A

Mini Project Report

on

LABTRACKER-Lab Inventory and Expense Manager

Submitted in partial fulfillment of the requirements for the

degree

Third Year Engineering – Information Technology

by

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CERTIFICATE

This to certify that the Mini Project report on **LABTRACKER-Lab Inventory and Expense Manager** has been submitted by Yash Jain (21104041), Karan Jain (21104008), Swapnil Joshi (21104005) and Urvi Joshi (21104100) who are bonafide students of A. P. Shah Institute of Technology, Thane as a partial fulfillment of the requirement for the degree in **Information Technology**, during the academic year **2023-2024** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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This project would not have come to fruition without the invaluable help of our guide **Prof. Sonal Jain**. Expressing gratitude towards our HoD, **Dr. Kiran Deshpande**, and the Department of Information Technology for providing us with the opportunity as well as the support required to pursue this project. We would also like to thank our project coordinator **Prof. Randeep Kaur** who gave us his/her valuable suggestions and ideas when we were in need of them. We would also like to thank our peers for their helpful suggestions.

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ABSTRACT

The Inventory & Expense Management System is a powerful and indispensable tool that we've developed to help businesses enhance their competitive edge and streamline their operations. In the complex and ever-evolving landscape of modern business, effective inventory and expense management stands as a critical facet of achieving success, and our comprehensive system has been meticulously designed to address these challenges comprehensively. At its core, the system offers a game-changing real-time inventory tracking feature that is invaluable to organizations of all sizes. This real-time monitoring capability empowers businesses to keep a constant eye on stock levels, item locations, and statuses, enabling them to respond swiftly to market demands. This not only prevents the dreaded issue of stockouts but also eliminates the costly problem of overstocking, which can tie up capital and storage space. To further augment efficiency in inventory management, we've incorporated barcode scanning technology, making the processes more accurate and significantly faster.

On the expense management front, our system offers a suite of sophisticated tools that empower businesses to take control of their finances. It allows for the categorization of expenses, bringing an element of clarity to the often complex world of financial management. This empowers businesses to gain granular insights into where their money is being spent, enabling them to identify cost centers and areas where cost-cutting measures can be implemented to boost profitability. The system also facilitates the digital storage of receipts, ushering in an era of paperless expense management. This not only reduces clutter but also simplifies the auditing process, ensuring compliance with financial regulations. In addition, the multi-level approval workflows embedded in the system address one of the most common pain points in business expense management. These workflows ensure that expenses are reviewed and approved by the appropriate individuals, enhancing financial control and accountability, which is vital for businesses looking to improve their bottom line.

Our system also provides financial reporting and data visualization tools that transform raw data into meaningful insights. These tools offer a clear view of key performance indicators, trends, and areas requiring attention, allowing for data-driven decision-making. Furthermore, the system offers forecasting and budgeting capabilities, assisting organizations in setting achievable financial targets and efficiently allocating resources, thereby ensuring long-term financial health. The system's support for vendor and supplier management is crucial for maintaining a reliable and efficient supply chain. Features for tracking vendor performance, managing contracts, and negotiating favorable terms all contribute to improved supplier relationships, which are fundamental to business success.In summary, the Inventory & Expense Management System simplifies inventory and expense management, offers valuable financial insights, and supports efficient vendor and supplier management. It's designed to make your business more efficient, cost-effective, and ultimately more successful in today's competitive business landscap.

Chapter 1

Introduction

Colleges and universities are constantly changing, with new students and resources joining the community all the time. This growth creates a need to manage inventory and money efficiently. However, this can be difficult for individuals, especially department heads, who must oversee large inventories and create complex financial budgets. Doing these things by hand takes a lot of time and effort, and it also uses a lot of paper, which is not good for the environment.

To address these challenges, we have developed LabTracker, an innovative system that automates administrative tasks for college and university leaders. LabTracker automates financial budgeting, so department heads don't have to do it by hand. This saves time and effort, and it also makes the budgets more accurate and consistent. LabTracker also uses a paperless approach, so college and university presidents can approve budgets digitally.

The rest of this report will explain all of the features and benefits of LabTracker in detail, and it will show how it can revolutionize the way colleges and universities manage their inventory and money. LabTracker is an efficient, sustainable, and technologically advanced solution to the challenges faced in higher education institutions.

1.1. Purpose:

The LabTracker inventory management website is a dedicated platform with the primary purpose of helping educational institutions efficiently manage their inventory and financial resources. It provides a comprehensive set of features that automate and streamline key administrative tasks, such as:

- Budget planning and monitoring: LabTracker helps institutions create and manage budgets for their various departments and programs. It also provides real-time insights into spending patterns and budget variances, enabling institutions to make informed financial decisions.
- Inventory tracking and management: LabTracker helps institutions track their inventory levels in real time, ensuring that they always have the necessary supplies and equipment on hand. It also provides tools for managing inventory procurement, storage, and distribution.
- Financial reporting and analysis: LabTracker generates comprehensive financial reports that provide insights into historical and current financial performance. This information can be used to identify trends, track progress toward goals, and make informed decisions about resource allocation.

- Paperless workflow: LabTracker embraces a paperless approach, eliminating the need for manual data entry and record keeping. This saves time and effort and also reduces the environmental impact of the institution.
- User accessibility: LabTracker is designed to be user-friendly and accessible to all levels of staff, from department heads to college presidents. This ensures that everyone has the information and tools they need to make informed decisions about budget planning and resource allocation.
- Scalability: LabTracker is a scalable solution that can be tailored to the needs of institutions of all sizes. Whether you are a small community college or a large research university, LabTracker can help you improve the efficiency and effectiveness of your inventory management and financial planning processes.

1.2. Problem Statement

- Complex and time-consuming budgeting procedures:
    - Budgeting procedures in educational institutions typically involve multiple departments and stakeholders, each with its own input and requirements. This can lead to a complex and time-consuming process, as different groups must coordinate and reconcile their requests.
    - Traditional budgeting methods often rely on manual data entry and analysis, which can be error-prone and inefficient.
    - Budgeting cycles are often annual, which can make it difficult to respond to unexpected changes in financial conditions or priorities.

- Reliance on manual paperwork:
    - Manual paperwork is still widely used in educational institutions, despite the risks of errors, lost documents, and delays.
    - Paper-based budgeting processes can be difficult to track and audit.
    - Manual paperwork can also be costly and environmentally unfriendly.

- Lack of user accessibility:
    - Traditional budgeting processes are often designed for accountants and financial professionals. This can make it difficult for other stakeholders, such as department heads and program directors, to understand and participate in the process.
    - Budgeting software can be expensive and complex, making it inaccessible to some educational institutions.

- Negative consequences:
    - Inaccurate and outdated budgets can lead to financial overruns, missed deadlines, and difficulty in making informed decisions about resource allocation.
    - Workflow delays and administrative burdens can reduce employee morale and productivity.
    - Lack of user accessibility can prevent stakeholders from participating in the budgeting process and understanding their financial responsibilities.

Overall, the complex, time-consuming, and paper-based budgeting procedures in educational institutions can lead to a number of negative consequences. These challenges can be addressed by implementing a comprehensive budget management solution that is automated, user-friendly, and accessible to all stakeholders.

