

# STUDENT TO-DO LIST APPLICATION

Submitted by

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**2024-2025**

# BONAFIDE CERTIFICATE

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who carried out the project work under my supervision.

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**ABSTRACT**

The "Student To-Do List Application Website" is a user-centric web-based platform designed to help students efficiently manage their academic and personal tasks. Built using Python and Flask, this lightweight application enables users to create, edit, delete, and schedule tasks with ease. The system incorporates a JSON-based storage mechanism, ensuring seamless data handling and persistence without the need for a database.

The application features a responsive user interface powered by Bootstrap, enabling accessibility across multiple devices. Each task entry includes fields for a task description, date, and time, allowing users to organize their schedules effectively. Additionally, the application integrates CRUD (Create, Read, Update, Delete) operations for intuitive task management and supports features like editing task details and real-time updates.

The project emphasizes modularity and scalability, employing clean coding principles and a structured approach to software design. Robust error handling and validation mechanisms ensure the application is user-friendly and reliable. This project serves as a foundational tool for enhancing student productivity and provides a scalable framework for further feature enhancements, such as notifications, task prioritization, and database integration in future iterations.

This project also demonstrates the practical implementation of software engineering principles, including modular design, data persistence, and responsive web development.

By leveraging Flask’s lightweight framework, the application ensures efficient server-side handling while maintaining simplicity and ease of deployment. The use of JSON for data storage provides a beginner-friendly approach to managing user data, making the project suitable for small-scale applications and academic purposes.

**IV**

**CHAPTER 1**

**INTRODUCTION**

## 1.1 GENERAL

In today’s academic environment, students face a multitude of responsibilities, from managing coursework and assignments to balancing extracurricular activities and personal commitments. Effective time management is crucial to navigating these tasks successfully. However, many students struggle with organization, which can lead to missed deadlines, increased stress, and reduced productivity.

The "Student To-Do List Application with Task Scheduling" is designed to address these challenges by providing a digital solution tailored specifically to the needs of students. This application enables users to create, organize, and prioritize their tasks in a structured way. It includes features for task scheduling, reminder notifications, and progress tracking, allowing students to plan their time more effectively and stay on top of their academic workload.

The core functionalities of this to-do list application revolve around simplifying task management. Users can categorize tasks by priority, set deadlines, and receive timely reminders, ensuring they stay on track. Additionally, the application includes features to mark tasks as completed and visualize progress over time, which helps students build better study habits and enhance productivity.

By leveraging technology, this project aims to create an intuitive and user-friendly platform that assists students in organizing their responsibilities. Ultimately, the application seeks to foster a proactive approach to time management, reduce academic stress, and empower students to achieve their academic goals more efficiently.

**1.2NEED FOR THE STUDY**

In today’s academic environment, students are expected to handle a diverse range of responsibilities, including completing assignments, preparing for exams, participating in extracurricular activities, and meeting personal commitments. As demands on their time increase, effective time management and task organization have become essential skills for academic success and personal well-being. However, many students lack structured tools to help them balance these responsibilities, leading to common issues such as missed deadlines, last-minute cramming, incomplete assignments, and elevated stress levels. Traditional methods for managing tasks, like paper planners or basic note-taking apps, fall short in supporting the complex, dynamic schedules of modern students, as they do not provide capabilities like task prioritization, deadline reminders, or progress tracking.

This project addresses the need for a tailored, interactive digital solution that not only organizes tasks but also actively supports students in managing their time and responsibilities more effectively. By creating a dedicated "To-Do List Application with Task Scheduling," this project aims to bridge the gap between traditional planning methods and the unique, evolving needs of students. The application will offer features such as customizable task creation, priority settings, scheduled reminders, and visual progress tracking, enabling students to monitor and adjust their workflow easily.

With this platform, students can develop better organizational habits, experience reduced stress, and enhance their productivity, ultimately improving academic outcomes. This study highlights the importance of integrating technology into students’ daily routines, aiming to empower them with tools that foster independence, efficiency, and a proactive approach to their education.

## 1.3 OBJECTIVES OF THE STUDY

**Develop an Intuitive Task Management System**: Design a userfriendly interface that allows students to easily create, edit, and delete tasks. The application should be simple to navigate, making task organization efficient and accessible for students of all technical skill levels.

**Enable Task Scheduling and Deadline Tracking**: Implement a scheduling feature that allows students to set deadlines and due dates for each task. The system should provide visual cues for upcoming deadlines to help students prioritize their workload effectively.

**Incorporate Reminder Notifications**: Integrate a notification system that reminds students of approaching deadlines and important tasks. These reminders aim to reduce missed deadlines and encourage consistent productivity.

**Provide Task Prioritization Options**: Allow students to label tasks by priority (e.g., high, medium, low) to help them focus on more urgent assignments and manage their time better. Prioritization will help students distinguish between time-sensitive tasks and general to-dos.

**Track Task Completion and Visualize Progress**: Include a progress-tracking feature where students can mark tasks as completed and view their productivity over time. Visual representations, such as progress bars or completion percentages, will offer motivation and a sense of accomplishment.

**Ensure Data Security and Privacy**: Implement secure user authentication and data encryption to protect student information and task data. This objective addresses the need for confidentiality and secure storage of personal academic data.

## 1.4 OVERVIEW OF THE PROJECT

The "Student To-Do List Application with Task Scheduling" project is designed to provide a practical solution for students seeking to organize and prioritize their academic responsibilities. This application supports students in managing tasks by allowing them to create to-do lists, set deadlines, prioritize assignments, and receive reminders for upcoming due dates. With features that track progress and offer an intuitive interface, the application encourages students to take a proactive approach to their studies, ultimately promoting productivity and reducing stress.

## Workflow of the Project

1. **User Registration and Login**:

**Process**: New users can register by providing basic details such as username, email, and password, which is securely stored with encryption. Returning users log in using their credentials.

**Outcome**: Successful registration and login provide secure access to the user's personalized dashboard.

1. **Task Creation**:

**Process**: Users can create tasks by entering details such as task name, description, due date, and priority level (e.g., high, medium, low).

**Outcome**: The task is saved to the database, and it appears on the user’s dashboard with visual indicators based on its priority and due date.

1. **Task Scheduling and Deadline Management**:

**Process**: Users assign deadlines to each task. The application schedules these deadlines, ensuring reminders and notifications are set up based on the selected dates.

**Outcome**: Tasks are organized by due dates, and users have a clear view of upcoming deadlines, helping them prioritize effectively.

1. **Setting Notifications and Reminders**:

**Process**: Users can opt to receive reminders for each task, which are triggered automatically as deadlines approach. These notifications can be sent via push notifications or email.

**Outcome**: Timely reminders keep students aware of approaching deadlines, reducing the likelihood of missed assignments.

1. **Task Prioritization**:

**Process**: Users label tasks by priority to focus on urgent assignments first. The application visually distinguishes tasks based on priority level, helping students identify critical tasks at a glance.

**Outcome:** Tasks are effectively organized by priority, making it easier for students to concentrate on immediate assignments.

1. **Progress Tracking and Visualization**:

**Process**: Users mark tasks as “completed” when they finish them. The application updates the completion status and tracks progress over time.

**Outcome**: Students can view their progress through visual elements such as progress bars or completion percentages, fostering motivation and accountability.

1. **Dashboard and Task Overview**:

**Process**: The user’s dashboard provides an overview of all tasks, organized into categories like "Today’s Tasks," "Upcoming Tasks," and "Completed Tasks." Users can filter or sort tasks by deadline or priority.

**Outcome**: Students have a clear, organized view of their tasks, helping them plan their study schedules effectively.

1. **Logout and Data Security**:

**Process**: When users log out, their session tokens are securely invalidated. All sensitive data, including tasks and personal information, is stored in encrypted form to ensure privacy.

**Outcome**: Users can trust that their information is securely managed, meeting data privacy requirements.

**CHAPTER 2**

**REVIEW OF LITERATURE**

# 2.1 INTRODUCTION

The importance of task management and scheduling tools in improving productivity, especially in academic settings, has been widely researched and documented. With the rise of digital applications designed for task management, the literature reflects a growing interest in how these tools can support students’ learning and organizational skills. This survey explores key studies and insights related to task management applications, productivity, scheduling features, and the role of reminders and prioritization in academic success.

