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Module Code: **CNET343SL**	Module Name: **Distributed Systems**
Coursework Title: **A Resource Allocation System for Government Schools**	
Deadline Date: **4th May 2022**	Member of staff responsible for coursework: **Mr. Pramudya Thilakaratne**
Programme: **BSc (Hons) Software Engineering**	

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Group work: please list all names of all participants formally associated with this work and state whether the work was undertaken alone or as part of a team. Please note you may be required to identify individual responsibility for component parts.

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Signed on behalf of the group:

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A RESOURCE ALLOCATION SYSTEM FOR GOVERNMENT SCHOOLS

Distributed System

Group 77

Batch 8 (2022)

Submitted to: - Mr.Pramudya Thilakaratne
Submission Date: - 4th May 2022

Group: Team 77

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Contribution of the Team

Individual Contribution	10601894 (B.M.P.D. Bandara)	10707156 (Karunarathna Dahanayake)	10707228 (B.L.D. Jayasiri)	10707231 (Lakvidu)	10707244 (Chamathka Nirmana)
Proposal and Report writing	✓	✓	✓	✓	✓
UI/UX Design	✓		✓	✓	✓
Web application development	✓	✓	✓	✓	✓
Desktop application development	✓	✓	✓		
Web services	✓	✓		✓	✓

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1. Introduction

The distributed system that has been introduced is a Resource Allocation System for Government Schools. The Resource Allocation System is accessible as a desktop program as well as a web-based application. The Web Communication Foundation (WCF) was utilized in the implementation to offer web service between the desktop application and the web application. The WCF framework is used to develop apps that perform a specified function. WCF allows you to send asynchronous messages from one service endpoint to another. A service endpoint might be a service that is embedded in an application, or a continuous service hosted by IIS. An endpoint is a client that is utilizing a certain service and is seeking or has requested data from a service endpoint.

The created system may be managed by a system administrator using the desktop program. Furthermore, the administrator has the power to make modifications such as adding, removing, changing, and making other changes. The web application is necessary for framework users.

Users are divided into two groups. They are, indeed,

I. Members of the non-academic staff and teachers
II. Students

Non-academic employees and instructors have access to all of the school's timetables; however, students can only see the timetable for their own grade. The Smart Resource Allocation system that has been developed is expected to be more efficient and competitive than the present approach. It is also envisaged that the system would make the duties of instructors and students easier, and that they will be able to save time by using the existing system.

2. Description of the System

2.1. Problems of the Existing System

The school's complete resource allocation is currently done manually. This method is both inefficient and time-consuming. Furthermore, it was discovered that this method frequently makes errors.

Here are a few examples of such blunders,

- There were times when two teachers were assigned to the same class at the same time.
- Teachers for the same grade are overlapping because there are no accurate records of teacher allocation.
- Staff members do not have records of the activities that other staff members have performed.
- It is impossible to tell which classes are reserved and which are open for usage.

Because of these errors, both teachers and students waste time. Furthermore, such mistakes cause pupils and parents to lose trust in the school. Furthermore, frequent blunders will increase the effort workload of the employees. This allows you to devote your attention to more important tasks.

2.2. Proposed System

After examining all the issues encountered by staff and students, it was decided to automate the job of resource distribution inside the school. The suggested system includes both a web application and a desktop application. The web application allows users to access the system through a web browser, whereas the desktop application lets users to access the system through the Windows stage. Furthermore, the information given by the online and desktop apps is maintained in a single database.

2.3. Functionality Of the Proposed System

There are two distinct implementations in the suggested technique.

1. desktop application
2. web application

Using the Desktop Application, new clients and timetables may be added to the system. It may also use the WCF web administration to send data to the database. The database's details would be shown through the Web Application. There are distinct login interfaces for students and teachers. To access the framework, they will utilize the web application. Staff, instructors, and students have uninterrupted access to their schedules. This framework's middleware, WCF web administration, links all desktop and online applications to a single database.

3. Scope of the System

This is a distributed architecture with client and server components. The server side includes WCF web management for the network of desktop and web apps, as well as the interface between the desktop, web, and database. Data in the desktop program may be accessed, added, edited, and uninstalled by the administrator. The online application will help and benefit students, instructors, and staff members. They would be able to view the school's schedules. Students will only be allowed to utilize schedules for their specific classes, while professors and staff will have access to all timetables on campus.

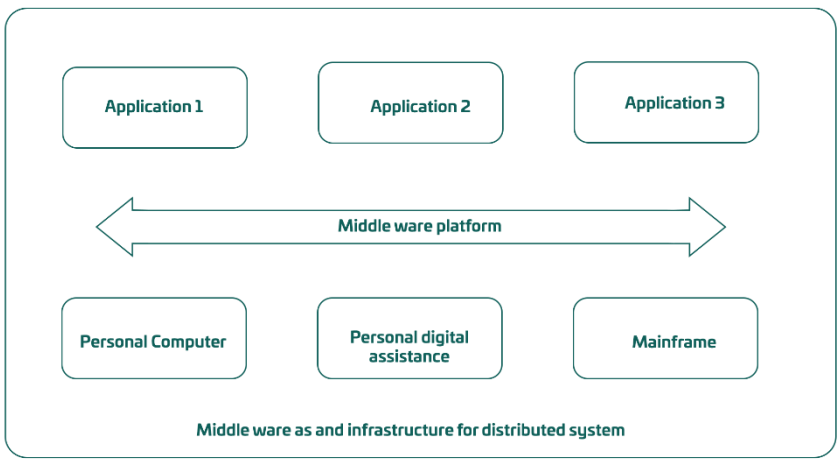
4. Background Research

A user usually expects an app to satisfy specific criteria, such as clarity, receptivity, unshakable consistency, execution, and usability. Straightforwardness in this context refers to a single system picture that is free of the framework's actualities, such as area, discontent, and movement.

The level of reliability with respect to a particular system should be extremely high. The term "execution" suggests that, independent of other models, the dispersed system is intended to be fast. Transparency facilitates the planning and adaptation of the device, which aids the distributed application.

