UNIVERSITI KUALA LUMPUR

MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY

GROUP PROJECT - SCHOOL MANAGEMENT SYSTEM

MODULE: IIB43203 – CLOUD COMPUTING

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TITLE

School Management System using AWS Cloud Services

1. INTRODUCTION

This project focuses on building and deploying a simple web-based School Management System using Amazon Web Services (AWS). The main goal of the project is to show an understanding of basic cloud computing concepts by using AWS services such as computing, storage, networking, and databases. The system enables administrators to add and view student information through a cloud-hosted web interface.

2. PROJECT OBJECTIVES

The objectives of this project are:

- To deploy a web application using Amazon EC2
- To store and manage application data using Amazon RDS (MySQL)
- To set up secure network access using AWS Security Groups
- To understand how different AWS cloud services work together in a real application
- To gain hands-on experience using AWS CloudShell and Linux-based servers

3. AWS SERVICES USED

3.1 Amazon EC2 (Elastic Compute Cloud)

Amazon EC2 is used as the compute service for this project. An EC2 instance running Amazon Linux 2023 hosts the web server and PHP application files.

Functions of EC2 in this project:

- Hosts the Apache web server
- Runs PHP scripts (index.php, add_student.php, view_students.php, edit_student.php)
- Handles user requests through a public IP address

3.2 Amazon RDS (Relational Database Service)

Amazon RDS is used as the database service. A MySQL-compatible RDS instance stores student data securely.

Functions of RDS in this project:

- Stores student records (student ID, name, class, email)
- Manages database operations such as insert, update, delete, and search
- Provides a managed and scalable database solution

3.3 AWS Networking (VPC & Security Groups)

AWS automatically provides a Virtual Private Cloud (VPC) for networking. Security Groups are used as virtual firewalls.

Networking configurations:

- Port 80 (HTTP) is opened for public web access
- Port 22 (SSH) is opened for secure server access
- Port 3306 (MySQL) allows EC2 to communicate with RDS

3.4 Amazon S3 (Simple Storage Service)

Amazon S3 is used to store a school logo image, which is displayed on the website.

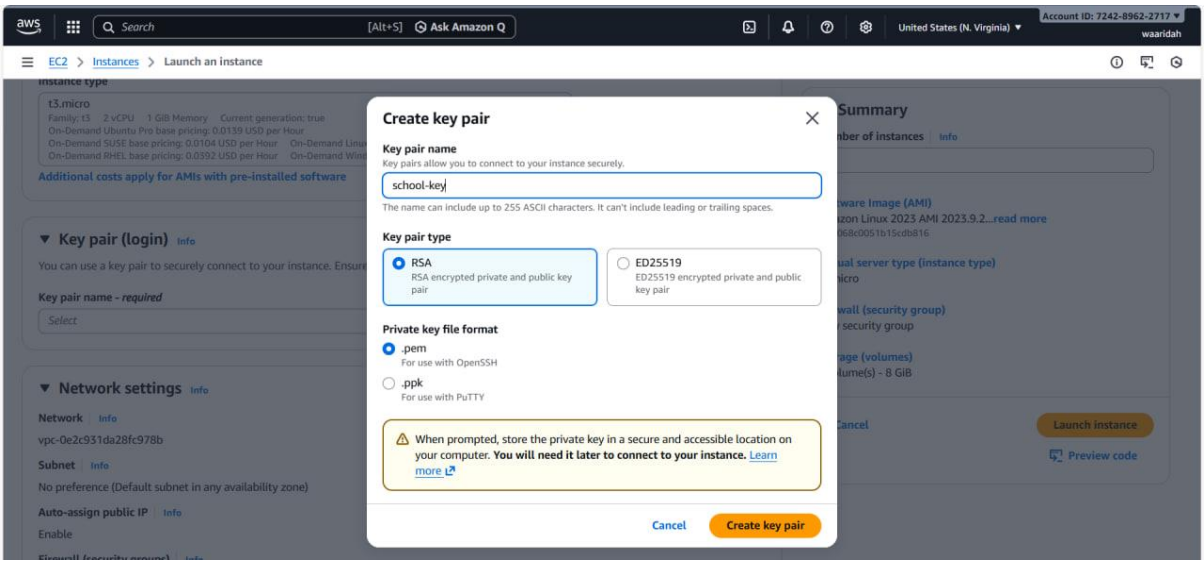
Purpose of S3 in this project:

- Demonstrates AWS storage service usage
- Stores static assets such as images
- Improves project creativity and presentation

