Assignment: SEC-2070: Project SRS (Inventory Management System)
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Contents

All diagrams (except Collaboration Diagram) are made using Microsoft Visio 2016.

1. Introduction

In software industry, requirement engineering is one of the most important parts of the software engineering process. It gives us the proper scenario of what the customer wants, analyzing their needs and checking the feasibility of what they need, negotiating a reasonable solution etc. A software project begins when a business need is identified, so, the first step is to understand what the customer needs and figure out a rough feasibility analysis. In this phase, after interacting with the client, we get some requirements for an inventory management system.

1.1 Purpose

The purpose of this document is to present a detailed description of the Inventory Management System. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react to external events.

In this document, we will try to introduce our stakeholders along with their respective viewpoints, balancing those to reach a theoretical solution of the identified problems.

1.2 Scope

The outcome of the project would be an Inventory Management System. The software will have all common features and functionalities along with some other special facilities.

- To provide user efficient working environment.
- User friendly interface for targeted stakeholders.
- Ensure security.

This system will help keep records of items in the inventory. This system will complete the work in very less time, resulting in high level of efficiency.

1.3 Glossary

Key Terms	Definition
Inventory	A list compiled for some formal purpose.
QC	Quality Control.
SRS	Software Requirement Specification.
QFD	Quality Function Deployment
UML	Unified Modeling Language
DFD	Data Flow Diagram

1.4 Overview

The next chapter is identifying stakeholders. This chapter will give an overview of who is directly and/or indirectly dependent on the developing system and what is their point of view.

The next chapter, the General Description section, of this document will give an overview of the functionality of the product. It describes the informal requirements and is used to establish a context of the technical requirements specification in the next chapter.

The fourth chapter, Requirements Specifications section, of this document is written primarily for the developers and describes in technical terms the details of the functionality of the product.

All the sections of the document describe the same software product in its entirety.

2. Overall Description

2.1 Product Perspective

In this modern world, people who don't own a vehicle are few and far between. Any store that deals in motor parts needs a way to efficiently and effectively manage their inventory of parts. Our system is concerned with managing the stored parts that one would have in their store who is in the business of vehicle parts.

The major concern of our system is inventory management for our client.

2.2 Product Functions

Inventory Management System must be designed to meet the needs of the client and support their strategic plans. The features of this system include:

- User based login – password based authentication for data protection.
- Stock Manager – manage stock master, out and return.
- Item Manager – keep record of items.
- Generate Report.

These features are primary requirements of our client for this inventory management system. This feature list will change with client demands.

2.3 Potential User of the System

There are two groups of users in the system. One is the administrator and other is the staff.

- **Administrator:** The administrator has full access to the data and can add or remove users through the manage user menu.

- **Staff:** The staff has limited control over the system. The staff cannot remove or edit existing records.

2.4 User Characteristics

The users of the software are categorized into two categories, admin and staff. Both users can access the system but the staff doesn't have privileges that the admin does. To work through the system, one user should go through some fixed steps:

- The user should be registered (an admin can register users).
- The user can look at the stock details.
- Once the user is done with the system, they should log out.

2.5 Assumptions and Dependencies

After completing interview(s) with our client, according to our view, the inventory system will contain modules like:

- Information of different products.
- Available stock.
- Price of different items.
- Generate Report.
- The inventory management application will have all the items.

The administrator will have the right to add item, delete items etc.

Using these functions, the admin can:
- Add items in inventory.
- Edit items in inventory.
- Manage users on the system.
- Generate Report.

This inventory system also has some dependencies:

- If data needs some changing, only an admin can edit the records.
- If a user's information is invalid, only an admin can edit the records.
- If data is not inserted, user cannot view report.

3. Requirement Analysis

Requirement Analysis present the requirement specification, software and hardware requirements for both system developers and system users, process model and data model. In this section, we specify the external interface requirements, functional and non-functional requirements of the system.

3.1 Functional Requirements

Functional requirements define the functions that are requested by our stakeholders. The system specifies the authority of the administrator, they have control over the database of the system. They can make changes to update the system and the update will be carried out dynamically.

The functional requirements include:

- Login System – the user uses a username and password to gain access to the system.
- Stock Manager – manage stock.
- Item Manager – keep record of items by entering name, description, type, price, and quantity of the items.
- Perform CRUD functions – Create, Read, Update, and Delete items in the system.
- Report Generation.
- User Management – the admin will have options for adding and deleting users.

3.2 Quality Function Deployment

Quality Function Deployment is a method to transform user demands into design quality, to deploy the functions forming quality and to deploy methods for achieving the design quality.

QFD can be categorized by:

- Normal Requirements
- Expected Requirements

3.2.1 Normal Requirements

Normal Requirements are requirements which stakeholders want to be available in the system. The normal requirements of this proposed application are:

- The system must keep tracks of all products stored in the database.
- The system will perform user authorization for security purposes. All the users (including administration) must perform this action.
- All types of information (price, type etc.) related to any product must be stored in the system.
- If any kind of change occurs, the admins must be able to update the records.
- Well-structured database to store inventory records.

- The system must have an option to generate report.

3.2.2 Expected Requirements
Expected Requirements are requirements which the stakeholders do not mention, but expect them to be included in the final product. The expected requirements of our system are:

- The system will contain user-friendly interface.
- The system must ensure data backups, which are recent and as complete as possible.
- When viewing records, the user will have the option to search a desired record.

4. Interfaces
4.1 User Interface
User interface is one of the most important elements in any software. Most of the software are used by non-technical people. So they always seek out an easy to understand environment in their system, and the user interface makes the system more familiar to its user. For our system, we have not designed a user interface yet.

4.2 Hardware Interface
In the current version of the software, it will have no special hardware interface other external systems. It will run in a general-purpose computer system with general-purpose hardware and software.

4.3 Software Interface
The system will use Microsoft SQL Server for database management. The system will be made using C# Windows Form Application.

5. Non-Functional Requirements
Non-functional requirements of a system specify the performance, reliability, availability, security, maintainability, and portability of a system.

5.1 Performance
Our proposed system will be used in a shop, for fruitful production, it requires quick response time and proper storage of data. So, any error messages will be sent in a timely manner.

5.2 Reliability
Loss of data can cause a major setback to the shop. So, if the reliability is not confirmed, the whole system will be effected.

5.3 Availability
This system will be dedicated to a particular client. So its availability will be restricted for this system with system being available for at least 10 hours a day.

5.4 Security
This system will deal with huge amount of data. Hence, security is a prime factor. System should be secured from external interference by providing efficient security to the entire system.

