A school management system is a data management software for education sector establishments used to manage student data.

SCHOOL MANAGEMENT SYSTEM

Created by Ranbir Kumar Gupta

GUI Application Framework

There are multiple framework available in java for making GUI applications. Some of them are :-

- Spring
- AWT
- JavaFX

In this project we will be using JavaFX to make GUI.

JavaFX in Java

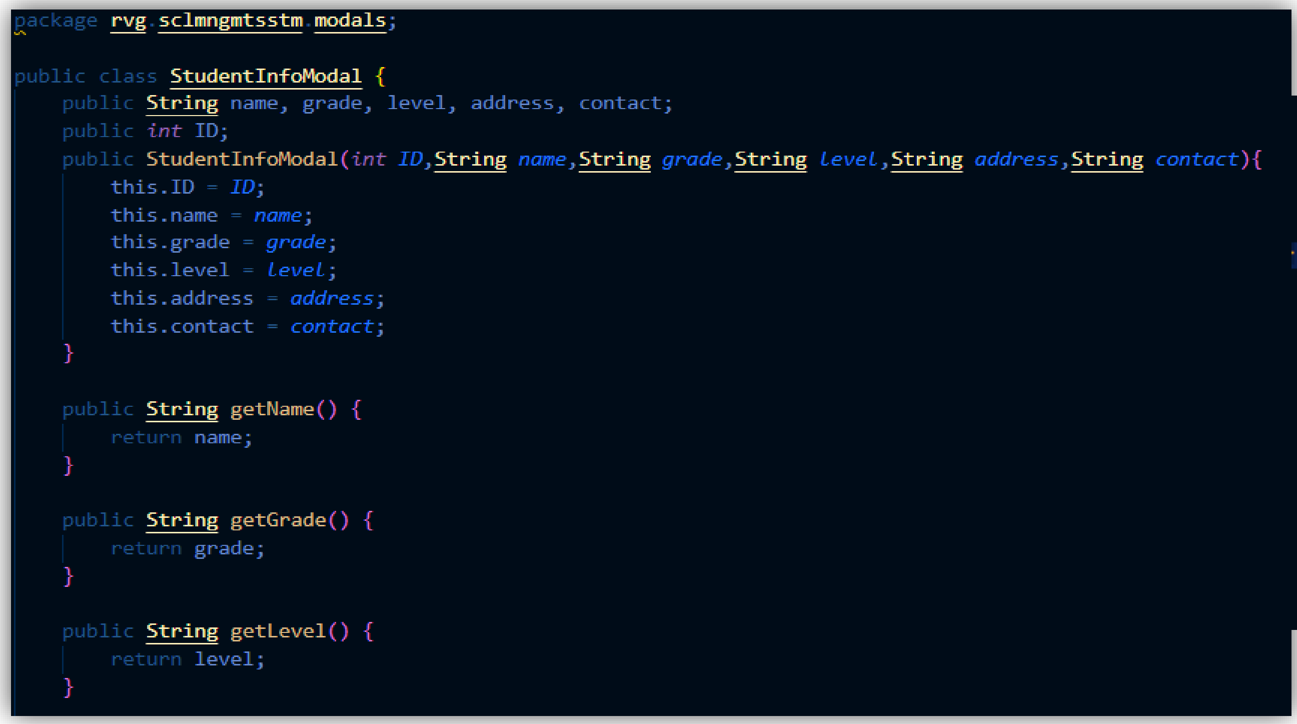
JavaFX is a set of graphics and media packages that enables developers to design, create, test, debug, and deploy rich client applications that operate consistently across diverse platforms.

Here are some key features and concepts related to JavaFX:

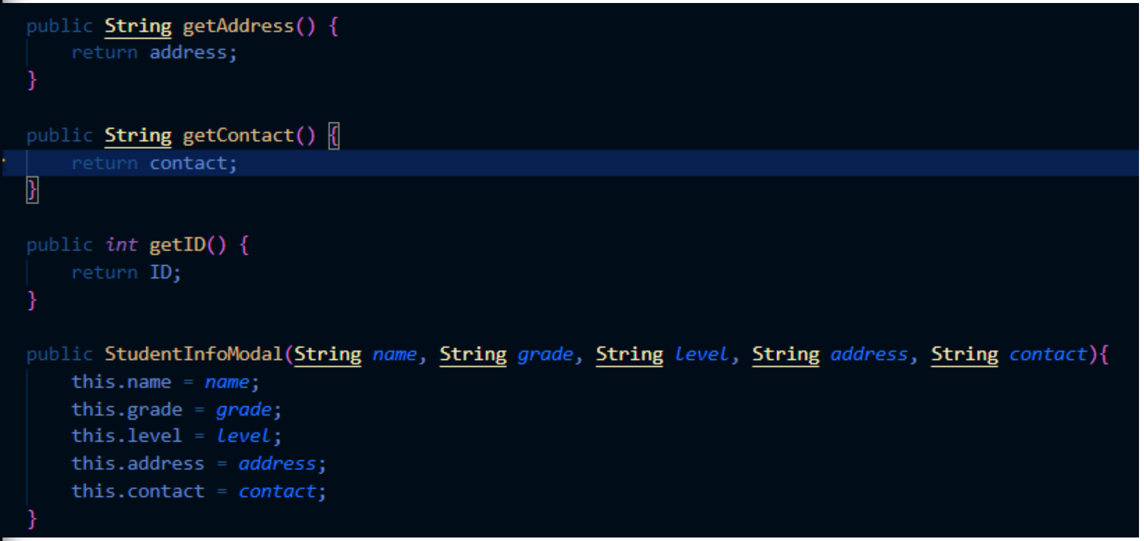
- JavaFX provides a rich set of UI controls such as buttons, text fields, tables, lists, etc., which developers can use to create interactive user interfaces.
- FXML is an XML-based markup language that allows developers to define user interfaces separately from the application logic. It provides a way to design UIs.
- JavaFX supports CSS for styling UI components, providing developers with a flexible way to customize the appearance of their applications.

Modal For Data

To store Student, Teacher and Course data in an arranged factor I have created modal classes for every type of data. I will be storing data to files as an object of modals.