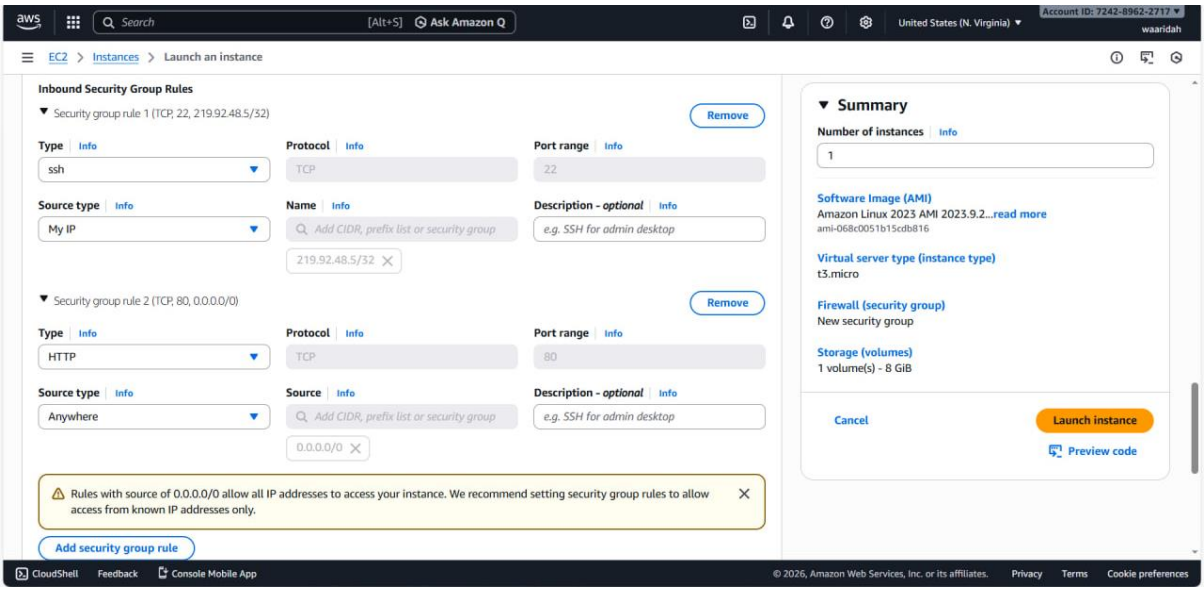
4. METHODOLOGY

Step 1: Launch EC2 Instance

An EC2 instance was launched using Amazon Linux 2023 (Free Tier eligible).



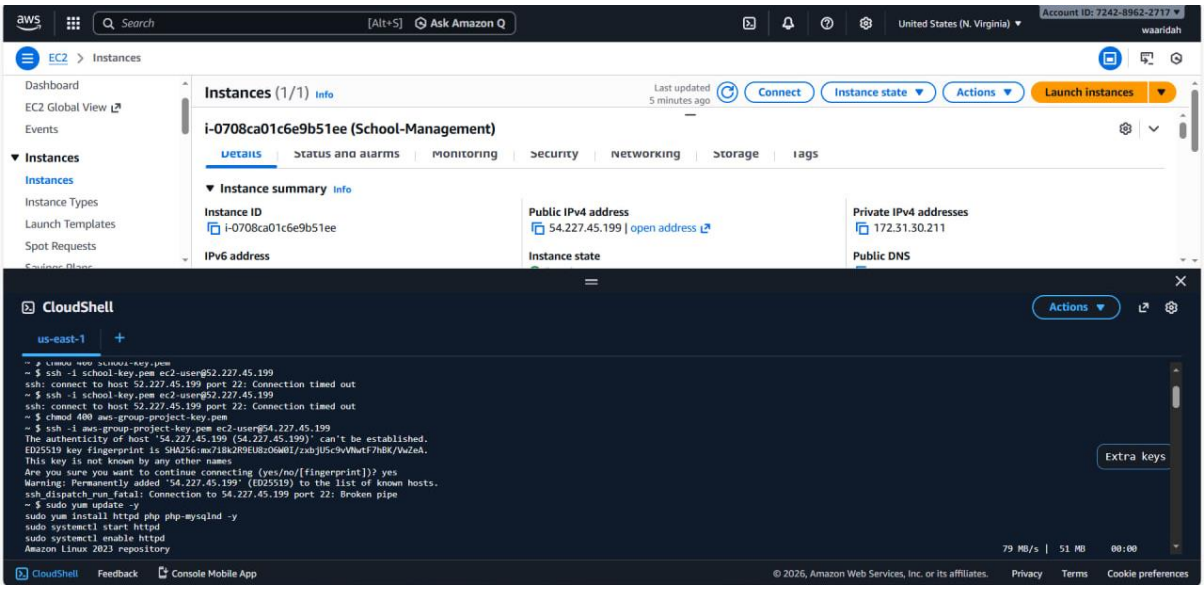
A key pair was created for SSH access, and a security group was configured to allow SSH (22) and HTTP (80).