5.5 Maintainability
Software maintenance in software engineering is the modification of a software product after delivery to correct faults, to improve performance or other attributes. Maintainability of a software is categorized into four classes:

- **Adaptive** – dealing with changes and adapting in the software environment.
- **Perfective** – accommodating new or changed user requirements which concern functional activities of the software.
- **Corrective** – dealing with errors and fixing them.
- **Preventive** – concern with activities aiming towards increasing software maintainability and preventing problems in the future.

In order to maintain our system, we will focus on these four classes.

5.6 Portability
Portability is the degree to which a software running on one platform can be easily converted to run on another. Portability is hard to quantify as it is hard to predict on which other platforms the software will be required to run on. In order to make our system portable, we have to use languages and tools that are universally available and standardized.

5.7 Operational Requirements
- The system will be made for Windows.
- The team will use MySQL script and Microsoft SQL Server to develop and maintain the database.

6. Constraints
6.1 Design Constraint
When the project team starts to design the system, they always try to meet all of the client's requirements properly. But, sometimes, this job is made difficult by some last minute requests made by the client. This is considered as the main constraint for our system.

7. Scenario Based Model

7.1 Use Case Diagram

After analyzing the requirements of our client, two main actors are defined, Administration and Staff.

So in our system, the Admin is the only one able to edit data and manage users, while the staff is only able to perform a selected few operations.
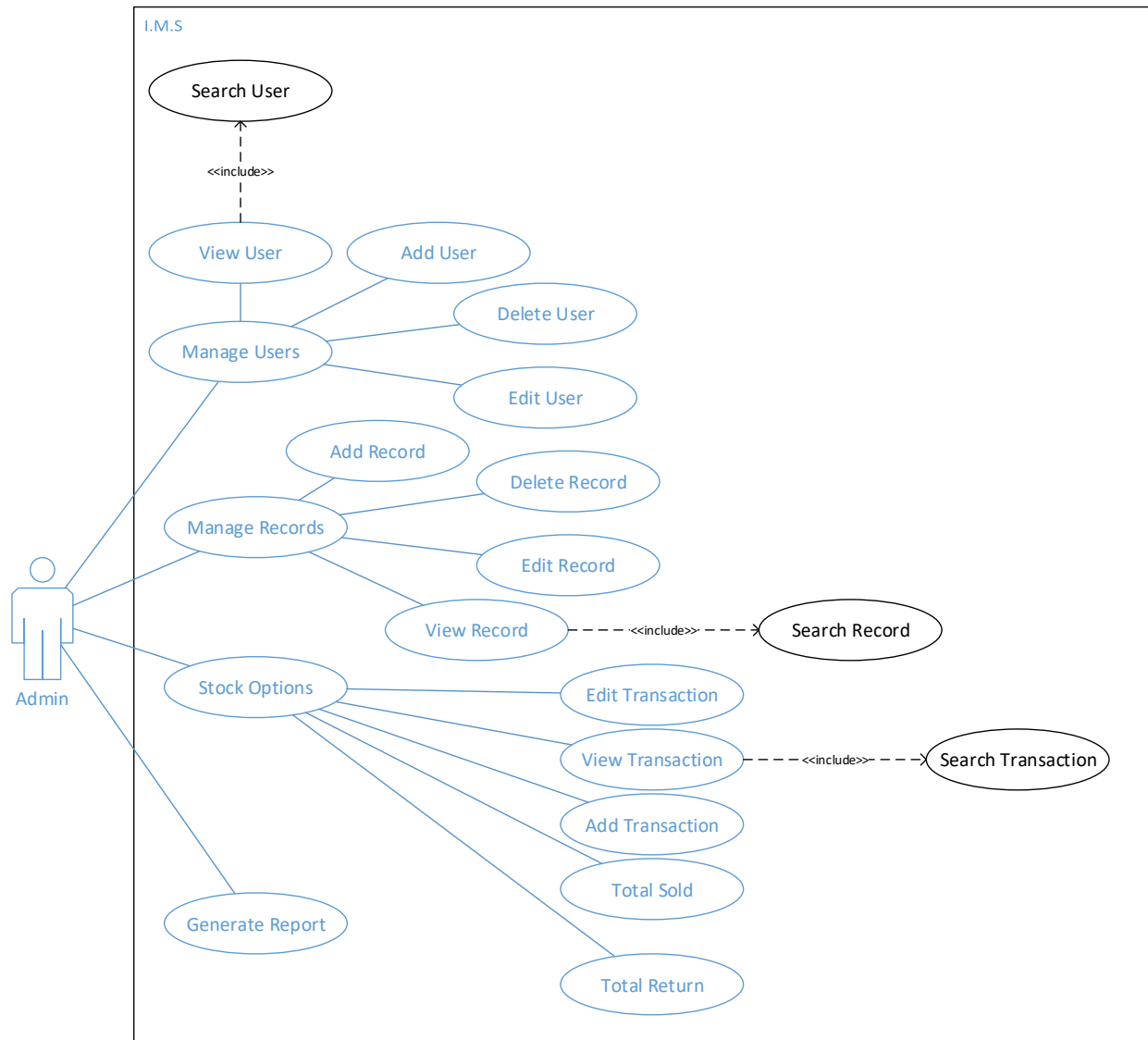