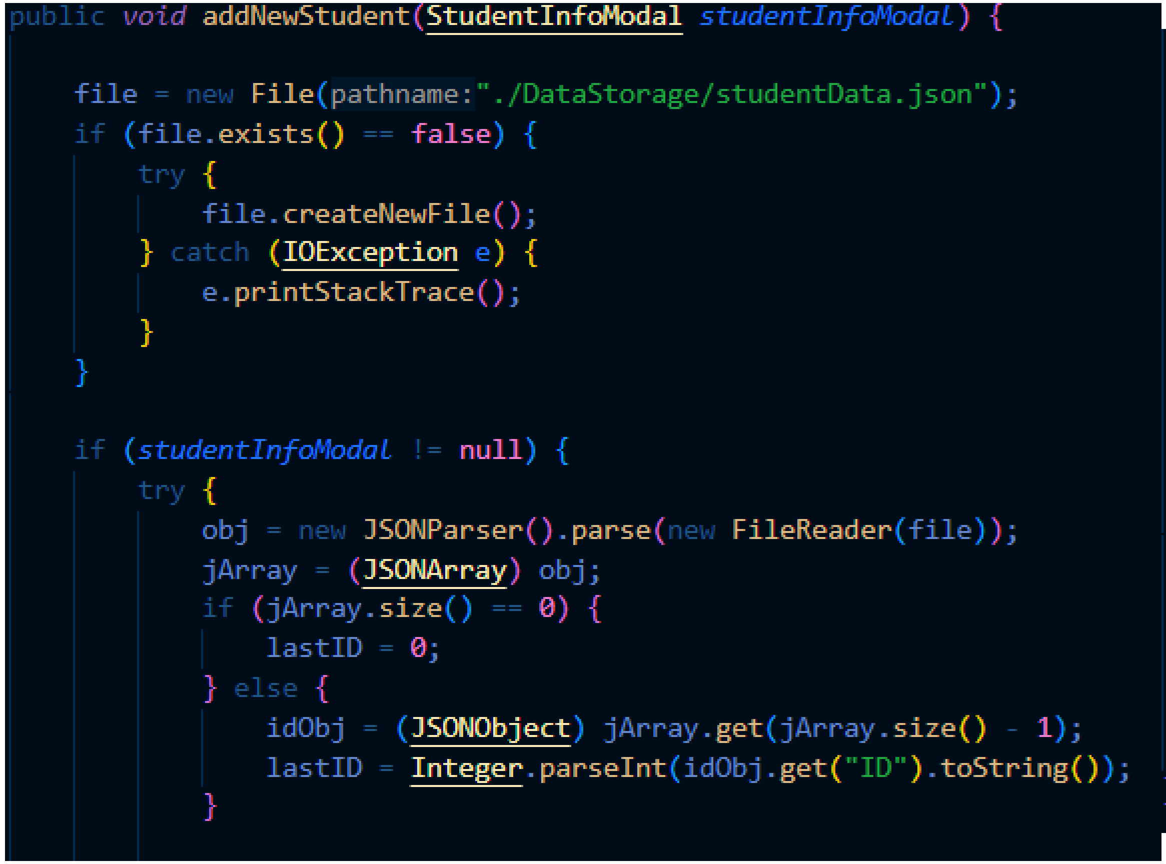


```java
package rvg.sclmngmtsstm.modals;

public class StudentInfoModal {
    public String name, grade, level, address, contact;
    public int ID;
    public StudentInfoModal(int ID,String name,String grade,String level,String address,String contact){
        this.ID = ID;
        this.name = name;
        this.grade = grade;
        this.level = level;
        this.address = address;
        this.contact = contact;
    }

    public String getName() {
        return name;
    }

    public String getGrade() {
        return grade;
    }

    public String getLevel() {
        return level;
    }
```

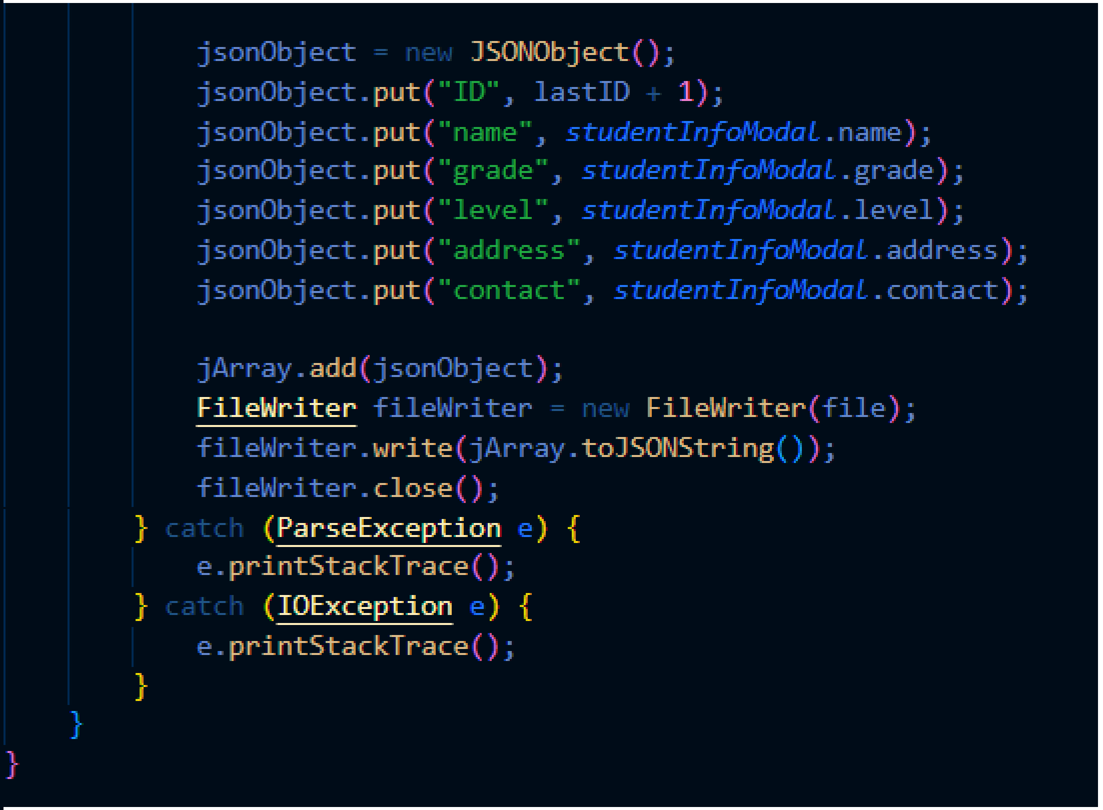


```java
public String getAddress() {
    return address;
}

public String getContact() {
    return contact;
}

public int getID() {
    return ID;
}

public StudentInfoModal(String name, String grade, String level, String address, String contact){
    this.name = name;
    this.grade = grade;
    this.level = level;
    this.address = address;
    this.contact = contact;
}
```