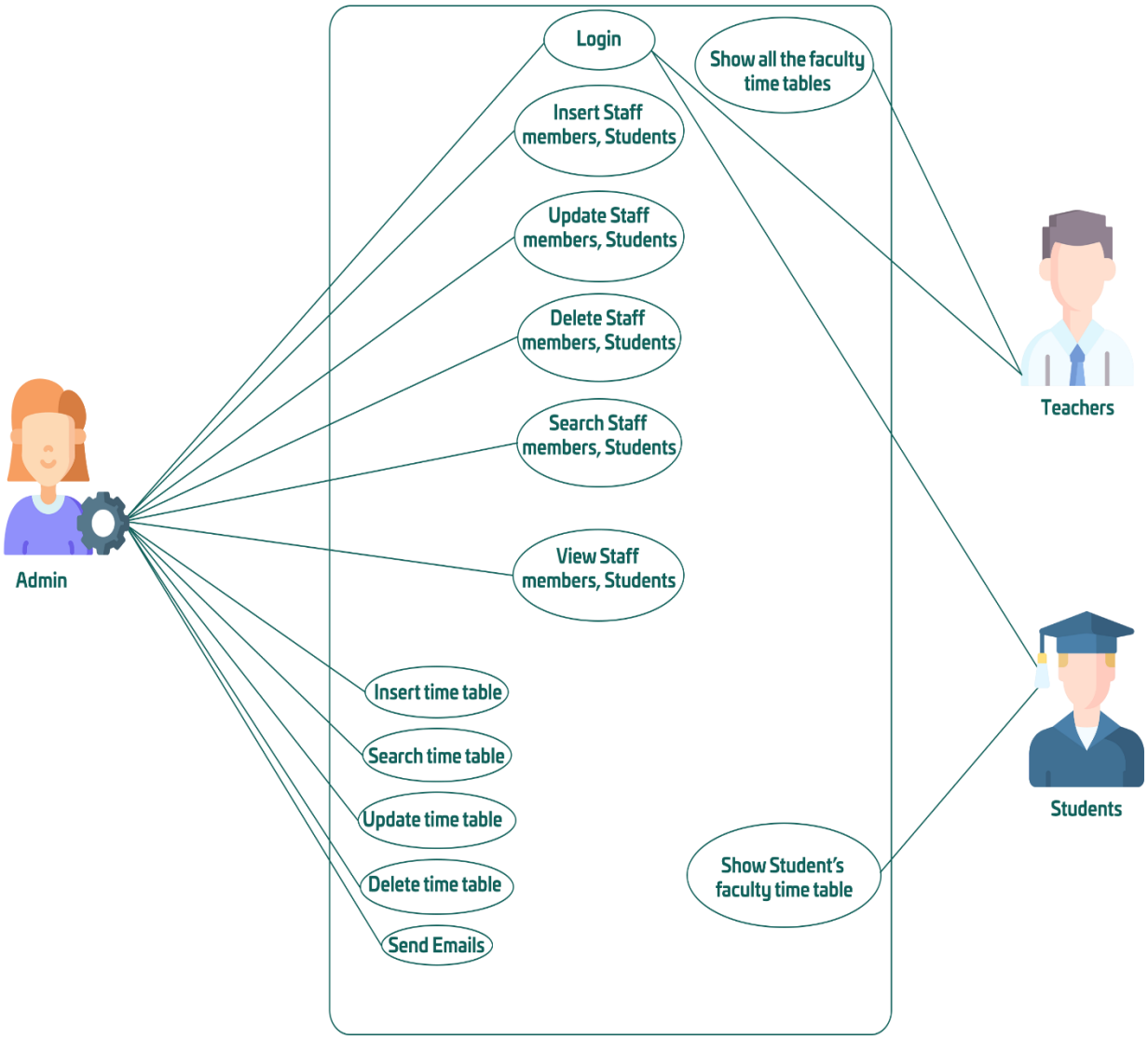
Versatility refers to the architecture's ability to grow by adding additional computers as needed while preserving the same topography and organization. A distributed application is a program that runs on numerous computers inside a system. These programs collaborate to perform a given objective. Previously, all apps were managed by a single system. Application programming had to continue to execute on either the customer or the server to which the customer was connected even under the customer server paradigm. Regardless, transmitted applications continue to run on both simultaneously.

Middleware is a unique programming layer that separates the operating framework and the application on both sides of the circulating PC network in an adequate framework. According to Prophet, middleware is a product that integrates programming components or business applications (Oracle 2017). Middleware is a product layer that lies between applications and operating systems, according to Techopedia. Remote Method Invocation (RMI), Simple Object Access Protocol (SOAP), and Popular Object Broker Architecture (COBRA) were all popular protocols. One of the ongoing contacts with middleware notions is the REST (Representational State Exchange) engineering. A RESTful API restricts an exchange to a sequence of modules, each corresponding to a single fundamental component of the exchanged module.