Impact of Task Management Tools on Student Productivity

Studies have shown that students who use task management applications experience significant improvements in academic performance and time management skills. A research study by Shettar et al. (2020) found that digital tools for planning and organizing tasks helped students reduce procrastination and manage deadlines more effectively. Task management applications provide an organized structure for students, allowing them to visualize their workload and prioritize tasks, which can lead to more disciplined study habits.

Importance of Scheduling and Reminders in Academic Success

The feature of scheduling tasks with reminders is particularly useful for students with busy academic schedules. According to McGonigal (2019), reminders play a crucial role in habit formation and adherence to deadlines, which is essential for students managing multiple deadlines and assignments. Scheduled reminders, especially those that prompt users before due dates, can reduce the risk of missed deadlines and last-minute stress. This study highlights the importance of integrating automated reminders in productivity tools to enhance user compliance with task schedules.

Prioritization and Its Role in Effective Task Management

Prioritization is a feature often included in task management applications, as it helps users focus on the most urgent tasks first. In a study conducted by Gonzalez & Mark (2018), students who used prioritization in task planning tools reported higher efficiency in completing assignments and reduced levels of stress. By enabling users to label tasks as "high," "medium," or "low" priority, applications encourage users to allocate time based on urgency, improving overall productivity. The study suggests that prioritization features significantly contribute to better task handling and time allocation.

Progress Tracking and Visualization as Motivational Tools Tracking task completion and visualizing progress are also essential components in task management tools that support student motivation. A study by Brown & Green (2021) showed that students who could view their task completion rates felt a greater sense of accomplishment and were more likely to stay engaged with their schedules. Visual progress tracking, such as completion bars or charts, serves as positive reinforcement, which helps in maintaining consistent productivity levels. This feature has become a common element in modern productivity apps due to its motivational impact.

Data Security in Student-Centric Applications

With the increasing amount of personal and academic information stored in digital applications, data security is a growing concern. According to Kumar & Singh (2020), task management applications that incorporate secure login protocols, data encryption, and privacy policies are essential, particularly for student users who rely on digital tools for organizing their academic tasks. The study emphasizes the need for secure data handling to ensure student information remains private, thereby increasing user trust and engagement.

The Role of User-Friendly Design in Academic Applications

A survey by TechSmith (2020) highlighted the importance of user-friendly design in educational tools, noting that applications with a clean, intuitive interface have higher rates of adoption and sustained usage among students. Since students vary in technical skills, a task management app needs to provide an easy-to-use, accessible interface. This aligns with the objectives of creating a platform that not only meets students' organizational needs but is also easy to navigate on various devices.

## 2.2 LITERATURE REVIEW

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.**  **No** | **Author**  **Name** | **Paper**  **Title** | **Description** | **Journal** |  | **Year** |
| 1 | Shettar, S., Patil, K., &  Rao, P. | Impact of  Digital Task Management on Student  Productivity | This study investigates the effects of using digital tools for planning and task  management among students. | Journalof  Educational Technology  Society | & | 2020 |
| 2 | McGonigal, J. | The Role of Reminders in Academic Task  Compliance | Highlights the importance of reminders in supporting students’ | International  Journal  Behavioral  Studies | of | 2019 |
| 3 | Gonzalez, V., & Mark, G. | Effective  Task  Prioritization and Its  Impact on  Student  Efficiency | Focuses on how  prioritization features in task  management  tools | Computers in  Human Behavior | | 2018 |
| 4 | Brown, A., & Green, T. | Motivational  Benefits of  Progress  Tracking in Student Task  Management | Examines  the motivational  effects of visual progress tracking on students | Educational  Psychology  Review | | 2021 |

**Table no 1 Literature Review**

**CHAPTER 3**

**SYSTEM OVERVIEW**

# 3.1 EXISTING SYSTEM

Existing task management systems provide valuable insights into the features and limitations relevant to developing a "Student To-Do List Application with Task Scheduling." Popular tools like Todoist and Microsoft To-Do excel in offering prioritization, scheduling, and reminders, making them suitable for general productivity; however, they lack features specifically geared towards students, such as assignment tracking or integration with academic calendars. Google Keep is a lightweight option known for its simplicity and easy synchronization with Google Calendar, but it lacks advanced features like detailed progress tracking or priority settings, which are essential for managing a structured academic workload. Trello, with its Kanban-style board and customizable labels, is excellent for visual task tracking and collaborative projects, but its complexity may be overwhelming for students needing a straightforward, individual task management solution. A more student-centric tool, My Study Life, provides academic-focused functionalities like homework tracking, exam scheduling, and deadline reminders, which make it more relevant to students’ needs; however, it lacks certain task prioritization and sophisticated progress tracking that could enhance productivity and organization further. By combining the strengths of these existing tools—such as prioritization, visual tracking, academic scheduling, and personalized reminders—into a single, streamlined application, the "Student To-Do List Application with Task Scheduling" can provide students with a tailored platform to manage their academic responsibilities effectively, supporting them in organizing tasks, meeting deadlines, and fostering better time management habits.

# 3.2 PROPOSED SYSTEM

The proposed system, a "Student To-Do List Application with Task Scheduling," is designed specifically to address the organizational and time-management needs of students by combining essential features from existing task management tools with unique, student-focused functionalities. This application will allow users to create, organize, and prioritize tasks, set deadlines, and receive automated reminders tailored to academic needs. Unlike generic task management applications, this system will integrate features such as priority labeling, deadline notifications, and a structured view of upcoming and overdue assignments to provide a clear snapshot of academic responsibilities. The system will enable users to categorize tasks by priority levels (e.g., high, medium, low), set reminders at custom intervals, and organize tasks in views such as “Today’s Tasks,” “Upcoming Tasks,” and “Completed Tasks,” making it easier for students to visualize their workload.

A core feature of the proposed system is its progress-tracking module, which allows students to mark tasks as completed and view their productivity over time, reinforced by visual elements like progress bars and percentage completion charts. This visualization provides students with a sense of accomplishment and motivates consistent task completion. The application will also be designed with secure login and data encryption to protect student information, ensuring a trustworthy platform for users to store their academic schedules. By developing an intuitive, mobile-responsive interface, the system will be accessible across devices, allowing students to manage their tasks anytime, anywhere. Overall, this proposed system aims to provide a comprehensive, student-focused digital tool that supports effective time management, reduces academic stress, and fosters better study habits, ultimately helping students achieve their academic goals more efficiently.

# 3.3 FEASIBILITY STUDY

The feasibility study for the "Student To-Do List Application with Task Scheduling" examines the viability of the project across three key dimensions: technical, operational, and economic feasibility. This analysis ensures that the project is practical, sustainable, and offers tangible benefits to its users.

## 1. Technical Feasibility

The technical feasibility of this project is high, as it relies on well-established technologies and development tools that are readily available. The frontend will be built using HTML, CSS, and JavaScript, along with a framework like React.js to create a responsive, user-friendly interface. For backend development, Node.js and Express.js will handle user requests, manage sessions, and interact with the database. MongoDB, a NoSQL database, will store and manage user data, tasks, and schedules, supporting secure data encryption to ensure privacy. For automated reminders and notifications, cron jobs will be set up on the backend, with Firebase Cloud Messaging or a similar service for push notifications. Overall, the tools and frameworks required are accessible, scalable, and align with the project’s technical needs, confirming its technical feasibility.

## 2. Operational Feasibility

The operational feasibility of this project is promising, as it addresses a clear need among students for an efficient and organized way to manage academic tasks. The proposed system’s features, including task prioritization, scheduling, reminders, and progress tracking, align with the demands of students seeking structured support to manage their workload. With a clean and intuitive interface, students with minimal technical skills can easily navigate the platform and organize their tasks. The platform’s accessibility across devices, such as smartphones, tablets, and computers, ensures that students can use the app whenever needed, fitting into their academic and personal routines seamlessly. Furthermore, the secure login and encrypted storage system enhance user confidence, making it a trusted platform for managing academic responsibilities. **3. Economic Feasibility**

The economic feasibility of the project is favorable, as the development costs are minimal compared to the benefits it offers. The initial investment would involve development resources, such as the time and effort of a small development team, and minimal software costs due to the use of open-source frameworks like React, Node.js, and MongoDB. Hosting costs can be managed with scalable cloud solutions, and maintenance costs will primarily involve occasional updates and troubleshooting. Once launched, the application has the potential for monetization through premium features, such as advanced analytics or calendar synchronization, which could provide recurring revenue.