Insert Operation

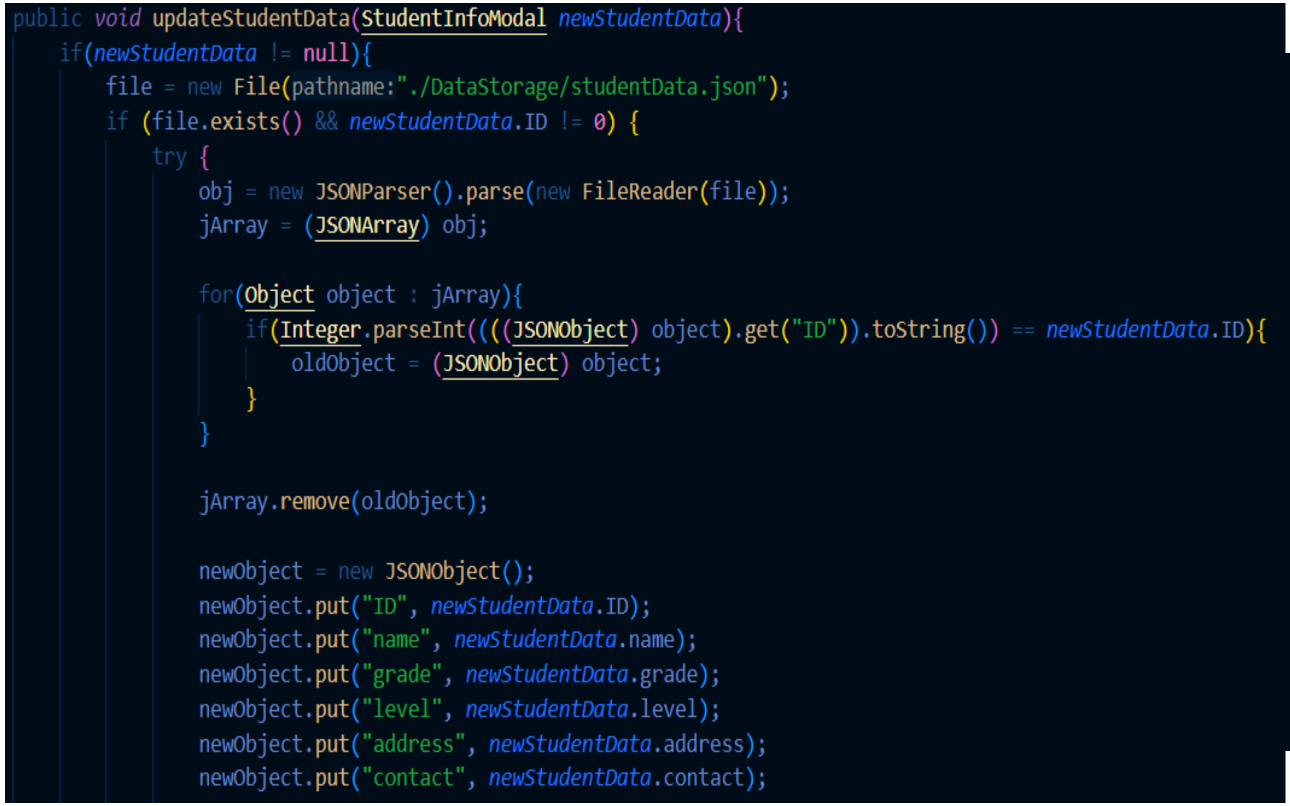


```java
public void addNewStudent(StudentInfoModal studentInfoModal) {

    file = new File(pathname:"./DataStorage/studentData.json");
    if (file.exists() == false) {
        try {
            file.createNewFile();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }

    if (studentInfoModal != null) {
        try {
            obj = new JSONParser().parse(new FileReader(file));
            jArray = (JSONArray) obj;
            if (jArray.size() == 0) {
                lastID = 0;
            } else {
                idObj = (JSONObject) jArray.get(jArray.size() - 1);
                lastID = Integer.parseInt(idObj.get("ID").toString());
            }
```