1.3. Objectives:

- To reduce dependence on paperwork by generating digital reports also it reduces the cost dynamically
- To generate dynamic reports by comparing the current year's budget with previous years.
- To make real time budget updates and standardise the format of budget report.
- To provide the userfriendly interface which helps faculties and higher authorities to navigate and use the system effectively.

1.4. Scope:

The implementation of this project holds several advantages for educational institutions. Firstly, it can significantly alleviate the administrative burden on staff members by automating various tasks related to budgeting. This automation not only saves time but also enhances accuracy in financial management processes. Secondly, the project can be a valuable tool for informed financial decision-making. It offers real-time insights and the ability to compare budgets across different years, aiding administrators in making data-driven choices. Furthermore, the system fosters collaboration among different departments and faculties within the institution by providing a centralized platform for budget management and financial communication. Lastly, its seamless integration with existing educational management systems ensures a smooth workflow, minimizing disruption and maximizing the efficiency of the entire institution's financial operations.

Chapter 2

Literature Review

REPORT 1: Automation of Inventory Management Process

The report on the "Automation of Inventory Management Process" delves into the challenges faced by Victoria Insglass Ltd. due to their inefficient and error-prone manual inventory record system. This system leads to inefficiencies, including labor-intensive processes and slow operations, resulting in inaccurate records and potentially costly stockouts. The proposed solution advocates the adoption of an automated inventory management system, leveraging a database to centralize and digitize inventory data and facilitate report generation for real-time inventory tracking. This automation promises enhanced efficiency, as it reduces manual labor, and improved accuracy, reducing the risk of human errors. Additionally, it enables real-time inventory tracking, offering a proactive approach to managing stock levels and mitigating the financial risks associated with inaccurate inventory records. In essence, the implementation of this automated system is expected to address the aforementioned challenges and enhance Victoria Insglass Ltd.'s inventory management capabilities.

RESEARCH PAPER 1: A Review of Inventory Management System

This research paper highlights the critical significance of effective inventory management for businesses, pointing out the problems that can arise when this aspect is neglected, including stockouts and poor customer service, which can have adverse financial and customer satisfaction repercussions. To address these issues, the paper recommends the implementation of an inventory management system in the form of a web application, enabling businesses to streamline sales tracking and inventory management. A central emphasis is placed on the benefits of heightened inventory accuracy, which can lead to cost savings and improved customer service. Additionally, the paper underscores the advantages of enhanced organizational data visibility, allowing businesses to make more informed decisions, allocate resources effectively, and respond adeptly to changing market conditions and customer demands, ultimately enhancing their competitive position and financial performance.

RESEARCH PAPER 2: Inventory Management for Segofer Technical Services

The report addresses the specific challenges encountered by Segofer Technical Services in their inventory management, primarily stemming from the use of a manual system that is susceptible to errors and delays. This manual approach not only consumes valuable time but is also error-prone, which can result in operational inefficiencies, customer service delays, and potentially detrimental financial consequences. To rectify these issues, the report advocates for the implementation of an automated inventory management system. This system is expected to significantly enhance the company's overall efficiency, profitability, and customer service. By automating inventory management, the company can expect to reduce customer service delays, leading to increased customer satisfaction. Furthermore, it emphasizes that automation can lead to improved decision-making through accurate and real-time data access and enhanced inventory tracking capabilities.

Chapter 3

Proposed System

3.1. Features and Functionality:

- **Real-time Data:**
  - Benefit: Track expenditures as they occur, enabling proactive decision-making.
  - Functionality: Collects and stores real-time data on budget expenses.

- **Dynamic Reports:**
  - Benefit: Gain actionable insights, identifying areas where budget adjustments are necessary.
  - Functionality: Generates dynamic reports that provide a side-by-side comparison of budgeted expenses and actual spending, highlighting disparities.

- **Budget**:
  - Benefit: Respond promptly to changes in circumstances, unexpected expenses, or shifting priorities.
  - Functionality: Facilitates real-time budget adjustments.

- **User-Friendly Interface:**
  - Benefit: Reduces the learning curve, making the system accessible to users with varying levels of technical proficiency.
  - Functionality: Intuitive and easy-to-navigate interface.

- **Integration with Other Systems:**
  - Benefit: Consolidate data and streamline operations.
  - Functionality: Seamlessly integrates with other institutional systems, such as financial management platforms.

Chapter 4

Requirement Analysis

1. **User Requirements:**
    - The system should be able to track inventory levels in real time.
    - The system should be able to generate reports that compare budgeted expenses to actual spending.
    - The system should allow users to make budget adjustments in real time.
    - The system should have a user-friendly interface.
    - The system should be able to integrate with other institutional systems.

2. **Functional Requirements:**
    - The system should be able to store data on inventory items, including quantity, cost, and location.
    - The system should be able to track inventory transactions, such as purchases, sales, and returns.
    - The system should be able to generate reports on inventory levels, spending patterns, and budget performance.
    - The system should allow users to create and manage budgets.
    - The system should allow users to make budget adjustments.

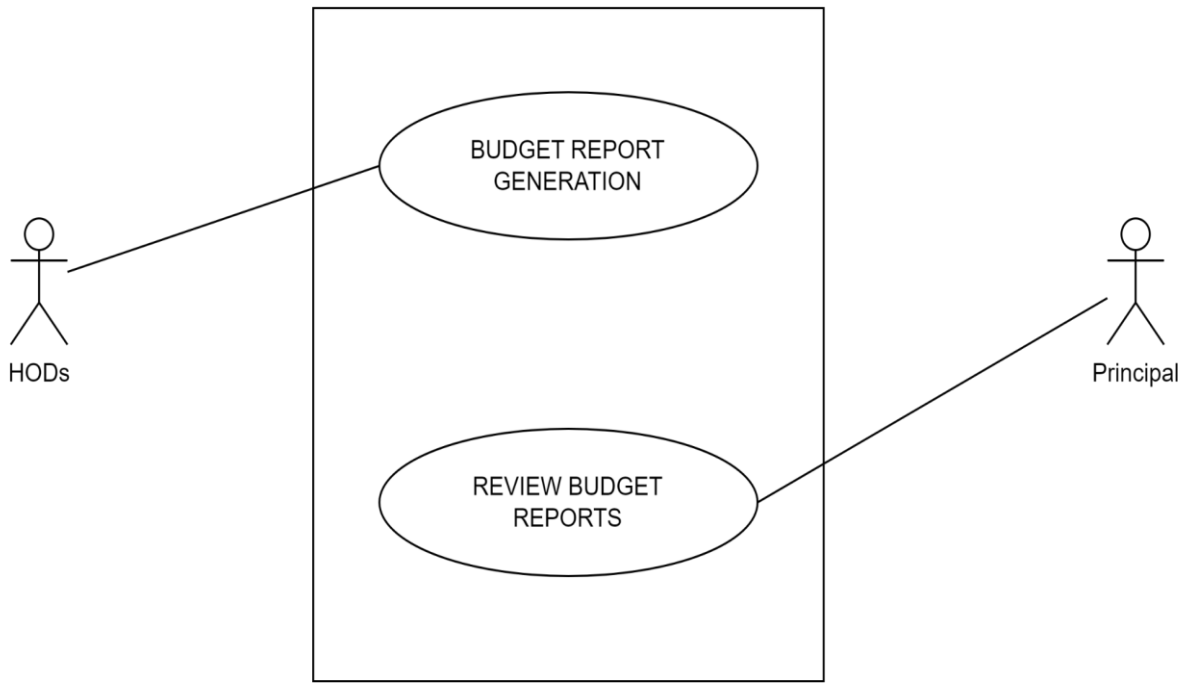
3. **Non-Functional Requirements:**
    - The system should be secure and protect user data from unauthorized access.
    - The system should be reliable and available 24/7.
    - The system should be scalable to accommodate the needs of growing institutions.
    - The system should be user-friendly and easy to learn and use.
    - The system should be affordable and within the budget of educational institutions.
    - Accessibility: The system should be accessible to users with disabilities.
    - Performance: The system should perform well and respond to user requests quickly.
    - Maintainability: The system should be easy to maintain and update.
    - Portability: The system should be portable to different operating systems and hardware platforms.
    - Documentation: The system should be well-documented to help users learn how to use it.