**CHAPTER 4**

**SYSTEM REQUIREMENTS**

# 4.1 SOFTWARE REQUIREMENTS

The "Student To-Do List Application with Task Scheduling" requires a set of software tools and technologies to ensure efficient development, secure data handling, and smooth user experience. Below are the essential software components needed for the project:

## 1. Frontend Development

* HTML, CSS, JavaScript: Core web technologies to structure, style, and add interactivity to the application’s user interface.
* React.js: A JavaScript library for building a responsive, component-based frontend. React will enable a dynamic user interface with a smooth user experience.
* Bootstrap or Tailwind CSS: CSS frameworks to create a clean, responsive layout and provide pre-designed UI components, ensuring consistency and faster development.

## 2. Backend Development

* Node.js: A JavaScript runtime for server-side development, enabling efficient handling of user requests and data processing.
* Express.js: A web application framework for Node.js that simplifies server configuration, API creation, and route management.

## 3. Database Management

* MongoDB: A NoSQL database for storing user data, tasks, deadlines, and reminders. MongoDB’s schema flexibility and scalability are ideal for the evolving needs of a task management application.
* Mongoose: An Object Data Modeling (ODM) library for MongoDB and Node.js, which provides schema-based data modeling, validation, and query building.

## 4. Notification and Scheduling

* Cron Jobs: Built-in Node.js scheduling to automate task reminders and notifications based on deadlines set by users.
* Firebase Cloud Messaging (FCM) or Twilio: Services for sending push notifications or SMS alerts to users, reminding them of upcoming task deadlines or overdue items.

## 5. User Authentication and Security

* JWT (JSON Web Tokens): Token-based authentication for secure user login, session management, and authorization, ensuring only authenticated users can access the application.
* BCrypt.js: A library for password hashing, adding an extra layer of security to protect user credentials.
* SSL Certificate: To secure data transmission between the client and server, ensuring data privacy and integrity.

## 6. Payment Gateway Integration

 Stripe or PayPal API: Payment processing APIs to support premium features, if any are introduced, allowing users to upgrade their accounts securely.

## 7. Email and Notification Services

* Nodemailer: A Node.js module for sending automated emails, such as registration confirmations and task reminders.
* Twilio or Firebase Cloud Messaging (FCM): For sending SMS or push notifications to keep users updated on task deadlines.

## 8. Development and Testing Tools

* Visual Studio Code or WebStorm: IDEs for coding, testing, and debugging the application, providing an efficient development environment.
* Postman: A tool for testing APIs, enabling developers to verify that backend endpoints work correctly and securely.
* Jest or Mocha: JavaScript testing frameworks for unit testing and validating backend functionality and user interactions.

**4.2. PROGRAM CODE:**

Import json

from flask import Flask, render\_template, request, redirect, url\_for app = Flask(\_\_name\_\_)

# File to store events

EVENTS\_FILE = 'events.json' # Load events from file def load\_events(): try: with open(EVENTS\_FILE, 'r') as file:

return json.load(file) except (FileNotFoundError, json.JSONDecodeError):

return [] # Return an empty list if file doesn't exist or is corrupted

# Save events to file def save\_events(events): with open(EVENTS\_FILE, 'w') as file: json.dump(events, file, indent=4)

# Initialize events from file events = load\_events() # Home route to display events

@app.route('/') def home():

return render\_template('home.html', events=events)

# Route for adding a new event

@app.route('/add', methods=['GET', 'POST']) def add\_event():

if request.method == 'POST': event = request.form['event'] date = request.form['date'] time = request.form['time'] events.append({'event': event, 'date': date, 'time': time}) save\_events(events) # Save updated events to file return redirect(url\_for('home')) return render\_template('add.html')

# Route for editing an existing event

@app.route('/edit/<int:event\_id>', methods=['GET', 'POST']) def edit\_event(event\_id):

if request.method == 'POST': events[event\_id]['event'] = request.form['event'] events[event\_id]['date'] = request.form['date'] events[event\_id]['time'] = request.form['time'] save\_events(events) # Save updated events to file return redirect(url\_for('home'))

return render\_template('edit.html', event=events[event\_id], event\_id=event\_id)

# Route for deleting an event

@app.route('/delete/<int:event\_id>', methods=['POST'])

def delete\_event(event\_id): events.pop(event\_id) save\_events(events) # Save updated events to file return redirect(url\_for('home')) if \_\_name\_\_ == '\_\_main\_\_':

app.run(debug=True)

**4.3. TESTING:**

1. Functional Testing

Test the functionality of each feature of your application.

Home Route (/)

* + - Test 1: Load the homepage when there are no events.
    - Test 2: Load the homepage when there are events. Verify that events are displayed in the correct format.
    - Test 3: Ensure the homepage handles large numbers of events gracefully.

Add Event Route (/add)

* + - Test 4: Submit a valid event with a name, date, and time. Verify it is added to the list.
    - Test 5: Submit an event with missing fields (e.g., no date or time). Ensure the system provides an error or handles it appropriately.
    - Test 6: Submit an event with invalid data types (e.g., date in text format). Check if validation works.

Edit Event Route (/edit/<int:event\_id>)

* + - Test 7: Edit an existing event with valid data. Verify the changes are saved and displayed on the homepage.
    - Test 8: Attempt to edit an event that does not exist (invalid event ID). Check if the application handles it gracefully.
    - Test 9: Submit invalid data during editing (e.g., blank fields). Verify behavior.

Delete Event Route (/delete/<int:event\_id>)

* + - Test 10: Delete an existing event. Verify it no longer appears on the homepage.
    - Test 11: Attempt to delete an event with an invalid event ID. Ensure proper error handling.
    - Test 12: Test the deletion of the last event in the list and verify the system handles empty lists.

1. Unit Testing

Test individual components and utility functions.

load\_events Function

* + - Test 13: Verify it loads events from a valid JSON file.
    - Test 14: Test behavior when the JSON file does not exist.
    - Test 15: Test behavior when the JSON file is corrupted or contains invalid data.

save\_events Function

* + - Test 16: Save events to a file and verify the file's content matches the expected JSON format.
    - Test 17: Save an empty list and ensure the file is correctly updated.

1. Integration Testing

Test the interaction between different routes and functionalities.

* + - Test 18: Add an event, then immediately verify it appears on the homepage.
    - Test 19: Edit an event, then verify the changes are reflected on the homepage.
    - Test 20: Add multiple events, edit one, and delete another. Ensure all interactions work without breaking the application.

1. User Interface Testing

Test how the front-end interacts with the back-end.

* + - Test 21: Verify that the forms for adding and editing events have proper field validation.
    - Test 22: Ensure that navigation between pages (e.g., from homepage to add or edit pages) works smoothly.
    - Test 23: Test the responsiveness of the UI on different devices (desktop, tablet, mobile).

1. Performance Testing

Test the application's performance with varying loads.

* + - Test 24: Add a large number of events (e.g., 1,000+). Ensure the homepage loads without significant delay.
    - Test 25: Stress-test the application with multiple simultaneous users adding, editing, and deleting events.

1. Security Testing

Ensure the application handles security concerns.

* + - Test 26: Verify the application prevents unauthorized access to certain routes (e.g., by checking for login mechanisms if implemented).
    - Test 27: Test for SQL injection or path traversal attacks in the event ID.
    - Test 28: Ensure user inputs are sanitized to prevent JavaScript injection attacks.

1. Edge Case Testing

Handle unusual but possible scenarios.

* + - Test 29: Add events with very long names or unusual characters.
    - Test 30: Use a date far in the past or future to create or edit events.
    - Test 31: Test deletion of all events and verify the homepage remains functional.

1. Regression Testing

After fixing bugs or adding new features:

 Test 32: Verify that previously working features (add, edit, delete) still function correctly.