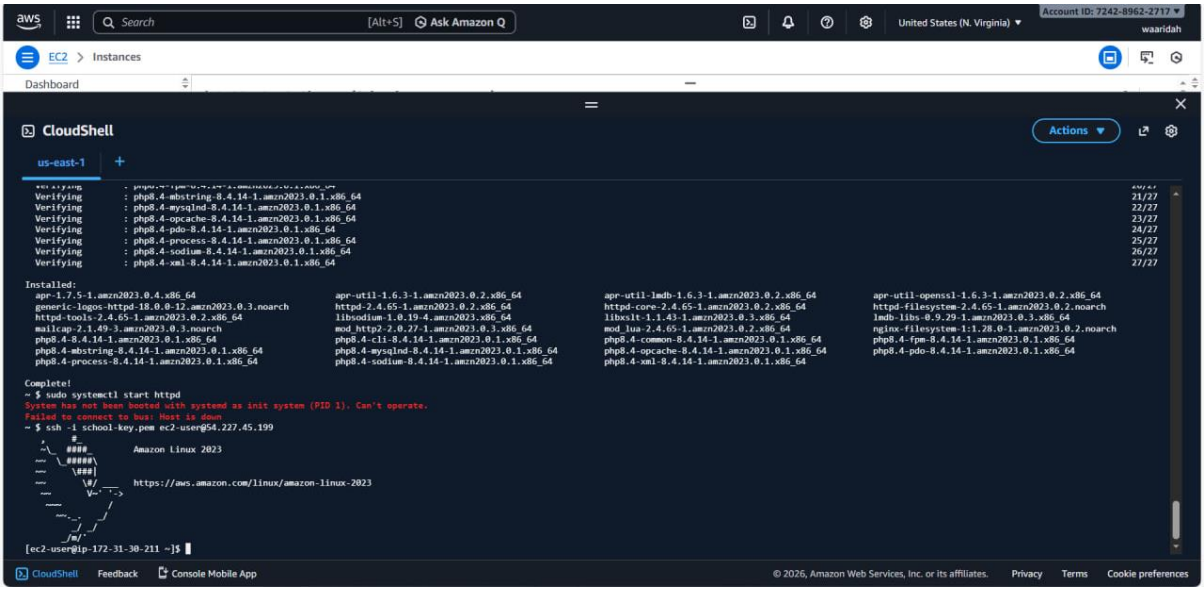


Step 2: Connect to EC2 Using CloudShell and Install Web Server and PHP

AWS CloudShell was used to connect to the EC2 instance securely via SSH. Apache and PHP were installed on the EC2 instance using the following commands:

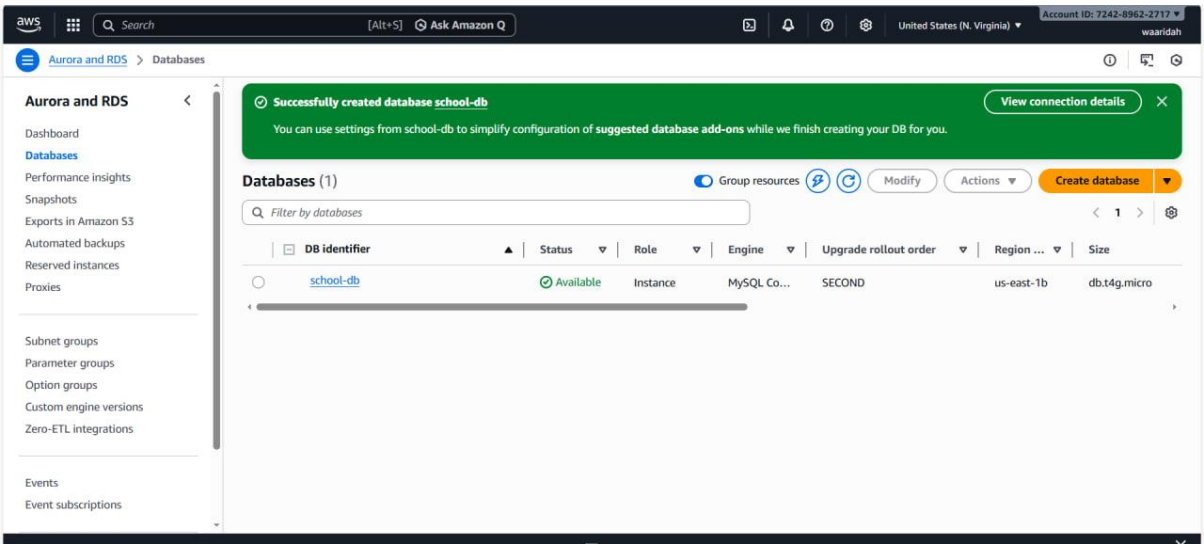
- sudo yum update -y
- sudo yum install httpd php php-mysqlnd -y
- sudo systemctl start httpd
- sudo systemctl enable httpd