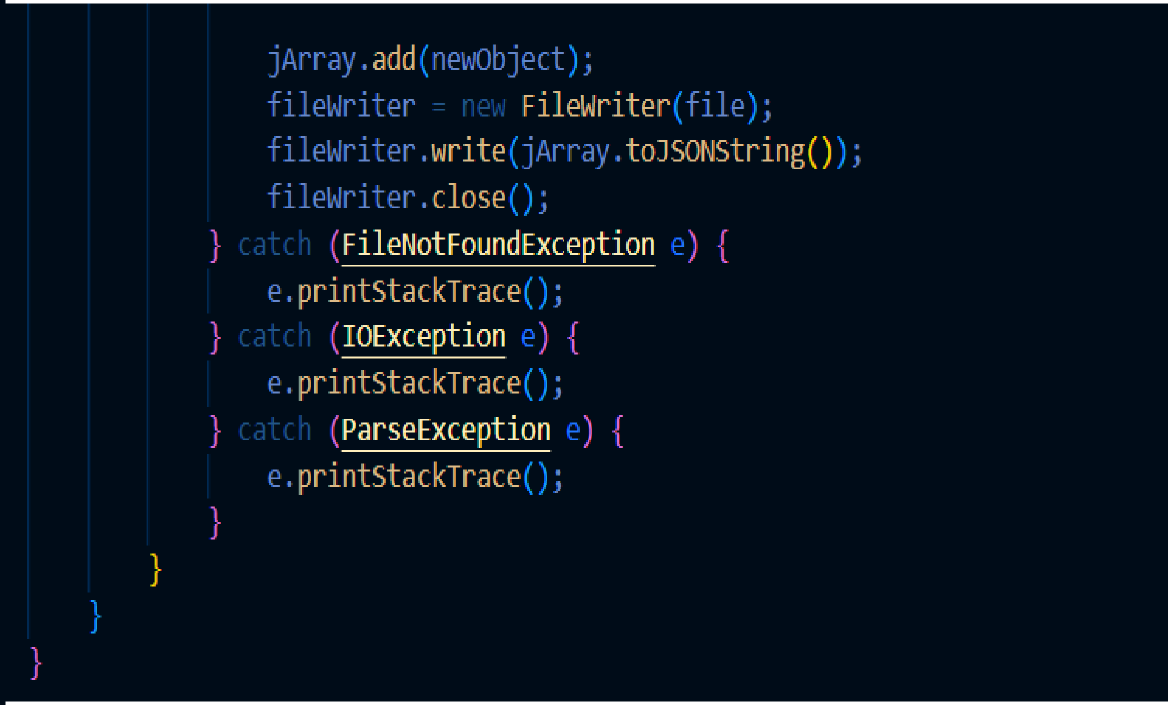


```java
            jsonObject = new JSONObject();
            jsonObject.put("ID", lastID + 1);
            jsonObject.put("name", studentInfoModal.name);
            jsonObject.put("grade", studentInfoModal.grade);
            jsonObject.put("level", studentInfoModal.level);
            jsonObject.put("address", studentInfoModal.address);
            jsonObject.put("contact", studentInfoModal.contact);

            jArray.add(jsonObject);
            FileWriter fileWriter = new FileWriter(file);
            fileWriter.write(jArray.toJSONString());
            fileWriter.close();
        } catch (ParseException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```

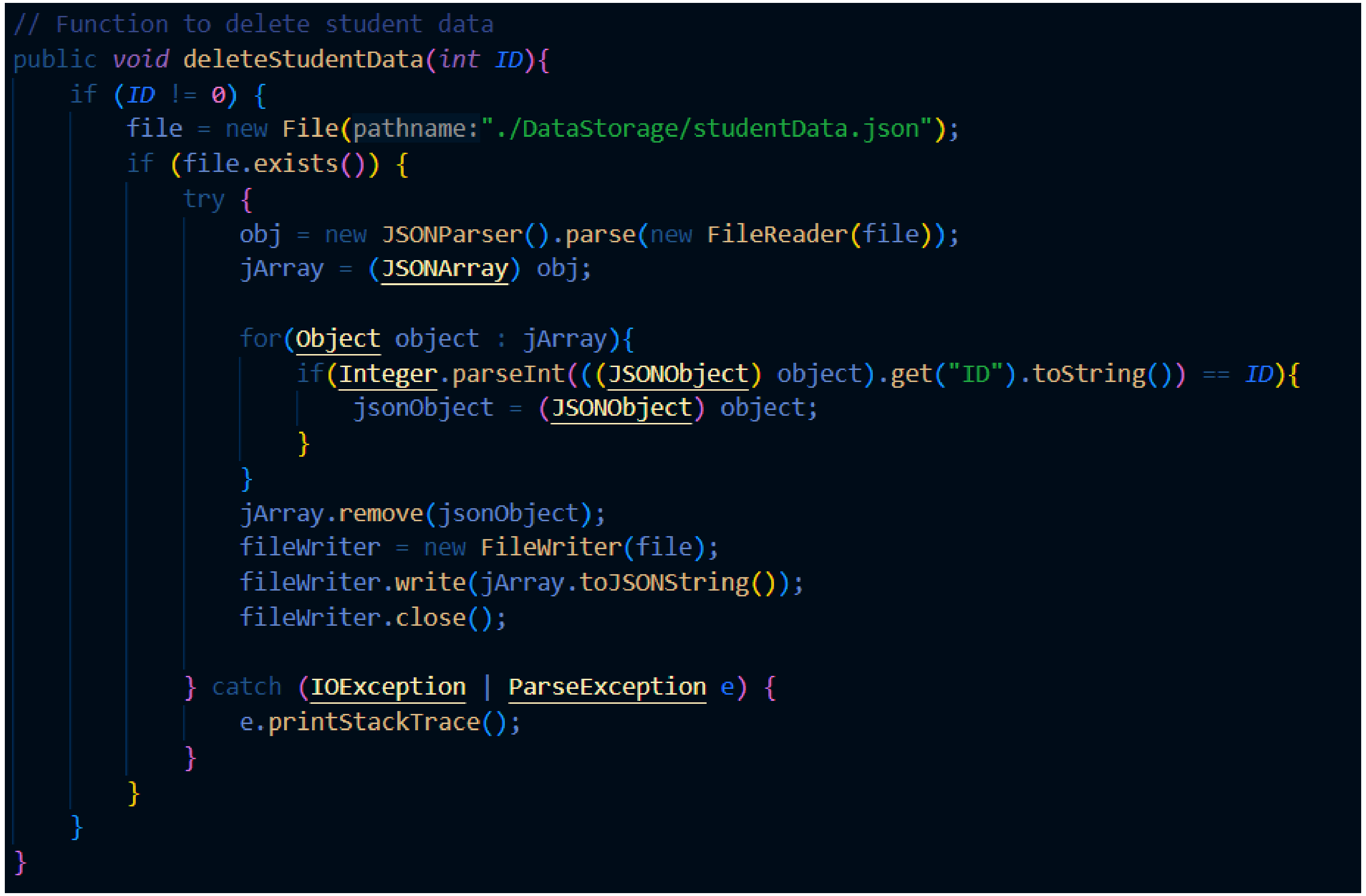
Update Operation



```
public void updateStudentData(StudentInfoModal newStudentData){
    if(newStudentData != null){
        file = new File(pathname:"./DataStorage/studentData.json");
        if (file.exists() && newStudentData.ID != 0) {
            try {
                obj = new JSONParser().parse(new FileReader(file));
                jArray = (JSONArray) obj;

                for(Object object : jArray){
                    if(Integer.parseInt((((JSONObject) object).get("ID")).toString()) == newStudentData.ID){
                        oldObject = (JSONObject) object;
                    }
                }

                jArray.remove(oldObject);

