

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**PROJECT DOCUMENTATION PRESENTED BY:**

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**PROJECT SUPERVISOR:**

**DR. KATE TAKYI**

**PROJECT TITLE:**

**SMART TIMETABLE SCHEDULING**

**Acknowledgment**

We would like to thank our supervisor, Dr. Kate, who ensured that we did the work in a timely manner. Most people would like to procrastinate on their work, you have taught us that the earlier we finish, the better, though it may be a bit uncomfortable, at the moment.

**Dedication**

This project is dedicated to all students currently in Kwame Nkrumah University of Science and Technology, and those yet to come.

**Abstract**

The Smart Timetable addresses the challenge of students not being able to focus in class due to smaller classrooms as compared to their number. This user-friendly application enables the exam officer to generate optimized timetables with just a few clicks, taking into account student enrollment numbers. By integrating real-time data from course registrations, the database ensures efficient classroom allocation tailored to the student population.

**Chapter 1: Introduction**

We believe that what distinguishes one individual from others is their ability to solve a problem. That is why we came up with the smart timetable to solve the issue of wrong class allocation.

**Problem Statement**

The timetable is drawn without considering the population of the students. This sometimes makes the class uncomfortable for student populations that are greater than the capacity of the classrooms, hence there is the need to design an application that will consider the populations of the students before assigning them to a class.

**Project Aim**

Smart timetable considers the students' population and then finds an appropriate class based on their total number.

**Project Objectives**

- To increase comfort in the classrooms of students, as well as lecturers

- To make best use of resources (classrooms)

- To make ready available classrooms at each period, for smooth rescheduling of classes by lecturers

**Limitations of Project**

- It is limited to one college, the College of Science.

**Approach to Project**

We began by defining the project's goals and identifying all potential users of the application. Next, we collected the necessary information and selected the appropriate programming language and tools for development. With this in place, we proceeded to develop the application, paying close attention to every detail to ensure the creation of an effective and user-friendly application.

**Chapter Two: Review of Literature and Tools**

**Background Review**

Timetable scheduling is an important task in educational institutions.It involved allocation of courses to specific rooms.

**Review of Existing Applications**

- Solving timetable Scheduling using genetic algorithm

Abstract:

A genetic algorithm for solving a timetable scheduling problem is described. The algorithm was tested on small and large instances of the problem. Algorithm performance was significantly enhanced with modification of basic genetic operators. Intelligent operators restrain the creation of new conflicts in the individual and improve the overall algorithm 's behavior.

**Problem Identification**

**-**Although the algorithm takes into consideration the conflict management it doesn’t take into consideration the optimal scheduling based on the number of students and the class.

**Project Evaluation**

The smart time table scheduling aims to overcome these issues by providing a congenial environment for students

**Review of Project-Related Methodologies**

The project employs a model view controller architecture for separation of concerns and iterative process for continuous improvement

**Chapter 3: Requirements Specification**

**Requirement Gathering**

We had to go around the college, taking note of the rooms that were classrooms, and those that were laboratories and offices.