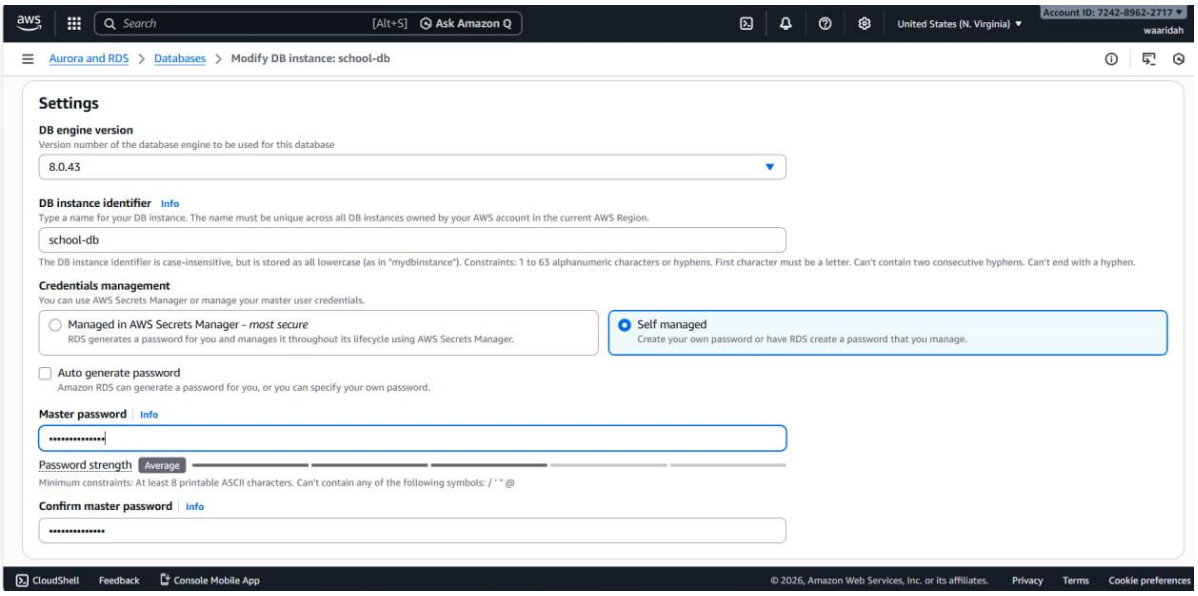


Step 3: Create RDS Database and Database Setup

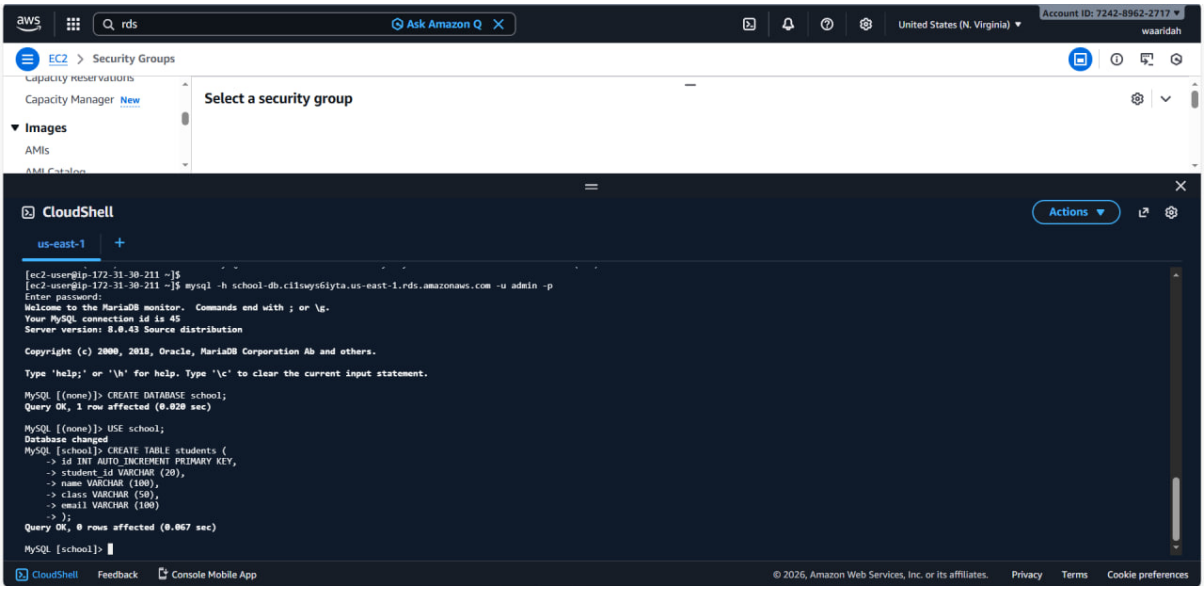
An Amazon RDS MySQL database was created using the Free Tier configuration. Public access was enabled, and a security group was configured to allow MySQL access (port 3306) from the EC2 security group.



The MySQL database was created using Amazon RDS with version 8.0.43. The database instance was named school-db. The password for the database was managed manually by the administrator to ensure secure access. This database is used to store student information for the School Management System.