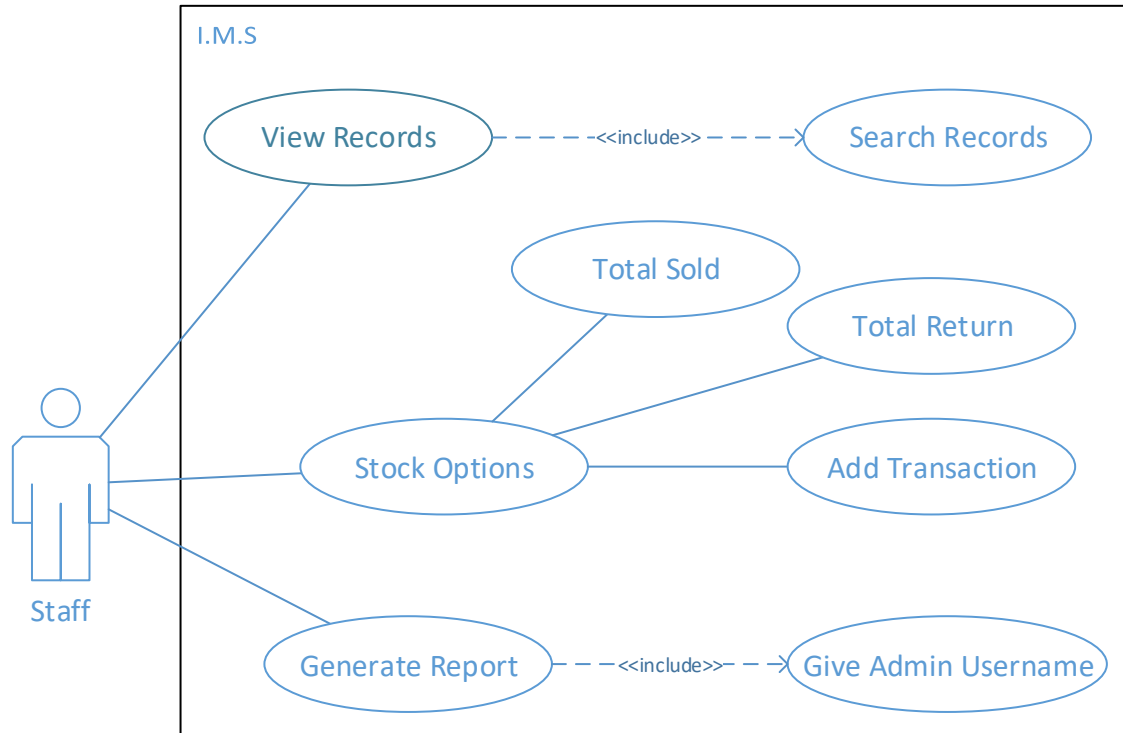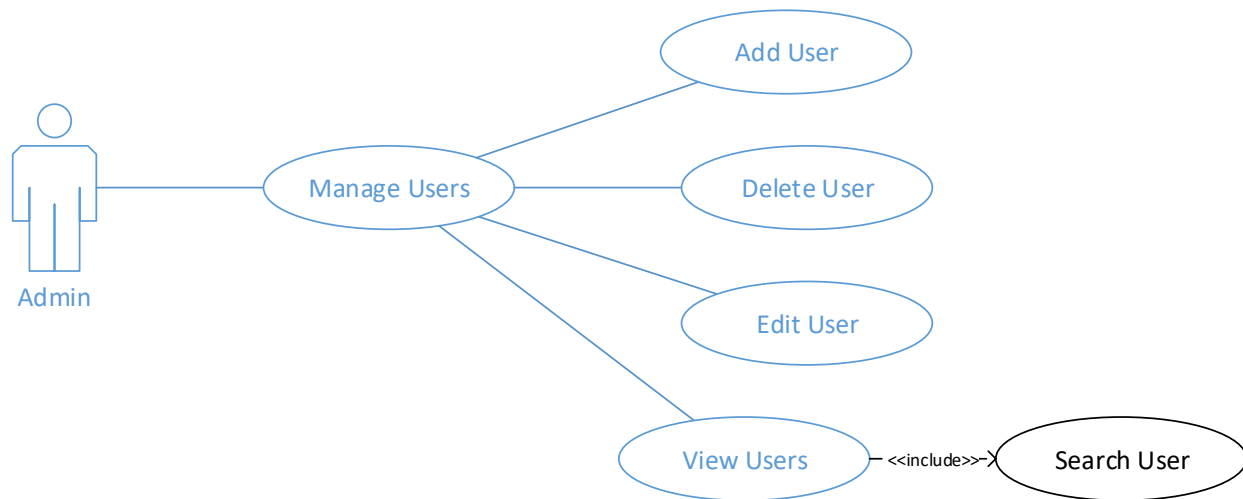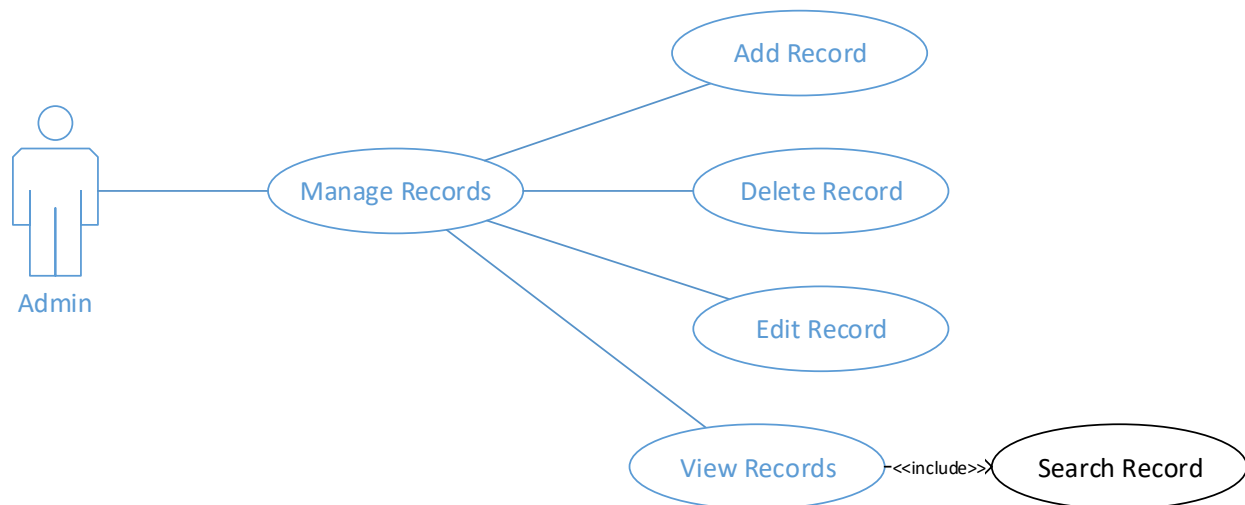**FIGURE 1: USE CASE DIAGRAM (ADMIN)**

FIGURE 2: USE CASE DIAGRAM (STAFF)

Manage Users	
Implementation Priority	1
Actors	Admin
Summary	The admin uses their authority in the system to manage users. The admin can: Add User, Delete User, Edit User and View currently registered users.
Pre-Condition	The admin has details about the user that they are about to perform actions on.
Post-Condition	A user record will either be created, formatted or viewed at the end of the session.
Extend	None
Uses	Add User, Delete User, Edit User, View Users, Search User
Normal Course of Events	• Admin Logs in. • Admin chooses Manage Users. • Admin performs an action from Add, Delete, Edit or View. • A user record is either created, deleted, changed or viewed at the end of the session. • Admin goes back to the main menu.
Alternative Path	The admin miss-clicked and chose the menu by mistake. • The admin clicks the exit button on the form. • The admin is directed to the main menu.
Exception	The system will not allow a staff member to access the admin menu.
Assumption	• The admin enters the menu with the intent of performing one of the stated actions. • A staff member will not have access to the admin menu.

