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TestForge: MSBTE Exam Scheduling System

Nilesh V. Patil[1], Aditya Sanjay Patil[2], Rehan Irfan Nadaf[3], Vedant Anil Raut[4]
Vishwaraj Deepak Savairam[5], Abubakr Siddique S. Nadaf[6]
Lecturer, Department of Computer Engineering (Diploma)[1]
Students, Department of Computer Engineering (Diploma)[2,3,4,5,6]
Rajarambapu Institute of Technology, Islampur, India

Abstract: *TestForge: A Smarter Way to Manage MSBTE Exam Centers TestForge is a modern web-based system developed to simplify and improve how MSBTE end-semester exams are conducted at exam centers. Built using Next.js and FastAPI, the platform handles essential tasks such as generating exam timetables, assigning blocks, preparing seating charts, and managing inventory automatically. It also includes digital marksheets for better and faster record-keeping. With features like real-time updates, automated reports, and efficient resource allocation, TestForge helps reduce the workload of exam center staff. This system brings more accuracy, less manual effort, and smoother exam operations. This paper explores how TestForge works and its benefits in streamlining exam center processes.*

Keywords: Maharashtra State Board of Technical Education (MSBTE), Examination Management, Block Allocation, Next.js Framework, FastAPI Backend, Automated Report Generation, Seating Chart Design, Inventory Tracking and Management

I. INTRODUCTION

Handling end-semester exams at a large scale is a complex responsibility for any academic board. For the Maharashtra State Board of Technical Education (MSBTE), managing exams across several centers involves coordinating timetables, seating plans, invigilation duties, and records—all of which can be time-consuming and error-prone when done manually.

To overcome these issues, TestForge has been introduced—a smart, web-based system built using Next.js and FastAPI. It automates important functions like retrieving timetables, block allocation, generating seating charts, and managing inventories. The system also includes e-marksheets to simplify and digitize student records.

With the help of modern Information Technology, TestForge brings more accuracy, real-time updates, and better efficiency to exam management. It significantly reduces the manual workload for staff, improves how resources are used, and makes the exam process smoother and more reliable.

II. NEED OF PROJECT

Conducting end-semester examinations on a large scale, as done by MSBTE, involves complex coordination across several centers. Tasks like preparing timetables, allocating exam blocks, arranging seating plans, and managing inventory are traditionally handled manually, often resulting in delays, miscommunication, and human errors.

To eliminate these inefficiencies, there is a growing demand for an automated and reliable system that can manage these operations smoothly. TestForge is designed to fulfill this need by providing a web-based platform powered by Next.js and FastAPI. It automates key processes such as timetable access, seating chart creation, block assignments, and e-marksheet integration while maintaining accuracy and speed.

The project aims to reduce manual workload, improve operational efficiency, and offer real-time data management. Implementing TestForge at exam centers can significantly enhance exam conduction by bringing in structure, accuracy, and ease of management.

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III. PROBLEM DEFINITION

Managing MSBTE exams manually across multiple centers leads to delays, errors, and high administrative workload. Tasks like timetable creation, block allocation, seating arrangements, and inventory tracking are inefficient without automation. The lack of a centralized, real-time system makes coordination difficult and reduces overall accuracy. There is a need for a digital solution that streamlines exam conduction and minimizes manual effort.

IV. METHODOLOGY TO SOLVE THE PROBLEM

To address the inefficiencies in manual exam handling, TestForge is designed as an online platform using Next.js for the user interface and FastAPI for server-side operations. The system is developed with a focus on automation, accuracy, and ease of use.

The methodology involves the following steps:

Input Gathering: Collecting necessary details such as exam dates, room capacities, and student information.

Process Automation: Automatically generating timetables, assigning exam blocks, creating seating charts, and tracking inventory.

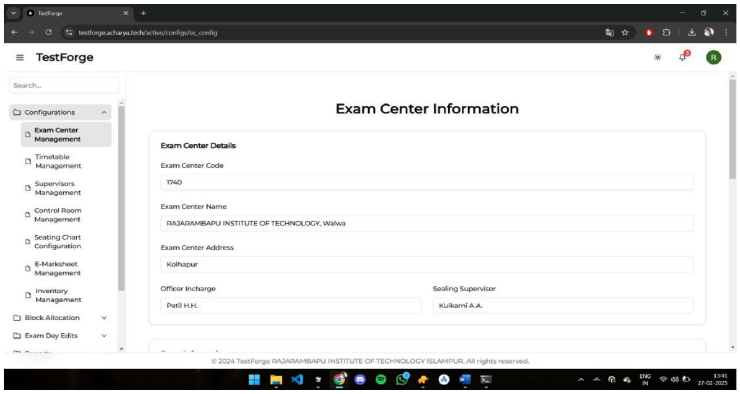
E-Marksheet Integration: Digitally managing student records for faster and error-free documentation.

