FIRE ALARM MONITORING SYSTEM

ASSIGNMENT 2-REST API

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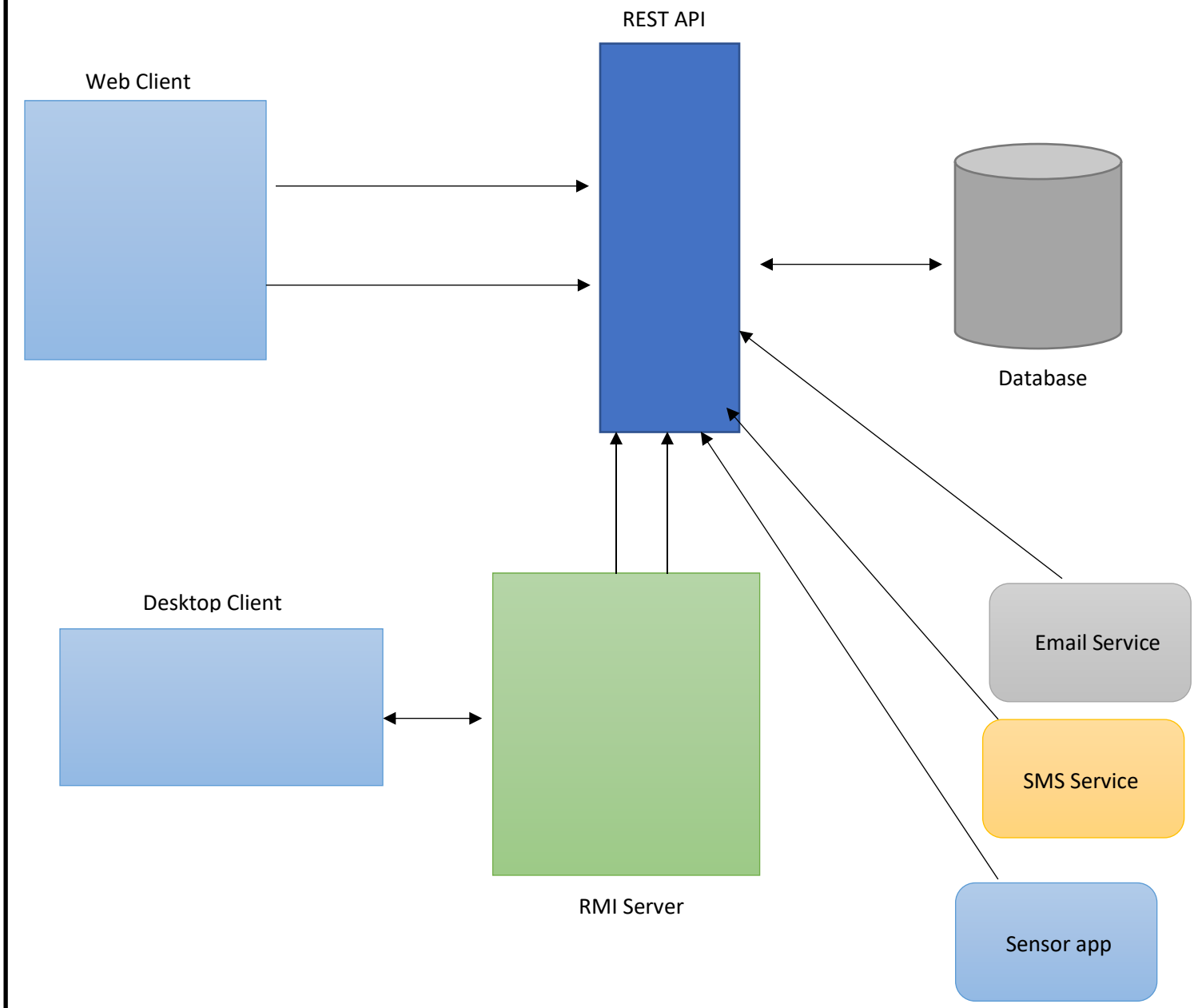
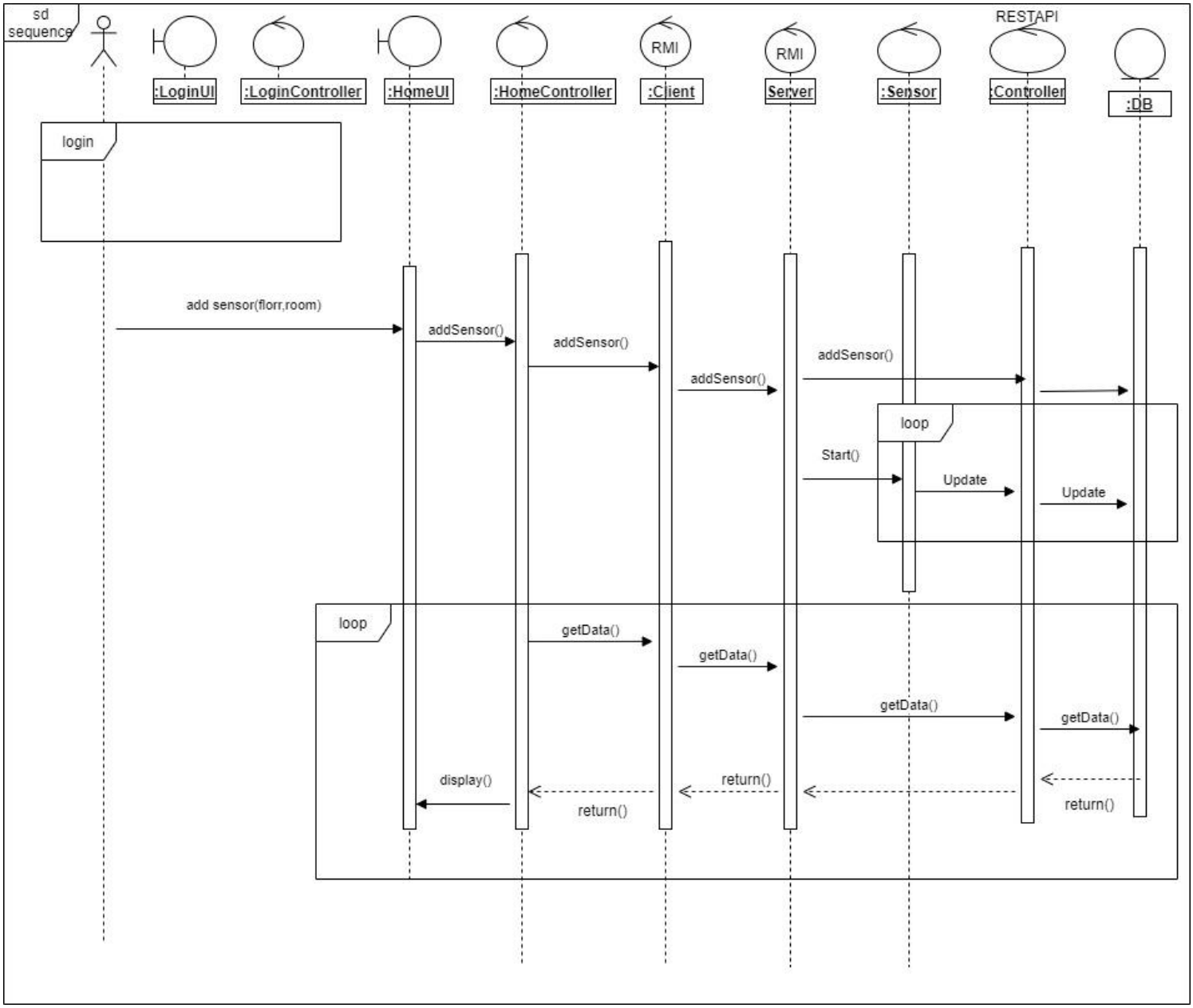