Chapter 5

Project Design

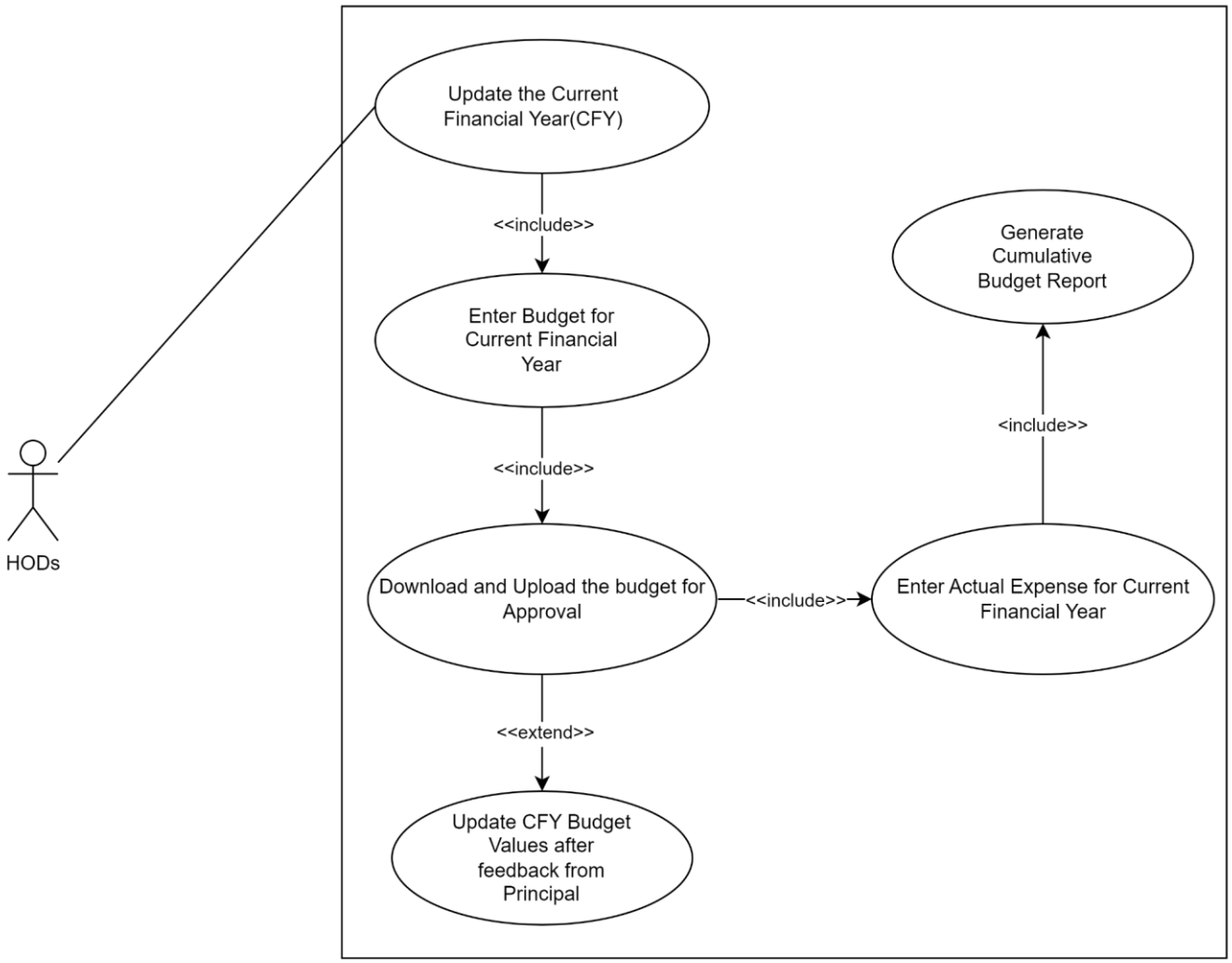
5.1 Use case diagram

General use case diagram:



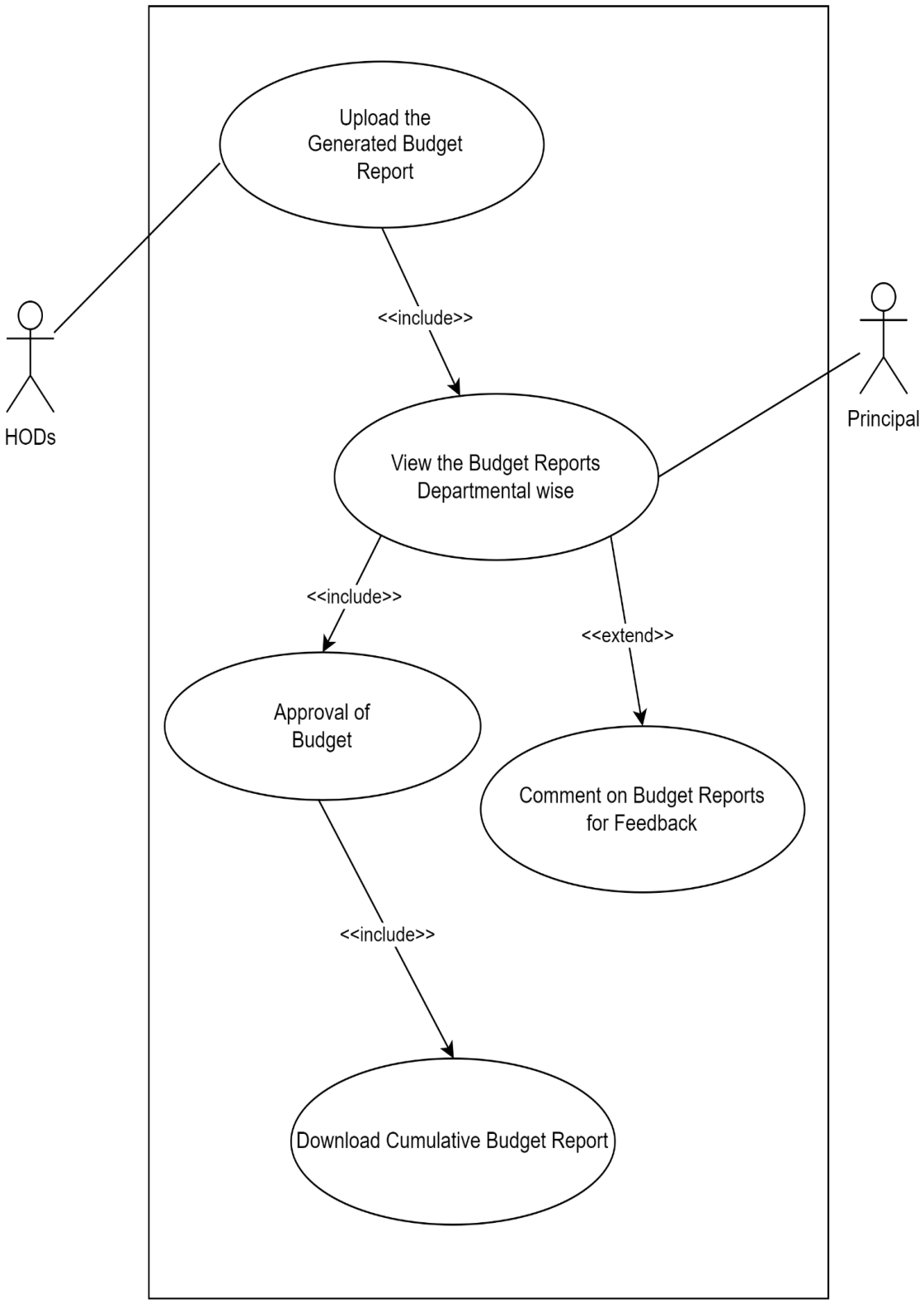
General Use Case Diagram

HOD’s User Case Diagram:



HOD's Use Case Diagram

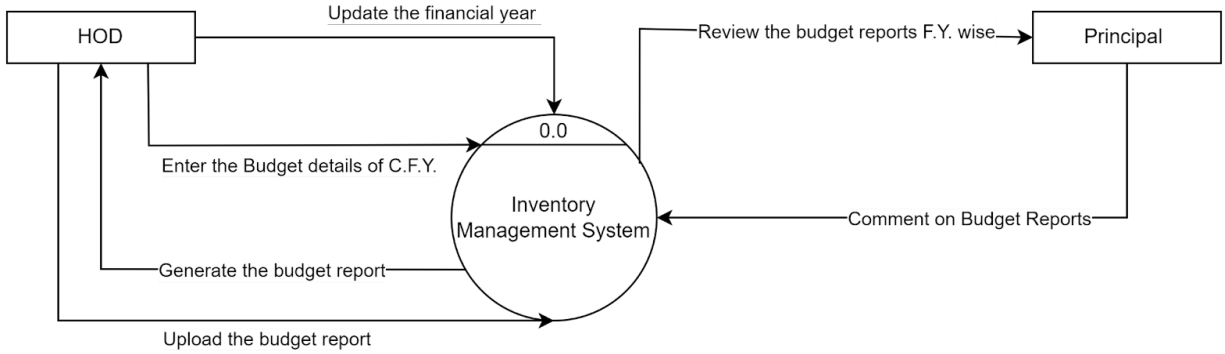
Principal’s Use Case Diagram:



Principal's Use Case Diagram

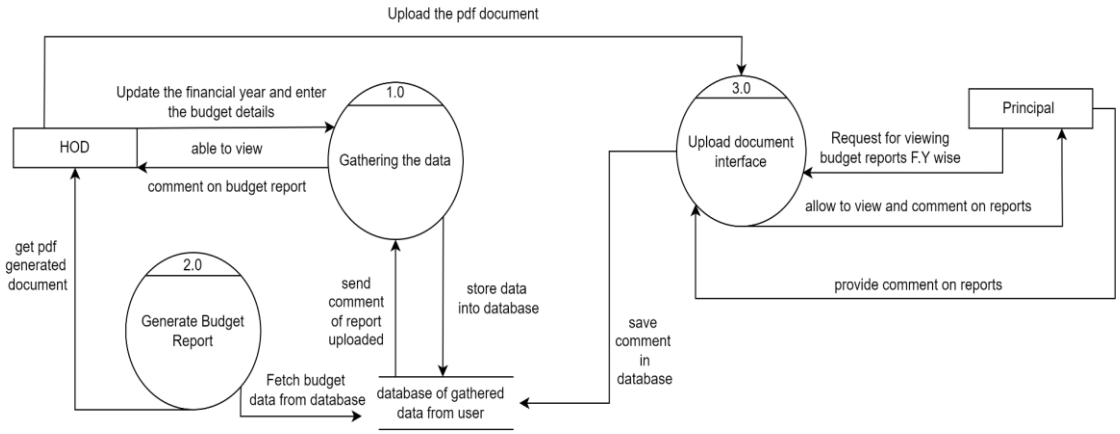
5.2 DFD (Data Flow Diagram)