                newObject = new JSONObject();
                newObject.put("ID", newStudentData.ID);
                newObject.put("name", newStudentData.name);
                newObject.put("grade", newStudentData.grade);
                newObject.put("level", newStudentData.level);
                newObject.put("address", newStudentData.address);
                newObject.put("contact", newStudentData.contact);
```



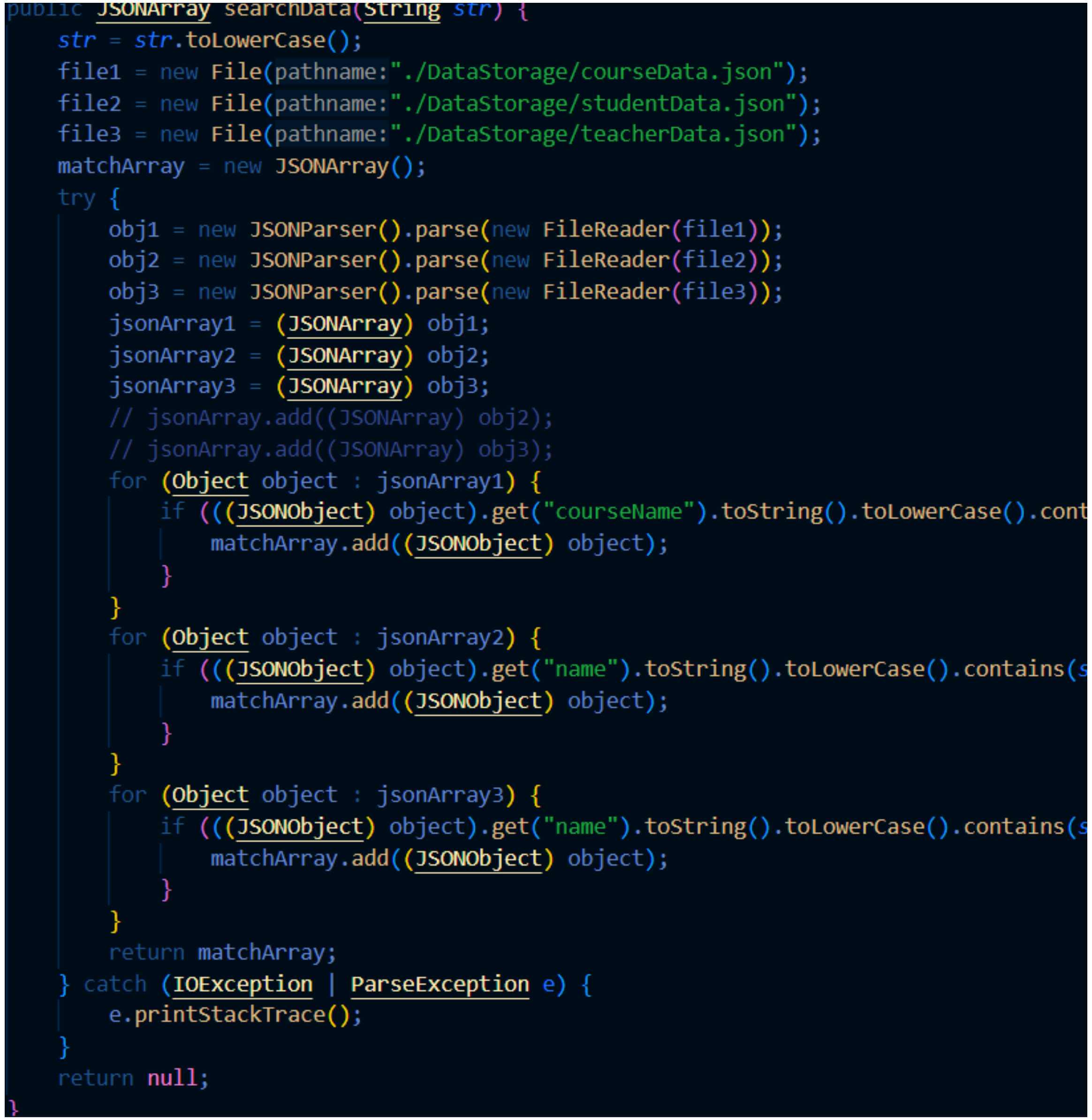
```
                jArray.add(newObject);
                fileWriter = new FileWriter(file);
                fileWriter.write(jArray.toJSONString());
                fileWriter.close();
            } catch (FileNotFoundException e) {
                e.printStackTrace();
            } catch (IOException e) {
                e.printStackTrace();
            } catch (ParseException e) {
                e.printStackTrace();
            }
        }
    }
}
```



```java
// Function to delete student data
public void deleteStudentData(int ID){
    if (ID != 0) {
        file = new File(pathname:"./DataStorage/studentData.json");
        if (file.exists()) {
            try {
                obj = new JSONParser().parse(new FileReader(file));
                jArray = (JSONArray) obj;

                for(Object object : jArray){
                    if(Integer.parseInt(((JSONObject) object).get("ID").toString()) == ID){
                        jsonObject = (JSONObject) object;
                    }
                }
                jArray.remove(jsonObject);
                fileWriter = new FileWriter(file);
                fileWriter.write(jArray.toJSONString());
                fileWriter.close();

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

Delete Operation

Search Data with Words



```
public JSONArray searchData(String str) {
    str = str.toLowerCase();
    file1 = new File(pathname:"./DataStorage/courseData.json");
    file2 = new File(pathname:"./DataStorage/studentData.json");
    file3 = new File(pathname:"./DataStorage/teacherData.json");
    matchArray = new JSONArray();
    try {
        obj1 = new JSONParser().parse(new FileReader(file1));
        obj2 = new JSONParser().parse(new FileReader(file2));
        obj3 = new JSONParser().parse(new FileReader(file3));
        jsonArray1 = (JSONArray) obj1;
        jsonArray2 = (JSONArray) obj2;
        jsonArray3 = (JSONArray) obj3;
        // jsonArray.add((JSONArray) obj2);
        // jsonArray.add((JSONArray) obj3);
        for (Object object : jsonArray1) {
            if (((JSONObject) object).get("courseName").toString().toLowerCase().cont
                matchArray.add((JSONObject) object);
            }
        }
        for (Object object : jsonArray2) {
            if (((JSONObject) object).get("name").toString().toLowerCase().contains(s
                matchArray.add((JSONObject) object);
            }
        }
        for (Object object : jsonArray3) {
            if (((JSONObject) object).get("name").toString().toLowerCase().contains(s
                matchArray.add((JSONObject) object);
            }
        }
        return matchArray;
    } catch (IOException | ParseException e) {
        e.printStackTrace();
    }
    return null;
}
```