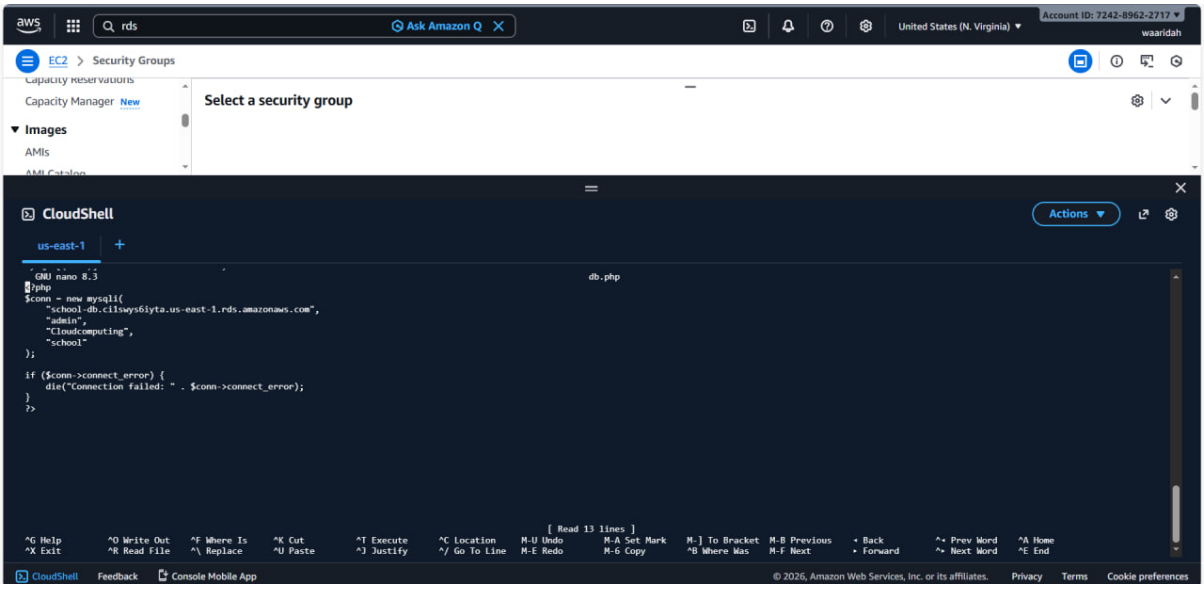


The EC2 instance was successfully connected to the Amazon RDS MySQL database using CloudShell. A database called *school* was created, followed by a *student's* table to store student information. This confirms that the database connection and configuration were completed successfully. The MariaDB client was installed on EC2, and the EC2 instance was connected to RDS.