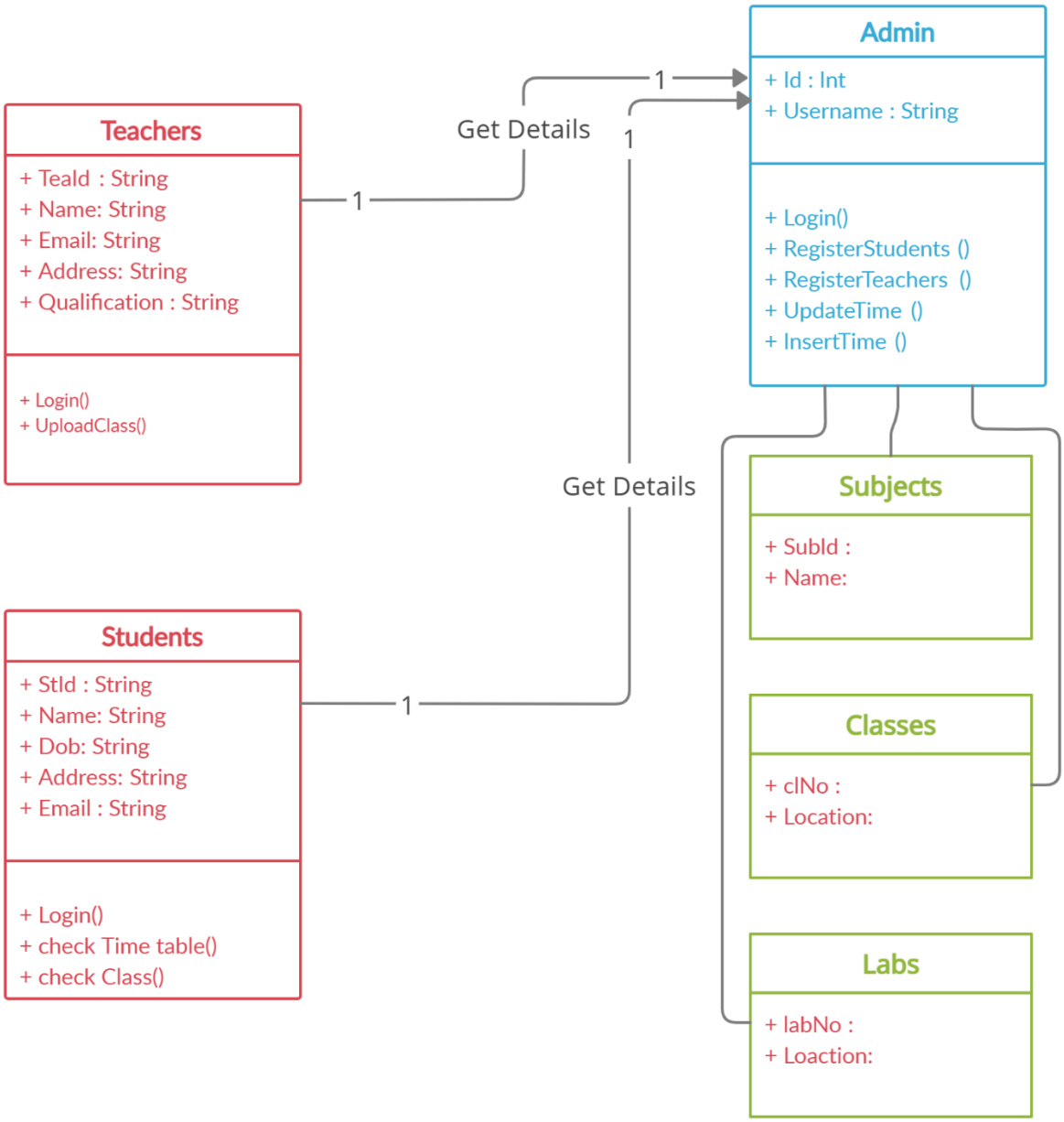


5. System Design

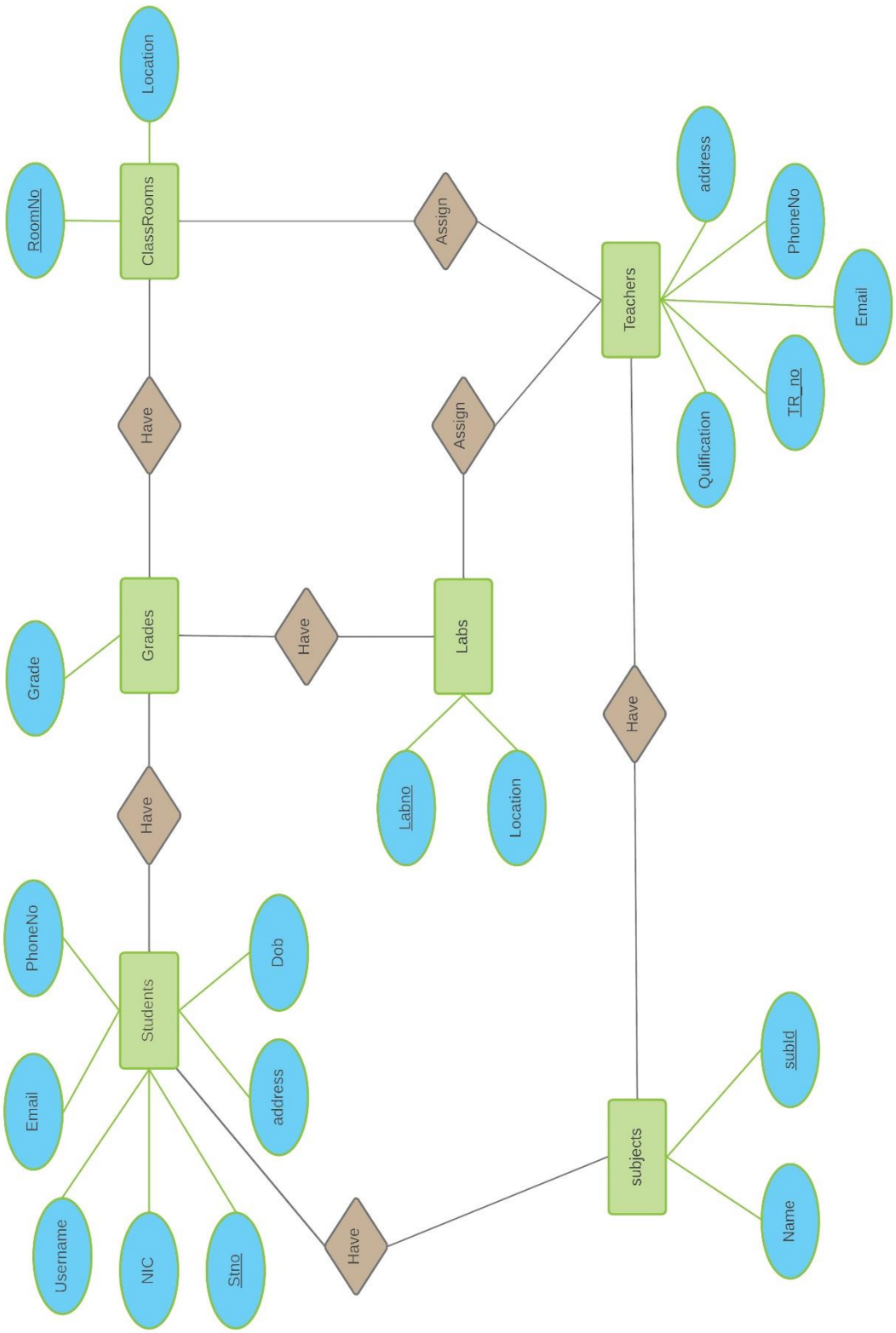
5.1. Use case



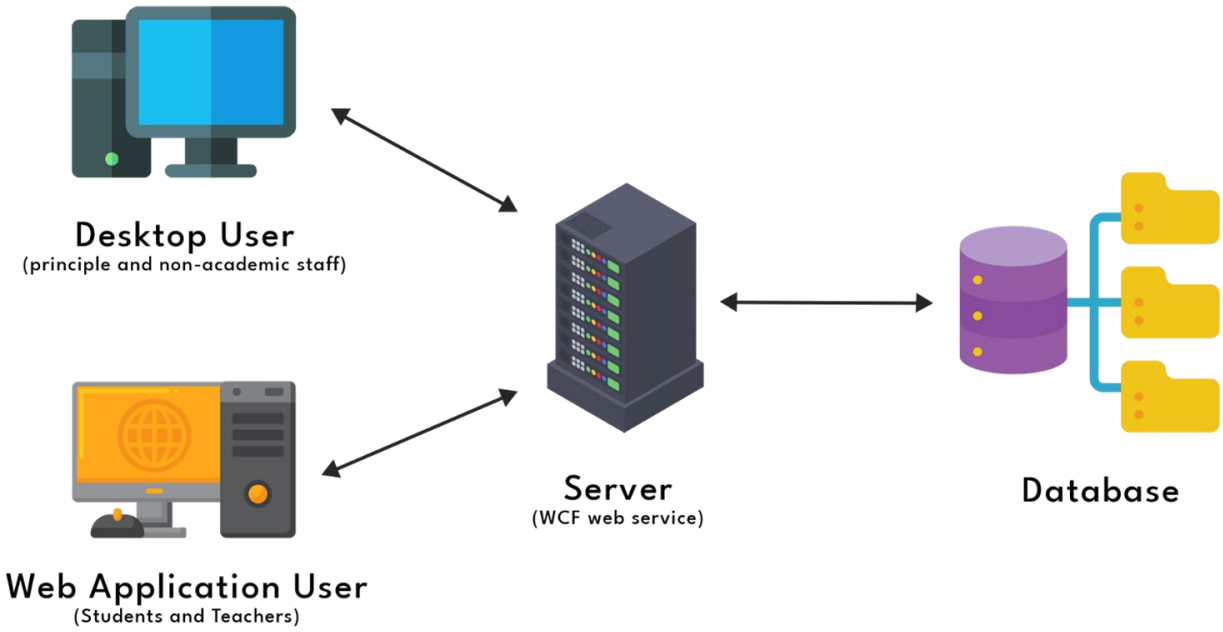
5.2. Class Diagram



5.3. ER Diagram

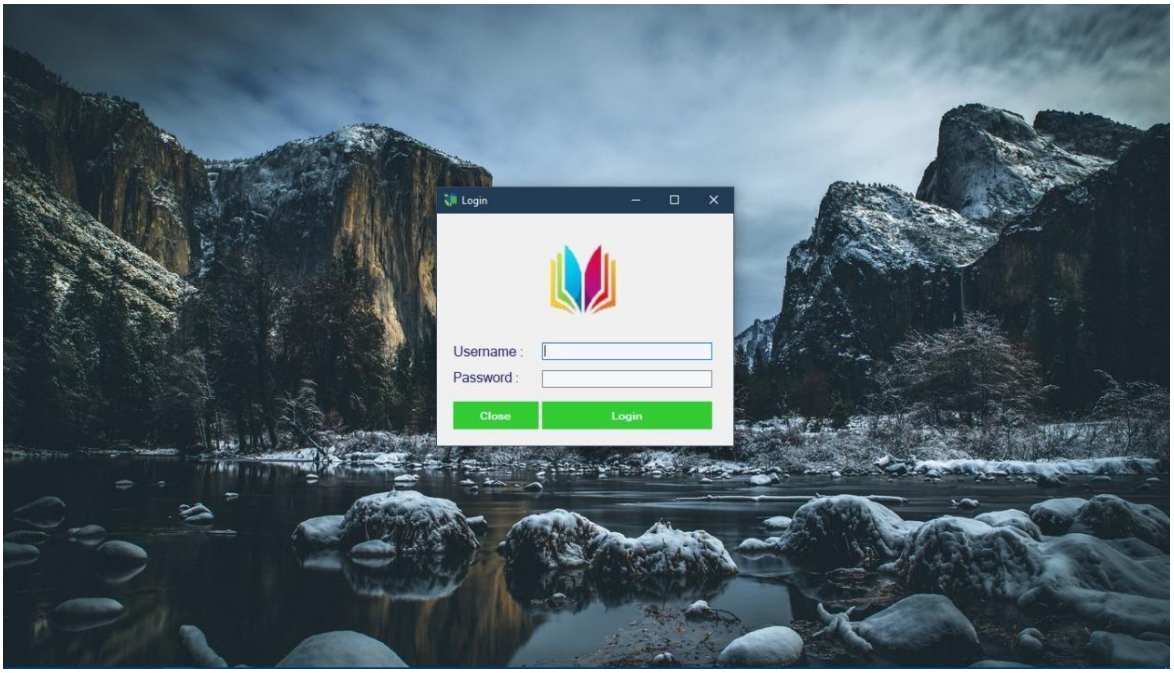


5.4. Technical Diagram

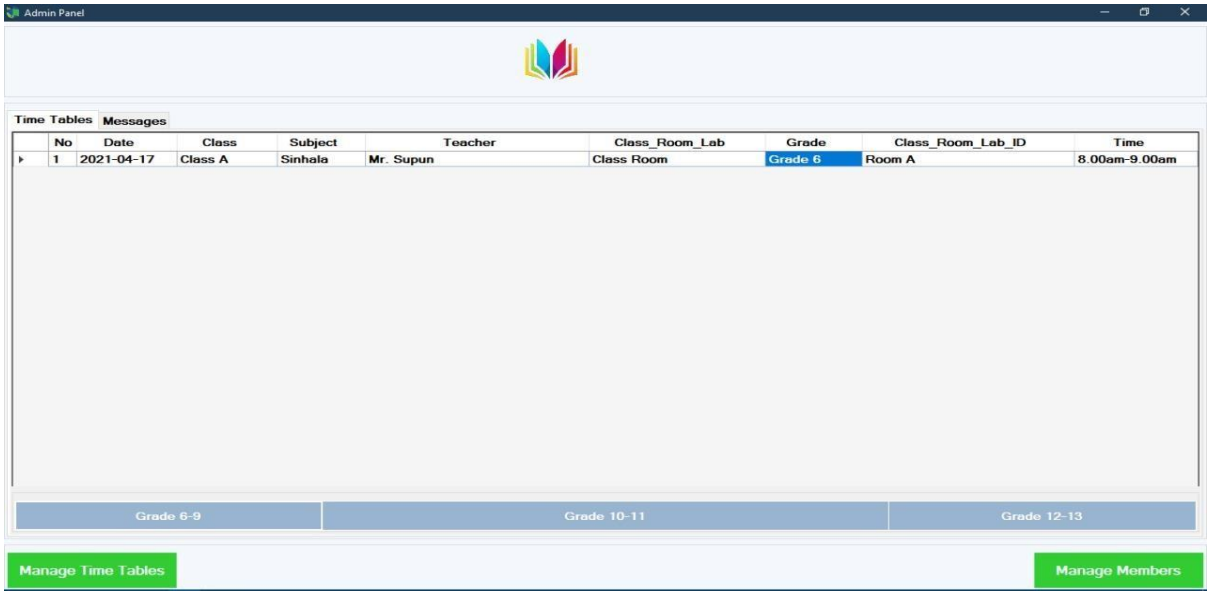


6. Interfaces of Desktop Application

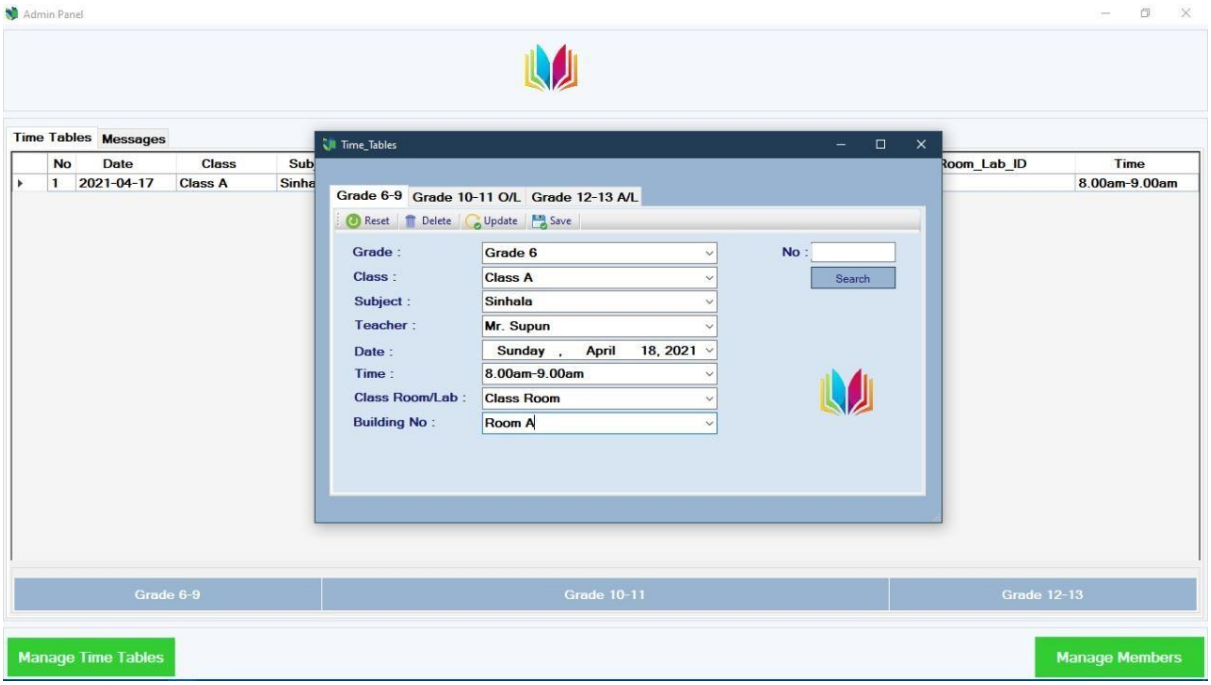
6.1 Admin Login Page



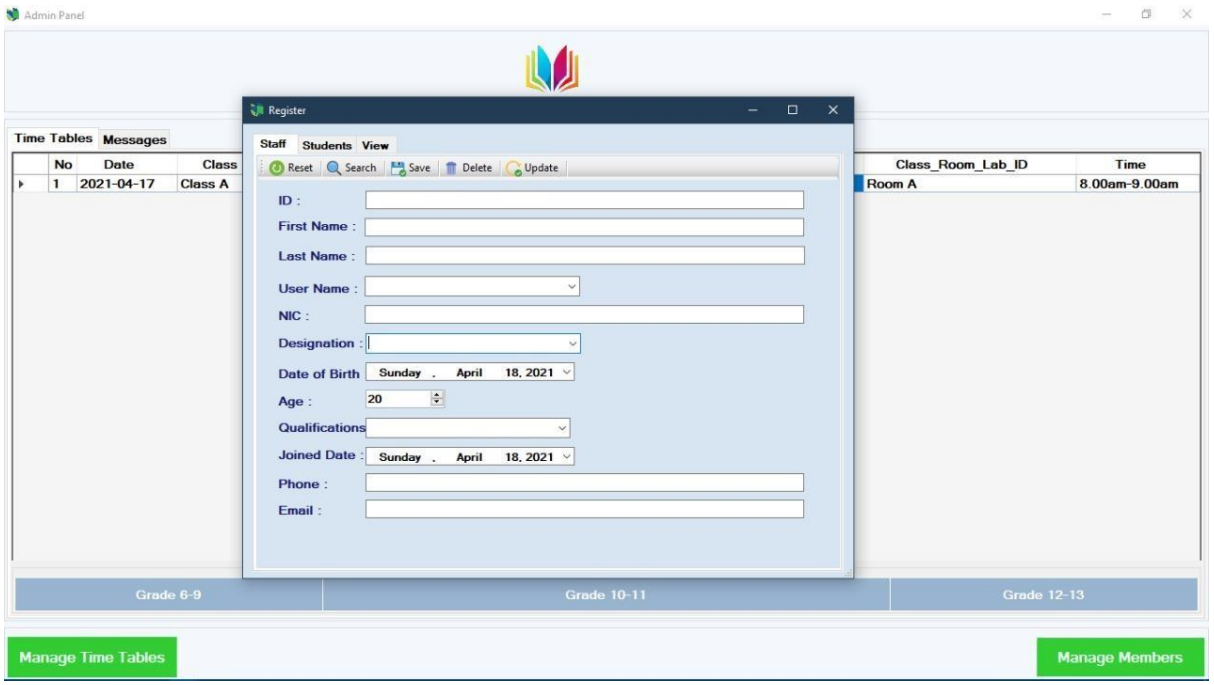
Admin Home Page

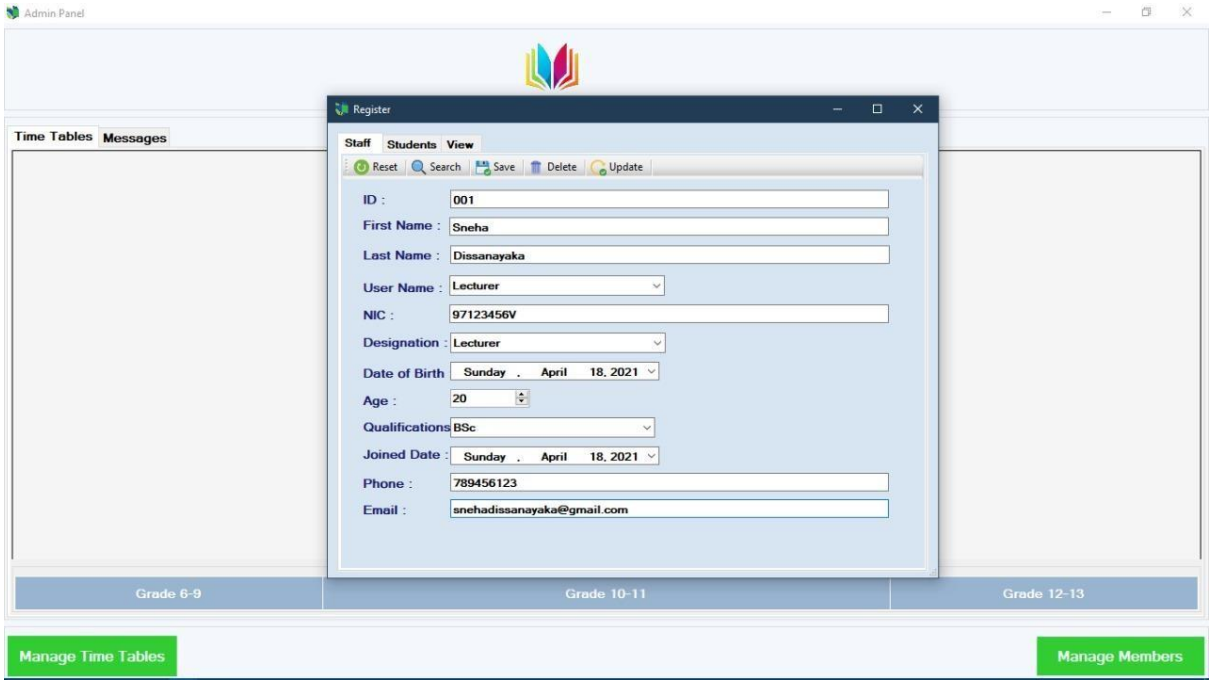


6.2 Timetable Management



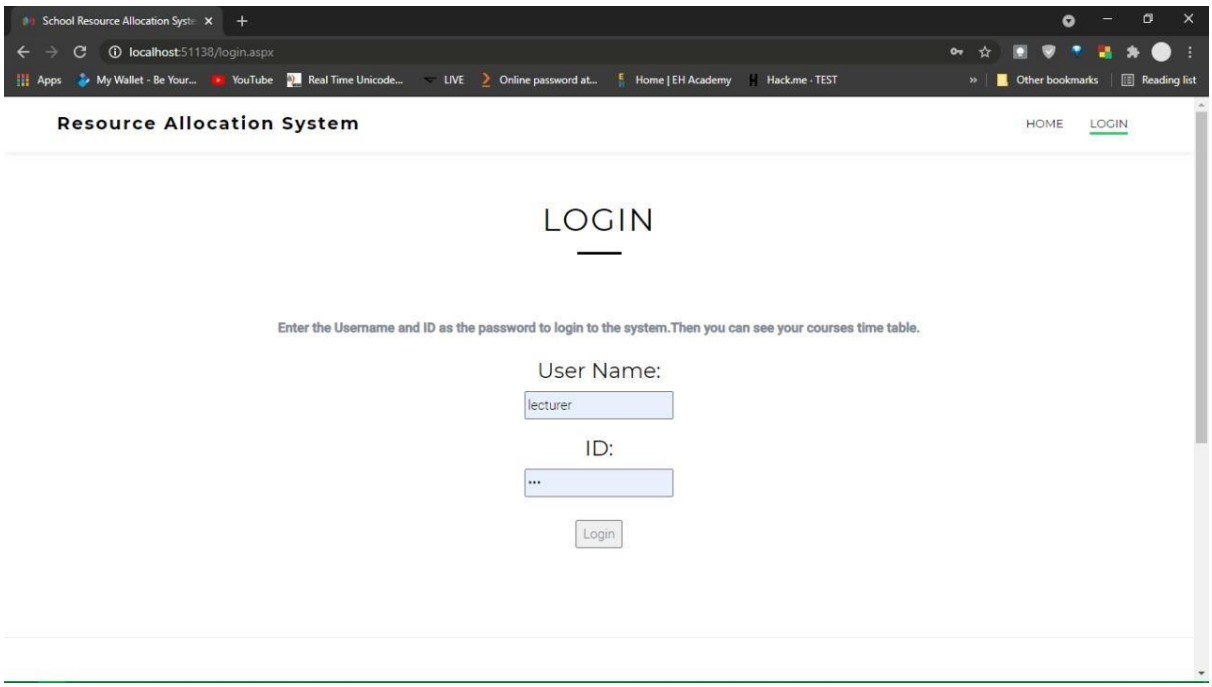
6.3 Staff Registration



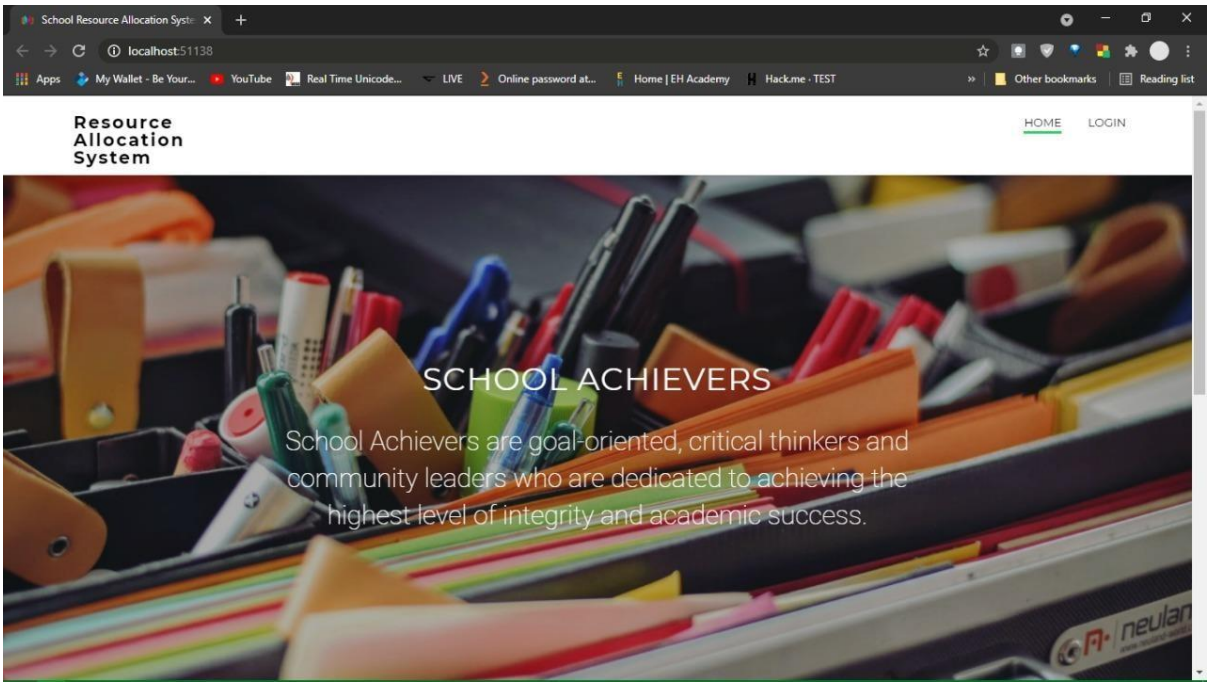


7. Interfaces of Web Application

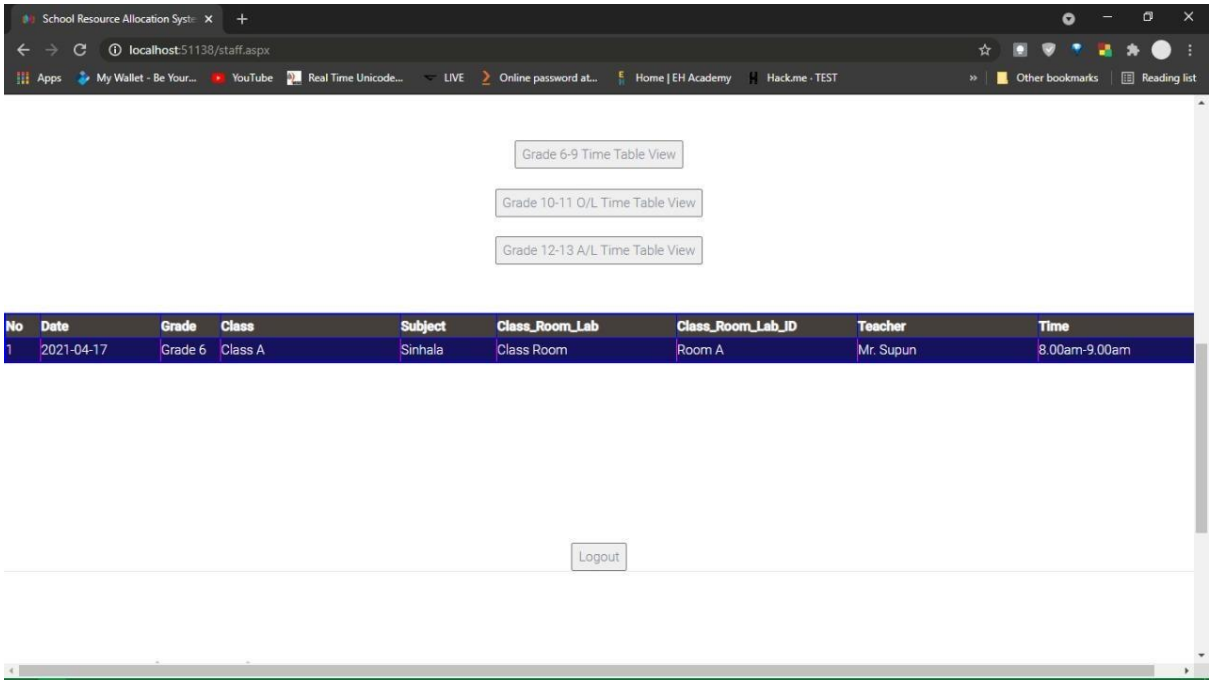