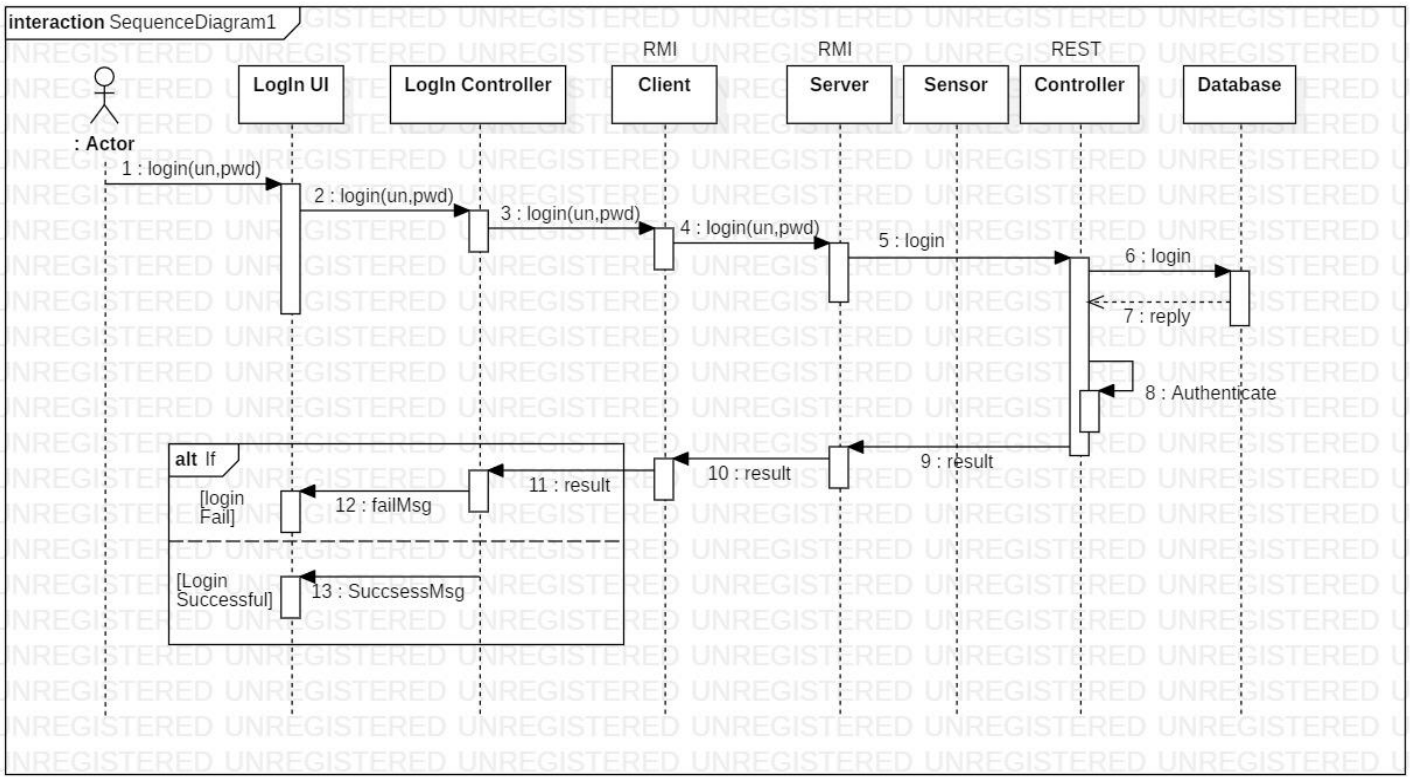
High level Architecture diagram for Fire alarm System