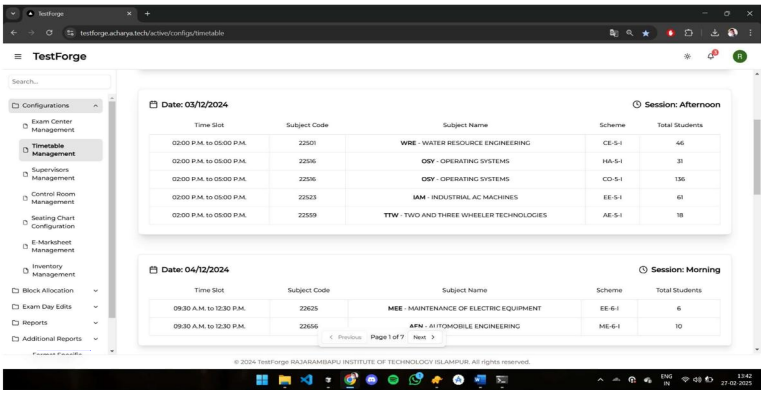
Live Updates: Displaying real-time changes and notifications to keep all stakeholders informed.

User-Friendly Design: Ensuring the interface is simple, interactive, and accessible for exam center staff.

This systematic approach reduces manual effort, improves coordination, and enhances the overall management of examination activities.

A. Output





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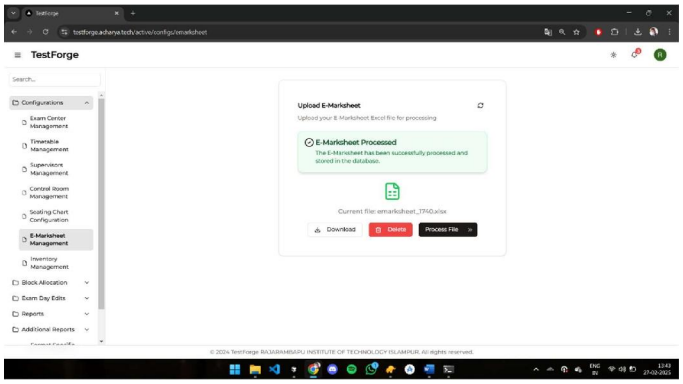

