Chemical Store Room Management System

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Abstract: Chemical store room management is a crucial process that ensures the safe storage, handling, and monitoring of chemicals, particularly in educational and research environments. The main goal of this system is to ensure the safety of time, and maintain the integrity of the chemicals. The system targets all individuals who handle, store, or are in proximity to chemicals, including incharge and teachers. Across all sectors, particularly in research and laboratory, there's a growing emphasis on effective chemical management. It involves the coordinated efforts of teachers, who are responsible for guiding students in the safe use of chemicals during practical sessions; the incharge, who manages inventory, storage conditions and labeling; and the admin, who oversees policy implementation, budgeting, and regulatory adherence. A well-structured system promotes accountability, minimizes risks, and working environment for all involved.

Keywords: Chemicals, chemical store, management, risks, teacher.

INTRODUCTION

The Chemical Store Room Management System is designed to improve safety, accuracy, and efficiency in managing chemical inventories within research and laboratory environments. It replaces traditional manual methods with a digital platform that enables staff to add and manage stock, track usage, and maintain up-to-date records. Teachers can easily request and monitor chemicals for academic and laboratory use, ensuring safe handling, timely access, and proper documentation. The system promotes transparency, reduces delays, and supports compliance.

For store in-charges and administrators, the platform offers centralized tools to oversee inventory, process teacher requests, and generate reports for audits. It minimizes waste, prevents stockouts, and ensures chemicals then chemicals are issued according to regulations. Administrators can update stock levels, and monitor process within department through an intuitive dashboard. Overall, the system enhances coordination, supports regulatory compliance, and provides a user-friendly solution for managing chemical workflows in laboratories.

PROBLEM

Current problems in chemical store room management include reliance on manual record-keeping, which often leads to errors, misplaced chemicals, and difficulty in tracking stock levels. Limited visibility of inventory causes delays, stockouts, while the lack of real-

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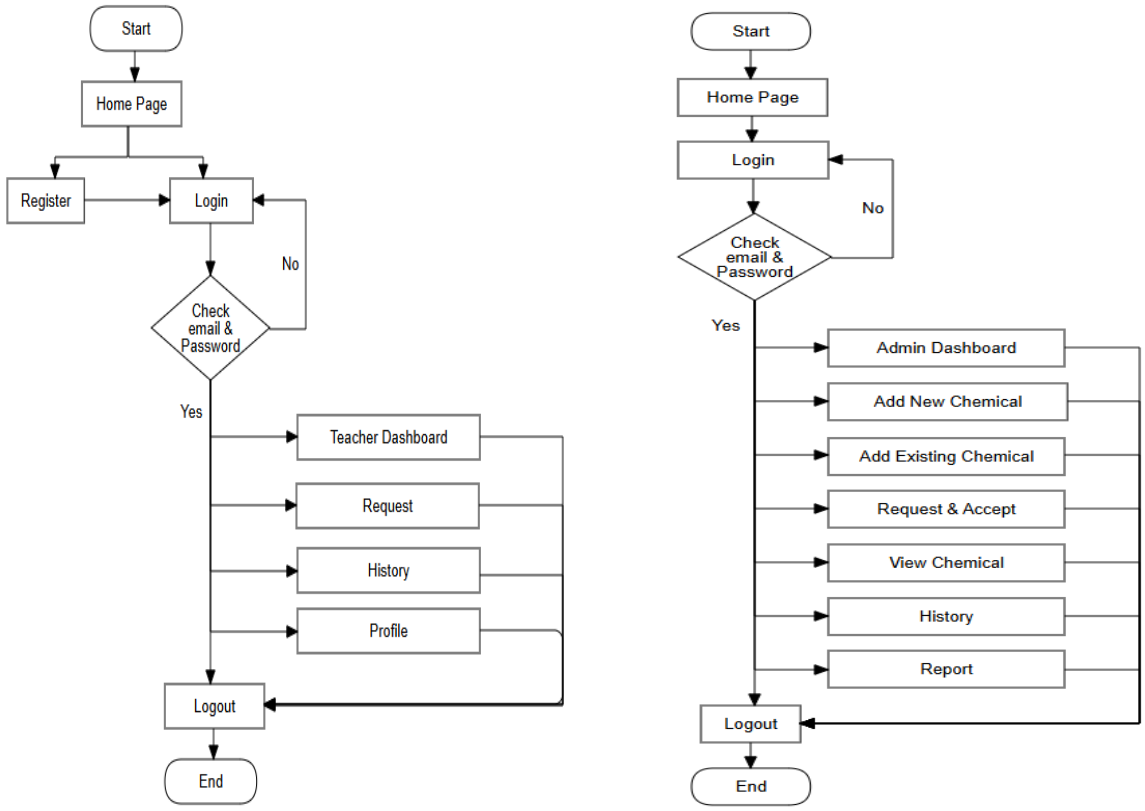
time updates makes it hard to plan laboratory activities efficiently. Safety risks also arise from improper storage, incomplete documentation, and failure to follow compliance protocols. Additionally, processing requests manually can cause time-consuming for in-charge staff, create communication gaps between teachers, technicians, and administrators. These challenges can reduce efficiency, increase waste, and compromise both safety and accountability in laboratory operations.