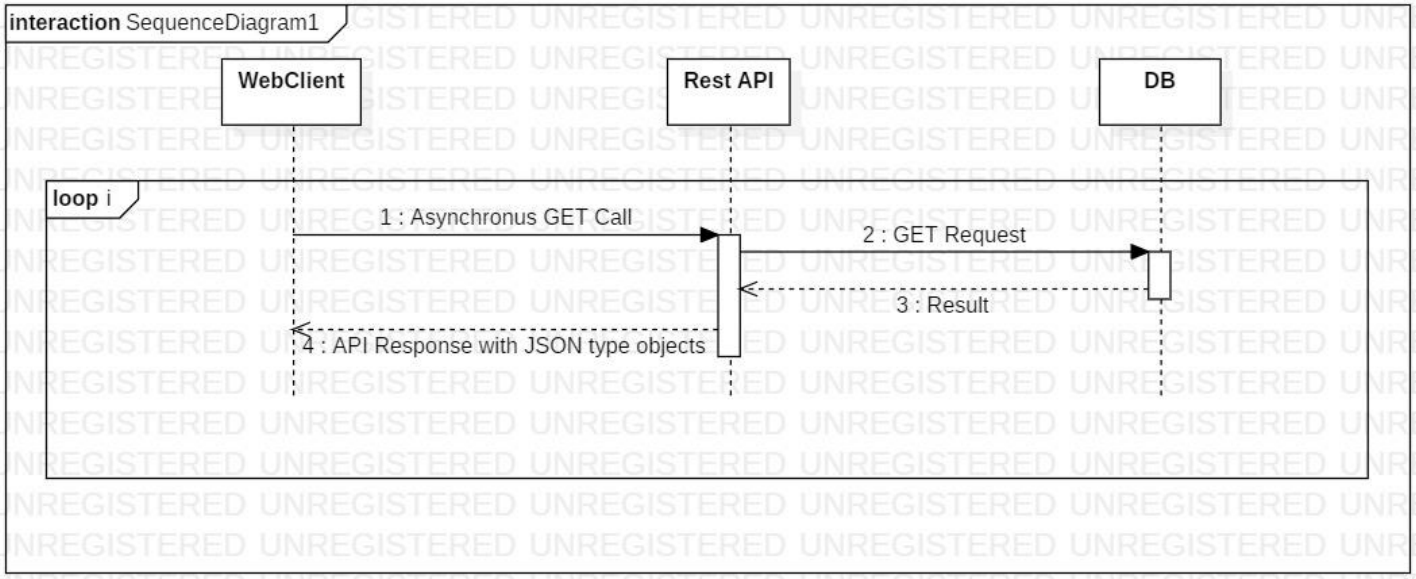
Sequence Diagram for Desktop Client Application



