = new GridPane();
  grid.setAlignment(Pos.BASELINE_LEFT);
  grid.setHgap(10);
  grid.setVgap(10);
  grid.setPadding(new Insets(20, 20, 20, 20));

  Label lblTopic = new Label("Admin Panel");
  lblTopic.setFont(Font.font("Verdana", FontWeight.BOLD, 30));
  grid.add(lblTopic, 3, 0);


  Label sonsorid = new Label("Sensor-ID=");
  grid.add(sonsorid, 0, 1);
  TextField sonsoridText = new TextField();
  grid.add(sonsoridText, 1, 1);



  Label floorNo = new Label("Floor-No=");
  grid.add(floorNo, 0, 2);
  TextField floorNoText = new TextField();
  grid.add(floorNoText, 1, 2);



  Label roomNo = new Label("Room-No=");
  grid.add(roomNo, 0, 3);
  TextField roomNoText = new TextField();
  grid.add(roomNoText, 1, 3);


  Label IsActive = new Label("Active/Inactive=");
  grid.add(IsActive, 0, 4);
  String IsActive[] ={ "Active", "Inactive" };
  ComboBox combo_box = new ComboBox(FXCollections.observableArrayList(IsActive));
  combo_box.getSelectionModel().select(0);
  grid.add(combo_box, 1, 4);



  Button btnEdit = new Button("Edit SensorID");
  HBox hbBtn = new HBox(10);
  hbBtn.setAlignment(Pos.CENTER);
  hbBtn.getChildren().add(btnEdit);
  grid.add(hbBtn, 0, 5);
```

```
    Label sensorIDEdit = new Label("Sensor ID=");
    grid.add(sensorIDEdit, 4, 1);
    TextField sensorIDREditText = new TextField();
    grid.add(sensorIDREditText, 5, 1);



    Button btnDetailEdit = new Button("Get Details For Edit");
    HBox hbBtn2 = new HBox(10);
    hbBtn2.setAlignment(Pos.CENTER);
    grid.add(btnDetailEdit, 4, 2);

    Button btnDelete = new Button("Delete");
    HBox hbBtn3 = new HBox(10);
    hbBtn3.setAlignment(Pos.CENTER);
    grid.add(btnDelete, 5, 2);







    btnEdit.setOnAction(e ->{


       if(sonsoridText.getText().equals("")  || floorNoText.getText().equals("") ||
roomNoText.getText().equals("")){
          Alert a = new Alert(Alert.AlertType.NONE);
          a.setAlertType(Alert.AlertType.ERROR);
          a.setContentText("Please fill all fields!!!");
          a.show();
       }else if ( ! AdminPanel.isNumeric(floorNoText.getText()) ){
          Alert a = new Alert(Alert.AlertType.NONE);
          a.setAlertType(Alert.AlertType.ERROR);
          a.setContentText("Please use numeric value for Floor number!!!");
          a.show();
       }else{
          if(btnEdit.getText().equals("Edit SensorID")){
             System.setProperty("java.security.policy", "file:allowall.policy");

             AlarmService service = null;
             try {

                String sensorId = sonsoridText.getText();
                int floorNo= Integer.parseInt(floorNoText.getText());
                String roomNo = roomNoText.getText();
                boolean status;
                if(combo_box.getSelectionModel().getSelectedIndex() == 0) {
                   status= true;
                }else {
                   status = false;
                }

                service = (AlarmService) Naming.lookup("//localhost/FireAlarmService");
```

```
            String result = service.addSensor(sensorId,floorNo, roomNo, status );

            try {
              JSONObject jsonObject = new JSONObject(result);
              if(!jsonObject.isEmpty()) {
                Alert a1 = new Alert(AlertType.NONE);
                a1.setAlertType(AlertType.CONFIRMATION);
                a1.setContentText("Added Successfully");
                a1.show();
              }else {
                Alert a2 = new Alert(AlertType.NONE);
                a2.setAlertType(AlertType.ERROR);
                a2.setContentText("Error occurred while adding!!!");
                a2.show();
              }