APPROACH

The Chemical Store Room Management System is designed to make chemicals handling easier for teachers, in-charge staff, and admins. Teachers can create accounts, log in, check available chemicals, and send requests online instead of using paper, which makes the process faster and more convenient.

The in-charge staff plays a key role by reviewing and approving teacher requests. Once a request is approved, the chemical is taken from the store, and the system automatically updates the stock records. This keeps inventory accurate and up to date at all times.

Admins have the highest level of control, as they manage stock levels, oversee requests and approvals, ensure safety rules are followed, and set permissions for users. Future versions will add useful features like low-stock alerts, smart search, automatic reports, and multi-device access. Regular updates will improve the system's performance and safety, helping schools and laboratories save time, reduce errors, and handle chemicals more effectively.



Teacher **Admin**

Figure 1: Flow chart for the system

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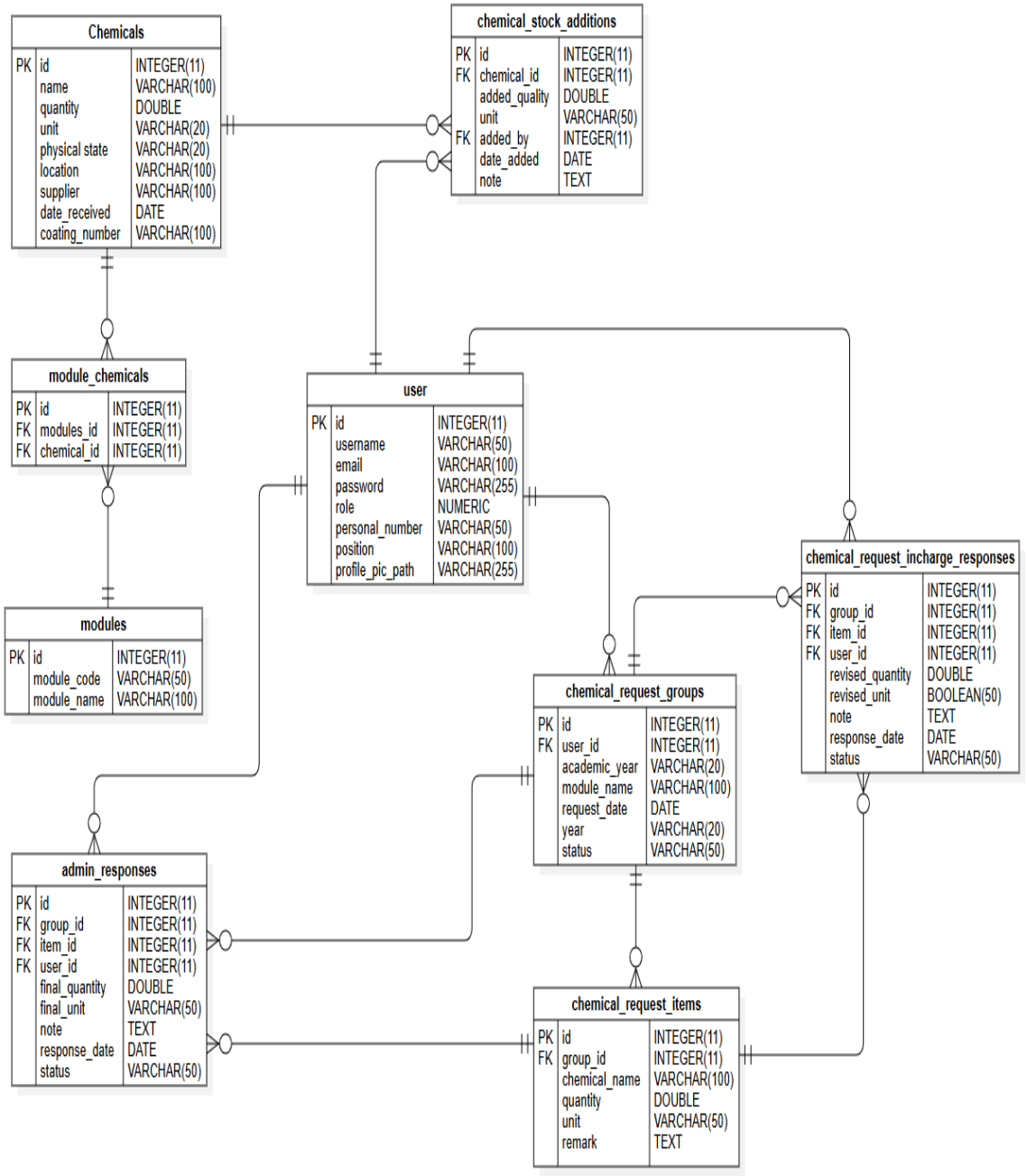

