Developing a Backend Admin for Learner's Academy

Developer: Kamar Zaghloul

1. Info

- FSD 2021 (Vodafone)
- **Developer**: Kamar Zaghloul
- **GitHub Repo**:

  https://github.com/kamarz01/Simplilearn_Phase2_Learners_Academy_Admin_Backend

2. Introduction

Project objective:

As a Full Stack Developer, design and develop a backend administrative portal for the Learner's Academy. Use the GitHub repository to manage the project artifacts.

Background of the problem statement:

Learner's Academy is a school that has an online management system. The system keeps track of its classes, subjects, students, and teachers. It has a back-office application with a single administrator login.

3. Project Planning

- The project is to be completed in two sprints.
- The resources available for this project is (2):
  1 Developer & 1 Tester.

Sprint (1) will include:

- Create application design.
- Create project skeleton.
- Setup project configurations.
- Create database schema.
- Design project UI screens.
- Implement Classes CRUD feature.
- Implement Subjects CRUD feature.

- Implement Teachers CRUD feature.
- Implement Student CRUD feature.

Sprint (2) will include:

- Implement Assign subject to class feature.
- Implement Assign student to class feature.
- Implement Assign teacher to class feature.
- Implement Assign teacher to subjects feature.
- Create class report design.
- Implement Class Report feature.
- Creating documentations.
- Pushing project to GitHub.

4. Technologies & Concepts used in Project

- Java EE
- Servlets
- JSP
- Hibernate
- MySql
- HTML5
- CSS3
- JSTL
- JSP EL
- Listeners
- Exception Handling
- OOP
- Collections
- Streams
- Data Structures

and more...

5. Application Entities

Admin.java

```java
package com.kamar.learnersacademybackend.entity;

import javax.persistence.*;

@Entity
@Table(name = "admins")
public class Admin {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "adminId")
    @OrderColumn
    private int adminId;

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

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

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

    public Admin() {
    }

    public Admin(String adminName, String adminUserName, String adminPassword) {
        this.adminName = adminName;
        this.adminUserName = adminUserName;
        this.adminPassword = adminPassword;
    }

    public String getAdminName() { return adminName; }

    public void setAdminName(String adminName) { this.adminName = adminName; }
```

Class.java

```java
@Entity
@Table(name = "classes")
public class Class {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "classId")
    @OrderColumn
    private int classId;

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

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

    @OneToMany(cascade = CascadeType.ALL)
    @JoinTable(name = "student_classes",
            joinColumns = {@JoinColumn(name = "classId")},
            inverseJoinColumns = {@JoinColumn(name = "studentId")})
    private List<Student> students = new ArrayList<>();

    @ManyToMany(cascade = CascadeType.ALL)
    @JoinTable(name = "subject_classes",
            joinColumns = {@JoinColumn(name = "classId")},
            inverseJoinColumns = {@JoinColumn(name = "subjectId")})
    private List<Subject> subjects = new ArrayList<>();

    @OneToMany(cascade = CascadeType.ALL)
    @JoinTable(name = "teacher_classes",
            joinColumns = {@JoinColumn(name = "classId")},
            inverseJoinColumns = {@JoinColumn(name = "teacherId")})
    private List<Teacher> teachers = new ArrayList<>();
```

Student.java

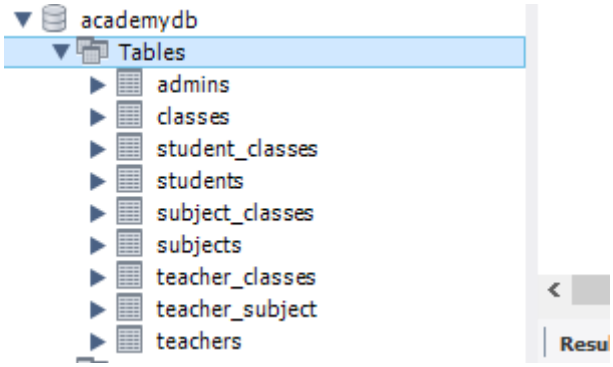
```java
import javax.persistence.*;
import java.util.ArrayList;
import java.util.List;

@Entity
@Table(name = "students")
public class Student {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "studentId")
    @OrderColumn
    private int studentId;

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

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

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

    @ManyToOne
    @JoinTable(name = "student_classes",
            joinColumns = {@JoinColumn(name = "studentId")},
            inverseJoinColumns = {@JoinColumn(name = "classId")})
    private Class classes ;

    public Student() {
    }

    public Student(String studentName, String studentPhone, String studentAddress) {
        this.studentName = studentName;
        this.studentPhone = studentPhone;
```

Subject.java

```java
import java.util.ArrayList;
import java.util.List;
import java.util.Set;

@Entity
@Table(name = "subjects")
public class Subject {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "subjectId")
    @OrderColumn
    private int subjectId;

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

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

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

    @ManyToMany(mappedBy = "subjects")
    private List<Class> classes = new ArrayList<>();

    @ManyToMany
    @JoinTable(name = "teacher_subject",
            joinColumns = {@JoinColumn(name = "subjectId")},
            inverseJoinColumns = {@JoinColumn(name = "teacherId")})
    private List<Teacher> teachers = new ArrayList<>();

    public Subject() {
    }
```