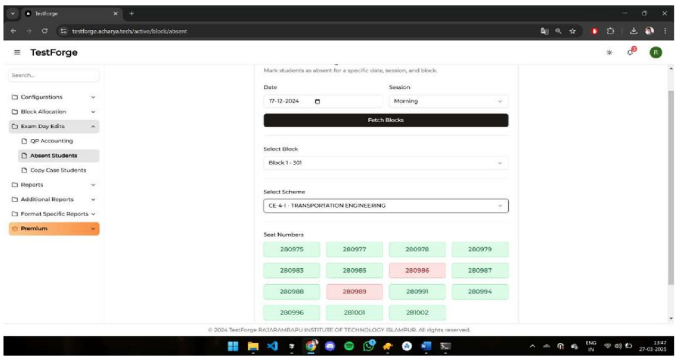

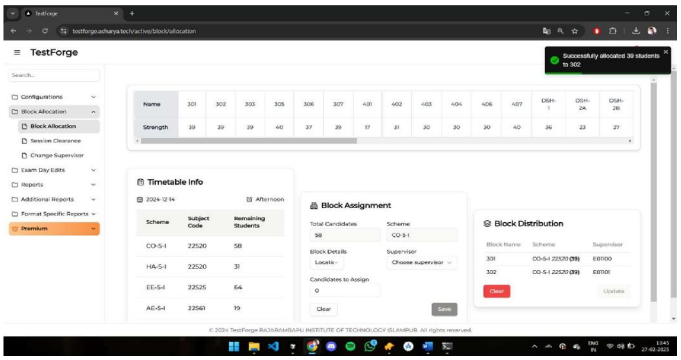

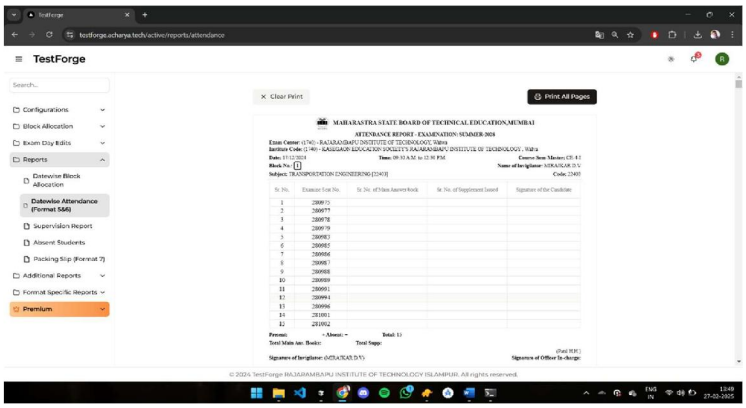

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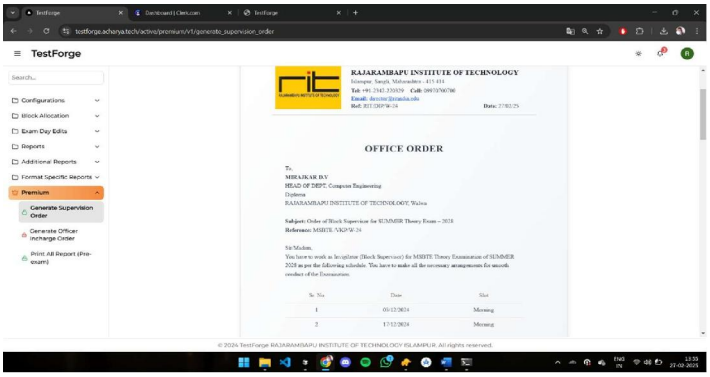

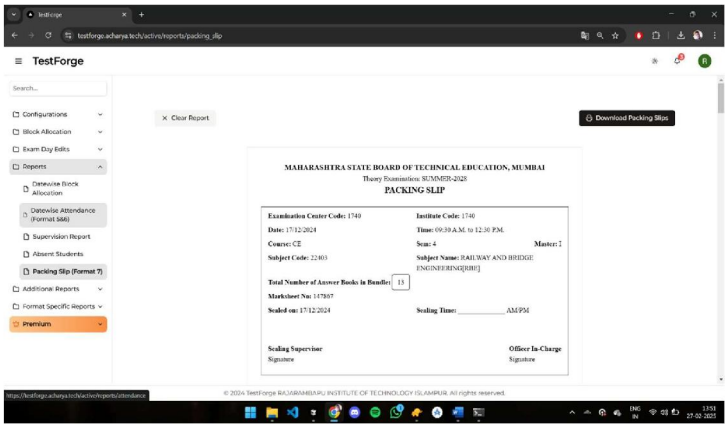

***B.* Training and Testing Algorithm**

The TestForge system uses an algorithmic approach to optimize exam-related processes. This includes training and testing phases for key components like block allocation, seating arrangements, and data management. Here's an overview of the process:

Training Phase:

- Data Collection: Gather historical data from past exams (e.g., timetables, room allocations, and seating arrangements).
- Algorithm Development: Develop algorithms to automate tasks such as seat assignments, block allocation, and inventory management.
- Pattern Recognition: The system learns from past data to understand patterns and constraints (e.g., number of students, room capacity, etc.).

Testing Phase:

- Model Validation: Test the algorithm with new data to ensure accuracy and consistency in generating timetables, seating charts, and block assignments.
- Real-World Scenarios: Simulate live exam conditions to check if the system can adapt to changes (e.g., last-minute schedule adjustments or resource reallocations).
- Performance Metrics: Measure system performance based on time efficiency, accuracy of seating arrangements, and resource utilization.

The training and testing process helps improve system reliability and ensures that TestForge delivers optimal performance in managing MSBTE exams.

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V. CONCLUSION

In conclusion, TestForge offers a robust solution to the challenges faced in managing end-semester examinations at MSBTE centers. By automating critical tasks such as timetable generation, block allocation, seating chart creation, and inventory management, the system significantly reduces manual effort, enhances accuracy, and ensures smooth coordination across exam centers.

Through its integration of modern technologies like Next.js and FastAPI, TestForge not only improves operational efficiency but also provides real-time updates, ensuring that exam staff are always informed and prepared. The system's ability to manage e-marksheets further streamlines record-keeping, contributing to a more organized and effective examination process.

Ultimately, TestForge serves as an essential tool in modernizing the examination management process, minimizing administrative burdens, and fostering an environment where exams can be conducted more efficiently and accurately.

VI. ACKNOWLEDGEMENT

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