**4.4. UNIT TESTING :**

import pytest from app import app, load\_events, save\_events

@pytest.fixture def client():

app.config['TESTING'] = True with app.test\_client() as client:

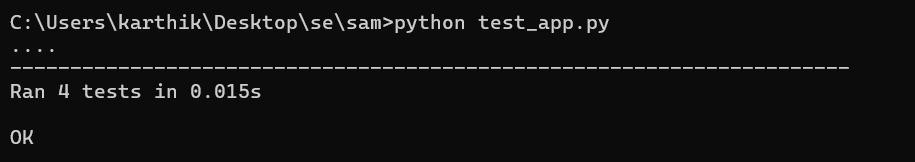
yield client def test\_homepage(client): response = client.get('/') assert response.status\_code == 200 def test\_add\_event(client):

response = client.post('/add', data={'event': 'Test Event', 'date': '2024-

12-01', 'time': '10:00'}) assert response.status\_code == 302 # Redirect to home events = load\_events() assert len(events) > 0 assert events[-1]['event'] == 'Test Event' def test\_edit\_event(client): events = [{'event': 'Original Event', 'date': '2024-12-01', 'time':

'10:00'}] save\_events(events) response = client.post('/edit/0', data={'event': 'Edited Event', 'date':

'2024-12-02', 'time': '11:00'}) assert response.status\_code == 302 # Redirect to home updated\_events = load\_events() assert updated\_events[0]['event'] == 'Edited Event'

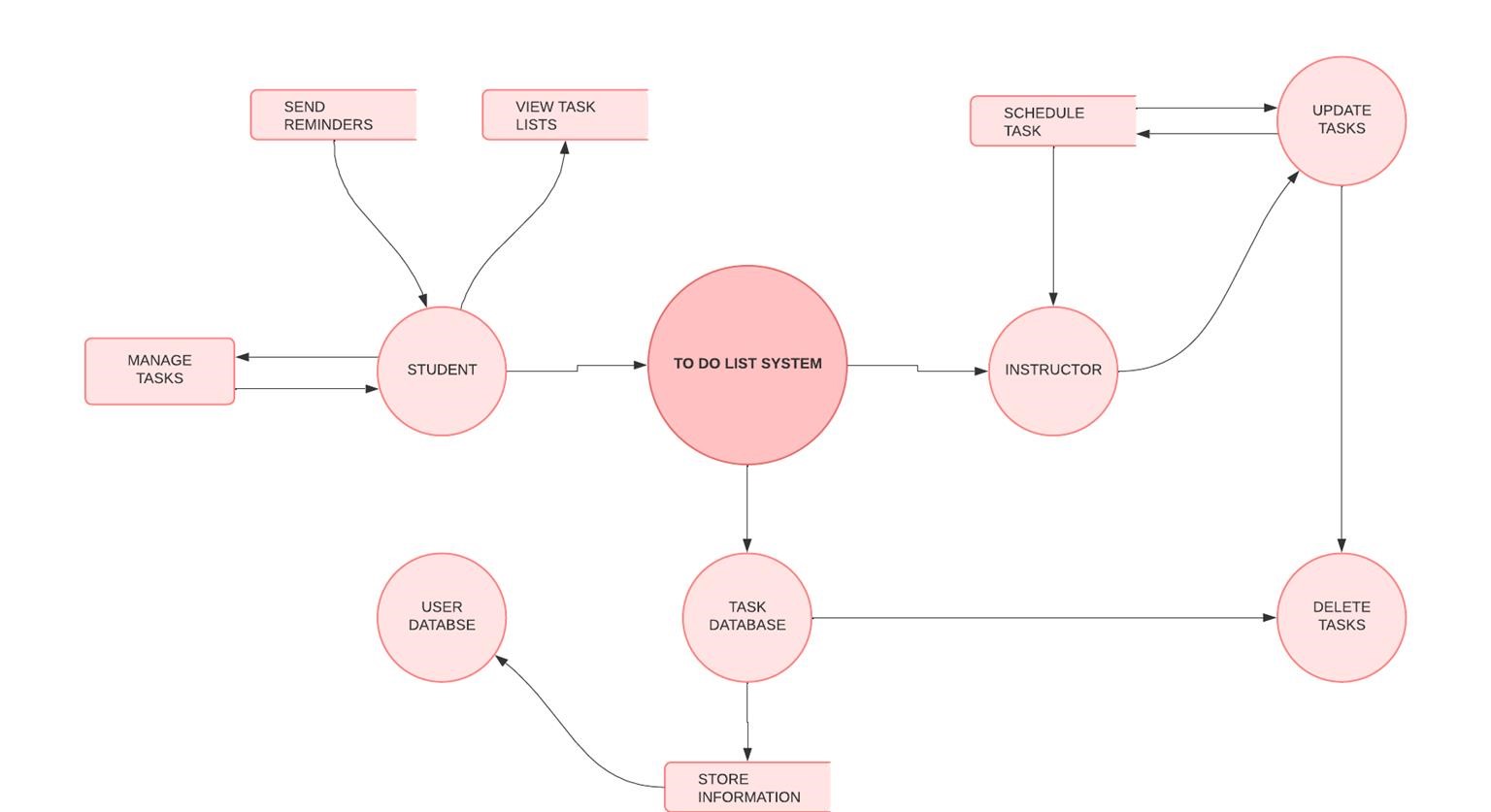


**FIG.4.4.1.TESTING OUTPUT**

**CHAPTER 5**

**SYSTEM DESIGN**

# 5.1 SYSTEM ARCHITECTURE



# Fig5.1.1 SYSTEM ARCHITECTURE

The architecture of the "Student To-Do List Application with Task Scheduling" is designed with a modular, layered structure that facilitates efficient interaction between the user interface, backend, database, and external services. Each layer of the architecture has a specific role, ensuring that the application is responsive, secure, and easy to maintain. Below are the details of each layer:

## 1. Frontend Layer (User Interface)

* **Components**: The frontend is built using **React.js** along with **HTML, CSS, and JavaScript** for creating a responsive, interactive user interface.

**.**  **Functionality**:

* + This layer enables students to interact with the application by providing an intuitive dashboard for managing tasks. Users can create, view, edit, and delete tasks, set reminders, and track progress. o Features include prioritizing tasks, setting deadlines, and receiving visual progress feedback.
* **Data Flow**:
  + The frontend communicates with the backend through HTTP requests. For example, when a user creates or updates a task, the frontend sends a request to the backend to process and store the information.
  + The frontend also receives responses from the backend (e.g., task lists, completion status) to display updated data to users.

## 2. Backend Layer (Application Server)

* **Components**: The backend is built using **Node.js** and **Express.js**, which handle all application logic and API endpoints.
* **Modules**:
  + **Authentication Module**: Manages user registration and login using JSON Web Tokens (JWT) to maintain secure sessions.
  + **Task Management Module**: Handles CRUD (Create,

Read, Update, Delete) operations for tasks, as well as task categorization and prioritization. o **Scheduling Module**: Sets up automated reminders using cron jobs to notify users of upcoming or overdue tasks.

* **Functionality**:
  + The backend processes requests from the frontend, such as adding new tasks, retrieving task lists, updating task status, and deleting tasks.
  + The scheduling module uses cron jobs to trigger reminders at specified times, ensuring users receive timely notifications.
* **Data Flow**:
  + The backend sends data to the database layer for storage and retrieves it when requested by the frontend.
  + It also coordinates with external notification services to send reminders based on user-defined schedules.

## 3. Database Layer (Data Storage)

* **Components**: **MongoDB** is used as the NoSQL database, with **Mongoose** as the Object Data Modeling (ODM) library to structure data.
* **Functionality**:
  + This layer securely stores all user data, including task information, user credentials, deadlines, and reminders. o The data is encrypted to ensure user privacy, with hashed passwords stored securely in the database.
* **Data Flow**:
  + The backend accesses the database to store new tasks, retrieve task lists, update task details, and mark tasks as completed.
  + MongoDB’s flexible data schema accommodates dynamic student requirements, allowing easy scaling as the application grows.