Login


interaction SequenceDiagram1
RMI
RMI
REST
LogIn UI
LogIn Controller
Client
Server
Sensor
Controller
Database
: Actor
1 : login(un,pwd)
2 : login(un,pwd)
3 : login(un,pwd)
4 : login(un,pwd)
5 : login
6 : login
7 : reply
8 : Authenticate
9 : result
10 : result
11 : result
12 : failMsg
13 : SuccsessMsg
alt If
[login Fail]
[Login Successful]

Sequence Diagram for Web Client Application



Web Client.

index.js

```
import React from 'react';
import ReactDOM from 'react-dom';
import './index.css';
import AlarmView from './AlarmView';
import * as serviceWorker from './serviceWorker';

ReactDOM.render(
  <React.StrictMode>
      //Render the Alarm View
    <AlarmView />
  </React.StrictMode>,
  document.getElementById('root')
);

// If you want your app to work offline and load faster, you can change
// unregister() to register() below. Note this comes with some pitfalls.
// Learn more about service workers: https://bit.ly/CRA-PWA
serviceWorker.unregister();
```

AlarmView.js

```
import React, {Component} from 'react';
import Table from 'react-bootstrap/Table';
import './App.css';

class AlarmView extends Component {
    state = {
        isloading : true,
        alarms : []
    }

    //---Asynchronous call to REST API
    async componentDidMount(){
        const url = "/getAll";
        const response = await fetch(url);
        const data = await response.json();
        this.setState({alarms :data, isloading:false});
        //console.log(data);
    }


    render() {
```

```
        //---Check the connection
        const {alarms,isloading} = this.state;
        if(isloading)
            return (<div>Loading.....</div>);


        //---Display the fetch data through the API
        return (
            <div>
                <br/>
               <h2 className="heading">...Fire Alarm System...</h2>
                <br/><br/>
                <Table striped bordered hover className="alarm">
                    <thead>
                    <tr>
                        <th>Floor Number</th>
                        <th>Room Number</th>
                        <th>Smoke Level</th>
                        <th>CO2 Level</th>
                    </tr>
                    </thead>
                    <tbody>
                    {
                        //Dispaly all data and change the row color if smokelevel and co2level is
greater than 5
                        alarms.map(alarm =>
                            <tr key = {alarm.sid} style= {{backgroundColor: (alarm.smokeLevel > 5 ||
alarm.co2Level > 5) ? "#FA8072" : "#90EE90"}}>
                                <td>{alarm.floorNum}</td>
                                <td>{alarm.roomNum}</td>
                                <td>{alarm.smokeLevel}</td>
                                <td>{alarm.co2Level}</td>
                            </tr>

                        )
                    }

                    </tbody>
                </Table>

            </div>


        );
    }
}

export default AlarmView;
```

package.json

```
{
  "name": "fire-alarm-web",
  "version": "0.1.0",
  "private": true,
  "dependencies": {
    "@testing-library/jest-dom": "^4.2.4",
    "@testing-library/react": "^9.5.0",
    "@testing-library/user-event": "^7.2.1",
    "bootstrap": "^4.4.1",
    "react": "^16.13.1",
    "react-bootstrap": "^1.0.1",
    "react-dom": "^16.13.1",
    "react-scripts": "3.4.1"
  },
  "scripts": {
    "start": "react-scripts start",
    "build": "react-scripts build",
    "test": "react-scripts test",
    "eject": "react-scripts eject"
  },
  "proxy": "http://localhost:8080",
  "eslintConfig": {
    "extends": "react-app"
  },
  "browserslist": {
    "production": [
      ">0.2%",
      "not dead",
      "not op_mini all"
    ],
    "development": [
      "last 1 chrome version",
      "last 1 firefox version",
      "last 1 safari version"
    ]
  }
}
```

Rest API.

SensorController.java

```
@RestController
public class SensorController {

   @Autowired
   private SensorService sensorService;

   @Autowired
   private UserService userService;

   @RequestMapping("/create")
   public String create(@RequestParam int floorNum, @RequestParam int roomNum, @RequestParam int
sid,@RequestParam int smokeLevel,@RequestParam int co2Level) {
      Sensor p = sensorService.create(floorNum, roomNum, sid,smokeLevel,co2Level);
      return p.toString();
   }

   @RequestMapping("/get")
   public Sensor getSensor(@RequestParam int sid) {
      return sensorService.getBySid(sid);
   }

   @RequestMapping("/getAll")
   public List<Sensor> getAll(){
      return sensorService.getAll();
   }

   @RequestMapping("/update")
   public String update(@RequestParam int floorNum, @RequestParam int roomNum, @RequestParam int sid) {
      Sensor p = sensorService.update(floorNum, roomNum, sid);
      return p.toString();
   }

   @RequestMapping("/updateData")
   public String updateData(@RequestParam int sid,@RequestParam int smokeLevel,@RequestParam int
co2Level) {
      Sensor p = sensorService.updateData(sid,smokeLevel,co2Level);
      return p.toString();
   }

   @RequestMapping("/delete")
   public String delete(@RequestParam int sid) {
      sensorService.delete(sid);
      return "Deleted "+sid;
   }

   @RequestMapping ("/deleteAll")
   public String deleteAll() {
```

```
      sensorService.deleteAll();
      return "Deleted all records";
   }

   @RequestMapping("/createUser")
   public String createUser(@RequestParam String username, @RequestParam String password) {
      User p = userService.createUser(username,password);
      return p.toString();
   }

   @RequestMapping("/login")
public boolean login(@RequestParam String username, String password) {
      return userService.getByUsernameAndPassword(username,password);
   }
```