Manage Records

|	
Implementation Priority	2
Actors	Admin
Summary	The admin uses their authority in the system to manage records. The admin can: Add Record, Delete Record, Edit Record and View current record of items and customers/suppliers in the database.
Pre-Condition	The admin has details about the record that they are about to perform actions on.
Post-Condition	An item or customer/supplier record will either be created, formatted or viewed at the end of the session.
Extend	None
Uses	Add Record, Delete Record, Edit Record, View Records, Search Record
Normal Course of Events	- Admin Logs in. - Admin chooses Manage Records. - Admin performs an action from Add, Delete, Edit or View. - An item or customer/supplier record is either created, deleted, changed or viewed at the end of the session. - Admin goes back to the main menu.
Alternative Path	The admin miss-clicked and chose the menu by mistake. - The admin clicks the exit button on the form. - The admin is directed to the main menu.
Exception	The system will not allow a staff member to access the admin menu.
Assumption	- The admin enters the menu with the intent of performing one of the stated actions. - A staff member will not have access to the admin menu.
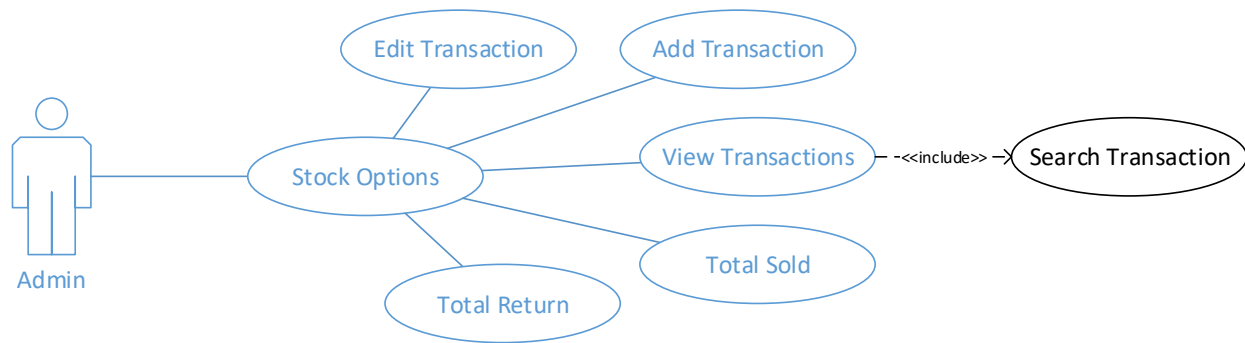
Stock Options - Admin

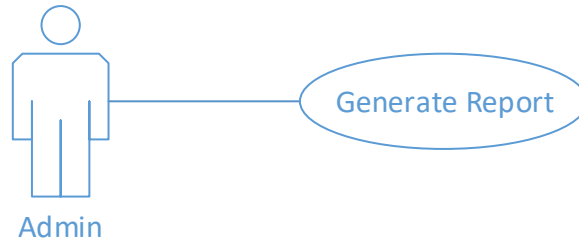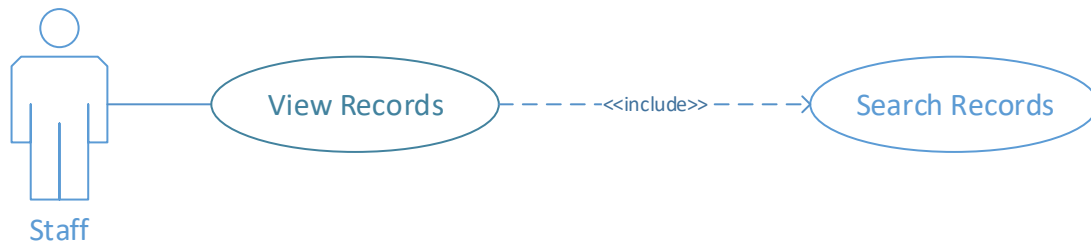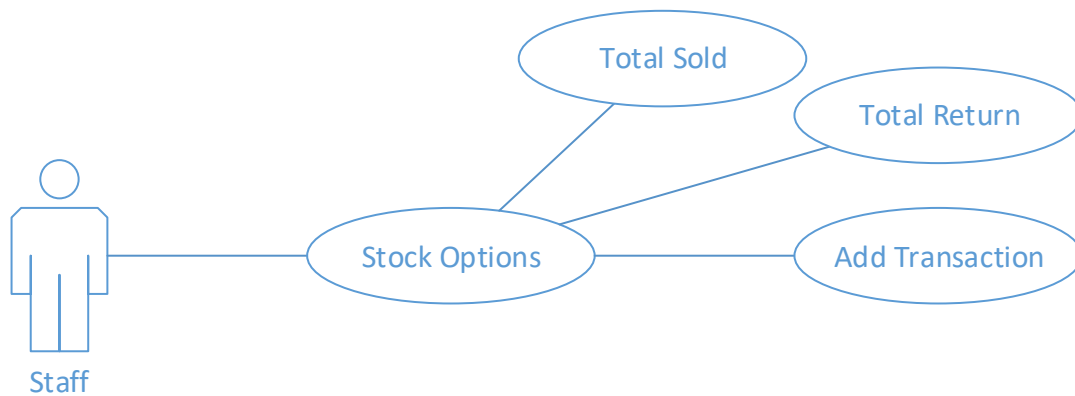|	
Implementation Priority	3
Actors	Admin
Summary	The admin uses this option to either add a transaction record, view transaction records, see the total amount gained from selling items or see the items that were returned.
Pre-Condition	The admin intends to manage stocks and view the details of their sold stock.
Post-Condition	The admin has better understanding of the items that were sold/returned. The admin can now make decision about ordering items.
Extend	None
Uses	Add Transaction, View Transaction, Total Sold, Total Return, Edit Transaction, Search Transactions
Normal Course of Events	• Admin Logs in. • Admin chooses Stock Options. • Admin performs an action from Add, Edit, View, Total Sold or Total Return. • Admin is more informed about the stocks of the shop. • Admin goes back to the main menu.
Alternative Path	The admin miss-clicked and chose the menu by mistake. • The admin clicks the exit button on the form. • The admin is directed to the main menu.
Exception	The system will not allow a staff member to access the admin menu.
Assumption	• The admin enters the menu with the intent of performing one of the stated actions. • A staff member will not have access to the admin menu.

Admin

Generate Report

Implementation Priority	4
Actors	Admin
Summary	The admin uses this option to generate a report of the sold/returned items.
Pre-Condition	The admin intends to get a report of all the items sold/returned ever.
Post-Condition	The admin has a report of the items that were sold/returned.
Extend	None
Uses	None
Normal Course of Events	- Admin Logs in. - Admin chooses Generate Report. - Admin has a report. - Admin goes back to the main menu.
Alternative Path	The admin miss-clicked and chose the option by mistake. The admin gets a report.
Exception	The system will not allow a staff member to access the admin menu.
Assumption	- The admin clicks the button with the intent of performing one of the stated actions. - A staff member will not have access to the admin menu.