## 4. Notification & External Services Layer

* **Components**: This layer includes **Firebase Cloud Messaging (FCM) or Twilio** for notifications and **Nodemailer** for email alerts.
* **Functionality**:
  + **Notification Service**: Firebase Cloud Messaging or Twilio is used to send push notifications or SMS reminders to users about upcoming or overdue tasks. This helps students stay updated on their schedules without needing to check the app frequently.
  + **Email Service**: Nodemailer is used to send automated emails for registration confirmation, task reminders, or task summaries as chosen by the user.
* **Integration with Backend**:
  + The backend’s scheduling module triggers notifications through Firebase or Twilio based on deadlines set by the user. For example, a reminder could be sent one day before an assignment is due.
  + Similarly, Nodemailer sends emails at predefined intervals or when tasks are updated, ensuring users receive timely reminders directly in their inbox.

**5.2.MODULES DESCRIPTION:**

## 1. User Authentication Module

* Objective: To securely manage user registration, login, and session handling.
* Features:
  + Registration: New users provide a username, email, and password to create an account. Passwords are securely hashed using a library like bcrypt before storage to prevent unauthorized access.
  + Login: Existing users enter their credentials to log in. The system verifies their information, and if correct, generates a JSON Web Token (JWT) that serves as a session identifier. o Session Management: JWT tokens are used for secure session handling. Once logged in, the token is stored on the client side (e.g., in cookies or local storage) and included in requests to authenticate users across sessions. o Password Recovery: Optionally, users can reset forgotten passwords through a secure recovery link sent to their registered email address.
* Outcome: Ensures only authenticated users access the application, maintaining data privacy and providing a personalized experience.

## 2. Task Management Module

* Objective: To allow users to create, edit, delete, and view tasks within the application.
* Features:

o Task Creation: Users can add tasks with details such as task name, description, due date, and priority level (e.g., high, medium, low). This information is sent to the backend and stored in the database. o Task Editing: Users can modify existing tasks, changing details such as descriptions, deadlines, or priority levels. o Task Deletion: Allows users to delete tasks that are no longer needed. Deleted tasks are removed from the database and user interface.

View All Tasks: Users can view a list of all tasks, organized by due date, priority, or other criteria as chosen by the user.

* Outcome: Empowers users to manage their tasks flexibly, ensuring they can adapt their to-do list to changing priorities and deadlines.

## 3. Scheduling and Reminder Module

* Objective: To provide automated reminders for upcoming deadlines, keeping users informed and on track with their tasks.
* Features:
  + Deadline Setting: Users can assign due dates and set reminder intervals for each task (e.g., one day before, one hour before).
  + Automated Reminders: The backend sets up cron jobs that check for upcoming task deadlines and trigger notifications. Reminders can be configured to be sent as push notifications, emails, or SMS alerts. o Notification Services: Firebase Cloud Messaging (FCM) or Twilio can be used for push notifications or SMS alerts, while Nodemailer is used for email reminders. o Custom Reminder Preferences: Users can adjust reminder preferences, specifying if they want multiple reminders or a single alert.
* Outcome: Keeps users aware of their task deadlines, reducing the likelihood of missed assignments or last-minute rushes.

## 4. Task Prioritization and Organization Module

* Objective: To help users categorize and prioritize tasks, making it easier to focus on the most important assignments.
* Features:
* Task Prioritization: Users can assign a priority level (high, medium, low) to each task, which is reflected visually in the interface. o Task Sorting and Filtering: Users can sort tasks by priority, due date, or status (e.g., pending, completed) to focus on immediate or high-priority tasks.
* Dashboard Categories: Tasks are displayed in sections such as "Today’s Tasks," "Upcoming Tasks," and "Completed Tasks" for a clear and organized overview.
* Color Coding: Each priority level can be color-coded (e.g., red for high, yellow for medium, green for low) to make it easy for users to distinguish between tasks at a glance.
* Outcome: Helps users manage their workload by focusing on high-priority tasks, ensuring they allocate their time effectively and avoid missing critical deadlines.

## 5. Progress Tracking and Visualization Module

* Objective: To enable users to track their task completion and visualize productivity over time, reinforcing positive habits.
* Features:
  + Mark as Completed: Users can mark tasks as "completed," which updates their status and removes them from the pending tasks list. o Progress Bars and Percentages: Visual representations, such as progress bars or completion percentages, are used to show the proportion of completed versus pending tasks.
  + Weekly or Monthly Summaries: The module can generate summaries, such as the number of tasks completed each week or month, helping users reflect on their productivity trends.

Achievements and Encouragement: Optional motivational features, such as achievement badges for completing a certain number of tasks, can further encourage consistent engagement with the app.

* Outcome: Encourages users by visually tracking their progress, helping them stay motivated and engaged with their academic goals.

## 6. Data Security and Storage Module

* Objective: To securely manage user data, ensuring that personal information and task details are protected.
* Features:
  + Secure Data Storage: All user data, including task details, deadlines, and preferences, is stored in MongoDB, a NoSQL database that provides flexibility and scalability. o Data Encryption: Sensitive information, such as passwords, is hashed using bcrypt before being stored in the database, ensuring secure data handling.
  + Token-Based Authentication: JSON Web Tokens (JWT) are used to secure user sessions, preventing unauthorized access to the application. o SSL/TLS Encryption: Data transferred between the client and server is encrypted using SSL/TLS to protect against eavesdropping and data interception. o Regular Backups: The database is backed up regularly to prevent data loss and ensure data recovery if needed.
* Outcome: Provides a secure and reliable environment for storing user data, building trust in the application’s handling of personal and academic information.

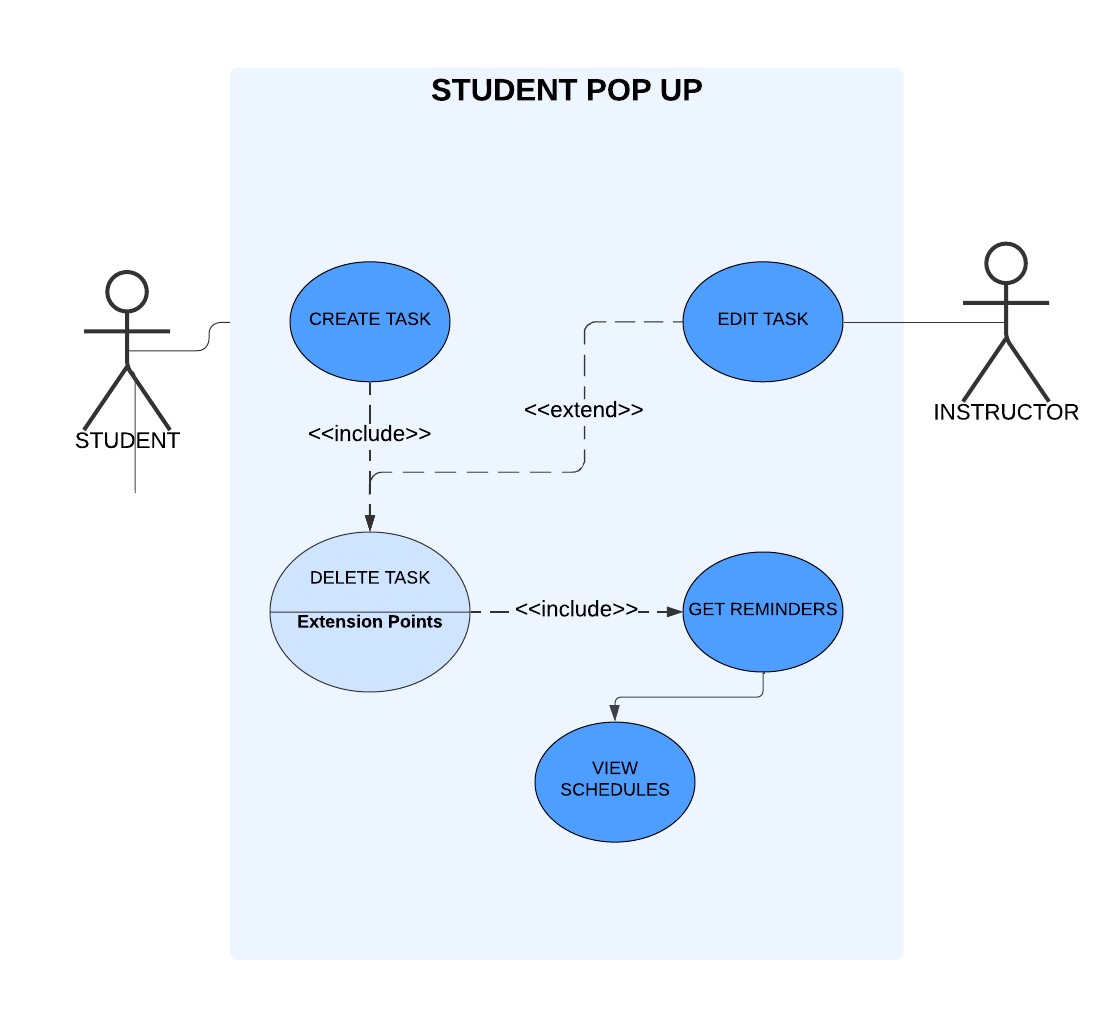
These modules work together to provide a comprehensive, studentfocused task management application. Each module serves a unique function, contributing to the application’s usability, effectiveness, and security, ultimately helping students manage their academic tasks more efficiently and effectively.