**Functional Requirements**

1. Automated time table scheduling
2. Visualization of timetable and optimality chart

**Non-Functional Requirements**

1. User friendly environment.
2. Protection of data on the database.

**Hardware Requirements**

1. A monitor with server and app running

**Requirements Analysis**

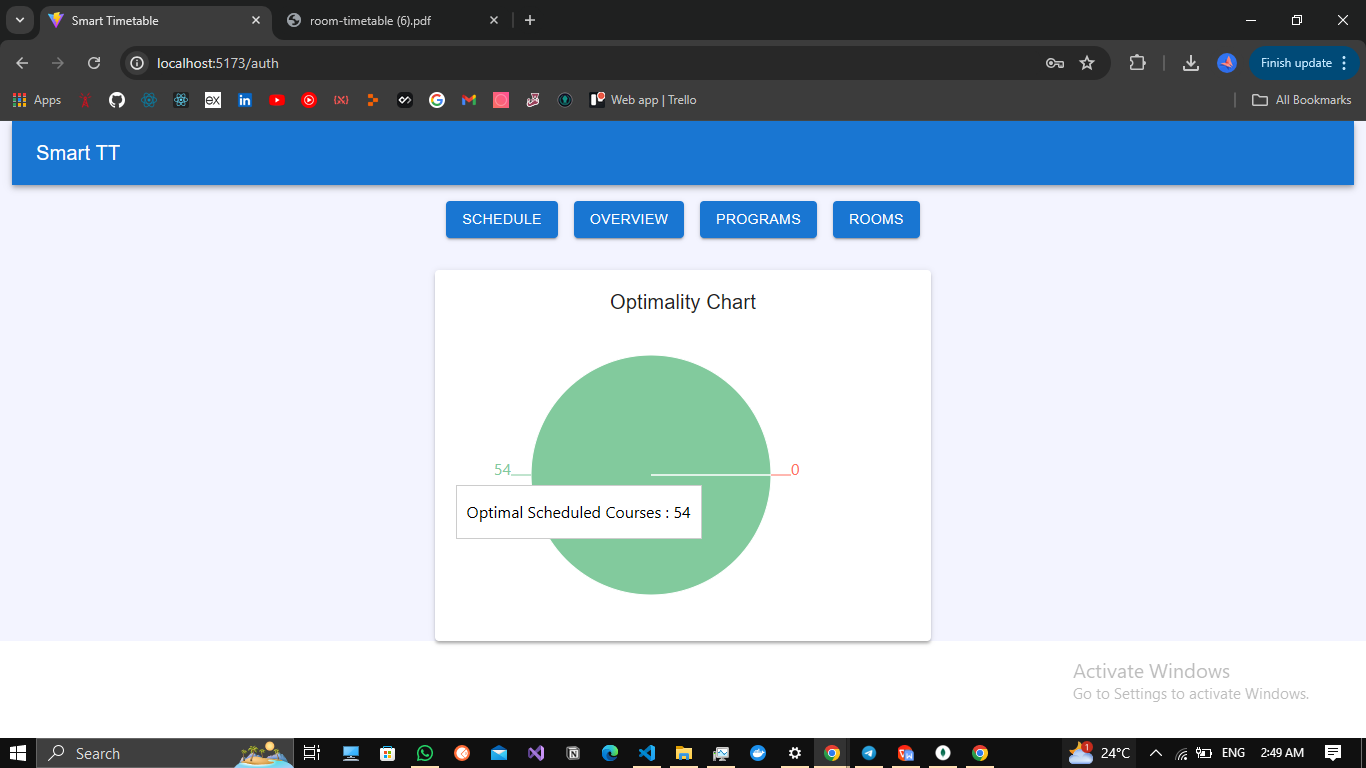
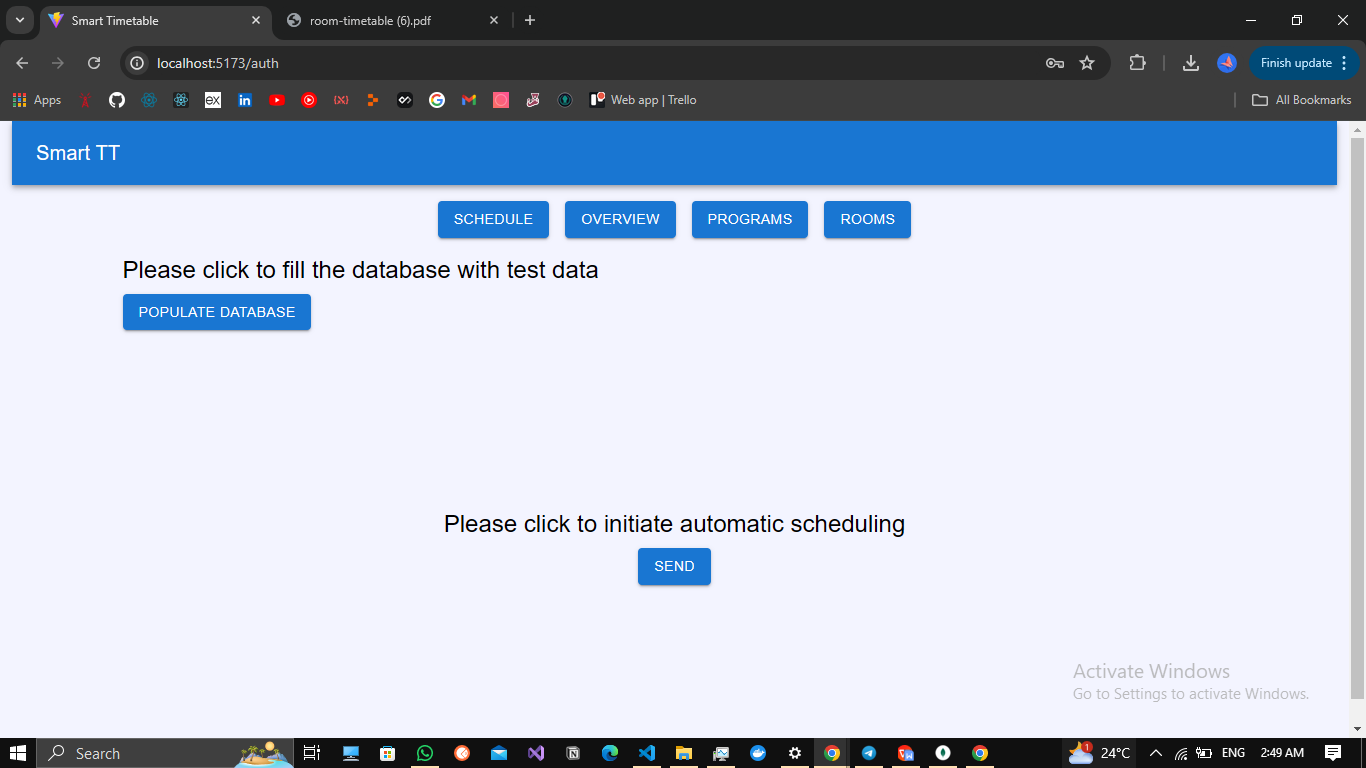
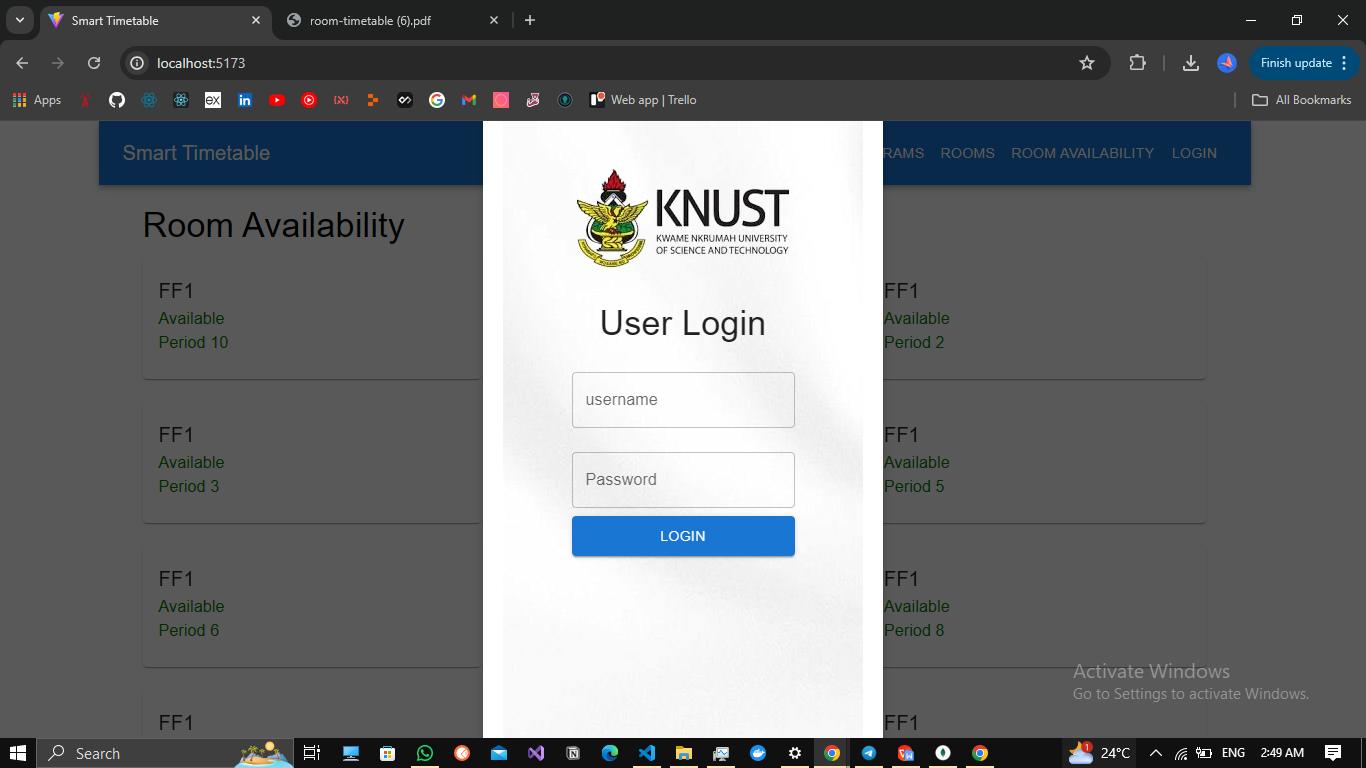