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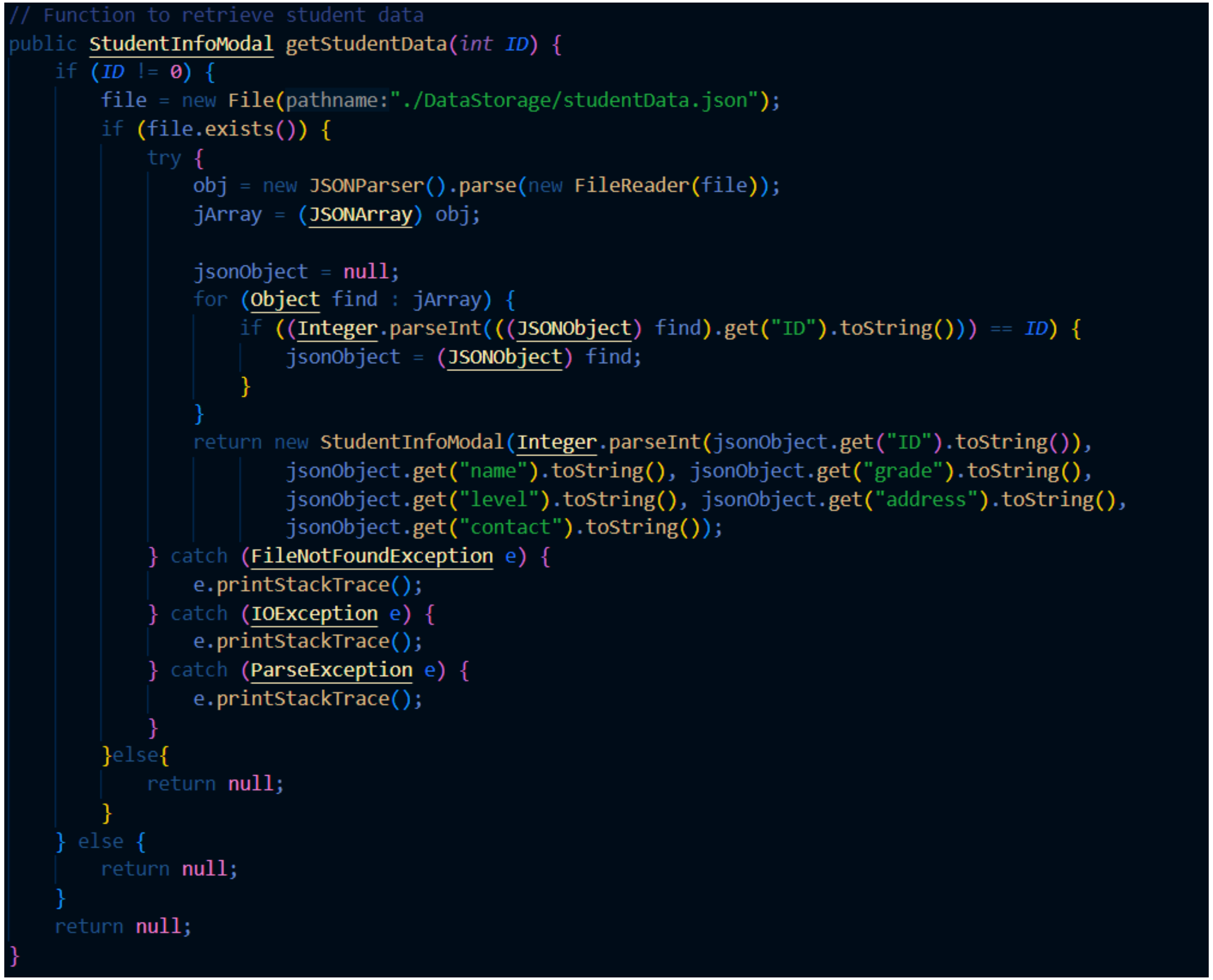
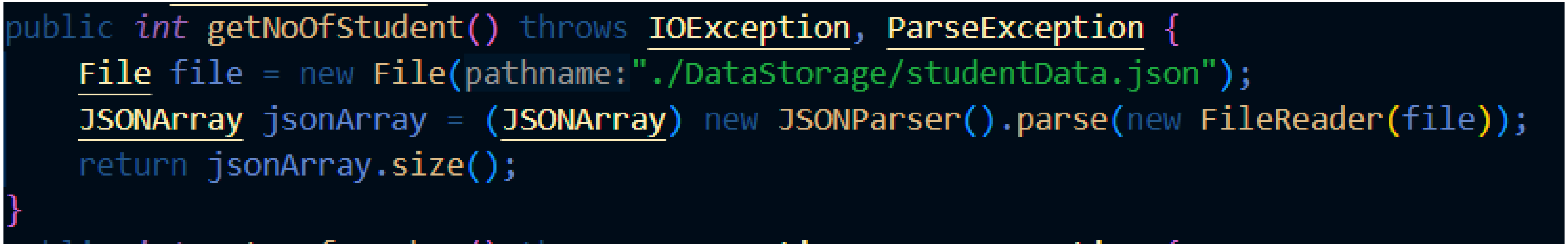


```java
// Function to retrieve student data
public StudentInfoModal getStudentData(int ID) {
    if (ID != 0) {
        file = new File(pathname:"./DataStorage/studentData.json");
        if (file.exists()) {
            try {
                obj = new JSONParser().parse(new FileReader(file));
                jArray = (JSONArray) obj;

                jsonObject = null;
                for (Object find : jArray) {
                    if ((Integer.parseInt(((JSONObject) find).get("ID").toString())) == ID) {
                        jsonObject = (JSONObject) find;
                    }
                }
                return new StudentInfoModal(Integer.parseInt(jsonObject.get("ID").toString()),
                        jsonObject.get("name").toString(), jsonObject.get("grade").toString(),
                        jsonObject.get("level").toString(), jsonObject.get("address").toString(),
                        jsonObject.get("contact").toString());
            } catch (FileNotFoundException e) {
                e.printStackTrace();
            } catch (IOException e) {
                e.printStackTrace();
            } catch (ParseException e) {
                e.printStackTrace();
            }
        }else{
            return null;
        }
    } else {
        return null;
    }
    return null;
}
```