Level 0



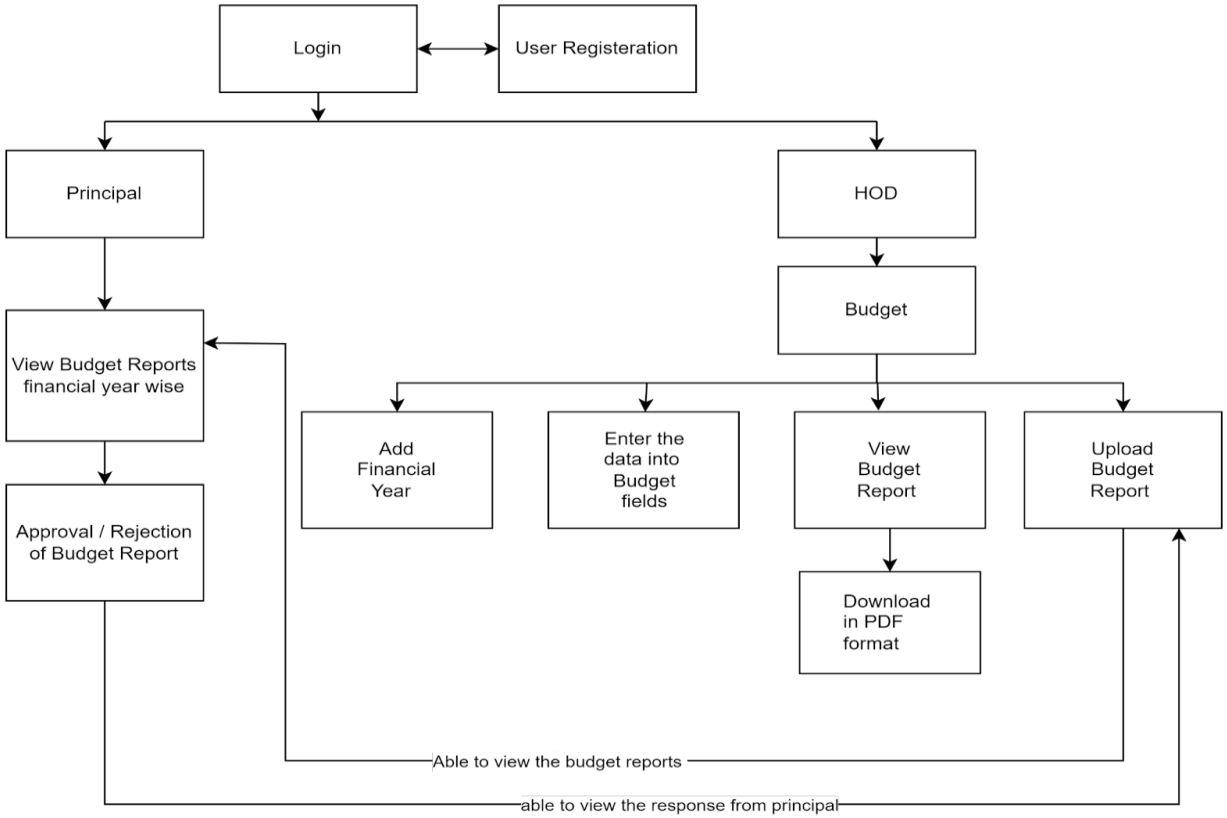
Level 0 Data Flow Diagram

Level 1



Level 1 Data flow diagram

5.3 System Architecture



Chapter 6

Technical Specification

For this project we have used different software Langugaes and technologies.

- Frontend
    - React: A JavaScript library for building user interfaces. React's component-based architecture allows for modular and reusable code, which speeds up development and ensures consistency. React is also known for its high performance and its ability to handle dynamic data efficiently.
    - Bootstrap: A CSS framework for styling web pages. Bootstrap provides a wide range of pre-designed components and utilities, which can be used to create responsive and visually appealing user interfaces. Bootstrap is also highly compatible with React, making it a popular choice for front-end development.

- Back-end
    - Django: A Python web framework that provides a high-level interface for developing web applications. Django is known for its speed, scalability, and security.
    - Django Rest Framework: A Django extension that provides a framework for building RESTful APIs. RESTful APIs are a popular way to communicate between front-end and back-end systems.
    - ReportLab: A Python library for generating PDF documents. ReportLab can be used to create dynamic and customizable PDFs, which can be used for a variety of purposes, such as generating financial reports.

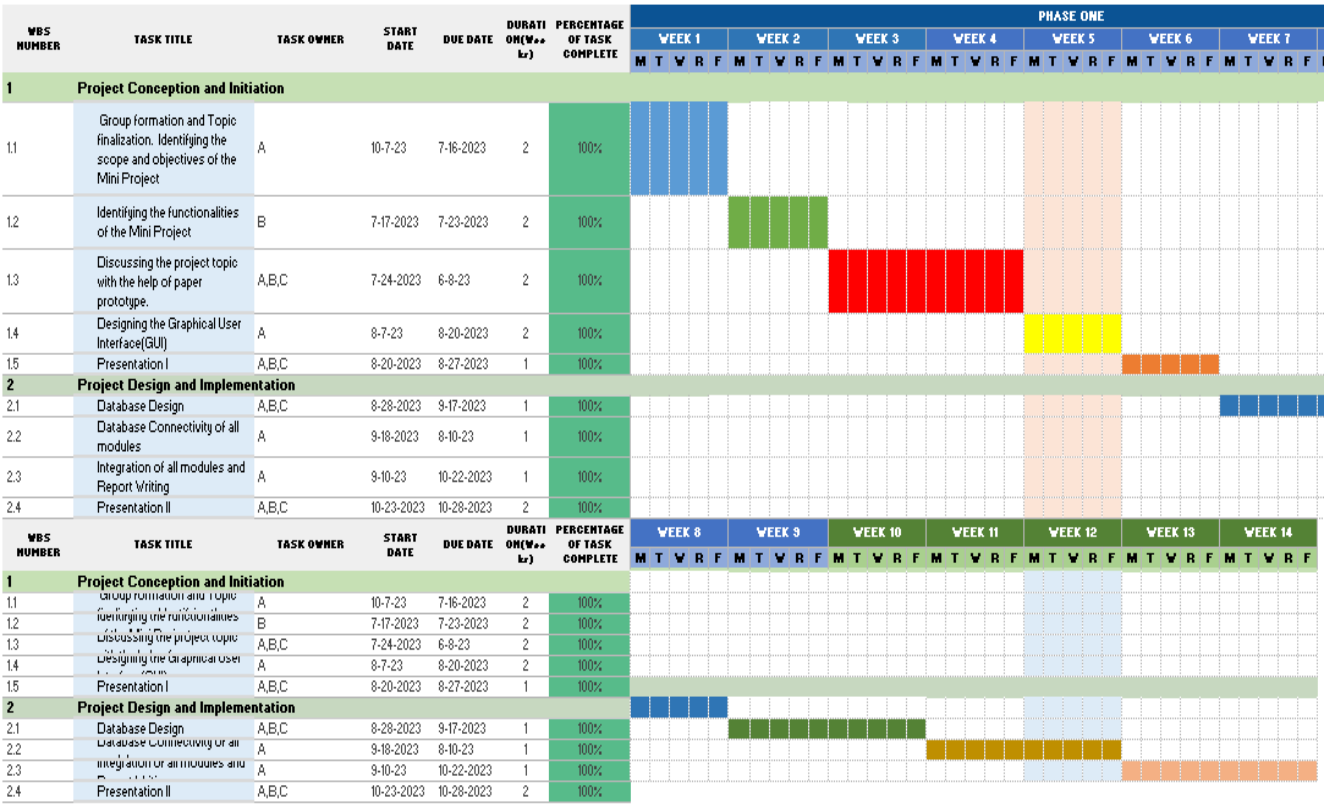
- Database
    - MySQL: A popular open-source relational database management system (RDBMS). MySQL is known for its reliability, performance, and scalability. It is also compatible with Django, making it a popular choice for back-end development.

- Other Technologies
    - Figma: A collaborative design tool that can be used to create user interfaces. Figma streamlines the design process by allowing teams to collaborate in real-time.

- Additional Technical Specifications
    - Email API: An email API can be used to send passcodes for password reset. This is a common security feature that can help to protect user accou

Chapter 7

Project Scheduling:



WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION(W.. kr)	PERCENTAGE OF TASK COMPLETE
1	**Project Conception and Initiation**					
1.1	Group formation and Topic finalization. Identifying the scope and objectives of the Mini Project	A	10-7-23	7-16-2023	2	100%
1.2	Identifying the functionalities of the Mini Project	B	7-17-2023	7-23-2023	2	100%
1.3	Discussing the project topic with the help of paper prototype.	A,B,C	7-24-2023	6-8-23	2	100%
1.4	Designing the Graphical User Interface(GUI)	A	8-7-23	8-20-2023	2	100%
1.5	Presentation I	A,B,C	8-20-2023	8-27-2023	1	100%
2	**Project Design and Implementation**					
2.1	Database Design	A,B,C	8-28-2023	9-17-2023	1	100%
2.2	Database Connectivity of all modules	A	9-18-2023	8-10-23	1	100%
2.3	Integration of all modules and Report Writing	A	9-10-23	10-22-2023	1	100%
2.4	Presentation II	A,B,C	10-23-2023	10-28-2023	2	100%

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2.4	Presentation II	A,B,C	10-23-2023	10-28-2023	2	100%

Chapter 8

Results:

Login Page: This is the login page of our project where use can enter the user name and and password and if he/she is a new user can create account and also use the feature of forgot password.