7.1 Login Page

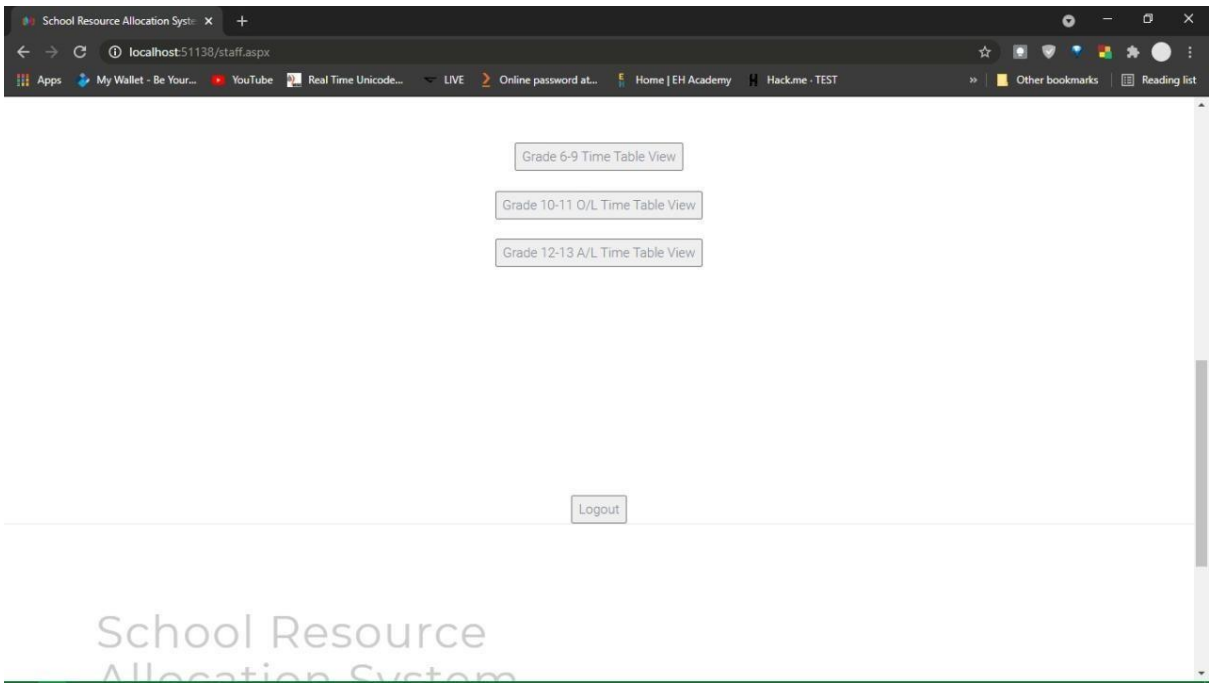


7.2 Home Page

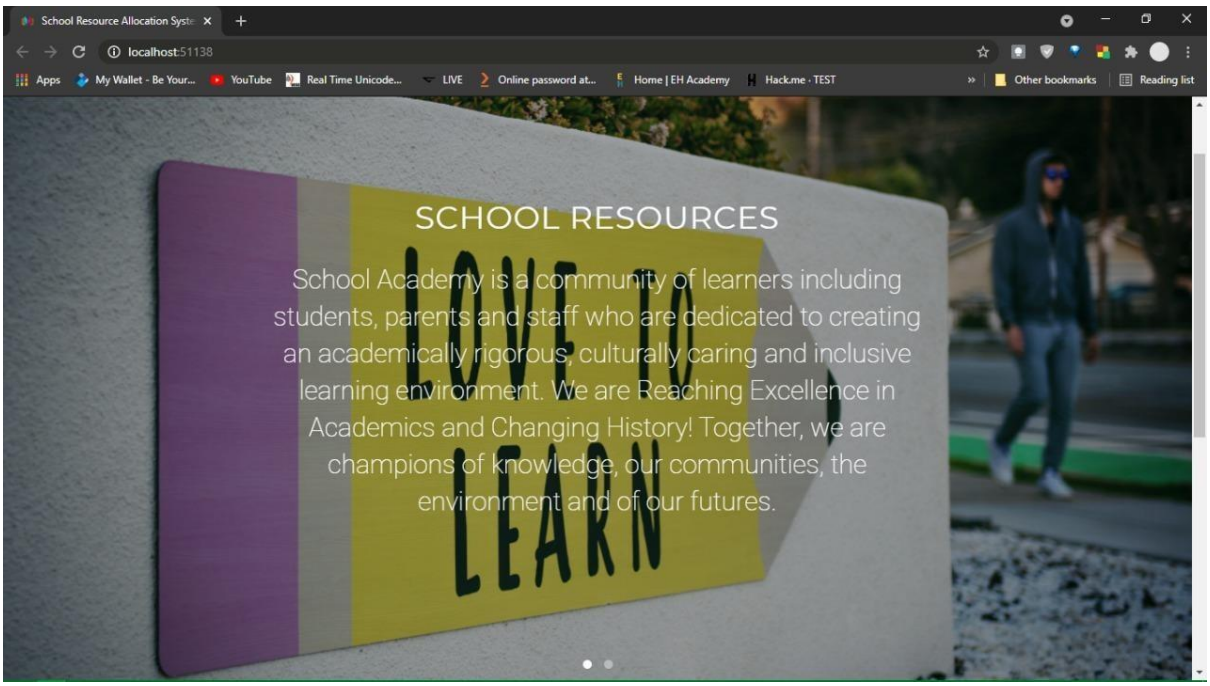


7.3 Timetable

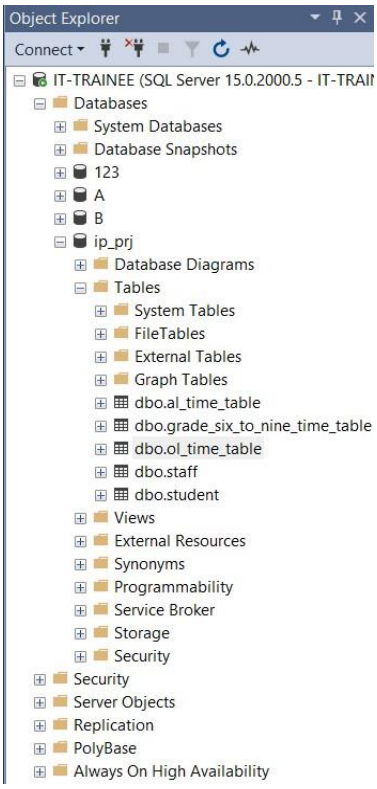




7.4 About



8.Database



- The database developed to hold the system's data is seen above. The database was constructed using the Microsoft SQL Server platform.

- WCF web services in C # .net were used to connect the database to the online application and the desktop application since the project needed the usage of distributed system technologies. A database is shared by both the online and desktop apps, and it is kept on the WCF server.

7.5 Student

	id	first_name	last_name	user_name	admission_no	section	grade	class	email	phone