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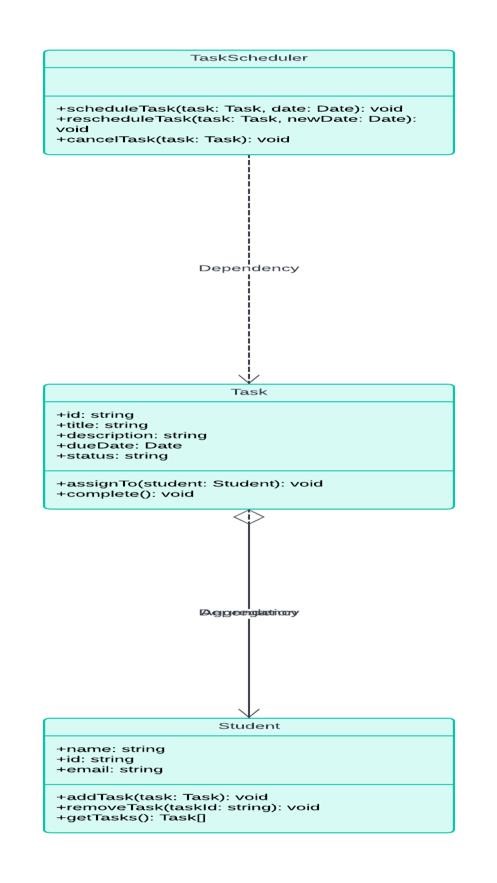
**CHAPTER 6**