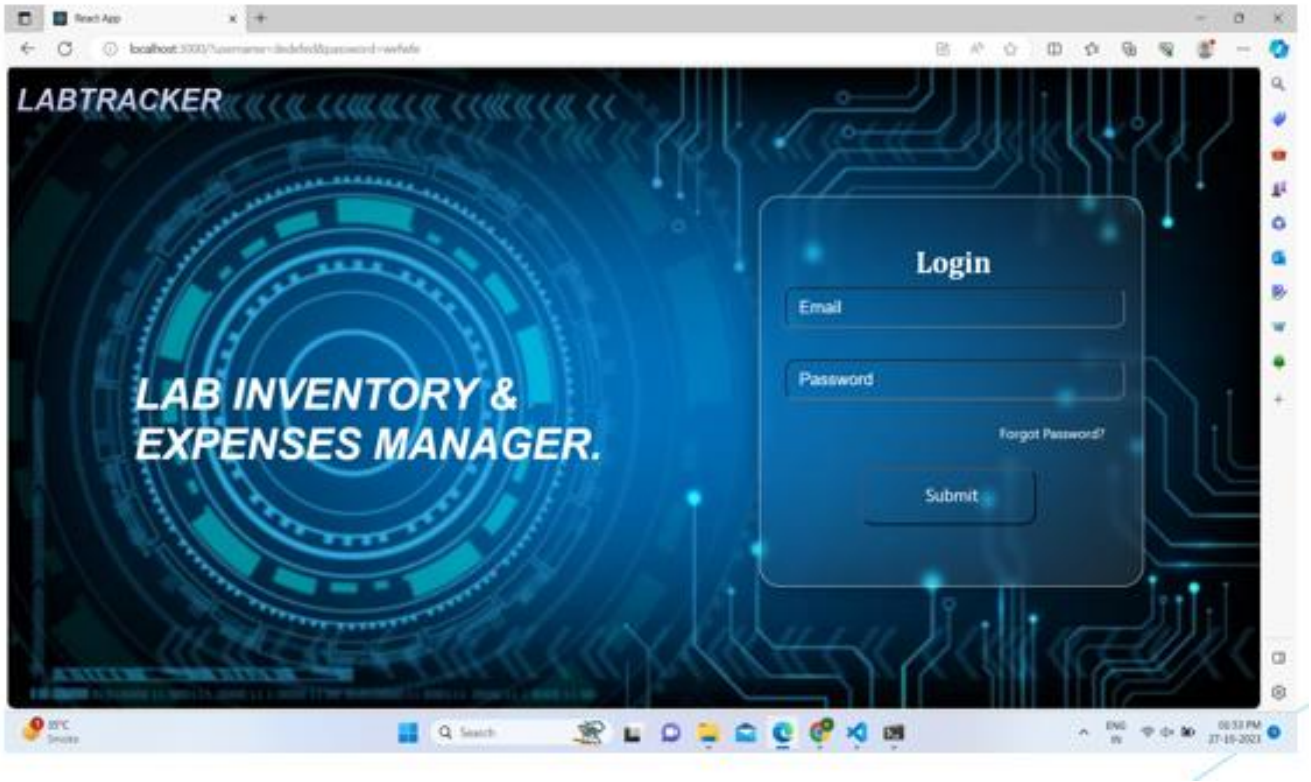

Fig 1.1

Registration Form & Forgot Password Page: In this user can enter the details in various fields to create account in our application. In forgot password page we are providing the verify e-mail feature and a passcode which would be generated for security purpose. Then user should enter the password and confirm it again.

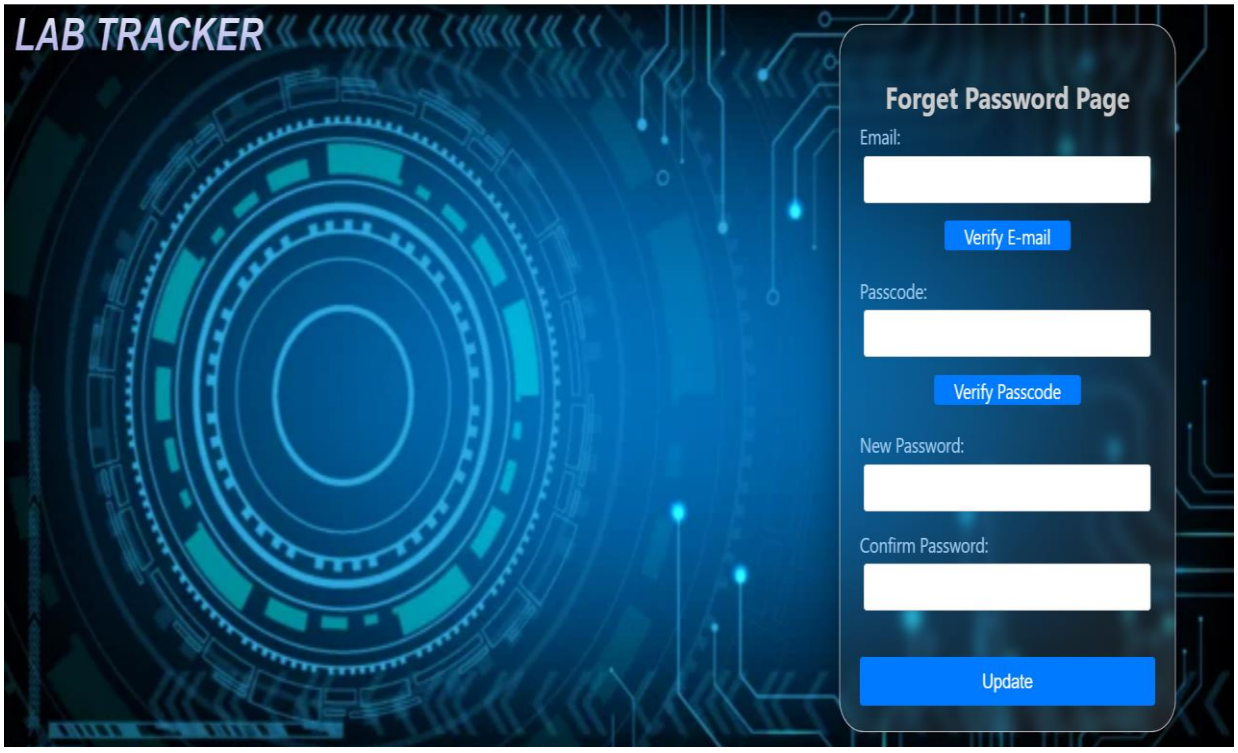

Fig 1.2 & 1.3

Budget Page which contains fields Enter Budget, generate Budget Report, View Budget and update financial Year. In the enter budget there are various table tables which user can enter values of budget are allocated in that year.