SensorRepository.java

```
@Repository
public interface SensorRepository extends MongoRepository<Sensor, String>{
   Sensor findBySid(int sid);
}
```

Sensor.java

```
@Document
public class Sensor {
   @Id
   String id;
   int floorNum;
   int roomNum;
   int    sid;
   int smokeLevel;
   int co2Level;

   public Sensor(int floorNum, int roomNum, int sid,int smokeLevel,int co2Level) {
      this.floorNum = floorNum;
      this.roomNum  = roomNum;
      this.sid       = sid;
      this.smokeLevel = smokeLevel;
      this.co2Level = co2Level;

   }

   //setters getters

   public String toString() {
      return "Sensor Floor Number:"+floorNum+" Room Number:"+roomNum+" SensorID:"+sid;
   }
}
```

Server

Server.java

```
public class Server extends UnicastRemoteObject implements Service {
```

```
    private final OkHttpClient httpClient = new OkHttpClient();
    private int sensorCount = 0;

    public Server() throws RemoteException {
        super();
    }

    public synchronized int getCount() throws RemoteException{
        return sensorCount;
    }

    @Override
    public void add(String sid,String roomNum,String floorNum) throws RemoteException {
        try {
            addSensor(sid,roomNum,floorNum);
            System.out.println("Sensor added");
            sensorCount++;
            Timer time = new Timer();
            SensorData st = new SensorData(sid);// start sensor dummy
            time.schedule(st, 0, 10000);// update sensor data every 10 seconds
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    @Override
    public void update(String sid, String roomNum, String floorNum) throws RemoteException {
        try {
            updateSensor(sid,roomNum,floorNum);
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    @Override
    public void delete(String sid) throws RemoteException {
        try {
            removeSensor(sid);
            System.out.println("Sensor deleted");
            if (sensorCount != 0)
                sensorCount--;
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    @Override
    public List<Sensor> getAll() throws RemoteException {
        List<Sensor> list = null;
        try {
            list = getSensors();
        } catch (IOException e) {
            e.printStackTrace();
        }
        return list;
    }
    //-------------------------- main method -----------------------------------------------------
    public static void main(String[] args){

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

        try{
```

```
            Server svr = new Server();

            Registry registry = LocateRegistry.getRegistry();
            registry.bind("SensorService", svr);

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

        }
        catch(RemoteException re){
            System.err.println(re.getMessage());
        }
        catch(AlreadyBoundException abe){
            System.err.println(abe.getMessage());
        }
    }
    //------------------------------ add sensor ----------------------------------------------------
    public void addSensor(String sid,String roomNum,String floorNum) throws Exception{
        RequestBody formBody = new FormBody.Builder()
                .add("sid",sid)
                .add("roomNum",roomNum)
                .add("floorNum",floorNum)
                .add("smokeLevel", String.valueOf(0))
                .add("co2Level", String.valueOf(0))
                .build();

        Request request = new Request.Builder()
                .url("http://localhost:8080/create")
                .addHeader("Content-Type", "application/json")
                .post(formBody)
                .build();

        try (Response response = httpClient.newCall(request).execute()) {
            if (!response.isSuccessful()) throw new IOException("Unexpected code " + response);
            // Get response body
            //System.out.println(response.body().string());
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
    //--------------------- delete sensor ------------------------------------------------------------
    public void removeSensor(String sid) throws Exception {

        RequestBody formBody = new FormBody.Builder()
                .add("sid", sid)
                .build();

        Request request = new Request.Builder()
                .url("http://localhost:8080/delete")
                .addHeader("Content-Type", "application/json")
                .post(formBody)
                .build();

        try (Response response = httpClient.newCall(request).execute()) {
            if (!response.isSuccessful()) throw new IOException("Unexpected code " + response);
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
    //--------------------------- update sensor ------------------------------------------------------
    public void updateSensor(String sid,String fno,String rno) throws Exception {

        RequestBody formBody = new FormBody.Builder()
                .add("sid", sid)
```

```
                .add("floorNum", fno)
                .add("roomNum", rno)
                .build();

        Request request = new Request.Builder()
                .url("http://localhost:8080/update")
                .addHeader("Content-Type", "application/json")
                .post(formBody)
                .build();

        try (Response response = httpClient.newCall(request).execute()) {
            if (!response.isSuccessful()) throw new IOException("Unexpected code " + response);
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
    //---------------------------------- get all ----------------------------------------------------
    public List<Sensor> getSensors() throws IOException {
        Request request = new Request.Builder()
                .url("http://localhost:8080/getAll")
                .build();

        ObjectMapper mapper = new ObjectMapper();

        try (Response response = httpClient.newCall(request).execute()) {
            String lst = response.body().string();
            List<Sensor> list = mapper.readValue(lst, new TypeReference<List<Sensor>>() {});

            return list;
        }
    }

}
```