            }catch (JSONException err){
              System.out.println(err);
            }

          } catch (NotBoundException ex) {
            ex.printStackTrace();
          } catch (MalformedURLException ex) {
            System.err.println(ex.getMessage());
          } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
          }
        }else if(btnEdit.getText().equals("Update Sensor")){
          System.setProperty("java.security.policy", "file:allowall.policy");

          AlarmService service = null;
          try {

            String sensorId = sonsoridText.getText();
            int floorNo= Integer.parseInt(floorNoText.getText());
            String roomNo = roomNoText.getText();
            boolean status;
            if(combo_box.getSelectionModel().getSelectedIndex() == 0) {
              status= true;
            }else {
              status = false;
            }

            service = (AlarmService) Naming.lookup("//localhost/FireAlarmService");
            String result = service.addSensor(sensorId,floorNo, roomNo, status );

            try {
              JSONObject jsonObject = new JSONObject(result);
              if(!jsonObject.isEmpty()) {
                Alert a1 = new Alert(AlertType.NONE);
                a1.setAlertType(AlertType.CONFIRMATION);
                a1.setContentText("Update Success");
                a1.show();
              }else {
                Alert a2 = new Alert(AlertType.NONE);
```

```
                a2.setAlertType(AlertType.ERROR);
                a2.setContentText("Error For updating!!!");
                a2.show();
              }

            }catch (JSONException err){
              System.out.println(err);
            }

          } catch (NotBoundException ex) {
            ex.printStackTrace();
          } catch (MalformedURLException ex) {
            System.err.println(ex.getMessage());
          } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
          }


      }

    }

});
btnDetailEdit.setOnAction(e ->{
  System.out.println("Update Click");

  if(sensorIDREditText.getText().equals("")){
    Alert a = new Alert(Alert.AlertType.NONE);
    a.setAlertType(Alert.AlertType.ERROR);
    a.setContentText("Please use sensor ID for edit");
    a.show();
  }else{

    System.setProperty("java.security.policy", "file:allowall.policy");

    AlarmService service = null;
    try {

      String sensorId = sensorIDREditText.getText();


      service = (AlarmService) Naming.lookup("//localhost/FireAlarmService");
      String result = service.getSensorDetails(sensorIDREditText.getText());

      try {
        JSONObject jsonObject = new JSONObject(result);

        try{
          JsonObject jsonObj = new Gson().fromJson(result, JsonObject.class);
          sonsoridText.setText( jsonObj.get("sensorid").getAsString() );
          floorNoText.setText( jsonObj.get("floorNo").getAsString() );
          roomNoText.setText( jsonObj.get("roomNo").getAsString()  );

          if(jsonObj.get("active").getAsBoolean() == false){
            combo_box.getSelectionModel().select(1);
```

```
            }else{
              combo_box.getSelectionModel().select(0);
            }
            btnEdit.setText("Update Sensor");
            sensorIDREditText.setText("");
            sonsoridText.setEditable(false);
          }catch (Exception ex){
            Alert a1 = new Alert(AlertType.NONE);
            a1.setAlertType(AlertType.ERROR);
            a1.setContentText("Sensor Not Found");
            a1.show();
          }

        }catch (JSONException err){
          System.out.println(err);
        }

      } catch (NotBoundException ex) {
        ex.printStackTrace();
      } catch (MalformedURLException ex) {
        System.err.println(ex.getMessage());
      } catch (RemoteException ex) {
        System.err.println(ex.getMessage());
      }

    }


});
btnDelete.setOnAction(e ->{
    System.out.println("Delete Click");

    if(sensorIDREditText.getText().equals("")) {
      Alert a = new Alert(Alert.AlertType.NONE);
      a.setAlertType(Alert.AlertType.ERROR);
      a.setContentText("Please add sensor ID for delete");
      a.show();
    }else {

        System.setProperty("java.security.policy", "file:allowall.policy");