1	1	Sneha	Dissanyaka	SnehaD	10026728	OL	10	B	s@gmail.com	0174493148
2	2	Chamodya	Samararatne	ChamodyaS	10025798	AL	12	F	C@gmail.com	6540461654
3	3	Chanaka	Sampath	ChanakaS	10027986	6-9	8	E	cs@gmail.com	4843448498

7.6 Staff

	id	first_name	last_name	user_name	NIC	designation	date_of_birth	age	qualifications	joined_date	phone	email
1	1	a	b	ab	11111111V	teacher	10.2.1964	55	Msc	2.3.2012	552556259	ab@gmail.com

7.7 Timetables

Results Messages

	no	garde	class	subject	teacher	date	time	class_room_lab	class_room_lab_id
1	1	10	C	Science	a	12.4.2021	5.00	12	1

9. Technical Description

- **Technologies Used**

During development, we used WCF site administration as the framework's middleware. The database is connected to both the desktop and online apps when using WCF, resulting in a single database that is used by both. The Bootstrap framework was used to create the web application, which was subsequently customized in Adobe Dreamweaver.

- Language - C#, asp.net
- Web language - HTML, CSS, JavaScript, Bootstrap
- Dreamweaver, Visual Studio 2015, Microsoft SQL Server
- Microsoft VISIO

10. Problems Faced

When creating the project, the team had to cope with the following difficulties,

- It was tough to build a relationship between the online application and the desktop application using the WCF framework.

- It was challenging to coordinate resources to accomplish this project because the team was working on tasks in other modules.

- I was unable to gather information on the school's classroom arrangement and class timetables.

- Adjustments to the ER diagram resulted in a few structural changes that took longer than anticipated.

11. Prospects

The developed system's prospects are listed below,

- By expanding the platform, teachers will be able to share notes with students and students will be able to download them.

- Allow students to utilize the system to submit homework and take online quizzes.

- lecturers should be allowed to upload and share test results with their students.

- Improve the system's usefulness by incorporating additional technologies.

12. Summery

This system was established to streamline the daily tasks of school personnel and pupils, as the present technique featured failures. Even though building such a system was a challenging challenge, the project's success was due to the participation of all group members. The created system is intended to offer its users a straightforward resource allocation method. Using the established programs, teachers and students will be able to show their schedules from wherever they are. This will save time, and students who live far from school will be able to find out if their lessons have been canceled or if the time has been changed from the comfort of their own homes.

13. Bibliography

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