Figure 2 Entity Relationship for Chemical Store Room Management System

The provided ER diagram presents a meticulously designed database structure for a chemical storeroom management system, consisting of eleven interrelated tables. This design is robustly built to handle the complexities of managing chemical inventory, user roles, and the entire request and fulfillment process. At its core, the Chemicals table serves as the central repository for all chemical data, including key details like name, quantity, and physical state, ensuring an accurate and up-to-date inventory. The Chemical Stock Additions table provides a detailed history of all new chemical entries, crucial for auditing and tracking inventory changes.

The user and organizational management are handled by the User and Modules tables, which define the user roles and departmental affiliations, respectively. These tables are linked to the Module Chemicals table to regulate access and allocate chemicals to the specific research groups. The system efficiently processes requests through a two-tiered structure: the Chemical

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Request Groups table organizes requests by the user and date, while the Chemical Request Items table details the specific chemicals and quantities requested. This separation ensures clarity and traceability. Finally, the Admin Responses and Chemical Request Incharge Responses tables provide a comprehensive audit trail for the approval process, recording administrator and in-charge actions, revised quantities, and final decisions, which is essential for accountability and system integrity. This integrated structure ensures that all aspects of chemical management from inventory control to request fulfillment are seamlessly and efficiently handled. Figure 2 shows the database design of the system.

RESULTS

When the customers or users first login the system, they will arrive at the home page. This page is the starting point for all users. At the top, there is a navigation bar that clearly shows the main functions available. In this navigation bar, there are options for Admin login, Incharge login, and Teacher. For teachers, there are also Login and Register buttons so they can create a new account or enter the system with their details. This simple design helps every user quickly understand where to go and what to do. Even first-time users will not get confused because everything is placed in a clear and organized way.

The Incharge Dashboard is one of the most important pages in the system. It gives a central place for the incharge to manage all teacher requests. Whenever a teacher submits a request for chemicals, it will appear in this dashboard. The request includes useful details such as the name of the requested chemical, how much quantity is needed, any remarks from the teacher, and the current status of the request. The incharge can look at the details carefully, make changes or add new remarks if it is required, and then forward the request to the admin. This step ensures that the workflow is systematic, well-recorded, and easy to follow. It also prevents mistakes because all requests go through proper checking before the final approval.

The main panel inside the dashboard provides a quick overview of key information, such as the most used chemical e.g., Acetone and the status of requests (approved or pending). It also displays the total number of chemicals in stock, requests made by teachers, and includes a low stock alert to help the incharge and admin plan ahead and prevent shortages.

On the left side of the page, there is a sidebar menu that makes navigation simple and fast. From here, the incharge or admin can go to different pages. They can add new chemicals, view the list of existing chemicals, and even check reports about chemical usage. Reports can show how many requests were made in a month, which chemicals were used the most, and which ones are still in storage. This information is very useful for keeping records and making better decisions about ordering and storing chemicals. The sidebar keeps everything one click away, so the users don’t waste time searching.

Teachers, incharge, and admin can all view the information they need without any difficulty. Each role has different permissions, so the users only view the pages that are useful for their tasks. For example, teachers mainly request chemicals, while the incharge manages teacher requests, and the admin monitors everything. This separation makes the system safe and organized. Figure 3 shows the actual implementation of the system. The figure also shows how information flows between teachers, incharge, and admin, making the process more transparent and reliable.