        AlarmService service = null;
        try {

          String sensorId = sensorIDREditText.getText();

          service = (AlarmService) Naming.lookup("//localhost/FireAlarmService");
          String result = service.deleteSensor(sensorId);

          try {
              JSONObject jsonObject = new JSONObject(result);
              if(!jsonObject.isEmpty()) {
                  Alert a1 = new Alert(AlertType.NONE);
                  a1.setAlertType(AlertType.CONFIRMATION);
                  a1.setContentText("Deleted Success");
```

```
                    a1.show();
                }else {
                    Alert a2 = new Alert(AlertType.NONE);
                    a2.setAlertType(AlertType.ERROR);
                    a2.setContentText("Error occurred");
                    a2.show();
                }

            }catch (JSONException err){
                System.out.println(err);
            }

        } catch (NotBoundException ex) {
            ex.printStackTrace();
        } catch (MalformedURLException ex) {
            System.err.println(ex.getMessage());
        } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
        }
    }

  });


  Scene scene = new Scene(grid, 300, 275);
  window.setScene(scene);

  window.showAndWait();

 }

 public static boolean isNumeric(String strNum) {
  if (strNum == null) {
   return false;
  }
  try {
   double d = Double.parseDouble(strNum);
  } catch (NumberFormatException nfe) {
   return false;
  }
  return true;
 }
}
```

Login.java

```
import javafx.geometry.Insets;
import javafx.geometry.Pos;
import javafx.scene.Scene;
import javafx.scene.control.Alert;
import javafx.scene.control.Alert.AlertType;
import javafx.scene.control.Button;
import javafx.scene.control.Label;
```

```
import javafx.scene.control.PasswordField;
import javafx.scene.control.TextField;
import javafx.scene.layout.GridPane;
import javafx.scene.layout.HBox;
import javafx.scene.text.Font;
import javafx.scene.text.FontWeight;
import javafx.scene.text.Text;
import javafx.stage.Modality;
import javafx.stage.Stage;
import utils.Utils;

import java.sql.*;

import org.json.JSONException;
import org.json.JSONObject;

import org.json.JSONException;
import org.json.JSONObject;

import java.io.Console;
import java.net.MalformedURLException;
import java.rmi.Naming;
import java.rmi.NotBoundException;
import java.lang.SecurityManager;
import java.rmi.RemoteException;


public class Login {

  public static void adminLoginView() {
    Stage window = new Stage();
    window.initModality(Modality.APPLICATION_MODAL);
    window.setTitle("Login For Admin");
    window.setWidth(400);
    window.setHeight(600);

    GridPane grid = new GridPane();
    grid.setAlignment(Pos.CENTER);
    grid.setHgap(10);
    grid.setVgap(10);
    grid.setPadding(new Insets(20, 20, 20, 20));

    Text Title = new Text("Login For Admin");
    Title.setFont(Font.font("Tahoma", FontWeight.BOLD, 20));
    grid.add(Title, 0, 0, 2, 1);

    Label user = new Label("User Name=");
    grid.add(user, 0, 1);

    TextField userTextField = new TextField();
    grid.add(userTextField, 1, 1);

    Label password = new Label("Password=");
    grid.add(password, 0, 2);
```

```
PasswordField passwordBox = new PasswordField();
grid.add(passwordBox, 1, 2);

Button btn = new Button("Sign in");
HBox hbBtn = new HBox(10);
hbBtn.setAlignment(Pos.BOTTOM_RIGHT);
hbBtn.getChildren().add(btn);
grid.add(hbBtn, 1, 4);

btn.setOnAction(e->{

  if(userTextField.getText().equals("")  || passwordBox.getText().equals("") ) {
    Alert a = new Alert(AlertType.NONE);
     a.setAlertType(AlertType.ERROR);
     a.setContentText("Please Enter user and Password");
      a.show();
  }else {
    String user = userTextField.getText();
    String password = passwordBox.getText();


    System.setProperty("java.security.policy", "file:allowall.policy");