View Records

Implementation Priority	5
Actors	Staff
Summary	The staff uses this option to view all the items currently in the database.
Pre-Condition	The staff member is registered in the system.
Post-Condition	The staff member has a view of all the items in the database.
Extend	None
Uses	Search Records
Normal Course of Events	• Staff logs in. • Staff chooses View Records. • Staff member views/searches the list of items. • The staff member goes back to the main menu.
Alternative Path	The staff miss-clicked and chose the menu by mistake. • The staff clicks the exit button on the form. • The staff is directed to the main menu.
Exception	The system will not allow a staff member to access the system without being registered by an admin.
Assumption	• The staff member is already a registered user.

Stock Options - Staff

Implementation Priority	6
Actors	Staff
Summary	The staff uses this option to perform selected actions from the admin menu of Stock Options.
Pre-Condition	The staff member is registered in the system.
Post-Condition	The staff member has either added a transaction and/or viewed the sold or returned items.
Extend	None
Uses	Total Sold, Total Return, Add Transaction
Normal Course of Events	- Staff logs in. - Staff chooses Stock Options. - Staff member performs one of the actions available to them. - Staff goes back to the main menu.
Alternative Path	The staff miss-clicked and chose the menu by mistake. - The staff clicks the exit button on the form. - The staff is directed to the main menu.
Exception	The system will not allow a staff member to access the system without being registered by an admin.
Assumption	The staff member is already a registered user.

Generate Report

Implementation Priority	7
Actors	Staff
Summary	The staff is asked by an admin to fetch them a report and they use the admin's username to generate a report.
Pre-Condition	The staff member is registered in the system and has a username of the admin who asked for the report.
Post-Condition	The staff member generated a report.
Extend	None
Uses	Give Admin Username
Normal Course of Events	- Staff logs in. - Staff chooses Generate Report. - Staff member provides admin username. - Staff member gets a report. - Staff member returns to the main menu.
Alternative Path	The staff miss-clicked and chose the menu by mistake. - The staff clicks the exit button on the form. - The staff is directed to the main menu.
Exception	The system will not allow a staff member to generate a report without the username of an admin.
Assumption	The staff member is already a registered user and has a username of an admin.

7.2 Activity Diagram

Activity Diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In UML, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. This diagram shows the overall flow of control.
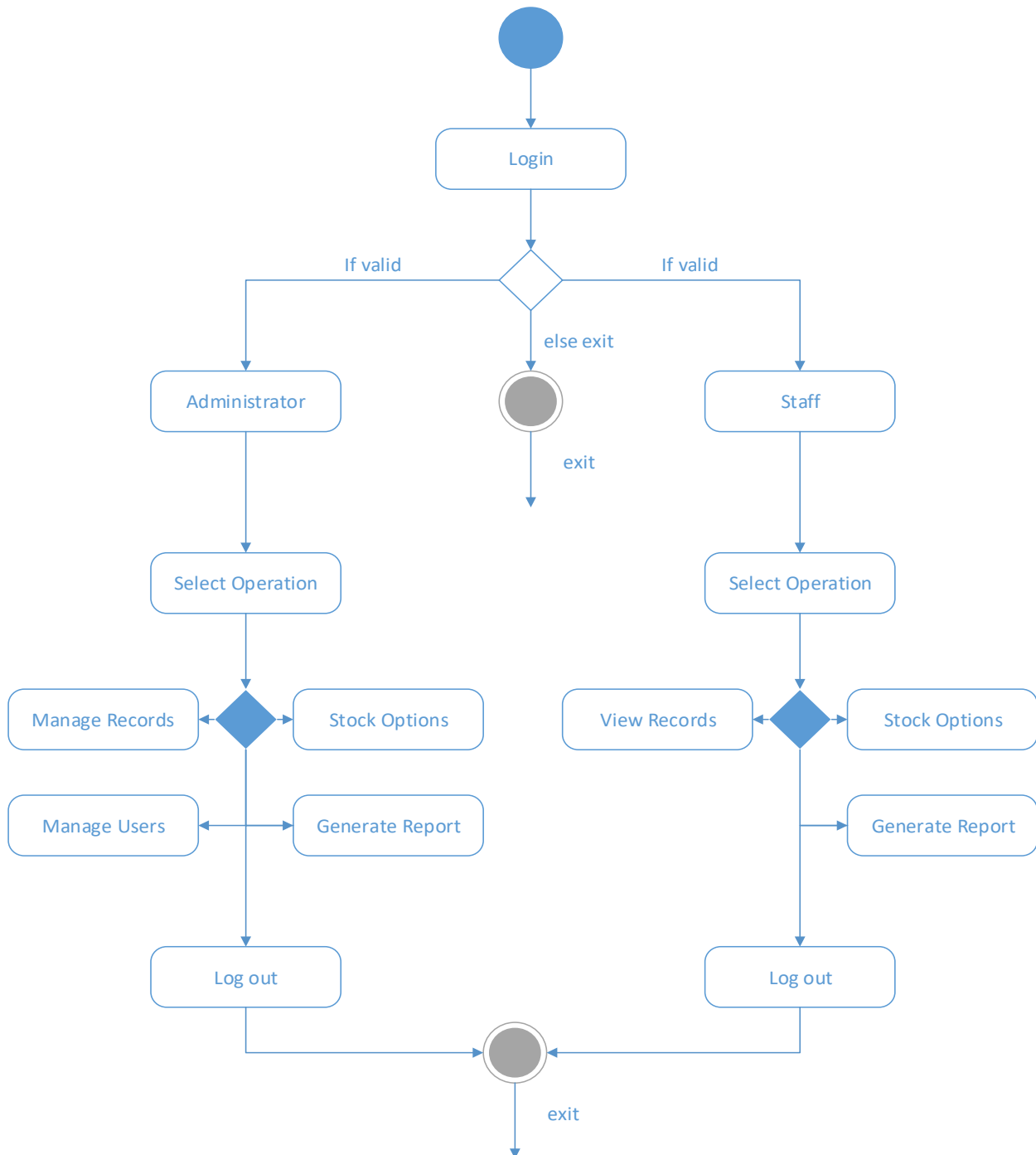

FIGURE 3: ACTIVITY DIAGRAM

Looking at this activity diagram will make it easier for us to find out the step-by-step operational workflow of our system. The user must first log in. Afterwards, depending on what role the user was given by the admin, they will have the options either of the Admin or the Staff, one user cannot be an admin and a staff member at the same time.

8. Flow Model

8.1 Data Flow Diagram (DFD)

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. Often they are a preliminary step used to create an overview of the system which can later be elaborated. DFDs can also be used for the visualization of data processing.

