

Research Lab Inventory Management System

<https://github.com/Teniwoha/Research-Lab-Inventory-Management-System>

Group 37

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System Analysis

Project Description:

The Research Lab Inventory Management System is a comprehensive tool designed to facilitate the management of inventory within a research laboratory setting. This system is developed with a focus on ease of use, efficiency, and accuracy, ensuring that lab personnel can track and control stock levels, record sales, update product details, and generate sales reports seamlessly.

By automating key inventory processes, the system significantly reduces manual workload and the likelihood of human error, ensuring more accurate inventory tracking. It delivers real-time inventory level updates, facilitating prompt stock replenishment and preventing the operational delays that often result from stock shortages. Additionally, the system's capacity to generate detailed sales reports provides essential insights into inventory turnover, thus supporting informed decision-making tailored to the specific needs of the laboratory. A major focus on operational efficiency is achieved through the development of an intuitive graphical user interface (GUI), which simplifies and expedites daily inventory management tasks for lab managers and personnel, making the system accessible to users with varying levels of technical expertise.

Inputs:

Inputs include input fields for adding new product(s) (name, quantity, price), and an input field for the quantity of the product that you may want to sell. Additionally, there is a search field where you can input the product name to search if a product is present in the inventory system. Finally, you can edit all the previously mentioned fields for products present in the inventory system to edit their details.

Outputs:

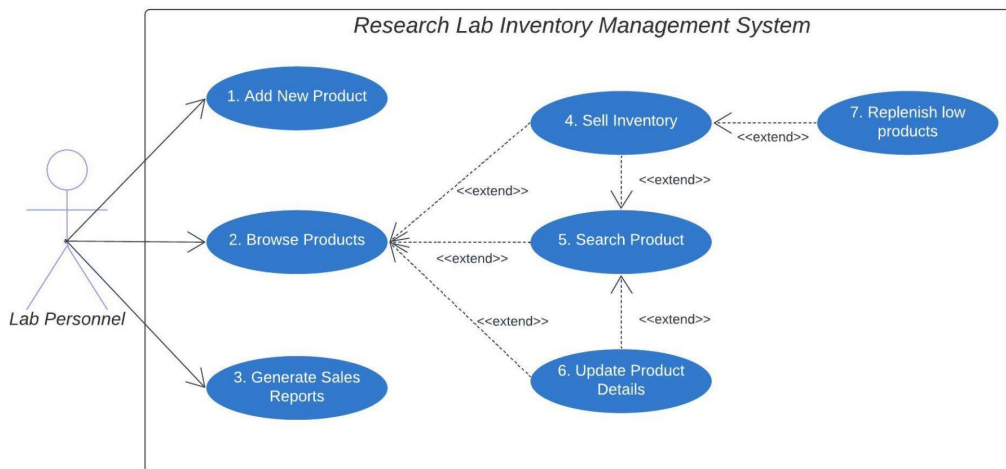
Outputs include displays of the data present in the inventory system, primarily the details about the product and the details about the sales. The details about a product entail the product's name, quantity, and price, while the details about a sale entail the date and time that the sale was made, the product's name, the price of the product,

the quantity of products sold, the profit made from that sale, and the total aggregate profit.

Special Requirements & Things to Note:

1. The text fields for AddProductGUI do not clear unless you successfully add a product
2. A product with a duplicate name cannot be added.
3. The minimum valid inputs for stock and price of a product is 1. However, you can sell a product until its stock reaches 0.
4. Input formats should be valid (Name: String, Stock: int, Price: double). Otherwise, errors will be thrown.
5. For ease of sale, the selection and the quantity field for ManageStockGUI will not be cleared even after a successful sale.
6. Once you sell a product that drops its stock below the low stock threshold (10), a popup option will show up that gives you the option to replenish the stock to 100.
7. If you try to sell quantities of the product above the current stock level, an error will be thrown.
8. The program will automatically generate an "inventory.txt" file (somewhere on your computer) when run for the first time. This file will serve as the database that will retain information regarding products and sales in the system as long as the contents of the file remain unchanged. To completely reset the inventory system, you must delete or clear out and save the "inventory.txt" file.

Uses Case Diagram and Descriptions:



UC Reference Name/Number: 1. Add New Product	
Overview	The lab personnel can create and add a new product to the inventory system.
Related use cases	N/A
Actors	Lab Personnel
Pre Conditions (Optional)	N/A
Post Conditions (Optional)	The new product is successfully added to the inventory list with details recorded.