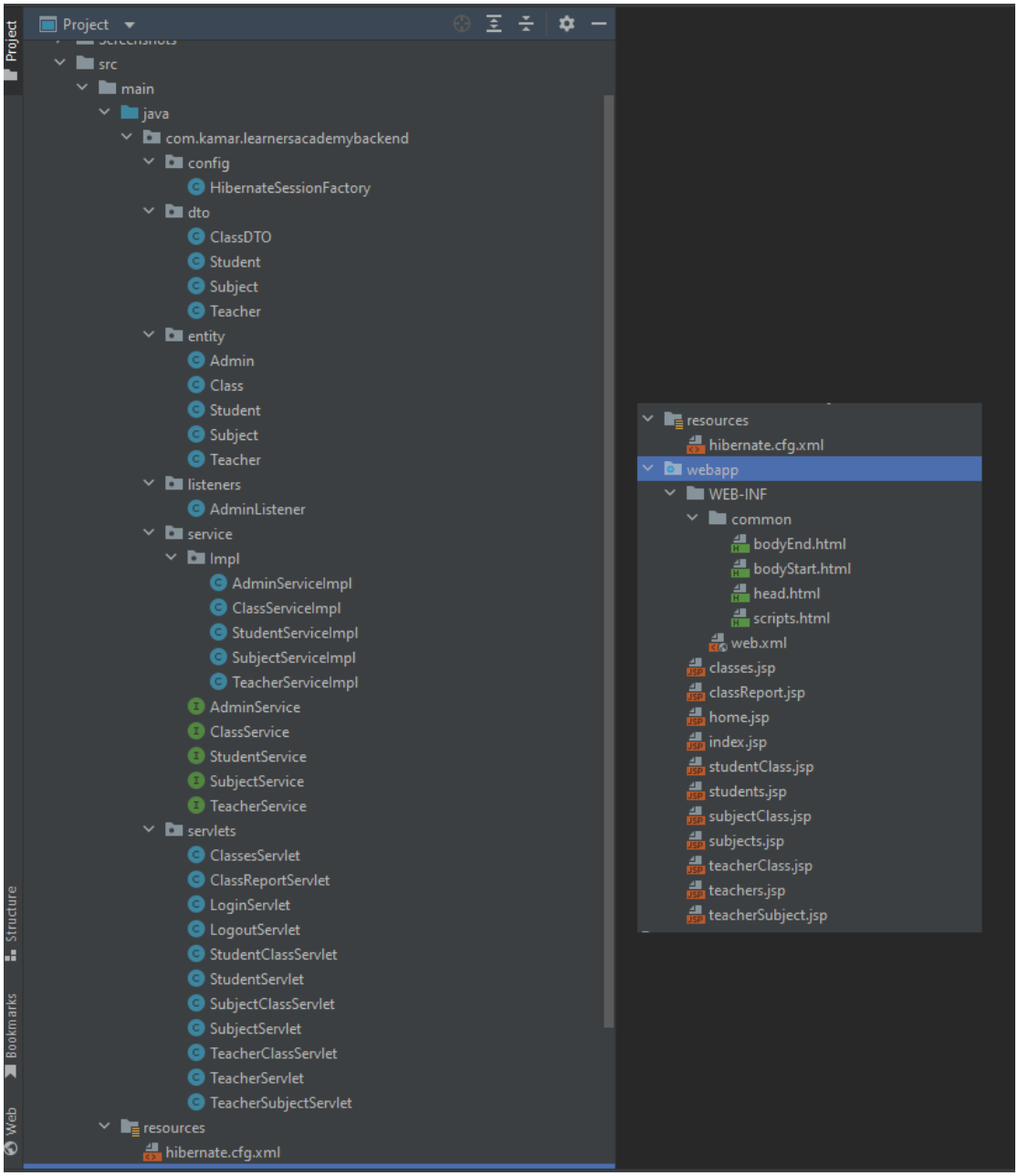
Teacher.java

```java
package com.kamar.learnersacademybackend.entity;

import javax.persistence.*;
import java.util.ArrayList;
import java.util.List;

@Entity
@Table(name = "teachers")
public class Teacher {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "teacherId")
    @OrderColumn
    private int teacherId;

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

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

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

    @ManyToMany
    @JoinTable(name = "teacher_subject",
            joinColumns = {@JoinColumn(name = "teacherId")},
            inverseJoinColumns = {@JoinColumn(name = "subjectId")})
    private List<Subject> subjects = new ArrayList<>();

    @ManyToOne
    @JoinTable(name = "teacher_classes",
            joinColumns = {@JoinColumn(name = "teacherId")},
            inverseJoinColumns = {@JoinColumn(name = "classId")})
    private Class classes;

    public Teacher() {
    }
```