Get data with an unique ID

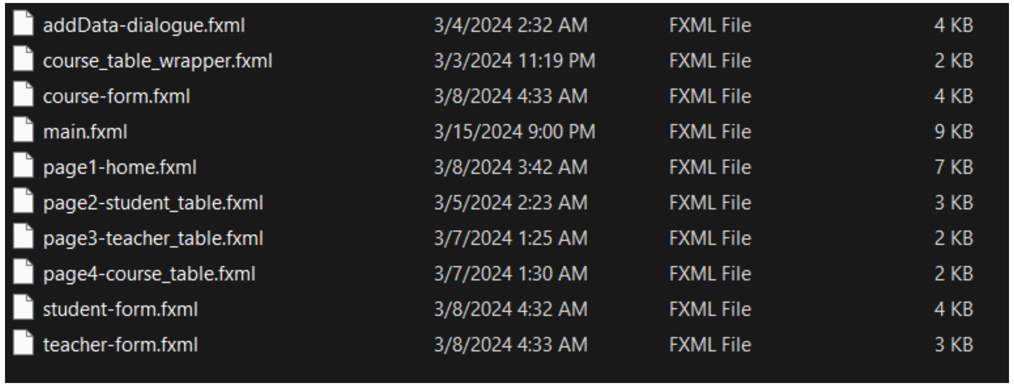
No of Data stored in a Table



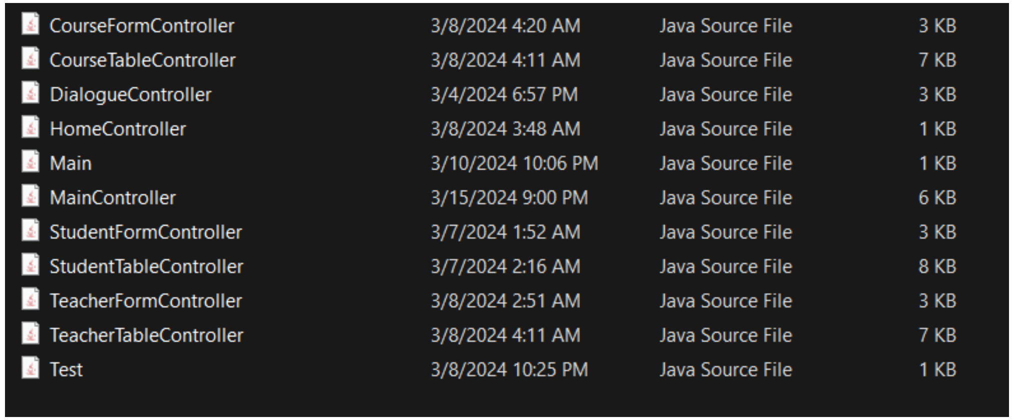
```
public int getNoOfStudent() throws IOException, ParseException {
    File file = new File(pathname:"./DataStorage/studentData.json");
    JSONArray jsonArray = (JSONArray) new JSONParser().parse(new FileReader(file));
    return jsonArray.size();
}
```

GUI and Controls

Many XML files are created to make GUI and controller classes are created to control GUI.

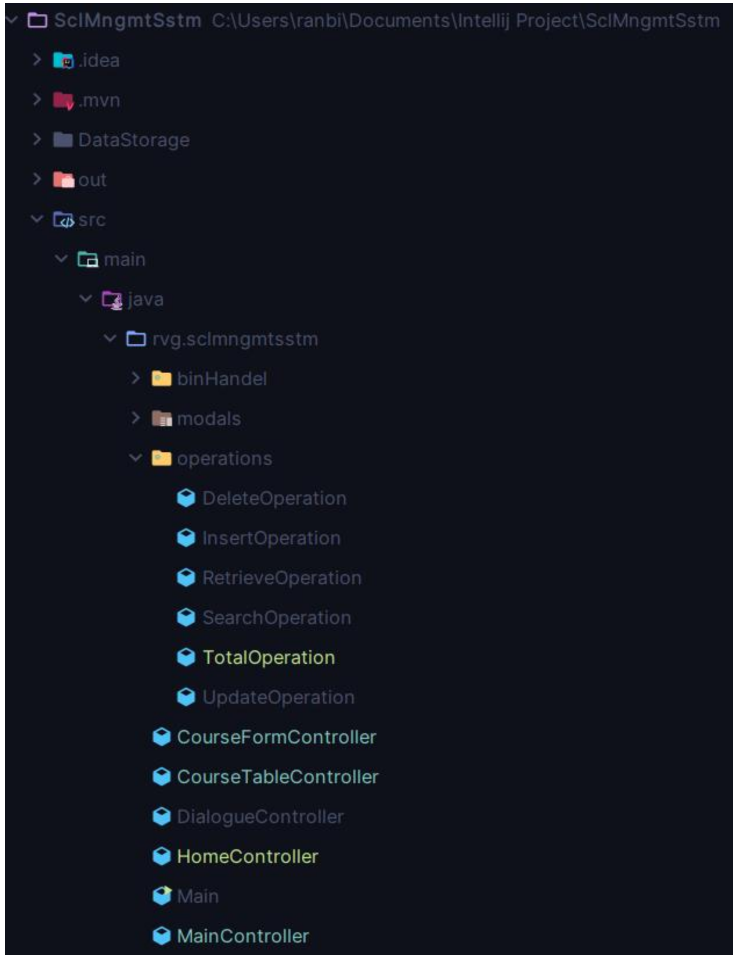


addData-dialogue.fxml	3/4/2024 2:32 AM	FXML File	4 KB
course_table_wrapper.fxml	3/3/2024 11:19 PM	FXML File	2 KB
course-form.fxml	3/8/2024 4:33 AM	FXML File	4 KB
main.fxml	3/15/2024 9:00 PM	FXML File	9 KB
page1-home.fxml	3/8/2024 3:42 AM	FXML File	7 KB
page2-student_table.fxml	3/5/2024 2:23 AM	FXML File	3 KB
page3-teacher_table.fxml	3/7/2024 1:25 AM	FXML File	2 KB
page4-course_table.fxml	3/7/2024 1:30 AM	FXML File	2 KB
student-form.fxml	3/8/2024 4:32 AM	FXML File	4 KB
teacher-form.fxml	3/8/2024 4:33 AM	FXML File	3 KB