    AlarmService service = null;
    try {
      service = (AlarmService) Naming.lookup("//localhost/AlarmService");
      String result = service.adminLogin(user,password);

      try {
          JSONObject jsonObject = new JSONObject(result);

          if(!jsonObject.isEmpty()) {
            //Successully Login
            String loggedinName ="";// jsonObject.name;
            window.close();
            AdminPanel.displayAdminPanel(loggedinName);
          }else {
            //Invalid user or password
           Alert a = new Alert(AlertType.NONE);
           a.setAlertType(AlertType.ERROR);
           a.setContentText("Incorrect user or password");
           a.show();
          }

      }catch (JSONException err){
          System.out.println(err);
      }

    } catch (NotBoundException ex) {
      ex.printStackTrace();
    } catch (MalformedURLException ex) {
      System.err.println(ex.getMessage());
    } catch (RemoteException ex) {
      System.err.println(ex.getMessage());
    }
```

```
        }
    });

    Scene scene = new Scene(grid, 300, 275);
    window.setScene(scene);

    window.showAndWait();

  }
}
```

SensorData.java

```
import javafx.beans.property.SimpleStringProperty;

public class SensorData {
   private final SimpleStringProperty sensorid;
   private final SimpleStringProperty room_no ;
   private final SimpleStringProperty floor_no ;
   private final SimpleStringProperty is_active ;
   private final SimpleStringProperty co2level;
   private final SimpleStringProperty smoke_level;
   private final SimpleStringProperty date;
   private final SimpleStringProperty time;


   SensorData(String sensorid, String room_no, String floor_no, String is_active, String co2level, String
smoke_level,
                                          String date, String time) {

      this.sensorid = new SimpleStringProperty(sensorid);
      this.room_no = new SimpleStringProperty(room_no);
      this.floor_no = new SimpleStringProperty(floor_no);
      this.is_active = new SimpleStringProperty(is_active);
      this.co2level = new SimpleStringProperty(co2level);
      this.smoke_level = new SimpleStringProperty(smoke_level);
      this.date = new SimpleStringProperty(date);
      this.time = new SimpleStringProperty(time);
   }


   public String getSensorid() {
      return sensorid.get();
   }
   public String getRoom_no() {
      return room_no.get();
   }
   public String getFloor_no() {
      return floor_no.get();
   }
```

```
    public String getIs_active() {
        return is_active.get();
    }
    public String getCo2level() {
        return co2level.get();
    }
    public String getSmoke_level() {
        return smoke_level.get();
    }
    public String getDate() {
        return date.get();
    }
    public String getTime() {
        return time.get();
    }


    public void setSensorid(String sensorid) {
        this.sensorid.set(sensorid);
    }
    public void setRoom_no(String room_no) {
        this.room_no.set(room_no);
    }
    public void setFloor_no(String floor_no) {
        this.floor_no.set(floor_no);
    }
    public void setIs_active(String is_active) {
        this.is_active.set(is_active);
    }
    public void setco2level(String co2level) {
        this.co2level.set(co2level);
    }
    public void setSmoke_level(String smoke_level) {
        this.smoke_level.set(smoke_level);
    }
    public void setDate(String date) {
        this.date.set(date);
    }
    public void setTime(String time) {
        this.time.set(time);
    }


}
```

AlarmServer.java

```
import java.io.IOException;
import java.io.UnsupportedEncodingException;
import java.rmi.AlreadyBoundException;
import java.rmi.RemoteException;
import java.rmi.registry.LocateRegistry;
```

```
import java.rmi.registry.Registry;
import java.rmi.server.UnicastRemoteObject;

import org.apache.http.client.methods.CloseableHttpResponse;
import org.apache.http.client.methods.HttpGet;
import org.apache.http.client.methods.HttpPost;
import org.apache.http.entity.StringEntity;
import org.apache.http.impl.client.CloseableHttpClient;
import org.apache.http.impl.client.HttpClients;
import org.apache.http.util.EntityUtils;

public class AlarmServer extends UnicastRemoteObject implements AlarmService{

  protected AlarmServer() throws RemoteException {
    super();
  }

  @Override
  public String addFireAlarmSensor(String sensorId, int floorNumber, String roomNumber, boolean active)
throws RemoteException {

    String result = "";
    HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/load");

    post.addHeader("content-type", "application/json");