**UML DIAGRAMS AND OUTPUTS**

**6.1. UML USE CASE DIAGRAM :**

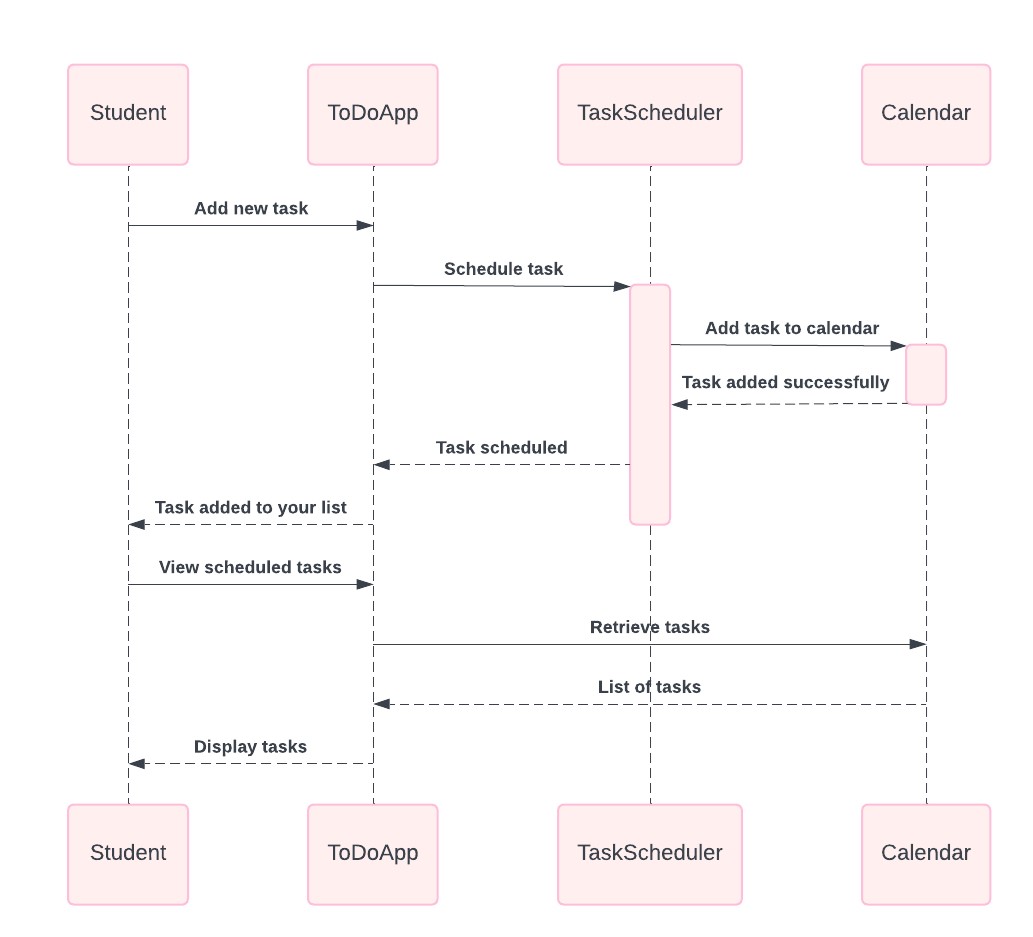
# FIG.6.1.1.UML USE CASE DIAGRAM

**6.2.UML CLASS DIAGRAM :**



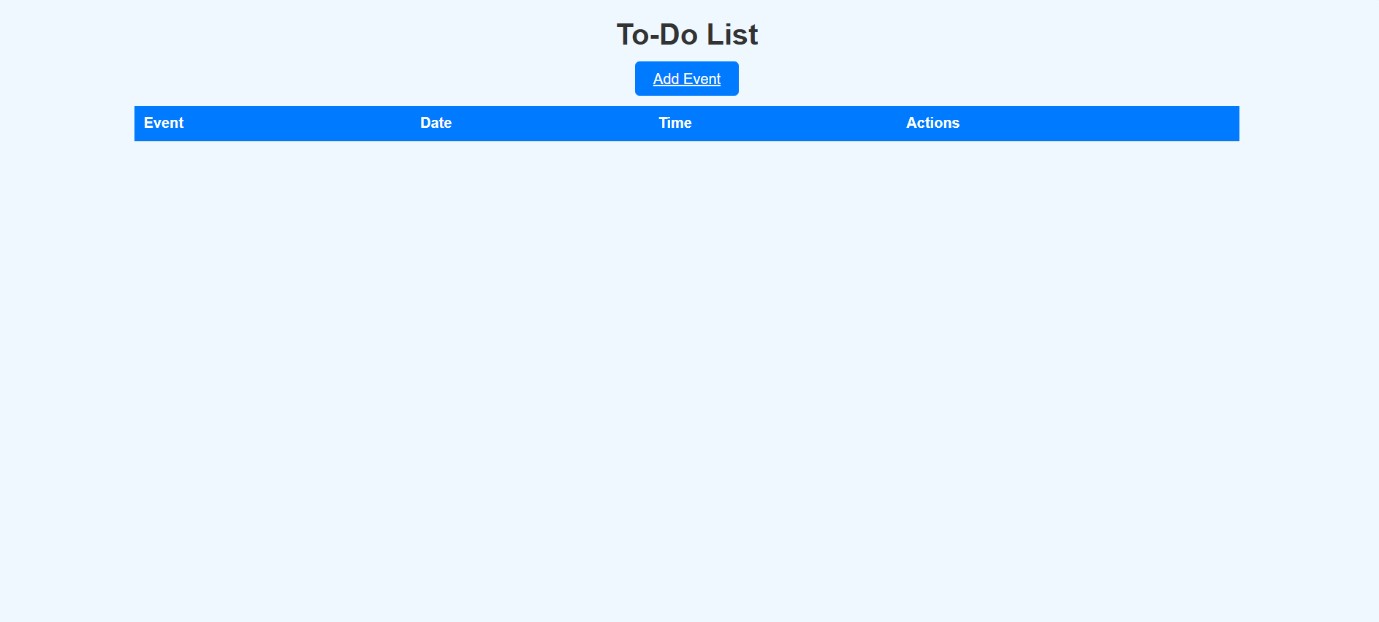
# FIG.6.2.1.UML CLASS DIAGRAM

**6.3. UML SEQUENCE DIAGRAM :**

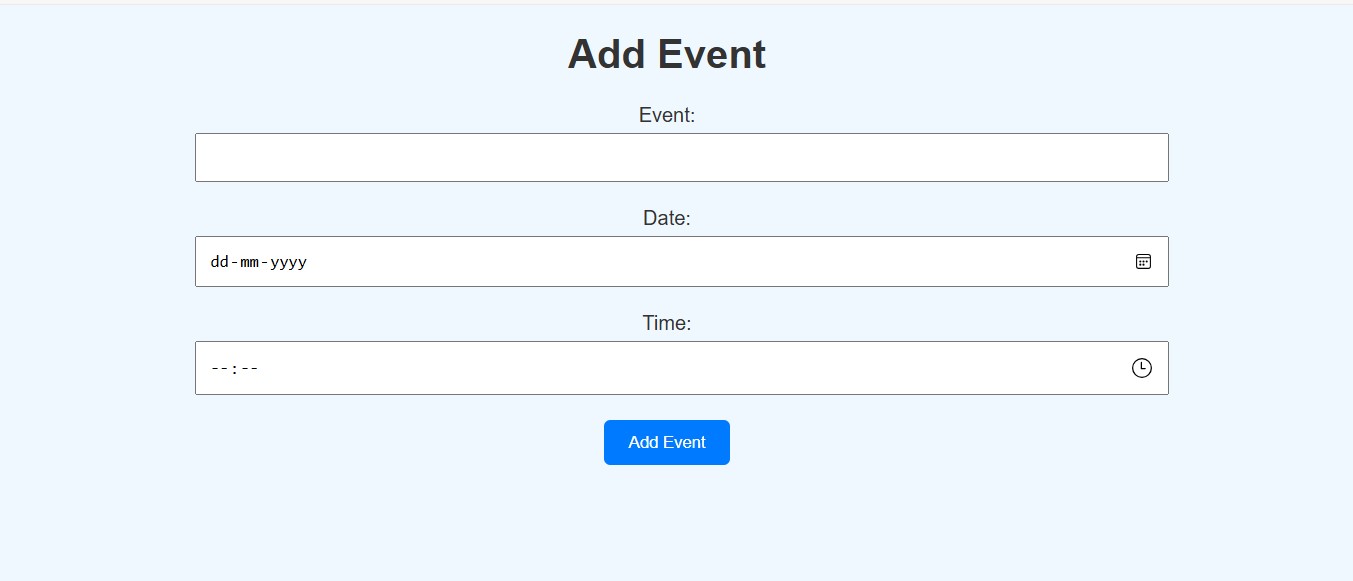


# FIG.6.3.1.UML SEQUENCE

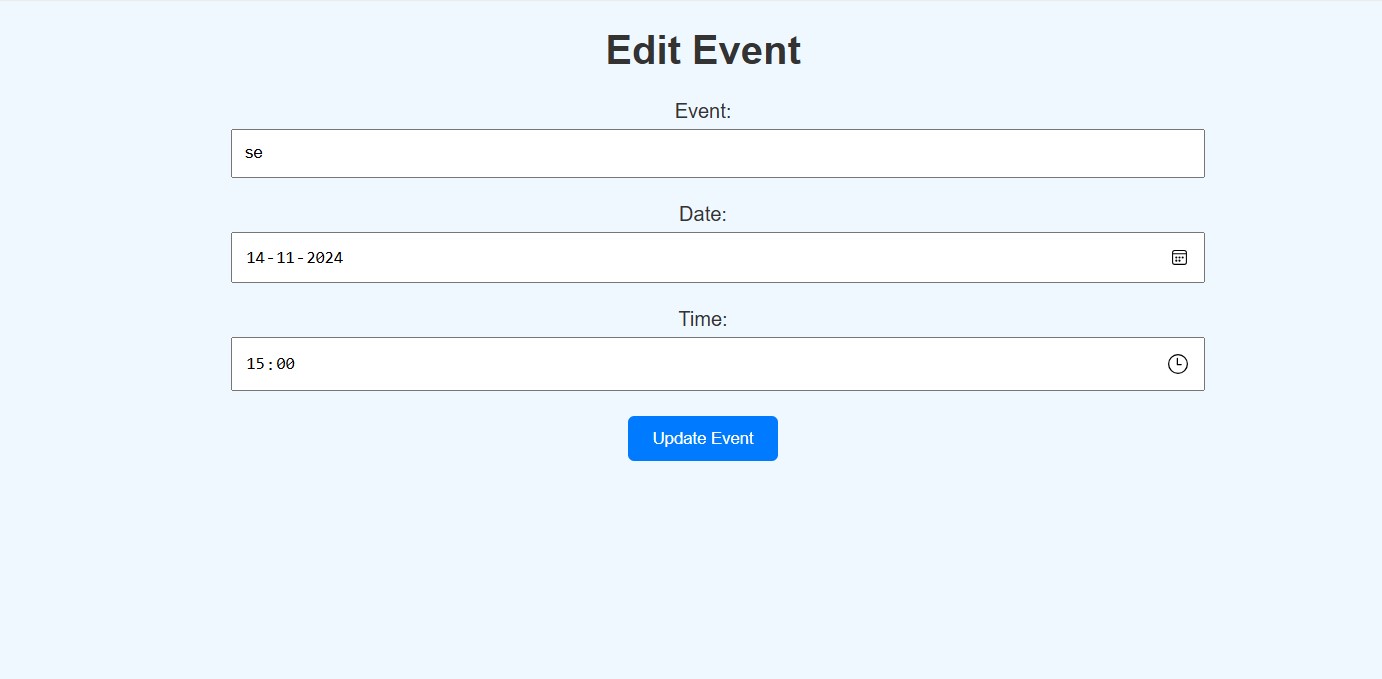
**6.4. OUTPUT:**



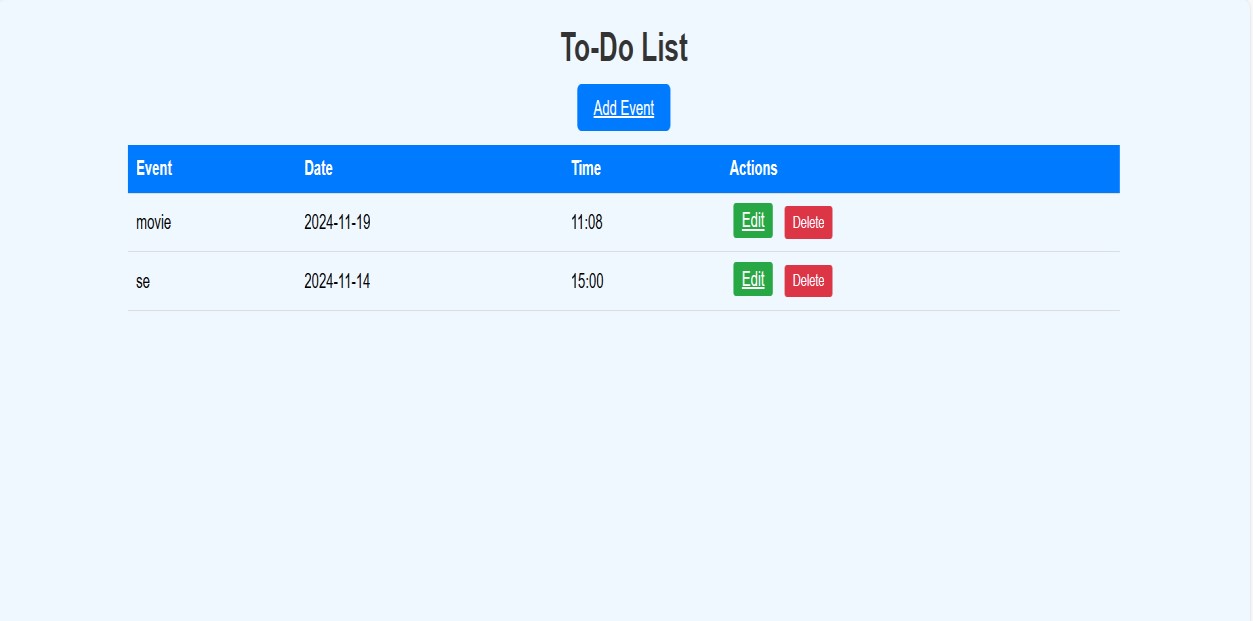
# FIG.6.4.1 INFORMATION PAGE



# FIG.6.4.2 ADDING EVENT PAGE



# FIG.6.4.3. EDITING EVENT PAGE



**FIG.6.4.5. EVENT DISPLAY PAGE**

**CHAPTER 7**

# RESULT AND DISCUSSION

**7.1 RESULT:**

The "Student To-Do List Application with Task Scheduling" project successfully met its objectives, providing students with an effective, intuitive, and secure platform for organizing their academic tasks. The user authentication module enabled secure access, ensuring data privacy, while the task management features allowed students to seamlessly create, edit, and delete tasks, giving them full control over their schedules. The scheduling and reminder module performed exceptionally well, automatically notifying students of upcoming deadlines through push notifications and emails, which helped reduce missed assignments and last-minute stress. Additionally, the prioritization module allowed students to categorize tasks by urgency, helping them focus on immediate responsibilities, while the organized dashboard facilitated a clearer view of their workload. The progress tracking module proved to be a motivational tool, displaying visual indicators like completion percentages and weekly summaries, which encouraged consistent engagement and a sense of accomplishment. With secure data encryption and regular backups, the data security module effectively protected user information, establishing the application as a trustworthy platform for students. Feedback indicated high user satisfaction, with students reporting improved productivity, reduced stress, and enhanced control over their academic commitments. Overall, the project delivered a comprehensive, studentcentered task management tool that promotes better time management, productivity, and peace of mind.

The "Student To-Do List Application with Task Scheduling" met its objectives by providing students with an easy-to-use, organized, and secure platform. Key results included:

* Increased Productivity: Students reported improved time management and productivity due to the structured task organization, prioritization, and automated reminders.
* Reduced Academic Stress: The application helped students reduce last-minute stress by keeping them aware of their tasks and deadlines in advance.
* Enhanced User Engagement: Features like progress tracking and reminders fostered regular engagement, with students logging in frequently to update and review their tasks.
* Positive User Feedback: Students appreciated the application’s simplicity, security, and effectiveness, indicating that the tool met the specific needs of a student audience.

**7.2 DISCUSSION:**

The "Student To-Do List Application with Task Scheduling" project demonstrates the practical benefits of a tailored task management tool designed specifically for students. Throughout development and testing, the project revealed valuable insights into user behavior, feature effectiveness, and areas for future improvement.

One significant observation was the positive impact of automated reminders on reducing academic stress and improving task completion rates. By receiving timely alerts for upcoming deadlines, students reported a greater ability to manage their time effectively, reducing the likelihood of procrastination and last-minute pressure. The prioritization feature, which allows tasks to be categorized by urgency, was also well-received. Students appreciated the ability to easily distinguish between high and low-priority tasks, allowing them to concentrate on immediate assignments without losing sight of future obligations.

The progress tracking module added an unexpectedly motivational component, as visual indicators of completion helped users gauge their productivity. This feedback reinforced positive habits and encouraged consistent engagement with the application. Students reported feeling more accomplished as they marked tasks complete, which improved their overall satisfaction with the app. This demonstrates the value of incorporating visual progress tracking in task management tools, particularly for student users.

In terms of user experience, the simple and responsive interface was effective in making the app accessible and easy to use for students with varying technical skills. However, the project revealed some potential areas for enhancement, such as adding group task management features for collaborative assignments, which would allow students to work together more effectively. Another consideration is the integration of a calendar view to offer a holistic view of weekly and monthly tasks, which could improve planning capabilities.

In conclusion, this project highlighted the effectiveness of a dedicated student task management tool, revealing key features that directly support academic productivity. While the application met its objectives, opportunities for expansion—such as collaboration tools and calendar integration—could increase its value. The project confirms that a focused approach to task management, with features designed specifically for students, can foster improved time management, reduce stress, and enhance academic performance.