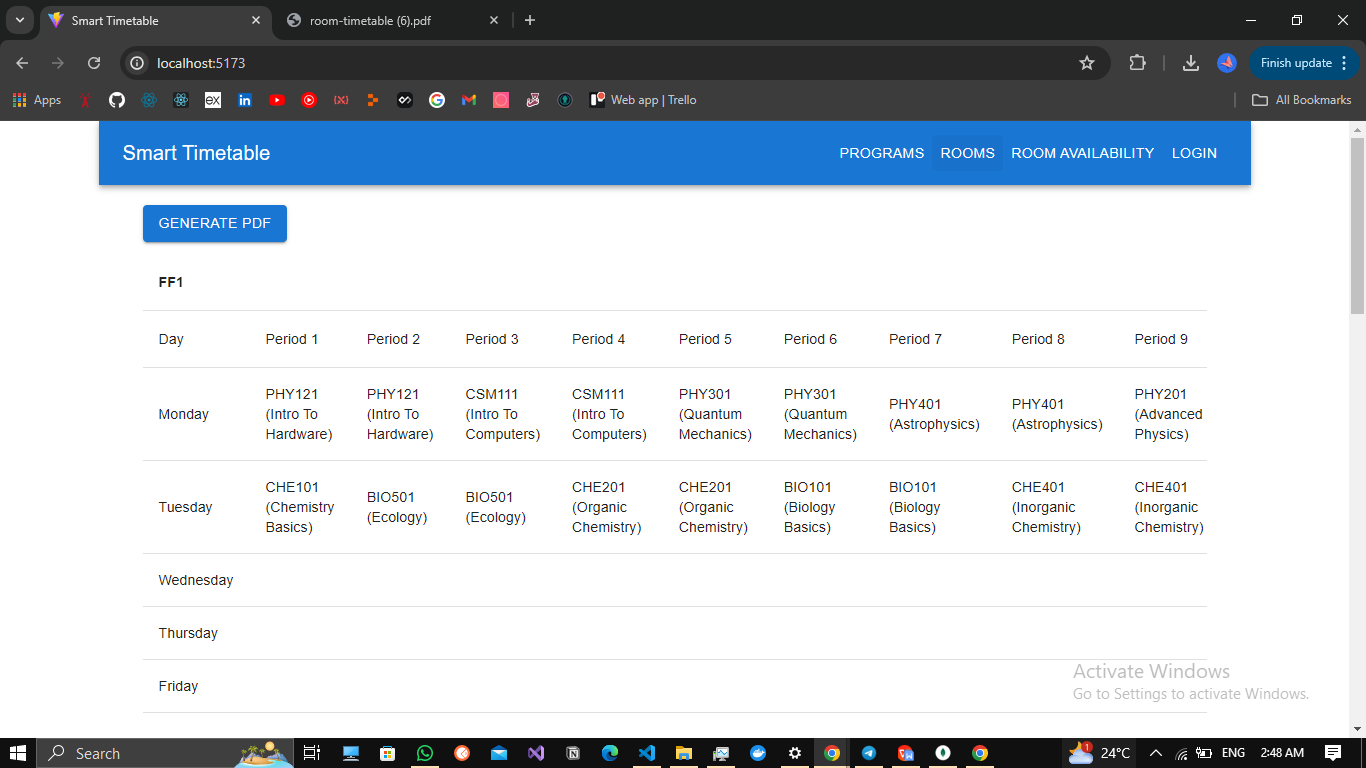
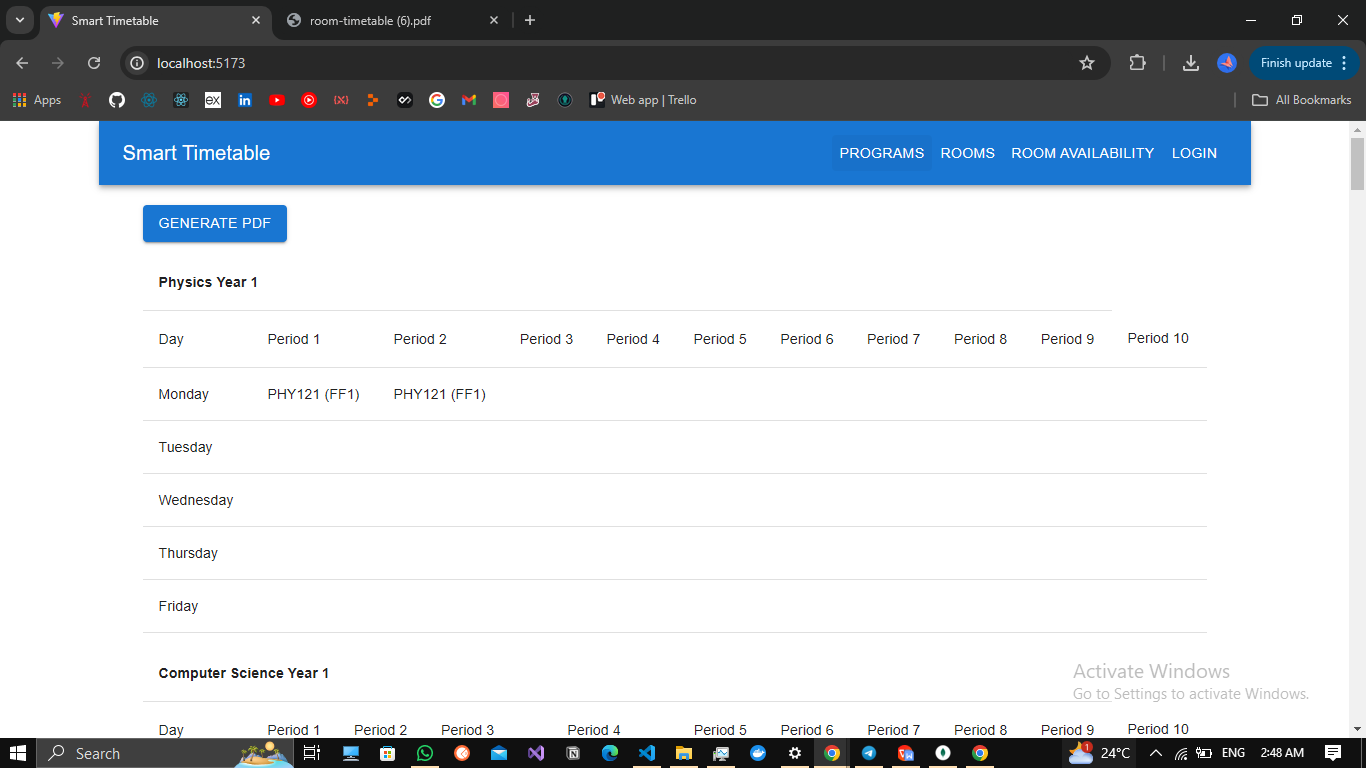
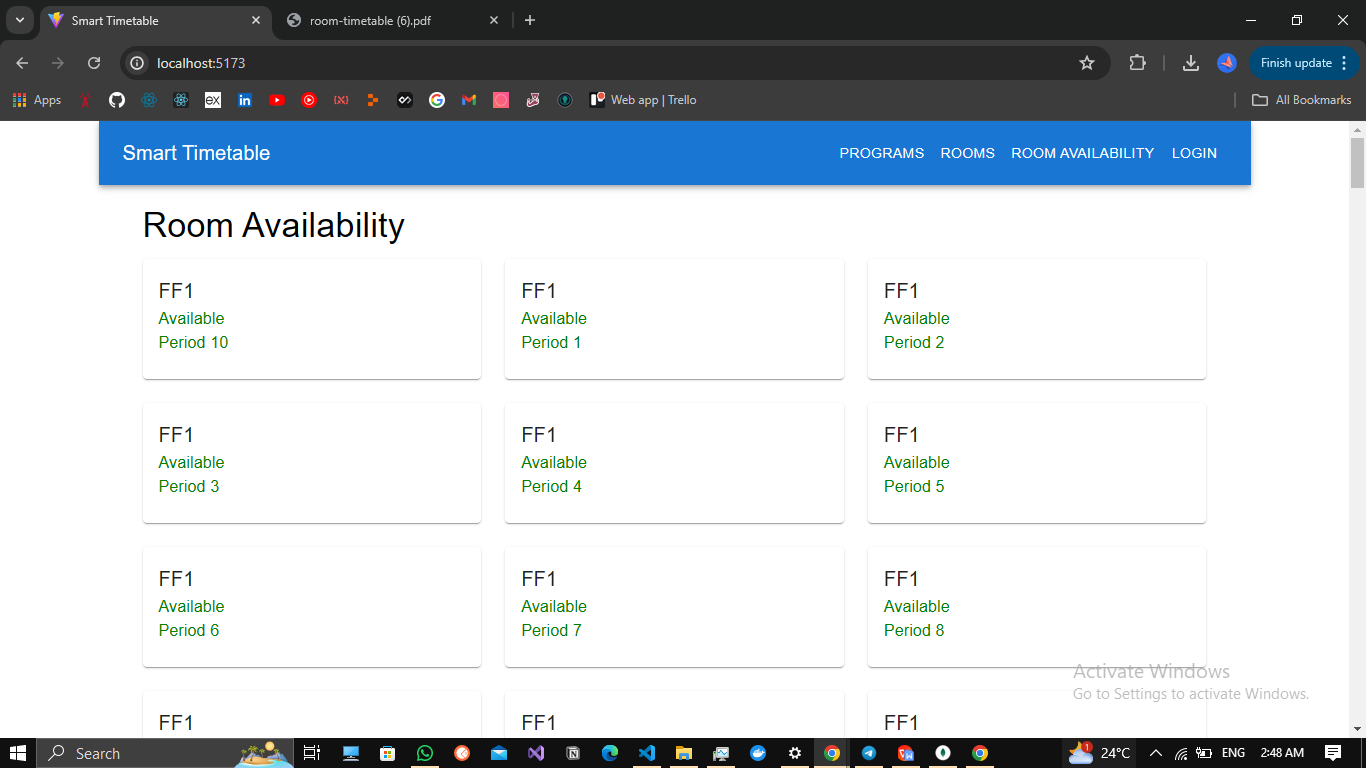
1. First download all the necessary node modules for both the backend and frontend.
2. Have nodejs installed.
3. - Have tool named compass for local database storage visualization and connect it.