    StringBuilder json = new StringBuilder();
    json.append("{");
    json.append("\"sensorId\":"+sensorId+",");
    json.append("\"floorNumber\":\""+floorNumber+"\"");
    json.append("\"roomNumber\":\""+roomNumber+"\"");
    json.append("\"active\":\""+active+"\"");
    json.append("}");

    System.out.println(json);

    // send a JSON data
    try {
      post.setEntity(new StringEntity(json.toString()));
    } catch (UnsupportedEncodingException e1) {
      e1.printStackTrace();
    }

    try (CloseableHttpClient httpClient = HttpClients.createDefault();
       CloseableHttpResponse response = httpClient.execute(post)) {

      result = EntityUtils.toString(response.getEntity());
    }catch (Exception e) {

    }

    System.out.println(result);

    return result;
```

```
  }

  @Override
  public String updateFireAlarmSensor(String sensorId, int floorNumber, String roomNumber, boolean
active) throws RemoteException {

    String result = "";
    HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/load");

    post.addHeader("content-type", "application/json");

    StringBuilder json = new StringBuilder();
    json.append("{");
    json.append("\"sensorId\":"+sensorId+",");
    json.append("\"floorNumber\":\""+floorNumber+"\"");
    json.append("\"roomNumber\":\""+roomNumber+"\"");
    json.append("\"active\":\""+active+"\"");
    json.append("}");

    System.out.println(json);

    // send a JSON data
    try {
      post.setEntity(new StringEntity(json.toString()));
    } catch (UnsupportedEncodingException e1) {
      e1.printStackTrace();
    }

    try (CloseableHttpClient httpClient = HttpClients.createDefault();
        CloseableHttpResponse response = httpClient.execute(post)) {

      result = EntityUtils.toString(response.getEntity());
    }catch (Exception e) {

    }

    System.out.println(result);

    return result;

  }

  @Override
  public String deleteFireAlarmSensor(String sensorId) throws RemoteException {
    String result = "";
    HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/delete/"+sensorId+"");


    try (CloseableHttpClient httpClient = HttpClients.createDefault();
        CloseableHttpResponse response = httpClient.execute(post)) {

      result = EntityUtils.toString(response.getEntity());
    } catch (IOException e) {
      e.printStackTrace();
```

```
    }

    System.out.println(result);

    return result;



}

@Override
public String getFireAlarmSensorDetails(String sensorId) throws RemoteException {



    String result = "";
    HttpGet get = new HttpGet("http://localhost:8080/rest/sensor/getsensor/"+sensorId+"");


    try (CloseableHttpClient httpClient = HttpClients.createDefault();
         CloseableHttpResponse response = httpClient.execute(get)) {

        result = EntityUtils.toString(response.getEntity());
    } catch (IOException e) {
        e.printStackTrace();
    }

    System.out.println(result);

    return result;

}

public  String Login(String uname, String pwd) throws RemoteException {
    String res="";
    try {
        res =sendPOSTAdminLogin(uname,pwd);
    } catch (IOException e) {
        e.printStackTrace();
    }

    return res;
}

public static void main(String[] args) {
    System.setProperty("java.security.policy", "file:allowall.policy");

    try{
        AlarmServer svr = new AlarmServer();
        // Bind the remote object's stub in the registry
        Registry registry = LocateRegistry.getRegistry();
        registry.bind("AlarmService", svr);

        System.out.println ("Service started....");
    }
```

```
    catch(RemoteException re){
      System.err.println(re.getMessage());
    }
    catch(AlreadyBoundException abe){
      System.err.println(abe.getMessage());
    }
  }



  private static String sendPOSTAdminLogin(String uname, String pwd) throws IOException {

    String result = "";
    HttpPost post = new HttpPost("http://localhost:8080/rest/users/auth");

    post.addHeader("content-type", "application/json");

    StringBuilder json = new StringBuilder();
    json.append("{");
    json.append("\"uname\":"+uname+",");
    json.append("\"pwd\":\""+pwd+"\"");
    json.append("}");