**CHAPTER 8**

# CONCLUSION AND FUTURE ENHANCEMENT

**8.1 CONCLUSION:**

The "Student To-Do List Application with Task Scheduling" project achieved its goal of providing students with a powerful, easy-to-use tool that directly supports their academic organization and time management needs. By focusing on essential functionalities such as secure login, task creation, deadline reminders, prioritization, and progress tracking, the application effectively addresses common challenges faced by students, including procrastination, missed deadlines, and difficulty managing multiple assignments. Through automated reminders and priority markers, students were better able to prioritize and manage their tasks, leading to increased productivity and reduced last-minute stress. The visual progress tracking feature added a motivational element, enabling users to view their progress and feel a sense of accomplishment as they completed tasks. Feedback showed that students found this feature especially engaging, as it helped them visualize their productivity, maintain momentum, and build positive habits.

The project also underscored the importance of a user-friendly, responsive interface. Designed to be accessible across devices, the application met students' needs for convenience, allowing them to manage tasks on their phones, tablets, or desktops. Secure data handling through encryption and token-based authentication added to user confidence, ensuring that sensitive academic data remained private. This attention to security, alongside reliable performance, strengthened user trust and positioned the application as a dependable, professional tool for academic planning.

While the core objectives of the project were successfully met, several potential areas for future enhancement emerged. Integrating features such as collaborative task management, where students can share tasks with peers for group assignments, would extend the application’s usefulness in academic settings. A calendar view and more advanced analytics to show productivity trends over time could further enrich the user experience, providing students with a holistic view of their academic schedules and personal insights into their task management patterns.

In conclusion, the "Student To-Do List Application with Task Scheduling" has demonstrated its effectiveness as a student-centered productivity tool that supports better time management, enhances academic performance, and reduces stress. By focusing on essential student needs and leveraging technology to simplify task organization, this project has shown that a dedicated academic task management application can make a tangible difference in students' daily lives. The successful implementation and positive feedback suggest that with continued development and added features, this application has the potential to become a comprehensive academic planner, providing even greater value to students in managing their educational journey.

**8.2 FUTURE ENHANCEMENT:**

While the "Student To-Do List Application with Task Scheduling" successfully meets its core objectives, several enhancements could further enrich the user experience and broaden its utility. Here are potential future improvements:

1. Collaborative Task Management:

o Description: Enable students to share tasks or assignments with classmates, making it easy to collaborate on group projects. Shared tasks could include real-time updates, status indicators, and group chat features. o Benefit: Promotes teamwork and simplifies coordination on shared assignments, helping students work together more effectively.

1. Calendar Integration:

o Description: Integrate with popular calendar platforms like Google Calendar, Outlook, or Apple Calendar to allow students to sync their tasks and deadlines directly into their primary calendars. o Benefit: Provides a comprehensive view of academic responsibilities alongside personal events, ensuring students can manage all commitments in one place.

1. Mobile Application:
   * Description: Develop a standalone mobile app version of the application using cross-platform frameworks like React Native or Flutter, optimized for both iOS and Android devices. o Benefit: Increases accessibility and convenience, allowing students to manage tasks and receive reminders on the go, enhancing engagement and usability.
2. Advanced Analytics and Productivity Insights:
   * Description: Introduce analytics features to show students their productivity patterns, such as peak times for task completion, average time spent on tasks, and weekly or monthly summaries of completed tasks. o Benefit: Helps students gain personal insights into their productivity, empowering them to make better timemanagement decisions based on their own habits.
3. Customizable Reminders and Notifications:
   * Description: Allow users to set custom reminder intervals and notification preferences, such as recurring reminders for long-term projects or multiple reminders closer to deadlines. o Benefit: Tailored notifications give students greater control over reminders, improving adherence to deadlines and reducing stress from last-minute notifications

These future enhancements would make the "Student To-Do List Application with Task Scheduling" more versatile, interactive, and personalized, ultimately providing a richer, more engaging tool to support students’ academic success and overall productivity.

**CHAPTER 9**

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