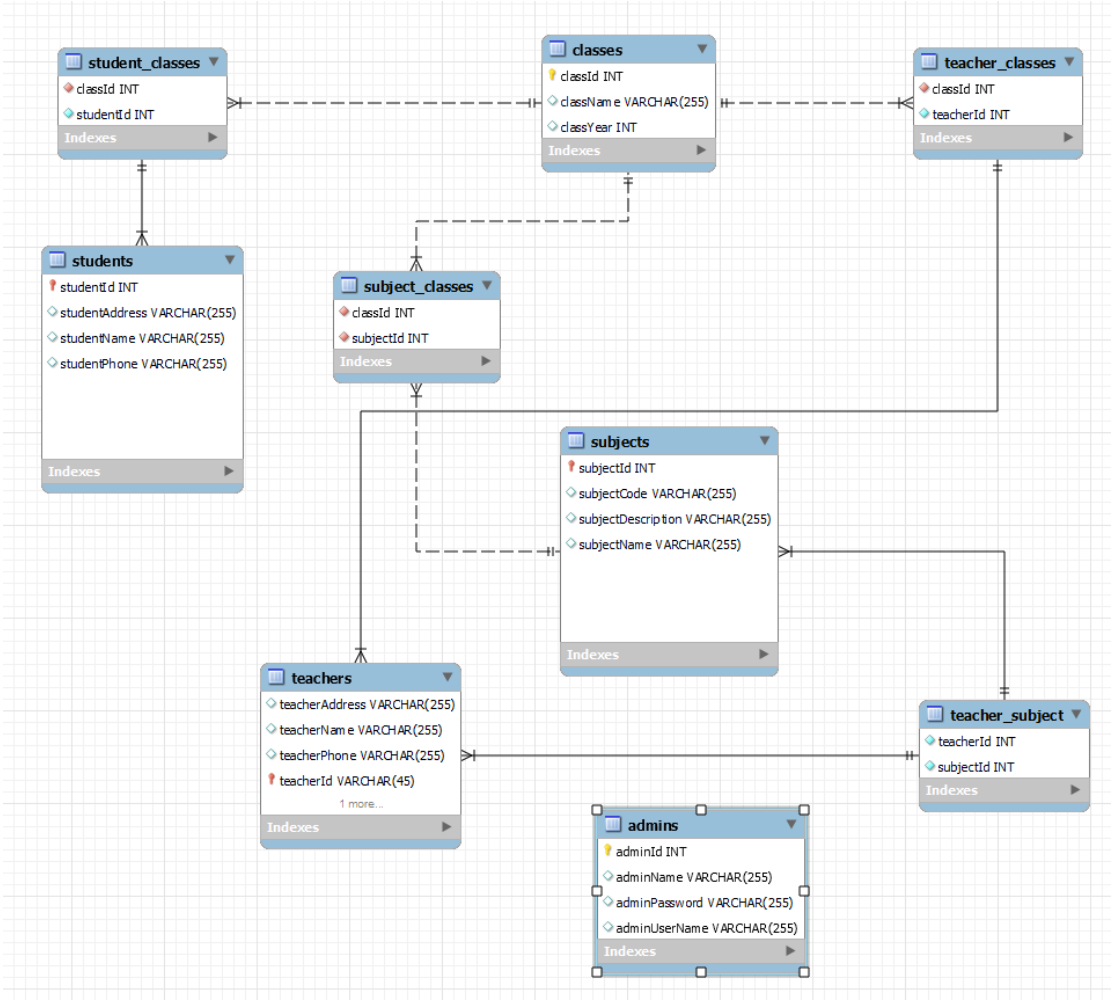


6. Project Structure

The project was been created following a good design structure to separate the logic from the user interface.