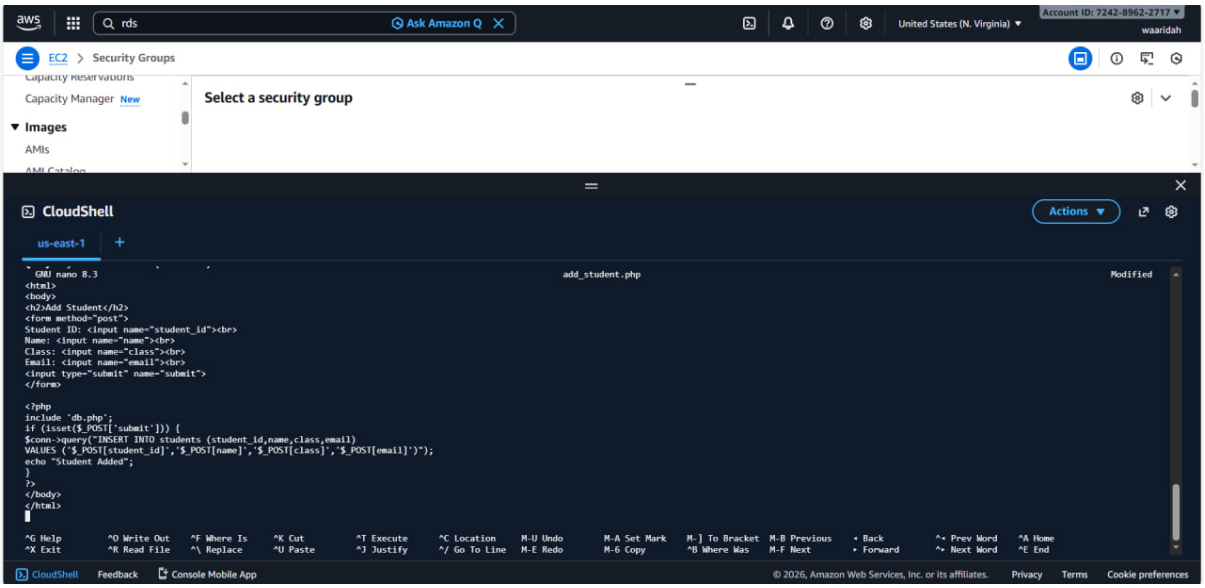


Step 4: Web Application Development

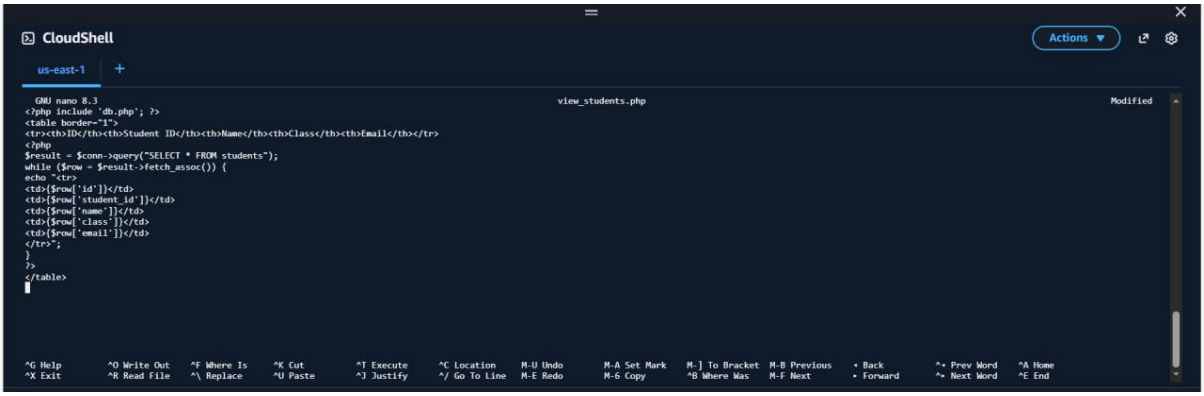
The db.php file was created to connect the EC2 web server to the Amazon RDS database. It stores the database credentials and establishes a MySQL connection using PHP.



This page allows users to insert new student records into the database through a web form. The page contains a simple HTML form that collects student information such as Student ID, Name, Class, and Email. When the form is submitted, the PHP script processes the input data and sends it to the database.



The view_students.php file is used to display all student records stored in the database. It connects to the database using db.php and retrieves data from the students table using an SQL SELECT query. The retrieved records are then shown in a simple HTML table, including Student ID, Name, Class, and Email. This page allows users to view and verify stored student information easily.

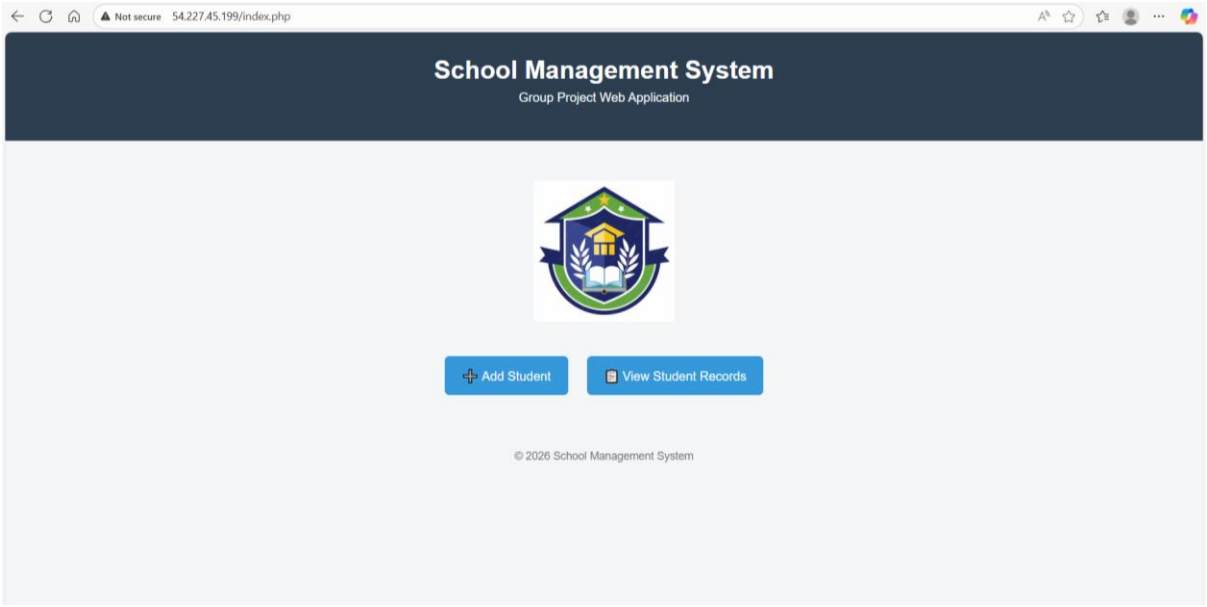


Step 5: System Testing

Web Application Development

- index.php – Homepage with navigation buttons
- add_student.php – Add new student records
- view_students.php – View and search student records
- edit_student.php – Edit existing student data
- delete_student.php – Delete student records
- db.php – Database connection file

Homepage (index.php)



The homepage is the main starting page of the School Management System. It is designed to be simple and easy to use.

At the top of the page, there is a header that shows the system title, “School Management System”, along with a short description to indicate that this is a group project web application. This helps users quickly understand what the system is about.