Service.java

```
public interface Service extends Remote {
    void add(String sid,String roomNum,String floorNum) throws RemoteException;
    void update(String sid,String roomNum,String floorNum) throws RemoteException;
    void delete(String sid) throws RemoteException;
    List<Sensor> getAll() throws RemoteException;
    int getCount() throws RemoteException;
}
```

SensorData.java

```
public class SensorData extends TimerTask {

    private final OkHttpClient httpClient = new OkHttpClient();
    int smokeLevel =0;
    int co2Level =0;
    Random r1 = new Random();
    Random r2 = new Random();
    private String sid;

    public SensorData(String sid){
        this.sid = sid;
    }
```

```
    //generate random number between 1-10 and update
    @Override
    public void run() {

        smokeLevel = r1.nextInt(10);
        co2Level = r2.nextInt(10);

        try {
            updateSensor(getSid(),smokeLevel,co2Level);
        } catch (Exception e) {
            e.printStackTrace();
        }

    }
    //---------------- update sensor data smoke level and co2 level-------------------------------------
    public void updateSensor(String sid,int smoke,int co2) throws Exception {

        RequestBody formBody = new FormBody.Builder()
                .add("sid", sid)
                .add("smokeLevel", String.valueOf(smoke))
                .add("co2Level", String.valueOf(co2))
                .build();

        Request request = new Request.Builder()
                .url("http://localhost:8080/updateData")
                .addHeader("Content-Type", "application/json")
                .post(formBody)
                .build();
        try (Response response = httpClient.newCall(request).execute()) {
            if (!response.isSuccessful()) throw new IOException("Unexpected code " + response);
            // Get response body
            //System.out.println(response.body().string());
        } catch (IOException e) {
            e.printStackTrace();
        }

    }
    public String getSid(){return this.sid;}
}
```

DesktopClient

Client.java

```
public class Client {

    Service service;

    public Client(){
        System.setProperty("java.security.policy", "file:allowall.policy");
        try {
            service =  (Service) Naming.lookup("//localhost/SensorService");
        } catch (NotBoundException e) {
            e.printStackTrace();
        } catch (MalformedURLException e) {
            e.printStackTrace();
        } catch (RemoteException e) {
            e.printStackTrace();
        }
    }
```

```
    //adding new sensor
    public void add(String sid,String roomNum,String floorNum){
        try {
            service.add(sid,roomNum,floorNum);
        } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
        }
    }
    //update existing sensor details
    public void update(String sid,String roomNum,String floorNum){
        try {
            service.update(sid,roomNum,floorNum);
        } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
        }
    }
    //delete existing sensors
    public void delete(String sid){
        try {
            service.delete(sid);
        } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
        }
    }
    //get all sensors list
    public List<Sensor> getAll(){
        List<Sensor> list = new ArrayList();
        try {
            list = service.getAll();
        } catch (RemoteException ex) {
            System.err.println(ex.getMessage());
        }
        return list;
    }
    //get number of connected sensors count
    public int getCount(){
        int count = 0;
        try {
            count = service.getCount();
        } catch (RemoteException e) {
            e.printStackTrace();
        }
        return count;
    }
}
```