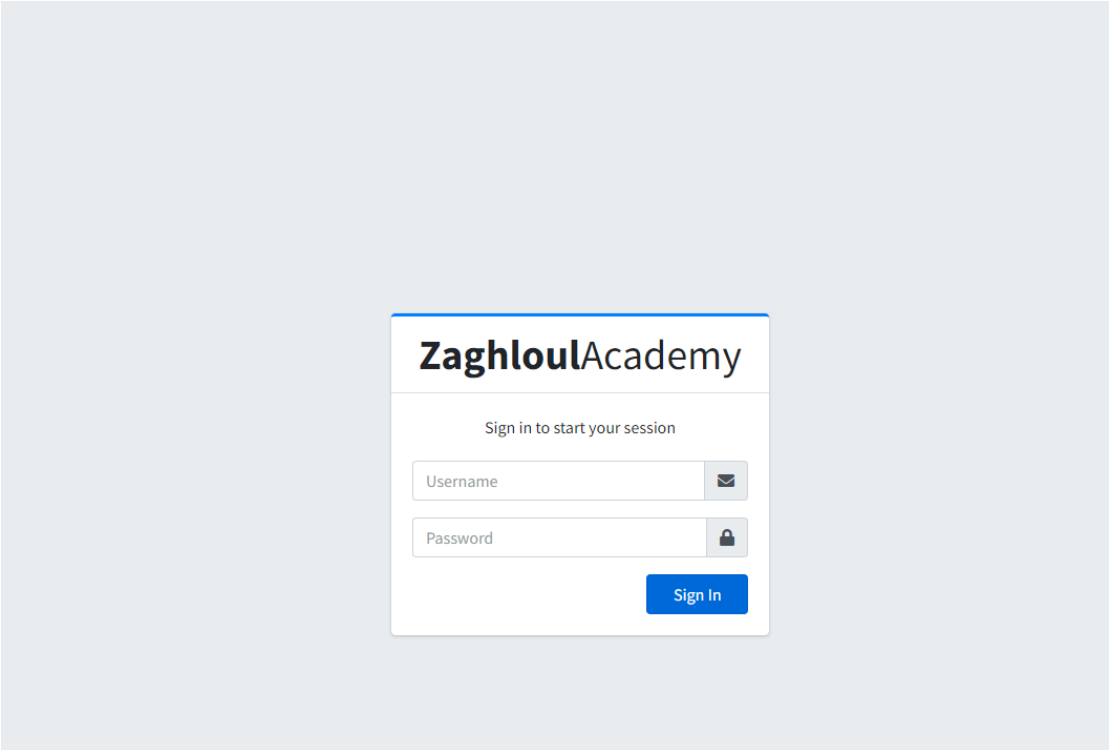
7. ERD

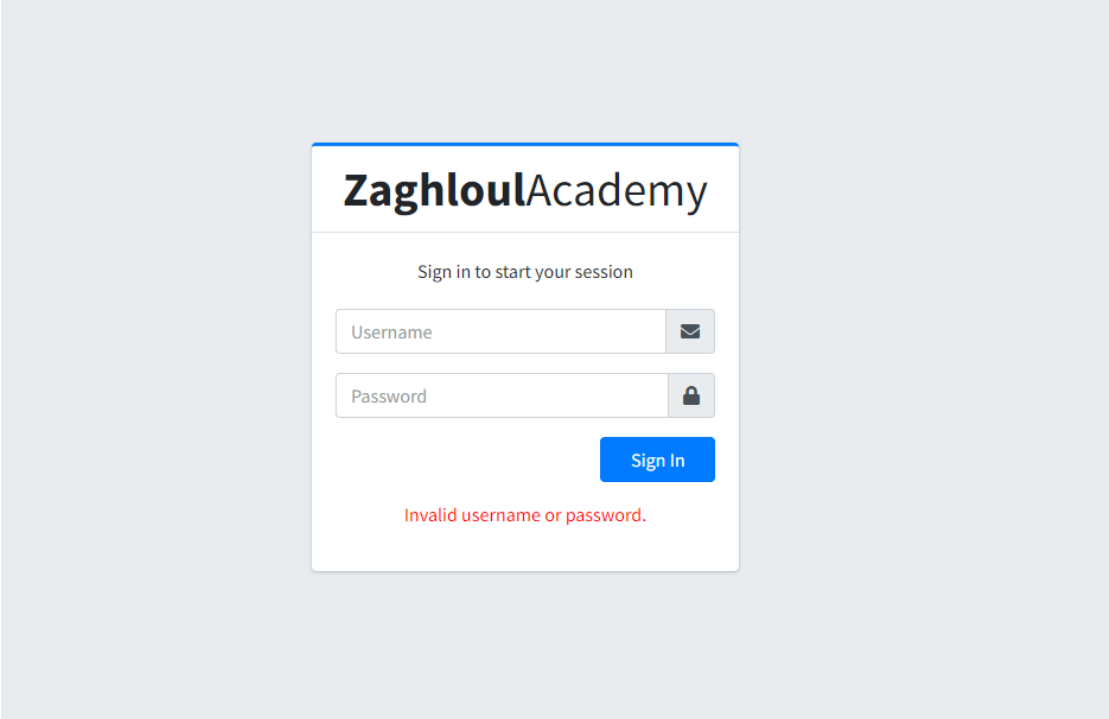


8. Create Admin user If does not exist

```java
@WebListener
public class AdminListener implements ServletContextListener{

    public AdminListener() {
    }

    @Override
    public void contextInitialized(ServletContextEvent sce) {
        System.out.println("App Started...");
        AdminServiceImpl service = new AdminServiceImpl();
        Admin checkAdmin  = service.getAdmin( username: "admin", password: "admin");
        if (Objects.isNull(checkAdmin)){
            service.createAdmin(new Admin( adminName: "Kamar Zaghloul", adminUserName: "admin", adminPassword: "admin"));
        }
    }
}
```