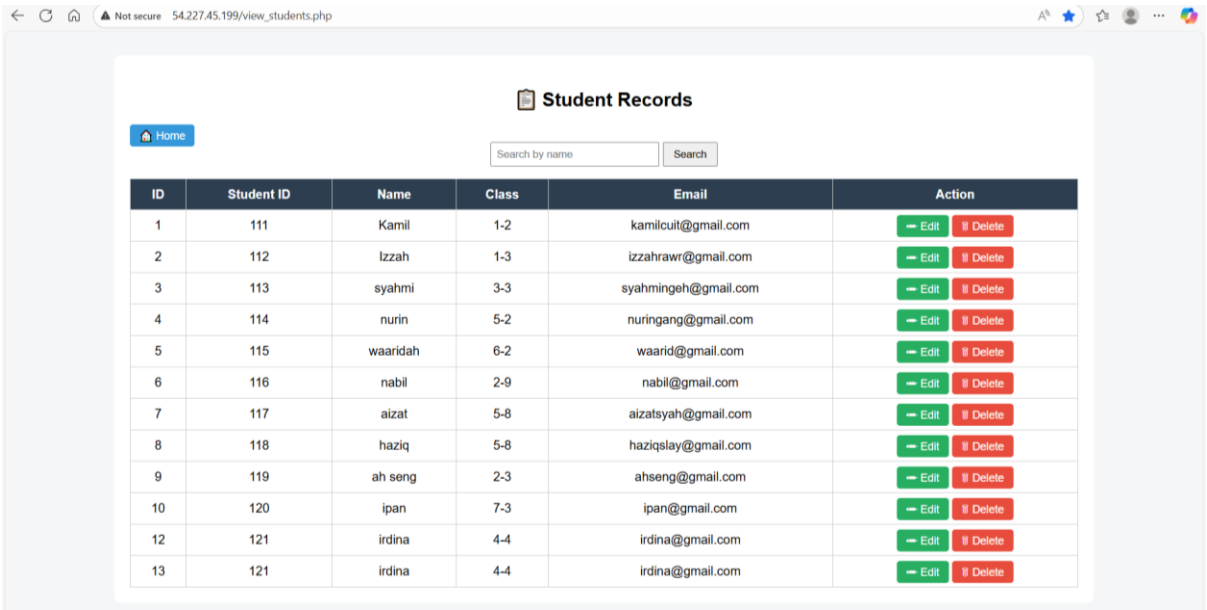
In the middle of the page, a school logo is displayed. The logo is stored in Amazon S3, which shows the use of AWS storage services and also makes the website look more attractive.

Below the logo, there are two main buttons:

- Add Student - This button takes users to a page where they can enter and save new student details into the database.
- View Student Records - This button allows users to see all saved student information in a table.

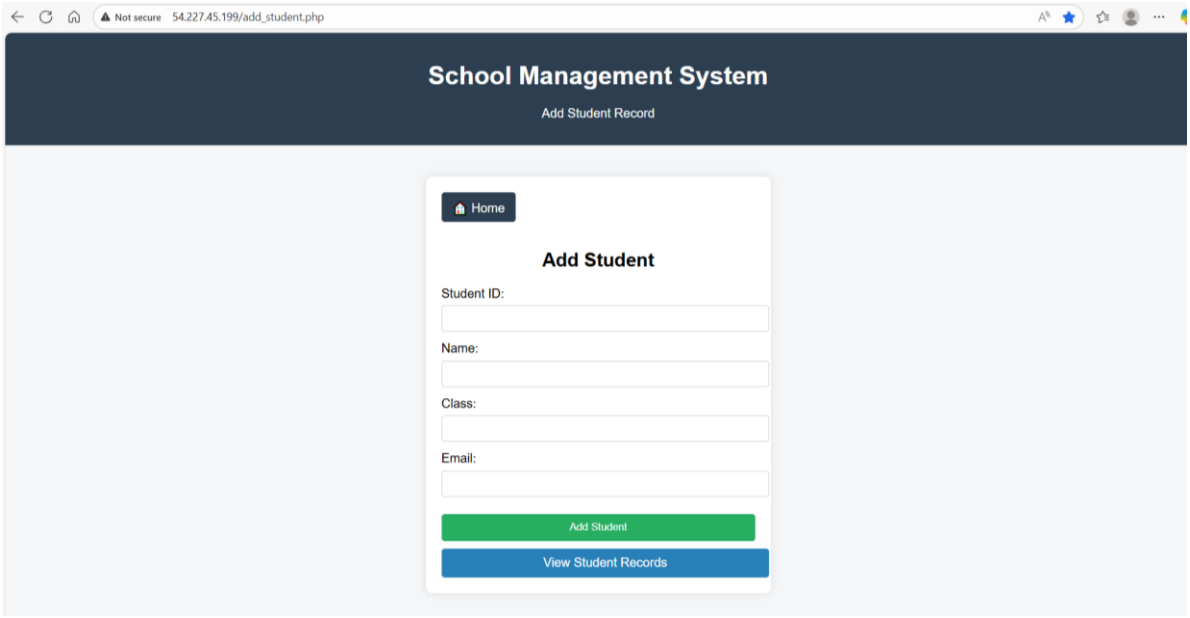
At the bottom of the page, a footer displays the copyright information to show system ownership. Overall, the homepage provides a simple and user-friendly interface that allows users to easily access the main functions of the School Management System.