A DFD shows what kinds of data will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It does not show information about the timing of processes, or information about whether processes will operate in sequence or in parallel.
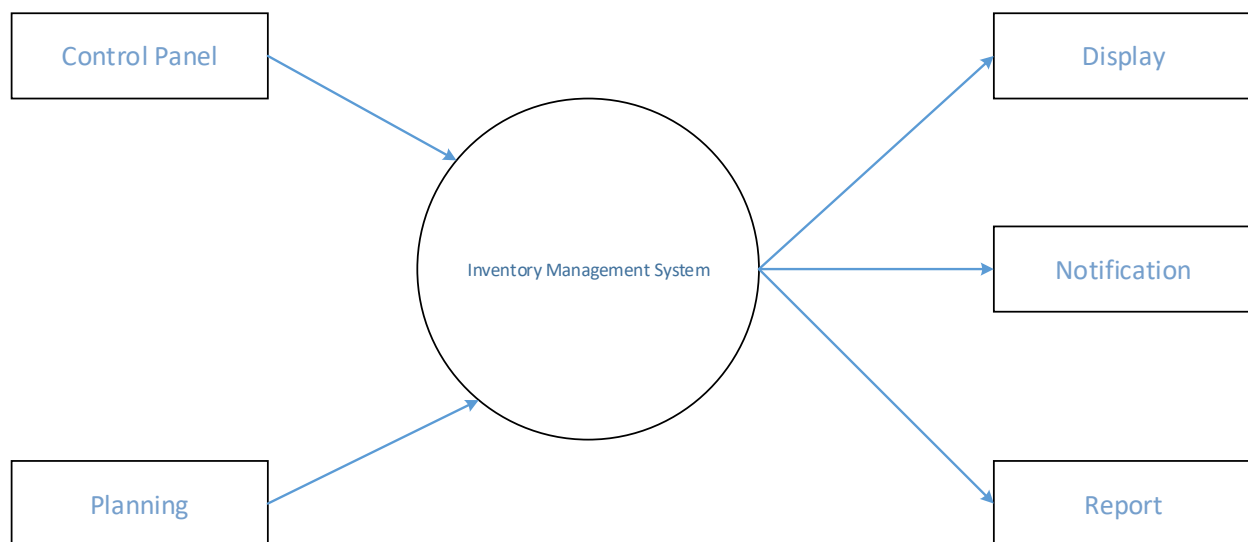
FIGURE 4: DATA FLOW DIAGRAM (LEVEL 0)

DFD level 0, is the representation of the system which only shows the inputs and outputs of the system without dealing with any function and file or database issue. In the given figure this is the data flow diagram (Level 0) for our system. Control panel and the planning are the two input entities which can give data command to the system, all the inputs will be processed in the system and the outputs will be viewed in the display panel or as notification, and the system can also generate a report.
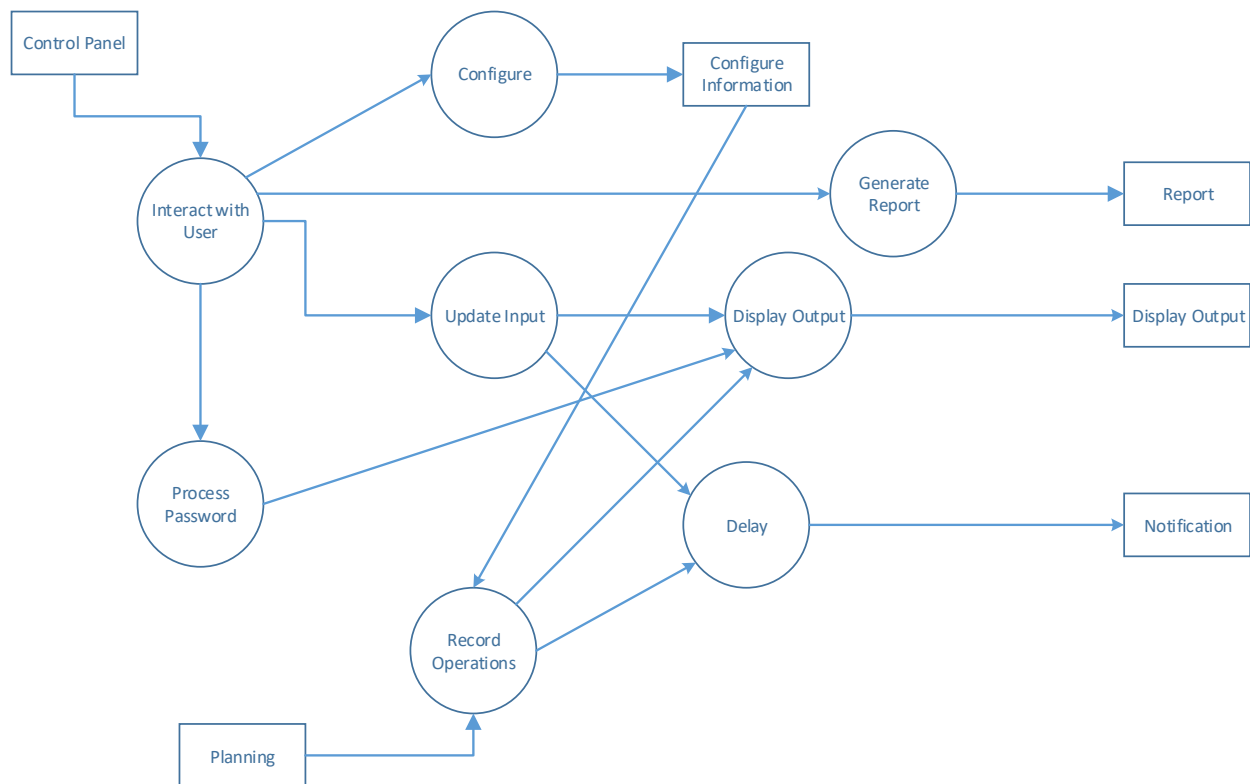
FIGURE 5: DATA FLOW DIAGRAM (LEVEL 1)