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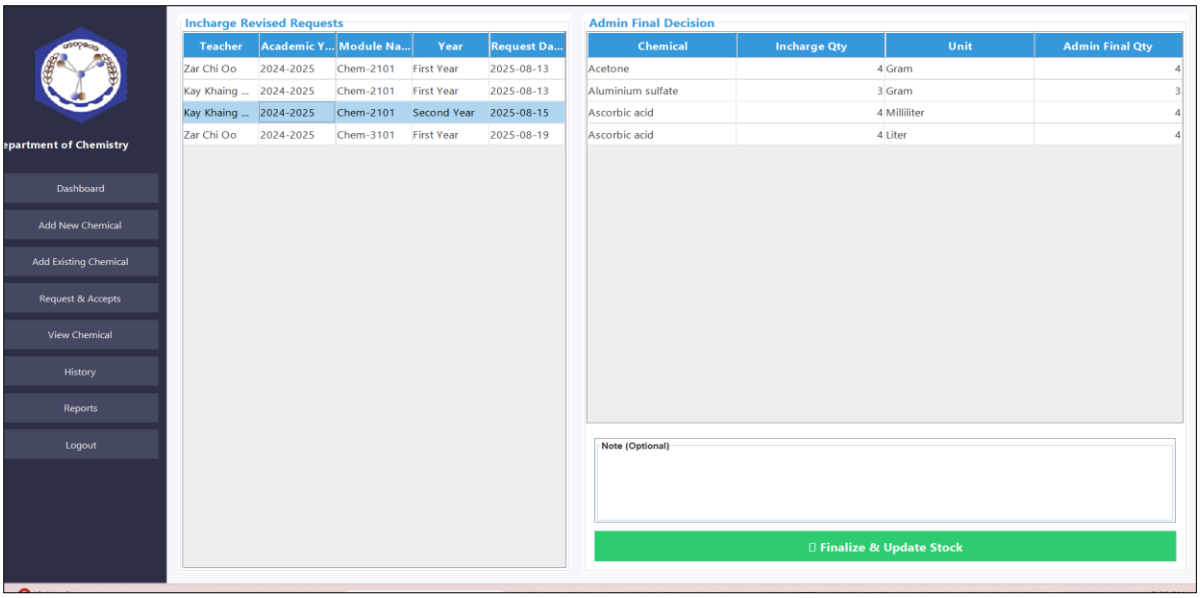

Figure 3 Dashboard for Admin

CONCLUSION

The Chemical Store Room Management System (CSMS) ensures a safe, organized, and efficient environment for handling chemicals, benefiting teachers, students, incharges, and administrators alike. It enhances classroom learning by tracking chemical usage and promoting safe practices, while also automating tasks like inventory control, reordering, and SDS management for the incharge. For administrators, the CSMS provides valuable insights into chemical consumption, costs, and safety compliance, supporting better budgeting and institutional oversight. Overall, the system fosters a culture of safety, accuracy, and accountability within the laboratory environment.

REFERENCES

[1] Bloch, J., “Effective Java (3rd ed.)”, Addison-Wesley Professional, Boston, USA, 2018.
[2] Deitel, P. J., & Deitel, H. M., “Java: How to Program (11th ed.)”, Pearson Education, London, UK, 2017.
[3] Downey, A., “Think Java: How to Think Like a Computer Scientist”, O’Reilly Media, Sebastopol, USA, 2012.
[4] Eckel, B., “Thinking in Java (4th ed.)”, Prentice Hall, Upper Saddle River, USA, 2006.
[5] Farrell, J., “Java Programming. Cengage Learning”, Boston, USA, 2018.
[6] Gosling, J., Joy, B., Steele, G., & Bracha, G., “The Java Language Specification (3rd ed.)”, Addison-Wesley, Boston, USA, 2005.
[7] Horstmann, C. S., “Core Java Volume I: Fundamentals (11th ed.)”, Pearson Education, Boston, USA, 2019.
[8] Horton, I., “Beginning Java. Apress”, New York, USA, 2018.
[9] Lafore, R., “Data Structures and Algorithms in Java (2nd ed.)”, Sams Publishing, Indianapolis, USA, 2018.

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www.ucsh.edu.mm