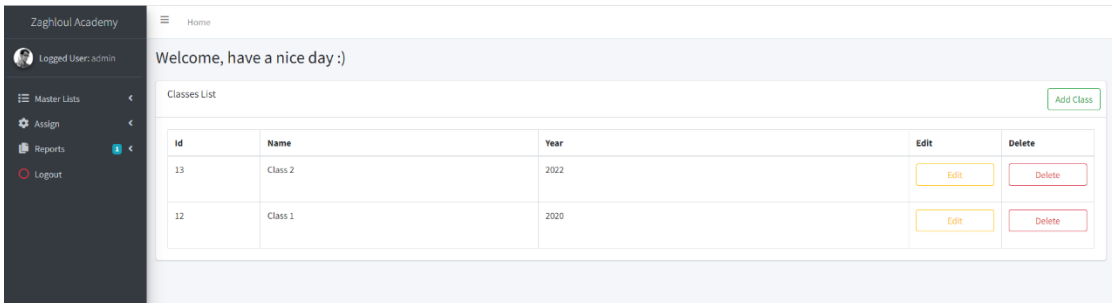
9. Application Demo

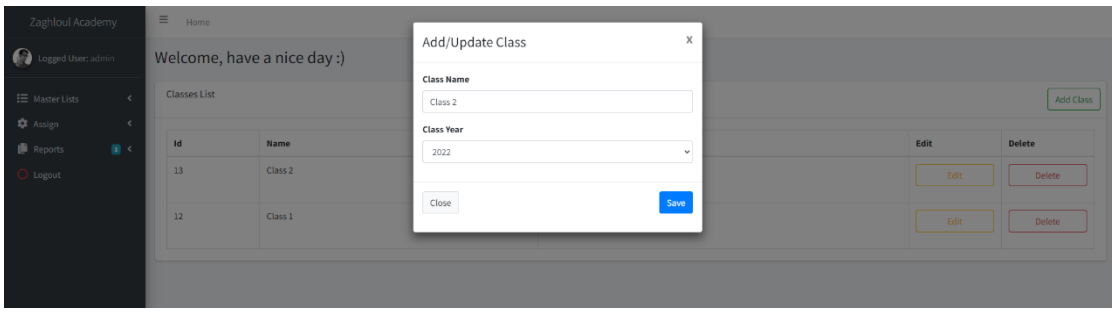


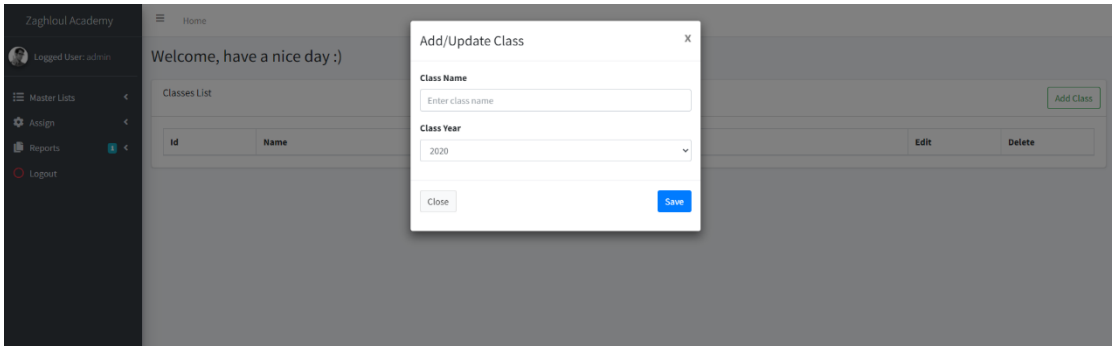


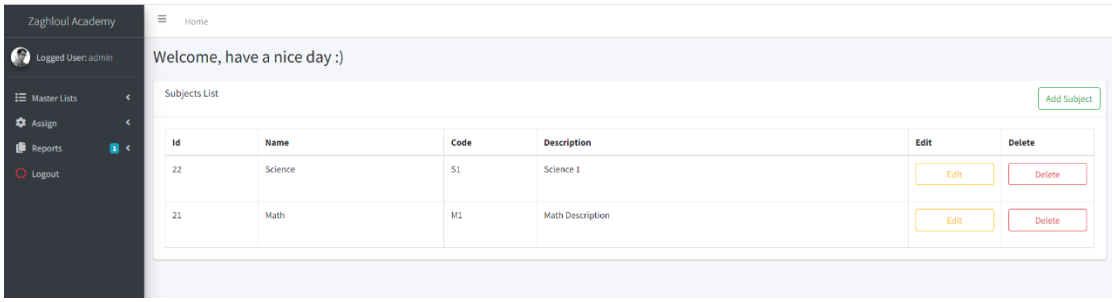
subjectClass.jsp

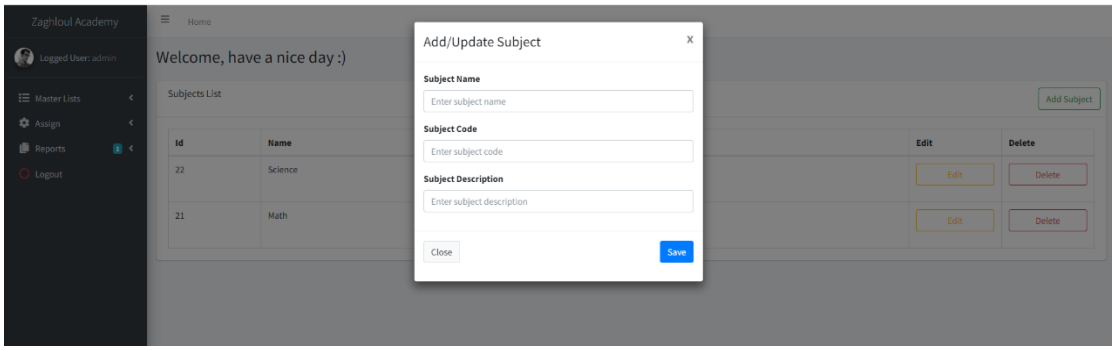
```
<tr>
    <td>${_class.classId}</td>
    <td>${_class.className}</td>
    <td>
        <c:choose>
            <c:when test="${_class.subjects.size() > 0}">
                <table>
                    <thead>
                    <tr>
                        <th>Name</th>
                        <th>Code</th>
                    </tr>
                    <c:forEach items="${_class.subjects}" var="subject">
                    <tr>
                        <span style="..." class="subjectId_${_class.classId}">${subject.subjectId}</span>
                        <td>${subject.subjectName}</td>
                        <td>${subject.subjectCode}</td>
                    </tr>
                    </c:forEach>
                </table>
            </c:when>
            <c:otherwise>
                None
            </c:otherwise>
        </c:choose>
    </td>
    <td>
        <c:choose>
            <c:when test="${requestScope.subjectList.size() == 0}">
                <button type="submit" class="btn btn-block btn-outline-warning" disabled
                        onclick="editAssign('${_class.classId}')">Edit
                </button>
                <span>Add Subjects First</span>
            </c:when>
            <c:otherwise>
                <button type="submit" class="btn btn-block btn-outline-warning"
                        onclick="editAssign('${_class.classId}')">Edit
                </button>
```