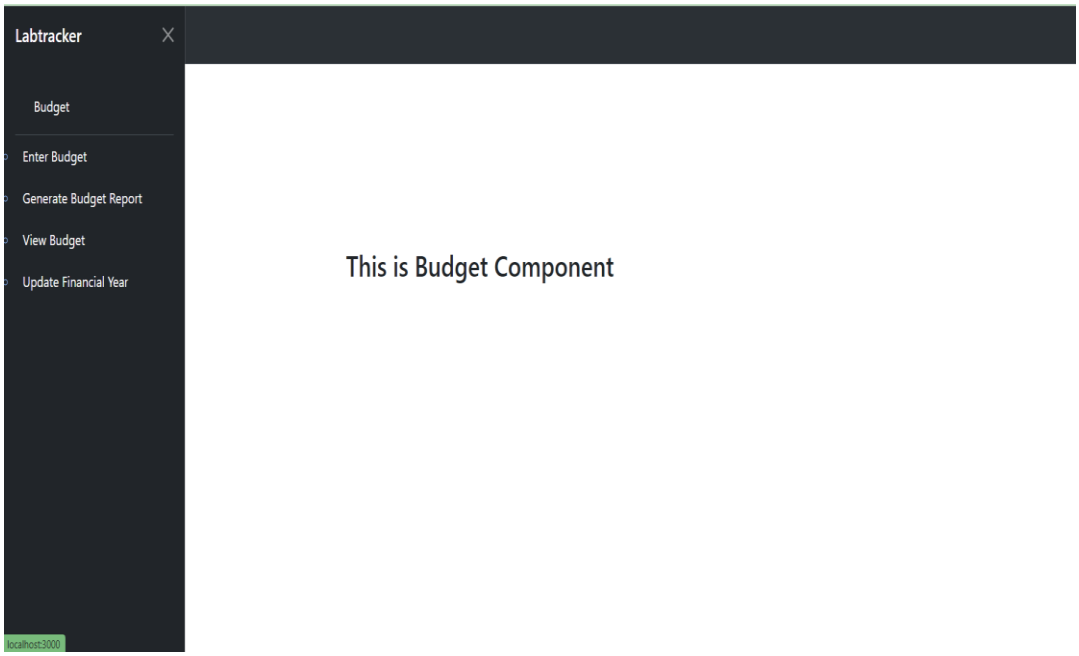

Fig 1.4

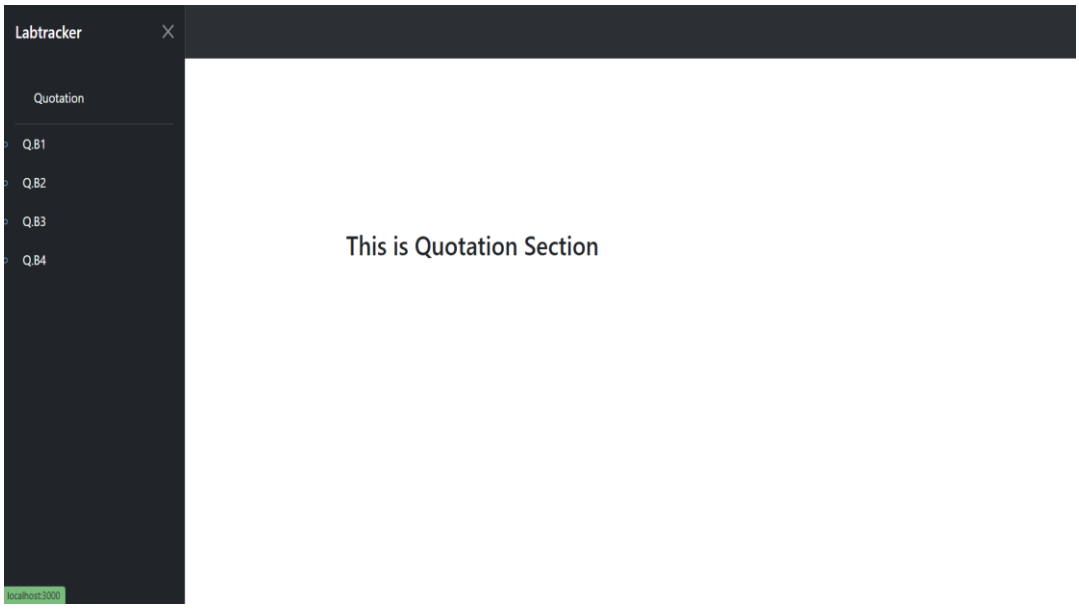

Fig 1.5

This contains the overall home component and the Quotation Content. All the Quotation of all the departments will be shown in this page.