DFD level 1, is the representation of the system which can visualize the relation among the functions and the file or database with inputs and outputs. Control panel and planning entity can give input commands to the system, which can be processed by some functions in this system, like interact with user, configure and update input, and display output. There is a database related with configure function which, one can modify information and display output and notifications. Generate Report can output a report to the user. Control Panel and Planning refer to the user interface through which the user will give command to the system.
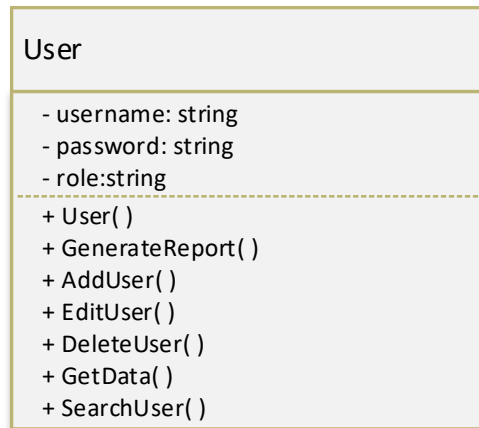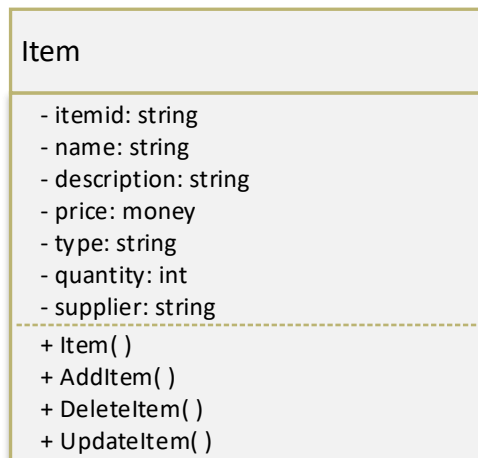
9. Class Diagram

```
┌─────────────────────────────────┐
│ User                            │
├─────────────────────────────────┤
│  - username: string             │
│  - password: string             │
│  - role:string                  │
│ ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄   │
│  + User( )                      │
│  + GenerateReport( )            │
│  + AddUser( )                   │
│  + EditUser( )                  │
│  + DeleteUser( )                │
│  + GetData( )                   │
│  + SearchUser( )                │
└─────────────────────────────────┘
```

FIGURE 6: CLASS DIAGRAM (USER)

```
┌─────────────────────────────────┐
│ Item                            │
├─────────────────────────────────┤
│  - itemid: string               │
│  - name: string                 │
│  - description: string          │
│  - price: money                 │
│  - type: string                 │
│  - quantity: int                │
│  - supplier: string             │
│ ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄   │
│  + Item( )                      │
│  + AddItem( )                   │
│  + DeleteItem( )                │
│  + UpdateItem( )                │
└─────────────────────────────────┘
```

FIGURE 7: CLASS DIAGRAM (ITEM)
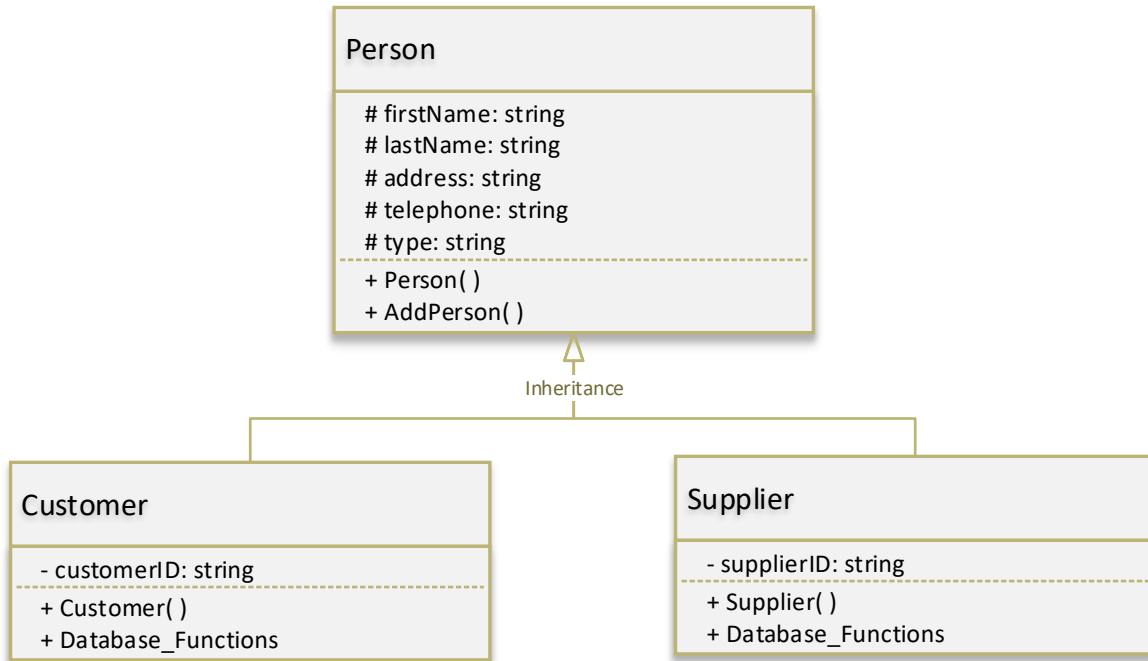
FIGURE 8: CLASS DIAGRAM (PERSON)
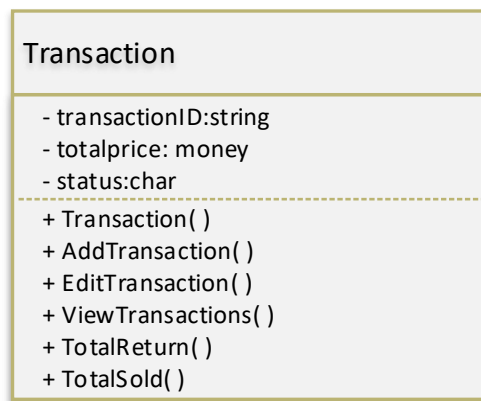
FIGURE 9: CLASS DIAGRAM (TRANSACTION)