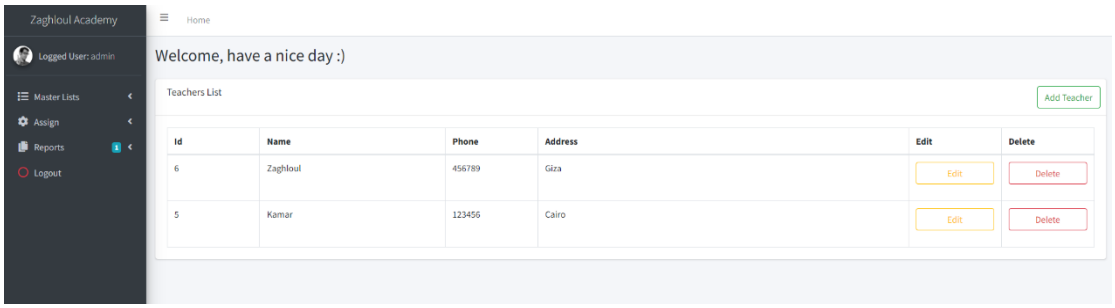


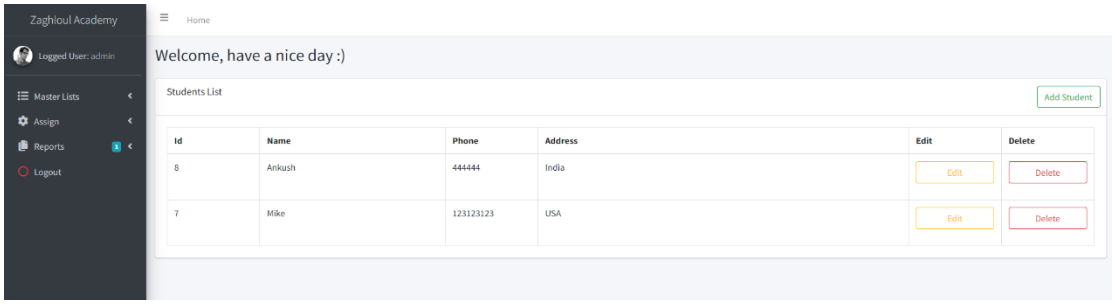


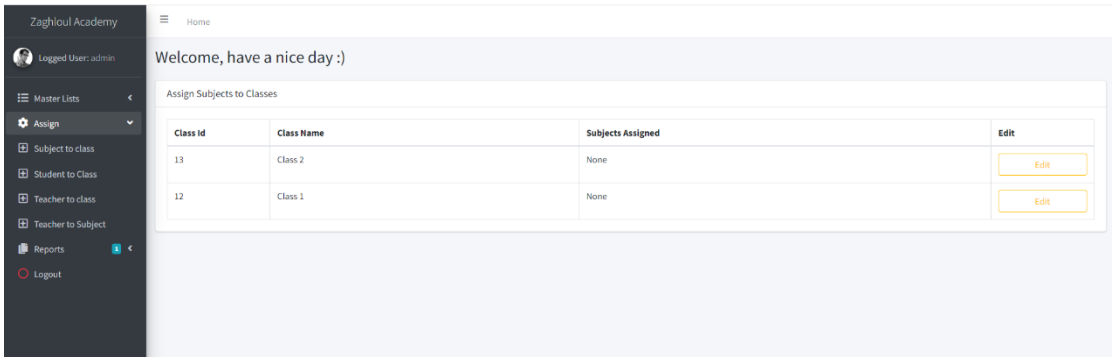

Zaghloul Academy
Logged User: admin
Master Lists
Assign
Reports
Logout
Home
Welcome, have a nice day :)
Classes List
Add Class
Id
Name
Edit
Delete
Add/Update Class
Class Name
Enter class name
Class Year
2020
Close
Save

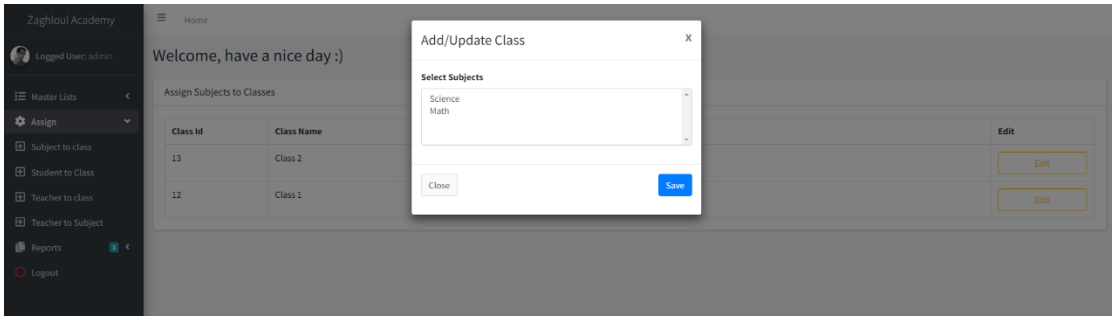

Zaghloul Academy
Logged User: admin
Master Lists
Assign
Reports
Logout
Home
Welcome, have a nice day :)
Subjects List
Add Subject
Id
Name
Code
Description
Edit
Delete
22
Science
S1
Science 1
21
Math
M1
Math Description

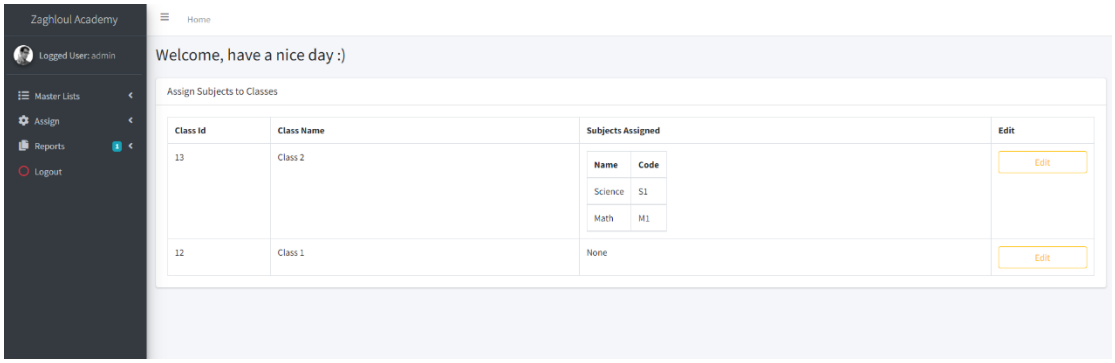

Zaghloul Academy
Logged User: admin
Master Lists
Assign
Reports
Logout
Home
Welcome, have a nice day :)
Subjects List
Add Subject
Id
Name
Edit
Delete
22
Science
21
Math
Add/Update Subject
Subject Name
Enter subject name
Subject Code
Enter subject code
Subject Description
Enter subject description
Close
Save