UC Reference Name/Number: 2. Browse Products	
Overview	The lab personnel can browse through the list of products, along with their details, that are in the inventory system.
Related use cases	Sell Inventory (4), Search Product (5), Update Product Details (6)
Actors	Lab Personnel
Pre Conditions (Optional)	N/A
Post Conditions (Optional)	N/A

UC Reference Name/Number: 3. Generate Sales Reports	
Overview	The lab personnel can generate/view a list of sales to see all the transactions that took place in the inventory system.

Related use cases	N/A
Actors	Lab Personnel
Pre Conditions (Optional)	N/A
Post Conditions (Optional)	N/A

UC Reference Name/Number: 4. Sell Inventory	
Overview	The lab personnel can sell specified quantities of product(s) in the inventory system.
Related use cases	Browse Products (2), Search Product (5), Replenish Low Products (7)
Actors	Lab Personnel
Pre Conditions (Optional)	At least 1 product with a stock of at least 1 in the inventory system.
Post Conditions (Optional)	The change in stock level for the product(s) is applied to the inventory system, and the details of the sale(s) are added to the sales report.

UC Reference Name/Number: 5. Search Product	
Overview	The lab personnel can search for a specific product in the inventory system.
Related use cases	Browse Products (2), Sell Inventory (4), Update Product Details (6)
Actors	Lab Personnel
Pre Conditions (Optional)	N/A
Post Conditions (Optional)	N/A

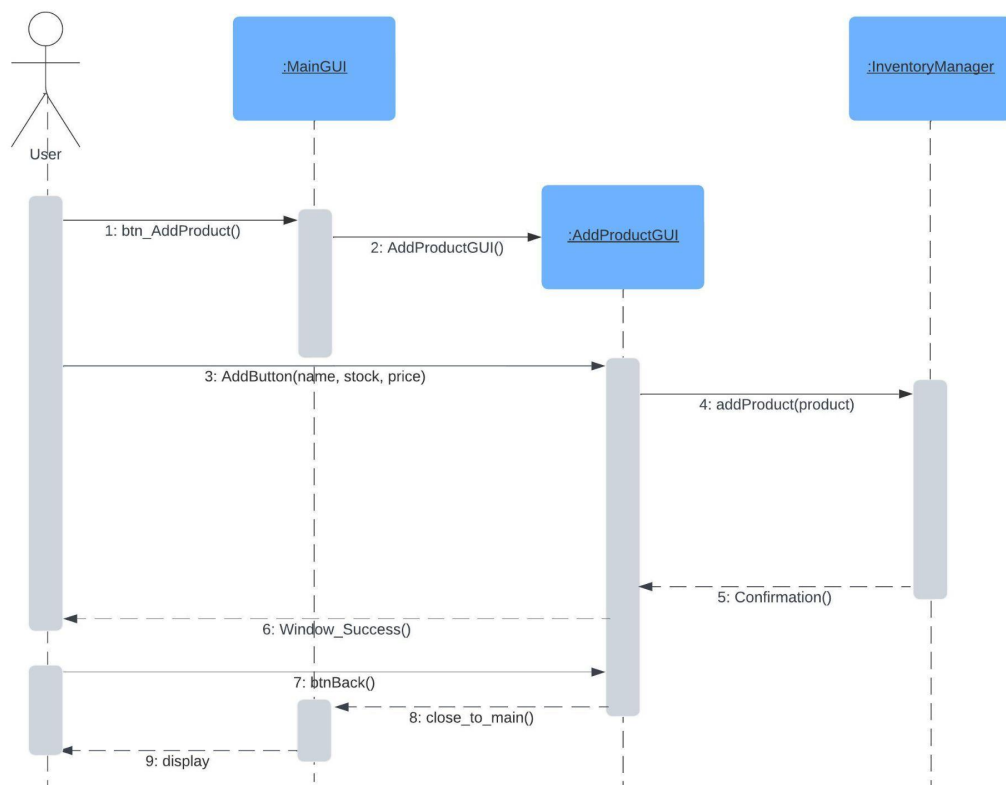
UC Reference Name/Number: 6. Update Product Details	
Overview	The lab personnel can edit and change the details of the product(s) in the inventory system.
Related use cases	Browse Products (2), Search Product (5)
Actors	Lab Personnel
Pre Conditions (Optional)	At least 1 product is in the inventory system.
Post Conditions (Optional)	The changes made to the details of the product(s) are applied to the inventory system.