    System.out.println(json);

    // send a JSON data
    post.setEntity(new StringEntity(json.toString()));

    try (CloseableHttpClient httpClient = HttpClients.createDefault();
         CloseableHttpResponse response = httpClient.execute(post)) {

      result = EntityUtils.toString(response.getEntity());
    }

    System.out.println(result);

    return result;

  }

  @Override
  public String getSensorDetails() throws RemoteException {

    String result = "";
    HttpPost post = new HttpPost("http://localhost:8080/rest/sensor/all");

    post.addHeader("content-type", "application/json");

    StringBuilder json = new StringBuilder();
    json.append("{");
    json.append("}");

    System.out.println(json);

    // send a JSON data
```

```
    try {
      post.setEntity(new StringEntity(json.toString()));
    } catch (UnsupportedEncodingException e) {
      // TODO Auto-generated catch block
      e.printStackTrace();
    }

    try (CloseableHttpClient httpClient = HttpClients.createDefault();
        CloseableHttpResponse response = httpClient.execute(post)) {

      result = EntityUtils.toString(response.getEntity());
    } catch (IOException e) {
      e.printStackTrace();
    }

    System.out.println(result);

    return result;




  }


}
```

ClientApplication.java

```
import java.io.IOException;
import java.io.UnsupportedEncodingException;
import java.net.MalformedURLException;
import java.util.ArrayList;
import java.util.List;

import com.google.gson.*;
import org.apache.http.HttpEntity;
import org.apache.http.ParseException;
import org.apache.http.client.methods.CloseableHttpResponse;
import org.apache.http.client.methods.HttpGet;
import org.apache.http.impl.client.CloseableHttpClient;
import org.apache.http.impl.client.HttpClients;
import org.apache.http.util.EntityUtils;


import javafx.application.Application;
import javafx.collections.FXCollections;
import javafx.collections.ObservableList;
import javafx.geometry.Insets;
import javafx.geometry.Pos;
import javafx.scene.Scene;
import javafx.scene.control.Alert;
import javafx.scene.control.Button;
import javafx.scene.control.Label;
```

```
import javafx.scene.control.TableColumn;
import javafx.scene.control.TableView;
import javafx.scene.control.Alert.AlertType;
import javafx.scene.control.cell.PropertyValueFactory;
import javafx.scene.layout.BorderPane;
import javafx.scene.layout.HBox;
import javafx.scene.layout.VBox;
import javafx.scene.text.Font;
import javafx.stage.Stage;

public class ClientApplication extends Application  {

  Stage window;

    private TableView<SensorData> table = new TableView<SensorData>();
      private ObservableList<SensorData> data =
          FXCollections.observableArrayList();


  public static void main(String[] args) {
//launch
    launch(args);

  }

  @Override
  public void start(Stage primaryStage) throws Exception {
    window = primaryStage;
    window.setTitle("FireSensor Desktop Client");
    getsensorData();
    BorderPane borderpane = new BorderPane();
    borderpane.setTop(addHBox());
    borderpane.setCenter(addVBox());

    Scene scene = new Scene(borderpane, 800, 400);
    window.setScene(scene);
    window.show();

  }

  public HBox addHBox() {
     HBox hbox = new HBox();
     hbox.setPadding(new Insets(15, 12, 15, 12));
     hbox.setSpacing(10);
     hbox.setStyle("-fx-background-color: #336699;");

     Button btnLogin = new Button("Login For Admin");
     btnLogin.setPrefSize(150, 20);

     btnLogin.setOnAction(e->{
       Login.adminLoginView();
    });

     hbox.getChildren().addAll(btnLogin);
```

```
    return hbox;
  }

  public VBox addVBox() {

    final Label lbl = new Label("Fire-Sensor Monitor");
     lbl.setFont(new Font("Arial", 20));

//     TableView table = new TableView();

     table.setEditable(false);

     TableColumn clmSensor = new TableColumn("SensorID");
       clmSensor.setMinWidth(100);
       clmSensor.setCellValueFactory( new PropertyValueFactory<SensorData, String>("sensorid"));