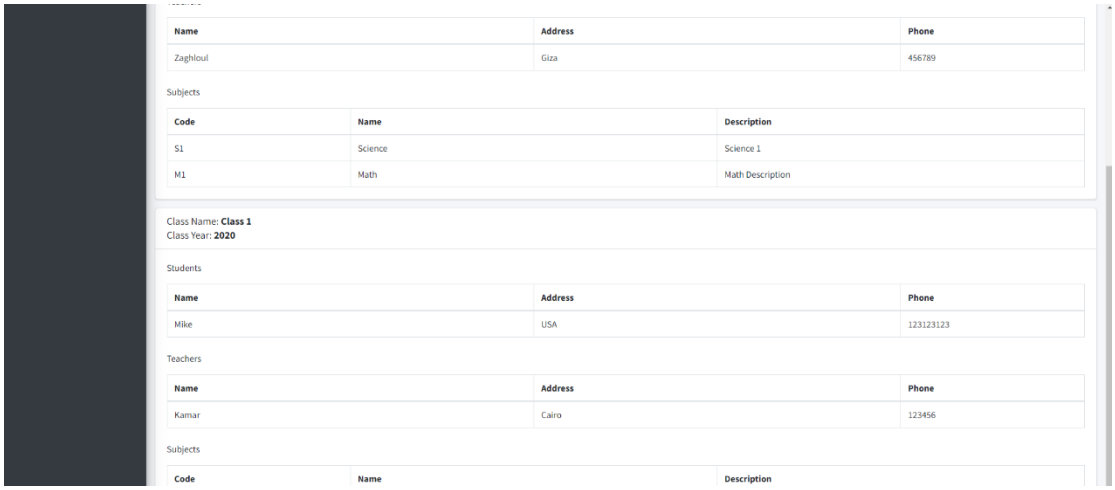

Zaghloul Academy
Logged User: admin
Master Lists
Assign
Reports
Logout
Home
Welcome, have a nice day :)
Teachers List
Add Teacher
Id
Name
Phone
Address
Edit
Delete
6
Zaghloul
456789
Giza
5
Kamar
123456
Cairo


Zaghloul Academy
Logged User: admin
Master Lists
Assign
Reports
Logout
Home
Welcome, have a nice day :)
Students List
Add Student
Id
Name
Phone
Address
Edit
Delete
8
Ankush
444444
India
Edit
Delete
7
Mike
123123123
USA
Edit
Delete


Zaghloul Academy
Logged User: admin
Master Lists
Assign
Subject to class
Student to Class
Teacher to class
Teacher to Subject
Reports
Logout
Home
Welcome, have a nice day :)
Assign Subjects to Classes
Class Id
Class Name
Subjects Assigned
Edit
13
Class 2
None
Edit
12
Class 1
None
Edit


Zaghloul Academy
Logged User: admin
Master Lists
Assign
Subject to class
Student to Class
Teacher to class
Teacher to Subject
Reports
Logout
Home
Welcome, have a nice day :)
Assign Subjects to Classes
Class Id
Class Name
Edit
13
Class 2
Edit
12
Class 1
Edit
Add/Update Class
Select Subjects
Science
Math
Close
Save


Zaghloul Academy
Logged User: admin
Master Lists
Assign
Reports
Logout
Home
Welcome, have a nice day :)
Assign Subjects to Classes
Class Id
Class Name
Subjects Assigned
Edit
13
Class 2
Name
Code
Science
S1
Math
M1
Edit
12
Class 1
None
Edit