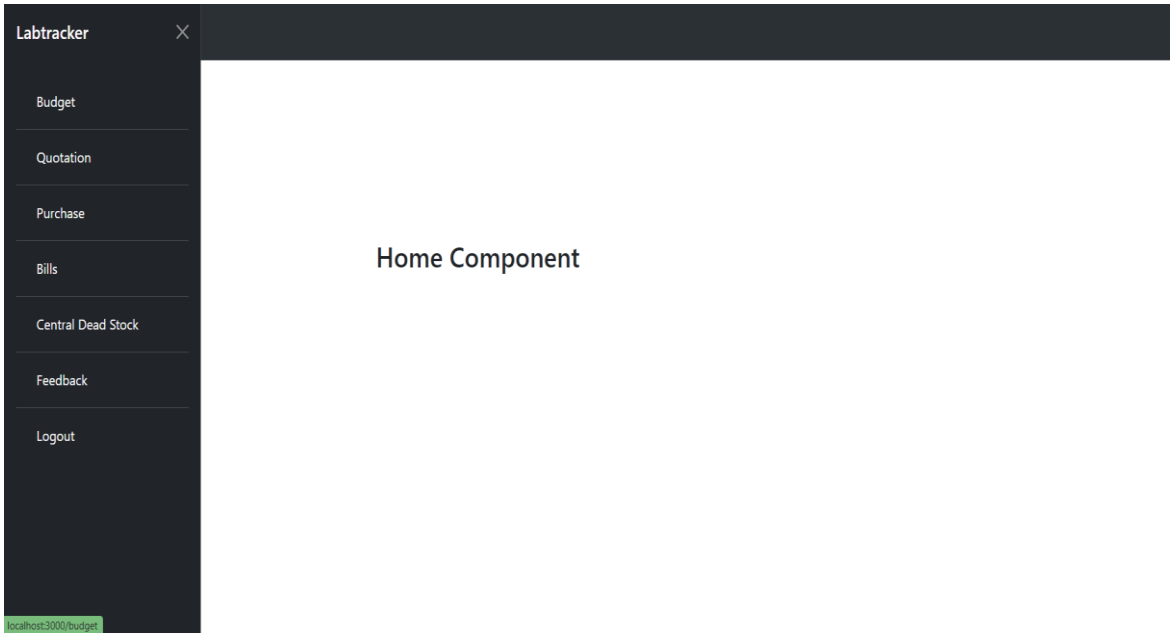

Fig 1.6

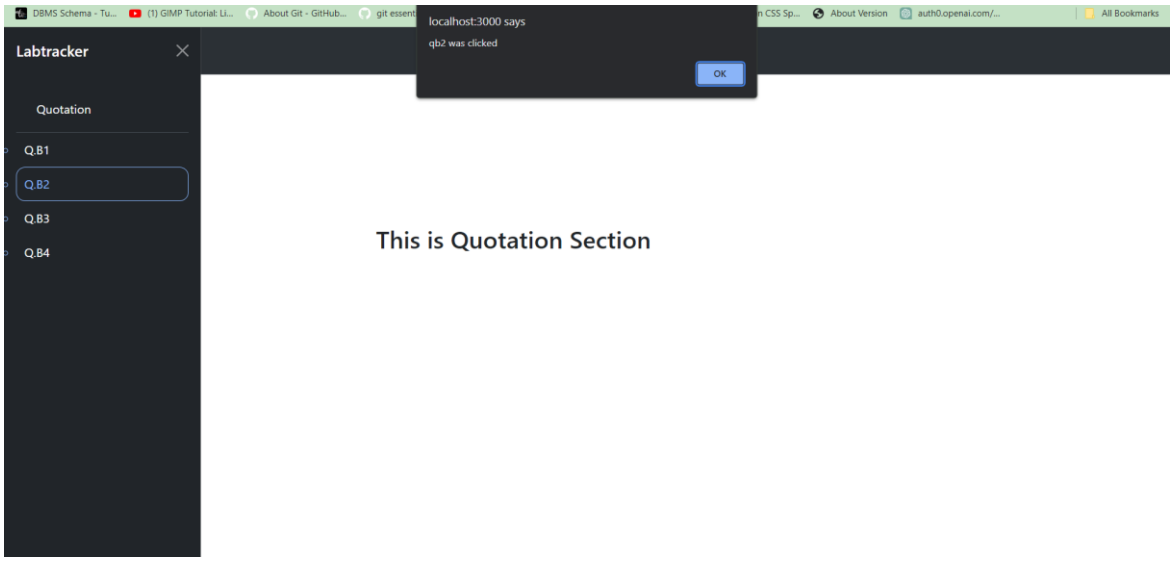

Fig 1.7

This is the enter budget table. User has to enter the various assigned in these fields.

Financial Year : 2021-2022

Items	Budget	Actual Expenses
Laboratory Equipment		
Software		
Laboratory Consumables		
Maintenance & Spares		
Research & Development		
Travel and Training		
Miscellaneous expenses		
Total		

Edit Save

Fig 1.8

This is the view budget field after entering the final values. Here we can do the comparison of last three years budget.

	Budget in CFY	Actual Expenses in CFY	Budgeted in CFY m1	Actual Expenses in CFY m1	Budgeted in CFY m2	Actual Expenses in CFY m2	Budgeted in CFY m2	Actual Expenses CFY m2
Laboratory Equipment								
Software								
Laboratory Consumables								
Maintenance & Spares								
Research & Development								
Training & Travel								
Miscellaneous Expenses								
Total								

Download

Fig 1.9

Chapter 9

Conclusion

In retrospect, the journey towards implementing our inventory management system was a complex yet highly rewarding endeavor that has left a lasting impact on our organization. The process involved a comprehensive approach that encompassed not only the conceptualization of the system but also its meticulous implementation. This article delves into how we transformed our vision into reality, highlighting the key steps taken in designing and building the frontend, backend, and database components. The foundation of our inventory management system was laid with the implementation of the frontend. Armed with carefully crafted Figma designs, we set out to create an interface that was not only visually appealing but also user-friendly. The goal was to ensure that our system's end-users would have a seamless and intuitive experience while navigating through the vast expanse of inventory data.

To achieve this, our frontend development team took great care to translate the Figma designs into a responsive and dynamic interface. This involved writing clean, maintainable code and leveraging modern web technologies to build an interactive user interface. The result was a system that not only met our aesthetic expectations but also improved the overall user experience, reducing the learning curve and ensuring efficient navigation through the inventory system. The success of any inventory management system heavily relies on the efficiency and reliability of its backend. Our next step was to create a robust backend that would act as the system's nervous system, ensuring that all the components operated harmoniously. In the backend development phase, we designed and implemented a wide range of functionalities. This included crafting algorithms to facilitate inventory tracking, managing user permissions, and ensuring data integrity. One of the most critical aspects was to establish secure user authentication, safeguarding the system against unauthorized access and data breaches. Moreover, the meticulous development of the backend ensured that our inventory management system operated smoothly, even under heavy loads, and met the needs of our dynamic organization.

At the heart of our inventory management system lay the database. It served as the repository for all critical data, ranging from product information to transaction records. The database needed to be structured in a way that allowed for efficient storage, retrieval, and analysis of this wealth of information This process involved identifying the right data types, creating indexes for speedy queries, and establishing relationships between tables. Additionally, the database played a vital role in generating valuable insights from historical data, allowing our organization to make informed decisions regarding inventory levels, product restocking, and overall business strategies. In hindsight, the implementation of our inventory management system was a comprehensive success. The meticulous integration of Figma designs with a robust frontend and backend transformed the way our organization manages its inventory. The system streamlined inventory processes, reduced errors, and significantly improved overall productivity.

Chapter 10

Future Scope

The future scope of inventory management systems is a vast and evolving landscape that promises to redefine the way businesses manage their inventories. As we move forward into an era characterized by rapidly advancing technologies and changing market dynamics, the role of inventory management systems is set to become even more critical. Integration with emerging technologies like the Internet of Things (IoT) and artificial intelligence (AI) will revolutionize the way we track and manage inventory. IoT sensors will provide real-time data on inventory levels, enabling predictive maintenance and automatic reordering, while AI will play a pivotal role in demand forecasting, optimizing inventory levels, and enhancing decision-making through data analytics. Advanced analytics and reporting will be at the forefront, enabling businesses to extract meaningful insights from their inventory data, improving decision-making, and enhancing operational efficiency.

Moreover, supply chain visibility and collaboration will be a primary focus, allowing businesses to track the movement of goods at every stage and enhancing communication with suppliers and logistics partners. With the rise of e-commerce and omnichannel retail, inventory management systems will need to adapt to manage inventory across multiple sales channels, both online and offline, providing real-time synchronization and a unified view of inventory. Sustainability and green inventory management will gain prominence, with systems focusing on reducing environmental impact by optimizing transportation routes, minimizing waste, and sourcing products from sustainable suppliers. The future will also see a continued shift towards mobile and cloud-based solutions, enabling businesses to access their inventory data from anywhere, improving flexibility and responsiveness. Security and data protection will remain paramount, with businesses needing to stay ahead of evolving cybersecurity threats and adhere to stringent data protection regulations. Customization and scalability will be essential features, allowing businesses to tailor inventory management systems to their unique requirements and expand or reduce their systems as needed. Artificial intelligence and automation will continue to play a pivotal role in automating routine tasks, improving efficiency, and optimizing inventory processes. The adoption of blockchain technology, with its immutable and transparent ledger, has the potential to enhance trust, reduce fraud, and streamline inventory-related documentation.

While the future of inventory management systems holds immense promise, it also comes with its share of challenges, including cybersecurity threats, the need for skilled professionals to manage advanced systems, and the associated costs of implementing and maintaining cutting-edge technology. Nonetheless, businesses that embrace these technological advancements and adapt to changing market dynamics will gain a competitive edge, ultimately contributing to enhanced supply chain management and improved overall operational efficiency and profitability

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