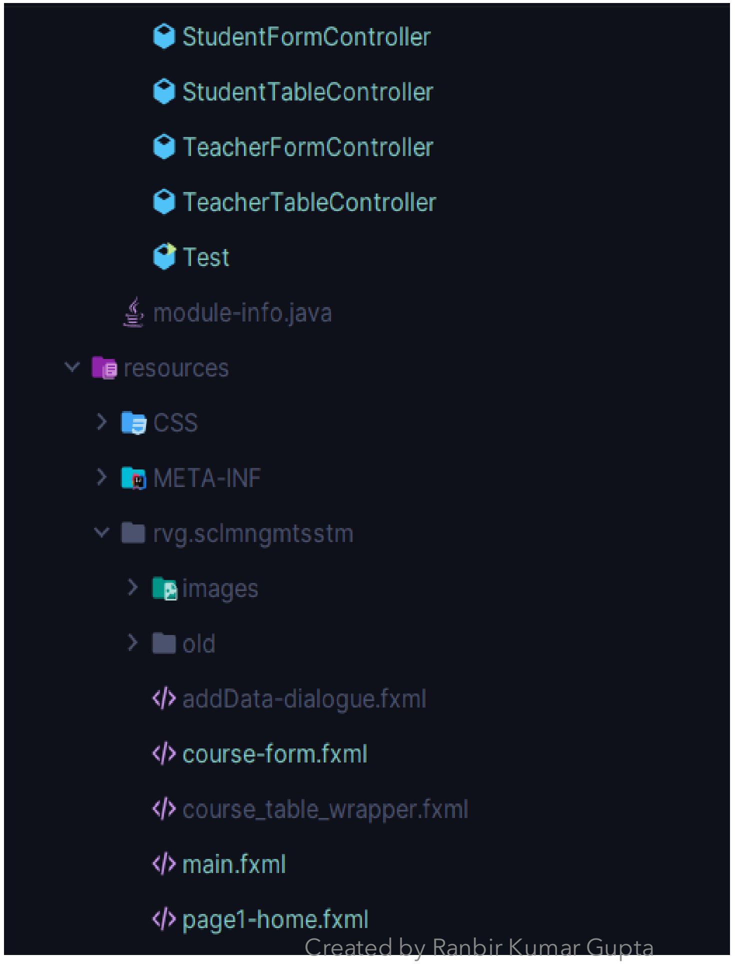


CourseFormController	3/8/2024 4:20 AM	Java Source File	3 KB
CourseTableController	3/8/2024 4:11 AM	Java Source File	7 KB
DialogueController	3/4/2024 6:57 PM	Java Source File	3 KB
HomeController	3/8/2024 3:48 AM	Java Source File	1 KB
Main	3/10/2024 10:06 PM	Java Source File	1 KB
MainController	3/15/2024 9:00 PM	Java Source File	6 KB
StudentFormController	3/7/2024 1:52 AM	Java Source File	3 KB
StudentTableController	3/7/2024 2:16 AM	Java Source File	8 KB
TeacherFormController	3/8/2024 2:51 AM	Java Source File	3 KB
TeacherTableController	3/8/2024 4:11 AM	Java Source File	7 KB
Test	3/8/2024 10:25 PM	Java Source File	1 KB

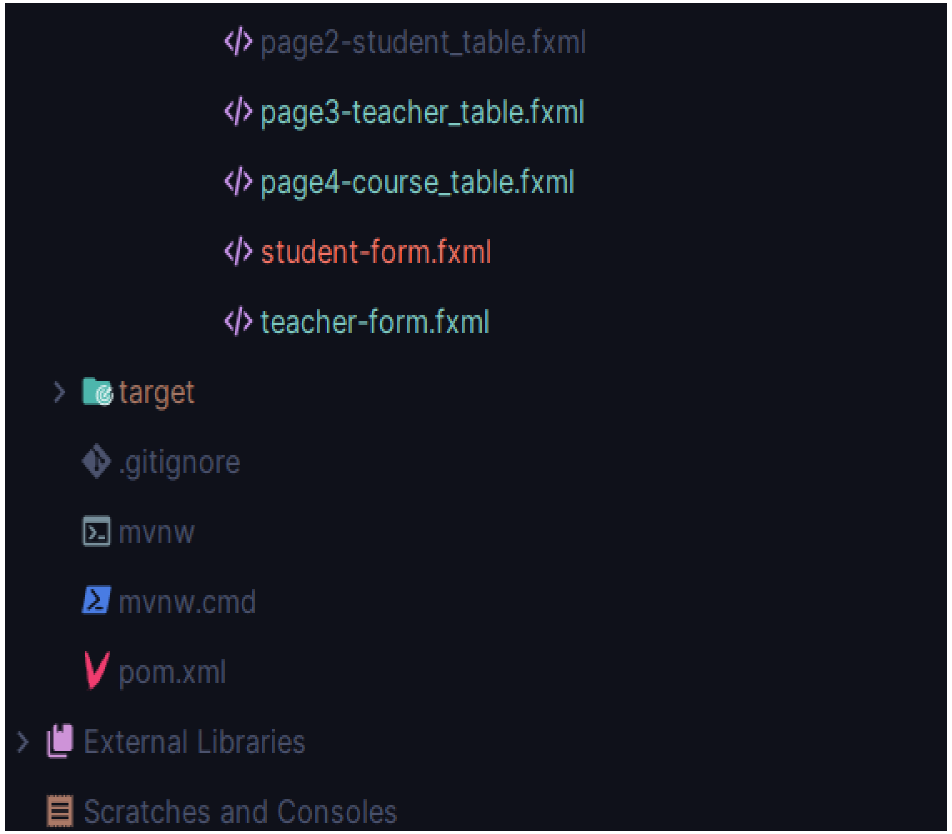
Final Project Hierarchy



```
ScIMngmtSstm  C:\Users\ranbi\Documents\Intellij Project\ScIMngmtSstm
  > .idea
  > .mvn
  > DataStorage
  > out
  v src
    v main
      v java
        v rvg.sclmngmtsstm
          > binHandel
          > modals
          v operations
              DeleteOperation
              InsertOperation
              RetrieveOperation
              SearchOperation
              TotalOperation
              UpdateOperation
            CourseFormController
            CourseTableController
            DialogueController
            HomeController
            Main
            MainController
```



```
            StudentFormController
            StudentTableController
            TeacherFormController
            TeacherTableController
            Test
          module-info.java
      v resources
        > CSS
        > META-INF
        v rvg.sclmngmtsstm
          > images
          > old
            addData-dialogue.fxml
            course-form.fxml
            course_table_wrapper.fxml
            main.fxml
            page1-home.fxml
```



```
            page2-student_table.fxml
            page3-teacher_table.fxml
            page4-course_table.fxml
            student-form.fxml
            teacher-form.fxml
  > target
    .gitignore
    mvnw
    mvnw.cmd
    pom.xml
> External Libraries
  Scratches and Consoles
```

Created by Ranbir Kumar Gupta

Hence, that was how the whole project is made. Please wait for a quick look of the Final Project.