HomeController.java

```
public class HomeController implements Initializable {

    //FXML attributes defining

    Client client;

    @Override
    public void initialize(URL location, ResourceBundle resources) {
        col_sid.setCellValueFactory(cellData -> cellData.getValue().getSidProperty().asString());
        col_floorNum.setCellValueFactory(cellData ->
cellData.getValue().getFloorNumProperty().asString());
        col_roomNum.setCellValueFactory(cellData ->
cellData.getValue().getRoomNumProperty().asString());
```

```
        col_smokeLevel.setCellValueFactory(cellData ->
cellData.getValue().getSmokeLevelProperty().asString());
        col_co2Level.setCellValueFactory(cellData ->
cellData.getValue().getCo2LevelProperty().asString());

        client = new Client();

        Timer timer = new Timer();
        timer.schedule(new TimerTask() {
            @Override
            public void run() {
                populateTable();
            }
        }, 0, 15000);//update table every 15 seconds
        table.setRowFactory(tv -> {
            TableRow<Sensor> row = new TableRow<>();
            row.setOnMouseClicked(event -> {
                if (! row.isEmpty() && event.getButton()== MouseButton.PRIMARY
                        && event.getClickCount() == 1) {

                    Sensor s = row.getItem();
                    txFloorNum.setText(String.valueOf(s.getFloorNum()));
                    txRoomNum.setText(String.valueOf(s.getRoomNum()));
                    txSid.setText(String.valueOf(s.getSid()));
                }
            });
            return row ;
        });
        //change row color if smoke level or co2 level exceed level 5
        table.setRowFactory(tv -> new TableRow<Sensor>() {
            @Override
            protected void updateItem(Sensor s, boolean empty) {
                super.updateItem(s, empty);
                if (s == null)
                    setStyle("");
                else if (s.getCo2Level() > 5 || s.getSmokeLevel()>5)
                    setStyle("-fx-background-color: #FF4658;");
                else
                    setStyle("");
            }
        });
    }
    //load sensor details into table
    private void populateTable(){
//        List<Sensor> sList = client.getAll();
//        ObservableList<Sensor> observableArrayList = FXCollections.observableArrayList(sList);
//        table.setItems(observableArrayList);

        RestManager restManager = new RestManager();
        List<Sensor> slist = null;
        try {
            slist = restManager.getAll();
        } catch (IOException e) {
            e.printStackTrace();
        }
        ObservableList<Sensor> observableArrayList = FXCollections.observableArrayList(slist);
        table.setItems(observableArrayList);
        txCount.setText(String.valueOf(client.getCount()));
    }
    //remove sensor button
    @FXML
    public void removeSensor(javafx.event.ActionEvent actionEvent) throws Exception {
        Sensor s = (Sensor) table.getSelectionModel().getSelectedItem();
```

```
        client.delete(String.valueOf(s.getSid()));
        clear();
        populateTable();
    }
    //update sensor details button
    @FXML
    public void updateSensor(javafx.event.ActionEvent actionEvent) throws Exception {
        Sensor s = (Sensor) table.getSelectionModel().getSelectedItem();
        client.update(String.valueOf(s.getSid()),txFloorNum.getText(),txRoomNum.getText());
        //populateTable();
        clear();
    }
    //add sensor button
    @FXML
    public void addSensor(javafx.event.ActionEvent actionEvent) throws Exception {
        client.add(txSid.getText(),txRoomNum.getText(),txFloorNum.getText());
        clear();
        populateTable();
    }
```