**Chapter Four: Design Specifications**

**System Design and Methodology**

The system consist of react frontend and nodejs backend and a nosql database,MongoDB for storing data.

**System Interfaces.**

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**Requirement Model (Use Case Descriptions)**

**Use Case : TimeTable Creation**

Actor: Scheduling Officer

Description: The scheduling officer clicks a button to generate the timetable

Preconditions: The scheduling officer is authenticated before proceeding

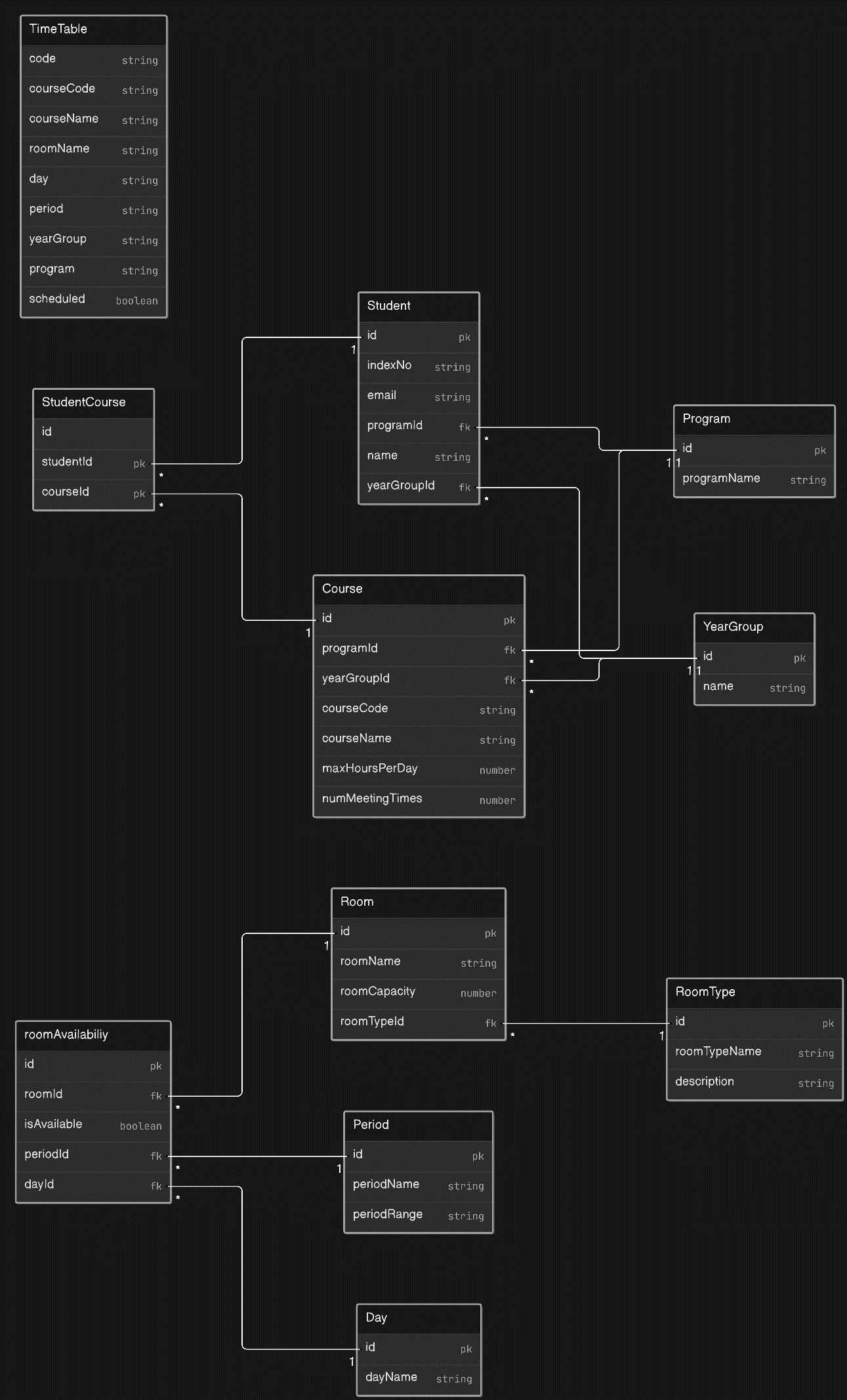
Postconditions: Timetable is generated and saved on the database.

**Use Case : Users**

Actor: Students and Teachers

Description: The student and teachers will have access to the timetable and also have access to the free rooms which in turn may be utilized

**Database Schema**

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**Chapter Five: Implementation and Testing**

**Development Tools And Platform Consideration**

Nodejs - Run time for javascript for bulding server-side applications

ExpressJs - FrameWork for building apis

MongoDb - Nosql database Mongoose - object modeling tool for javascript and nodejs

**Testing**

**Unit Testing**

**-**The user interface was tested to be user friendly and the use of thunder client for backend testing.

-Test was done to see if the classroom was scheduled and avoided conflicts

**Integration Testing**

-Both the frontend and backend are connected but run on a local server as of now

**Deployment**

The app has not yet been hosted but the hosting in consideration is vercel.

**Conclusion**

We believe that once the Smart Timetable is implemented, students will be given classrooms based on their population. This will improve comfortability, thereby enhancing their ability to grasp whatever the lecturer is teaching.

**References**

- B. Sigl et al. (2003) Solving timetable Scheduling using genetic algorithm, 4th September, Page 1.

Available at: <https://ieeexplore.ieee.org/abstract/document/1225396?casa_token=jRasA5Y5qv0AAAAA:Mup66L8S_ZyAq5-7phT8q_ZHMFRvms4yZEgCJ77hfzajaxvqZsUQ_bjvMduTksiYdBj9yhyggQ>