View Student Records (view_students.php)



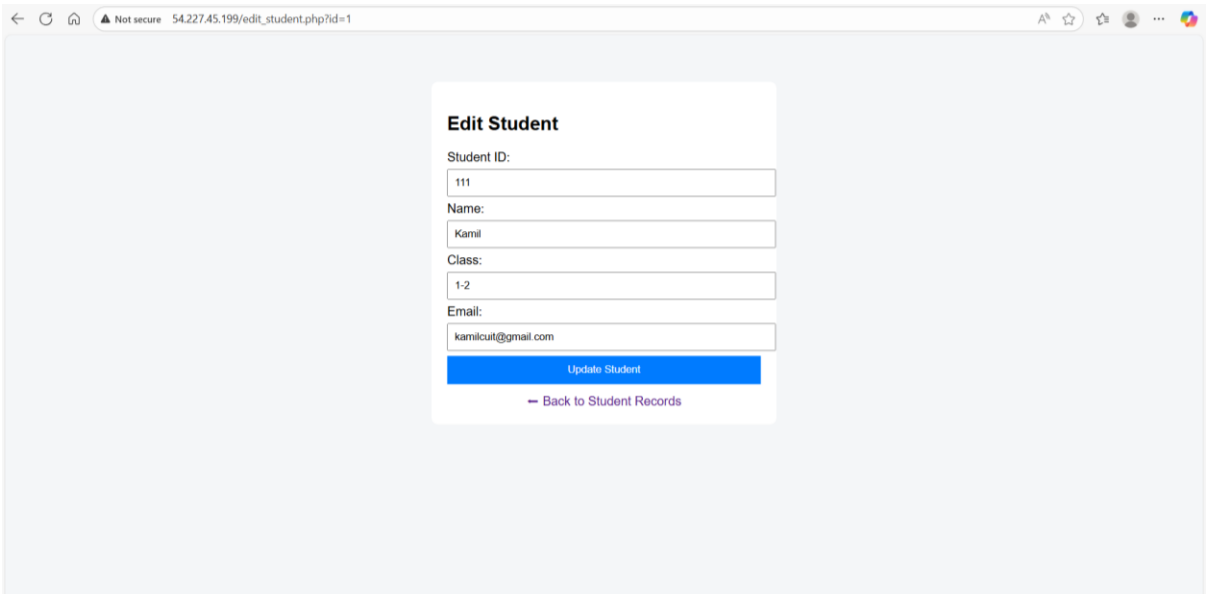
This page is used to display all student records stored in the database. The data is shown in a table that includes ID, Student ID, Name, Class, and Email. A search box is provided at the top so users can quickly search for students by name. This makes it easier to find specific records. Each record has Edit and Delete buttons. The Edit button allows users to update student information. The Delete button allows users to remove a student record from the database. A Home button is also available to return to the main page.

Add Student Page (add_student.php)



This page is used to add a new student record into the system. Users need to enter the Student ID, Name, Class, and Email in the form provided. After filling in the details, clicking the “Add Student” button will save the information into the database. A “View Student Records” button is also available to quickly check all saved students. There is a Home button at the top that allows users to return to the main page easily. This page makes it simple to insert new student data into the system.

Edit Student Page (edit_student.php)



This page allows users to edit existing student information. The form is automatically filled with the student's current details, such as Student ID, Name, Class, and Email. Users can update any information and click "Update Student" to save the changes to the database. A "Back to Student Records" link is provided to return to the student list easily. This feature helps ensure that student records can be updated accurately when changes are needed.

5. CONCLUSION

In conclusion, this project successfully demonstrated the implementation of a cloud-based School Management System using Amazon Web Services (AWS). By integrating core AWS services such as Amazon EC2, Amazon RDS, AWS Security Groups, and AWS CloudShell, the team was able to design, deploy, and test a functional web application hosted entirely on the cloud.

The project achieved its objectives by deploying a web server on EC2, securely storing student data in an RDS MySQL database, and ensuring controlled network access through security group configurations. The system was tested successfully, allowing users to add and retrieve student information via a web interface, which confirms proper connectivity between the application and the database.

From a learning perspective, this project provided valuable hands-on experience with cloud infrastructure, Linux-based server management, and basic web application deployment in a real-world cloud environment. It also enhanced understanding of how cloud services can work together to deliver scalable, reliable, and cost-effective solutions.

Overall, the School Management System serves as a strong foundational example of cloud computing implementation and can be further enhanced in the future by adding features such as user authentication, role-based access control, data validation, and scalability improvements using additional AWS services.

YOUTUBE VIDEO PRESENTATION LINK

Video presentation – https://youtu.be/3CCWWwMzfNk?si=DkG7Zcu4LOlm3ST6

GITHUB REPOSITORY LINK

https://github.com/waarid/CLOUD-COMPUTING-GROUP-PROJECT-SCHOOL-MANAGEMENT-SYSTEM