UC Reference Name/Number: 7. Replenish Low Products	
Overview	The lab personnel can replenish (100) the stock(s) of the product(s) that fall below the low stock threshold (10).
Related use cases	Sell Inventory (4)
Actors	Lab Personnel
Pre Conditions (Optional)	The stock level of the product currently being sold falls below the low stock threshold (10).
Post Conditions (Optional)	The stock level of the product is replenished to 100, going above the low stock threshold.

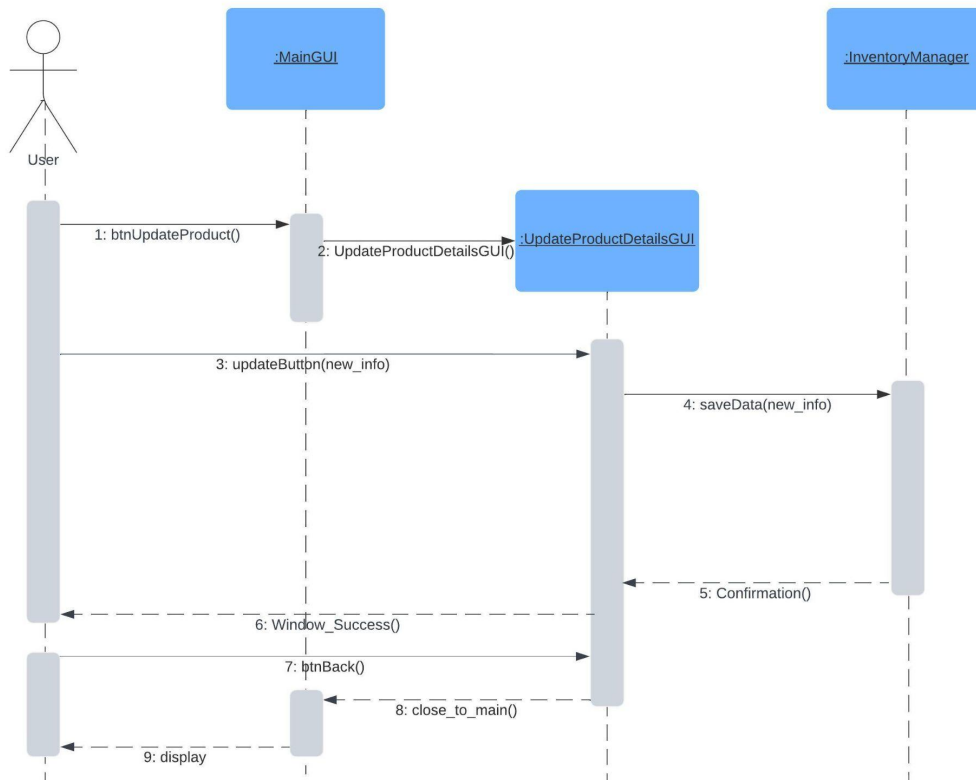
System Design

Sequence Diagrams:

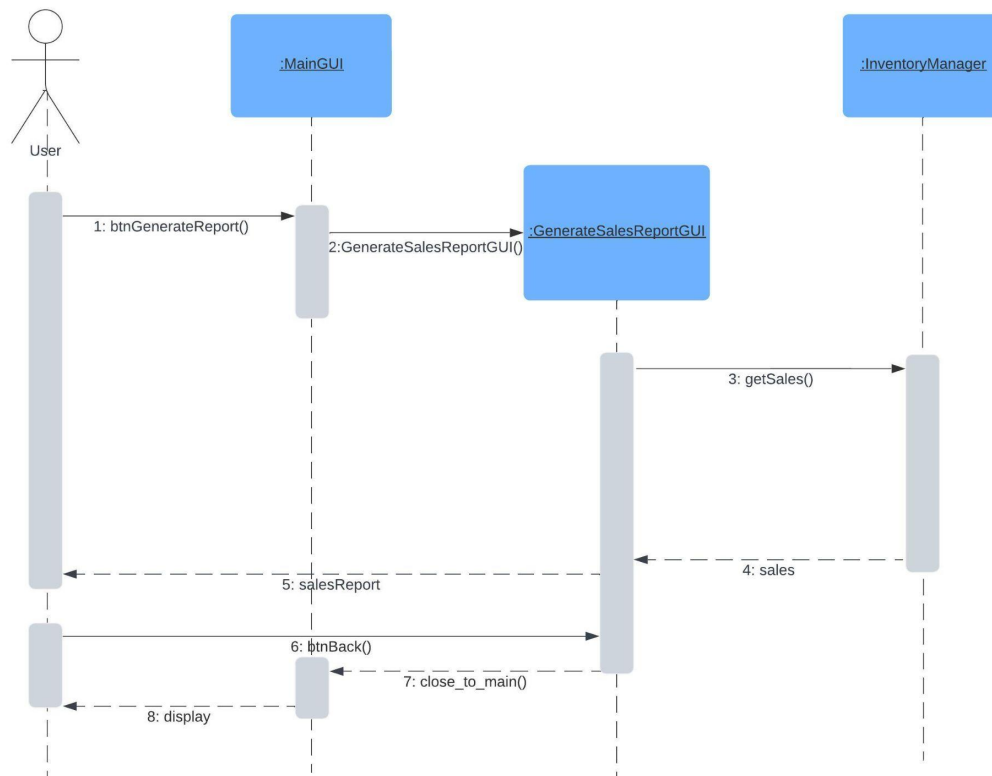
Add New Product



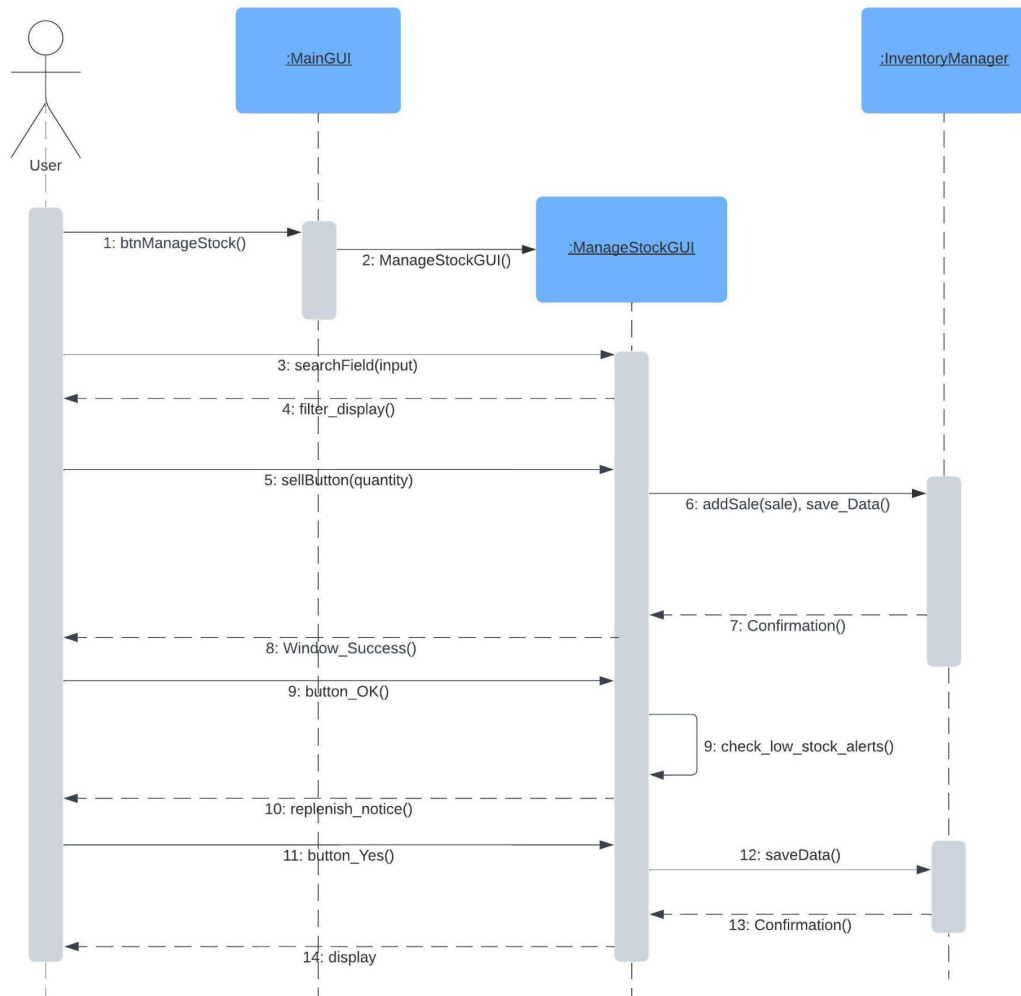
Update Product Details



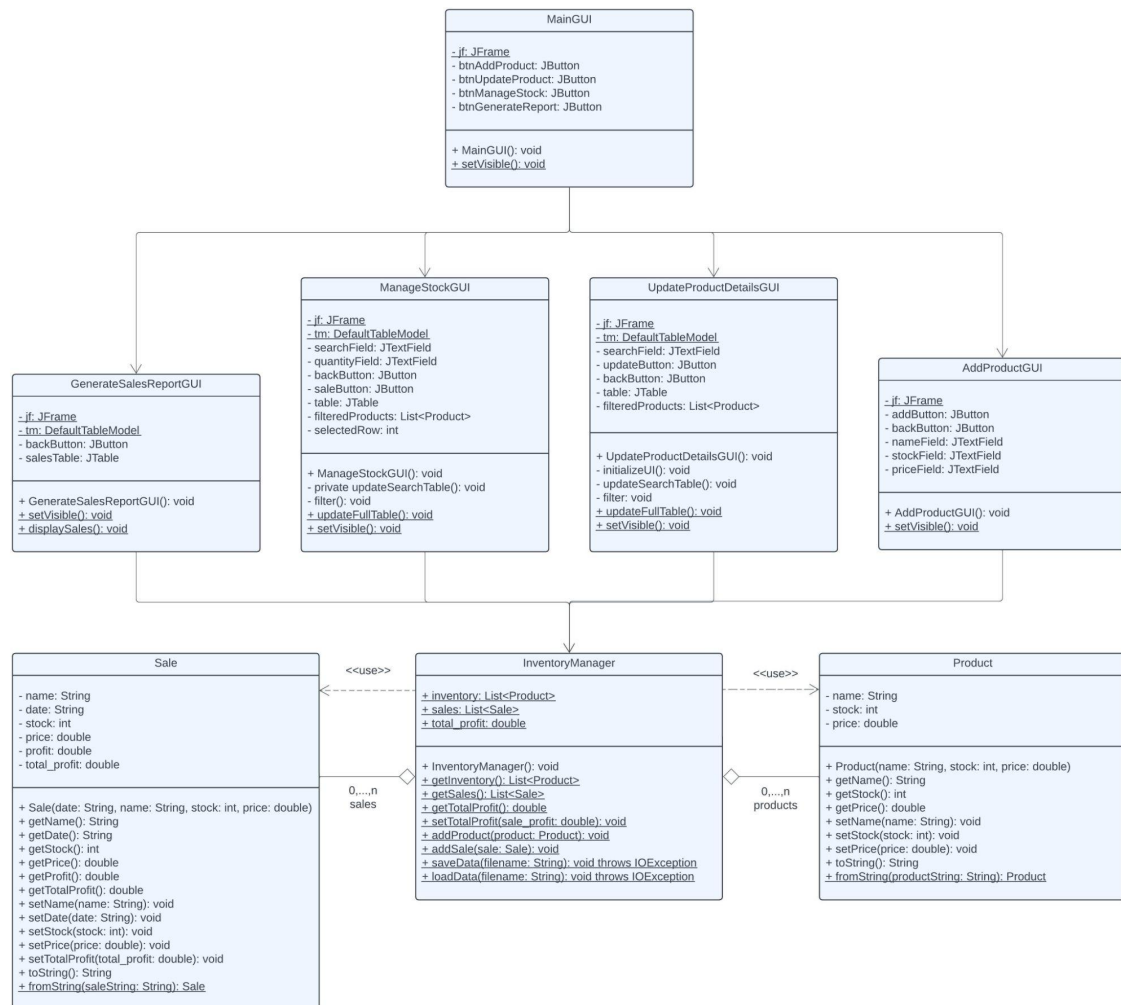
Generate Sales Reports



Search, Sell, and Restock Products



Class Diagram:



Conclusion:

In conclusion, the Research Lab Inventory Management System encapsulates an object-oriented approach to inventory management, allowing more flexibility and efficiency in its essential functionalities. Through its automated features, real-time tracking, and intuitive interface, the system not only streamlines inventory processes but also serves as a reliable tool for enhancing decision-making and operational efficiency. The completion of the system's design and implementation phases marks the beginning of a transformative journey for laboratory environments, promising increased accuracy, time savings, and a user experience tailored to the unique needs of lab personnel. As we transition from the development phase to deployment, we anticipate significant improvements in the management of laboratory inventories, ultimately contributing to the greater efficiency and effectiveness of research endeavors.