Name	Address	Phone
Zaghloul	Giza	456789

Subjects

Code	Name	Description
S1	Science	Science 1
M1	Math	Math Description

Class Name: **Class 1**
Class Year: **2020**

Students

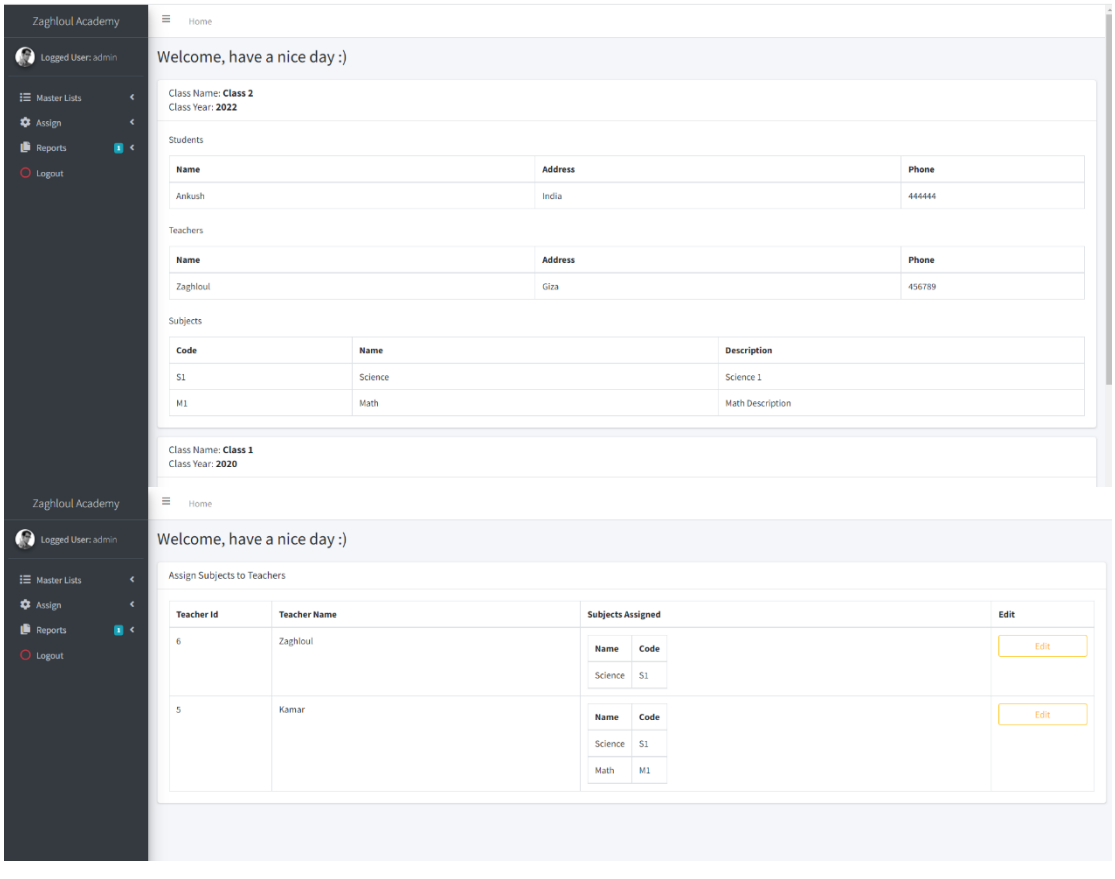
Name	Address	Phone
Mike	USA	123123123

Teachers

Name	Address	Phone
Kamar	Cairo	123456

Subjects

Code	Name	Description



Class Name: **Class 2**
Class Year: **2022**

Students

Name	Address	Phone
Ankush	India	444444

Teachers

Name	Address	Phone
Zaghloul	Giza	456789

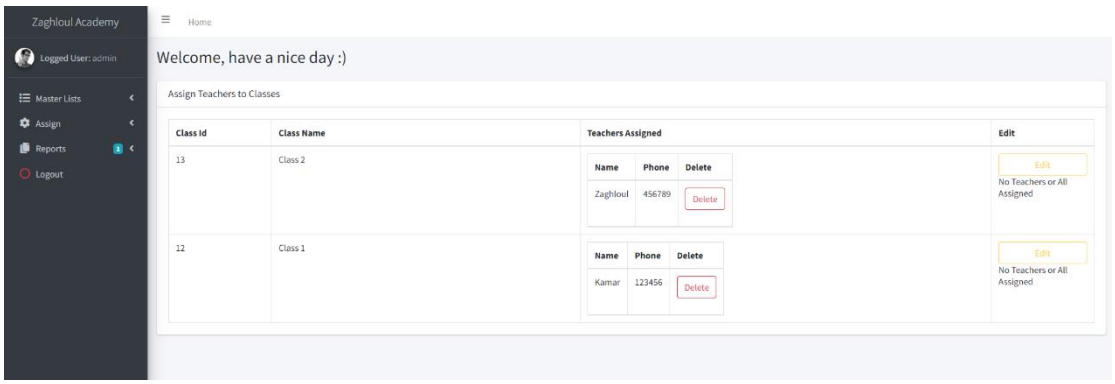
Subjects

Code	Name	Description
S1	Science	Science 1
M1	Math	Math Description

Class Name: **Class 1**
Class Year: **2020**

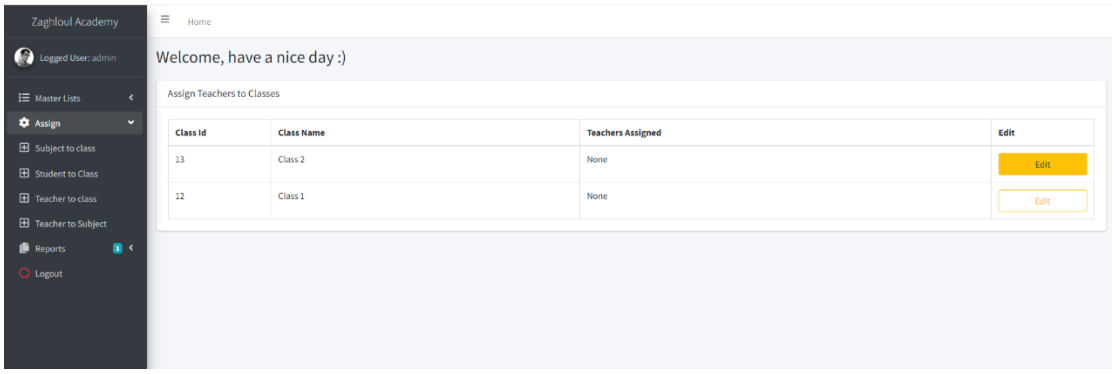
Assign Subjects to Teachers

Teacher Id	Teacher Name	Subjects Assigned	Edit
6	Zaghloul	Name: Science, Code: S1	Edit
5	Kamar	Name: Science, Code: S1; Name: Math, Code: M1	Edit



Assign Teachers to Classes

Class Id	Class Name	Teachers Assigned	Edit
13	Class 2	Name: Zaghloul, Phone: 456789, Delete	Edit — No Teachers or All Assigned
12	Class 1	Name: Kamar, Phone: 123456, Delete	Edit — No Teachers or All Assigned



Rest of screenshots can be found here:

https://github.com/kamarz01/Simplilearn_Phase2_Learners_Acadmy_Admin_Backend/tree/main/Screenshots

10.Github Repo

https://github.com/kamarz01/Simplilearn_Phase2_Learners_Academy_Admin_Backend