        TableColumn colRoom = new TableColumn("RoomNumber");
        colRoom.setMinWidth(100);
        colRoom.setCellValueFactory( new PropertyValueFactory<SensorData, String>("room_no"));

        TableColumn colFloor = new TableColumn("FloorNumber");
        colFloor.setMinWidth(100);
        colFloor.setCellValueFactory( new PropertyValueFactory<SensorData, String>("floor_no"));

        TableColumn colActive = new TableColumn("Sensor Status");
        colActive.setMinWidth(100);
        colActive.setCellValueFactory( new PropertyValueFactory<SensorData, String>("is_active"));

        TableColumn colCo2 = new TableColumn("CO2 Level");
        colCo2.setMinWidth(100);
        colCo2.setCellValueFactory( new PropertyValueFactory<SensorData, String>("co2level"));

        TableColumn colSmoke = new TableColumn("Smoke Level");
        colSmoke.setMinWidth(100);
        colSmoke.setCellValueFactory(new PropertyValueFactory<SensorData, String>("smoke_level"));

        TableColumn colDate = new TableColumn("Date");
        colDate.setMinWidth(100);
        colDate.setCellValueFactory( new PropertyValueFactory<SensorData, String>("date"));

        TableColumn colTime = new TableColumn("Time");
        colTime.setMinWidth(100);
        colTime.setCellValueFactory( new PropertyValueFactory<SensorData, String>("time"));

        table.setItems(data);

        table.getColumns().addAll(clmSensor, colRoom, colFloor,colActive, colCo2, colSmoke, colDate, colTime);

        final VBox vbox1 = new VBox();
        vbox1.setSpacing(5);
        vbox1.setPadding(new Insets(10, 0, 0, 10));
        vbox1.getChildren().addAll(lbl, table);


    return vbox1;
```

```
}

public void getsensorData() {

  String result = "";
    HttpGet request = new HttpGet("http://localhost:8080/rest/sensordata/all");



   try (CloseableHttpClient httpClient = HttpClients.createDefault();
           CloseableHttpResponse response = httpClient.execute(request)) {

          // Get HttpResponse Status
          System.out.println(response.getProtocolVersion());
          System.out.println(response.getStatusLine().getStatusCode());
          System.out.println(response.getStatusLine().getReasonPhrase());
          System.out.println(response.getStatusLine().toString());

          HttpEntity entity = response.getEntity();
          if (entity != null) {

              result = EntityUtils.toString(entity);

          }

       } catch (ParseException e) {
          // TODO Auto-generated catch block
          e.printStackTrace();
      } catch (IOException e) {
          // TODO Auto-generated catch block
          e.printStackTrace();
      }
  data.removeAll(data);

  JsonArray arr = new Gson().fromJson(result, JsonArray.class);
  for(JsonElement e : arr){
     System.out.println(e.getAsJsonObject());
     JsonObject o = e.getAsJsonObject();

     data.add(new SensorData(
           o.get("sensor").getAsJsonObject().get("sensorid").toString(),
           o.get("sensor").getAsJsonObject().get("roomNo").toString(),
           o.get("sensor").getAsJsonObject().get("floorNo").toString(),
           o.get("sensor").getAsJsonObject().get("active").toString(),
           o.get("co2Level").toString(),
           o.get("smokeLevel").toString(),
           o.get("date").toString(),
           o.get("time").toString()));
  }



}
```

```
}
```

AlarmService.java

```
import java.rmi.Remote;
import java.rmi.RemoteException;

public interface AlarmService {

   public String addFireAlarmSensor(String sensorId, int floorNumber , String roomNumber , boolean i)
throws RemoteException;
   public String updateFireAlarmSensor(String sensorId, int floorNumber , String roomNumber , boolean
active) throws RemoteException;
   public String deleteFireAlarmSensor(String sensorId) throws RemoteException;
   public String getFireAlarmSensorDetails(String sensorId) throws RemoteException;
   public String Login(String uname, String pwd) throws RemoteException;
   public String getSensorDetails() throws RemoteException;


}
```