The class diagrams show the various classes that will be used for this system. The Stock output will be generated using the information of Transaction class. The users are either Admin or Staff. The Person class allows keeping record of suppliers & customers and the Item class is the class for the stored items.
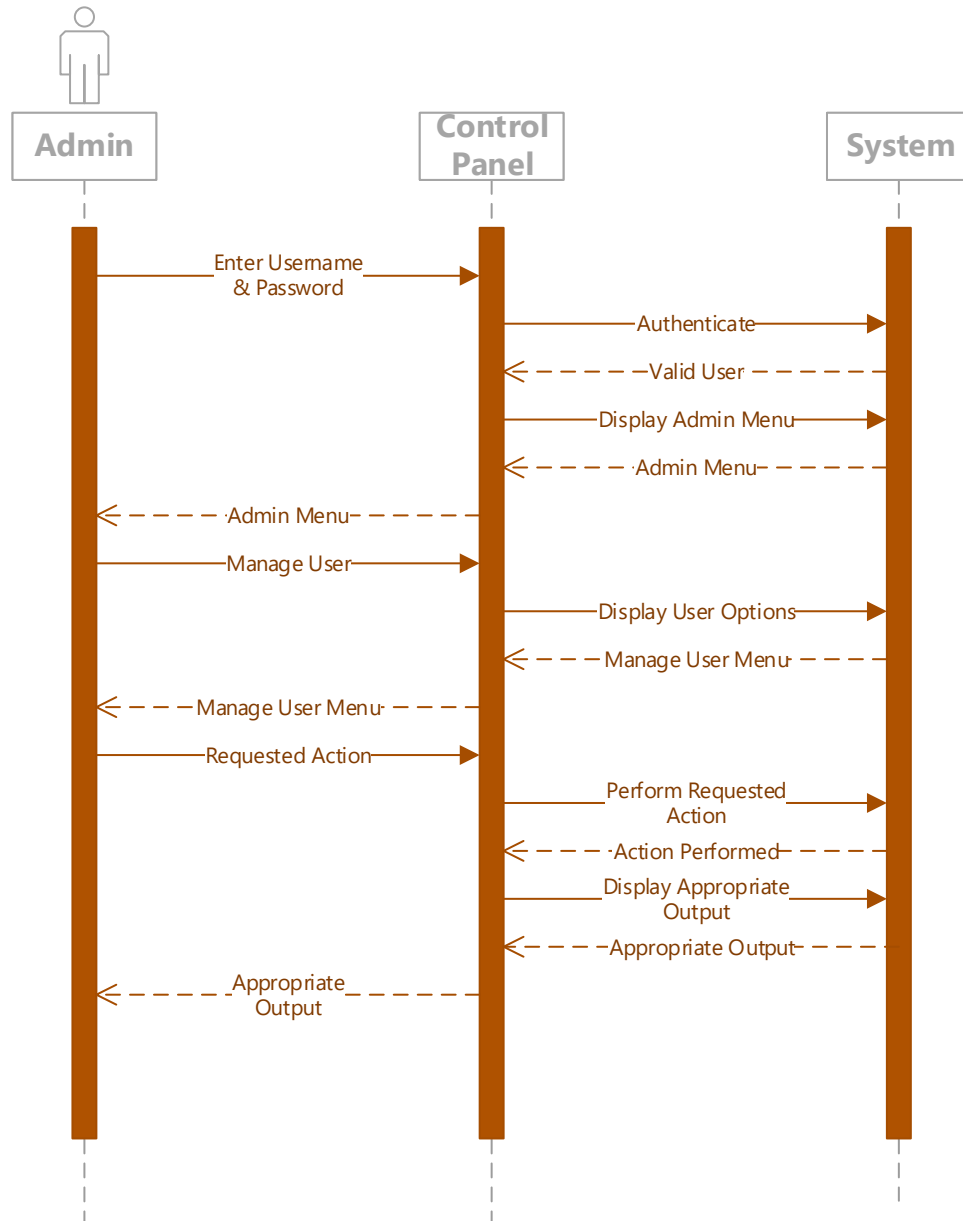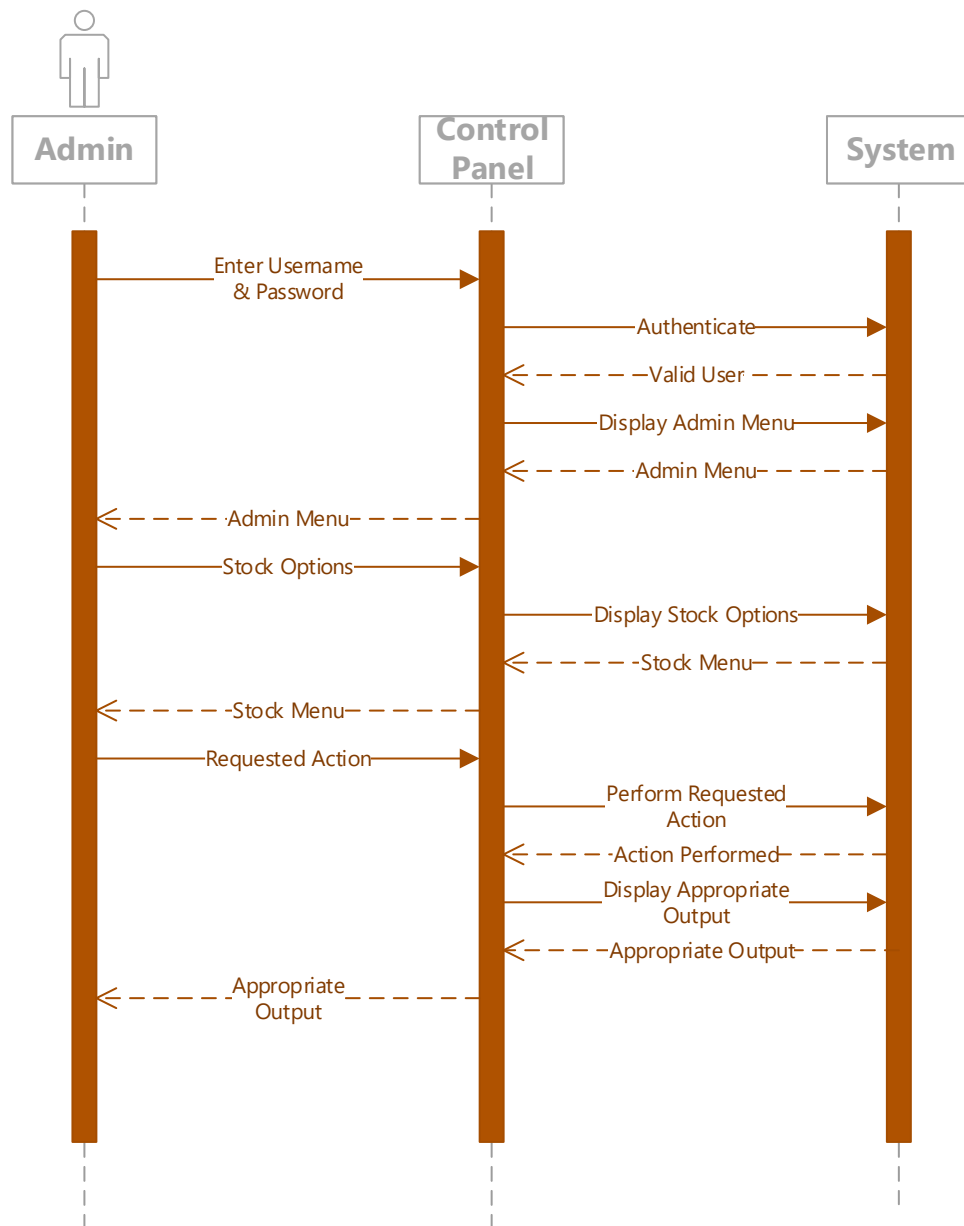
10. Sequence Diagram

FIGURE 11: SEQUENCE DIAGRAM (STOCK OPTIONS - ADMIN)
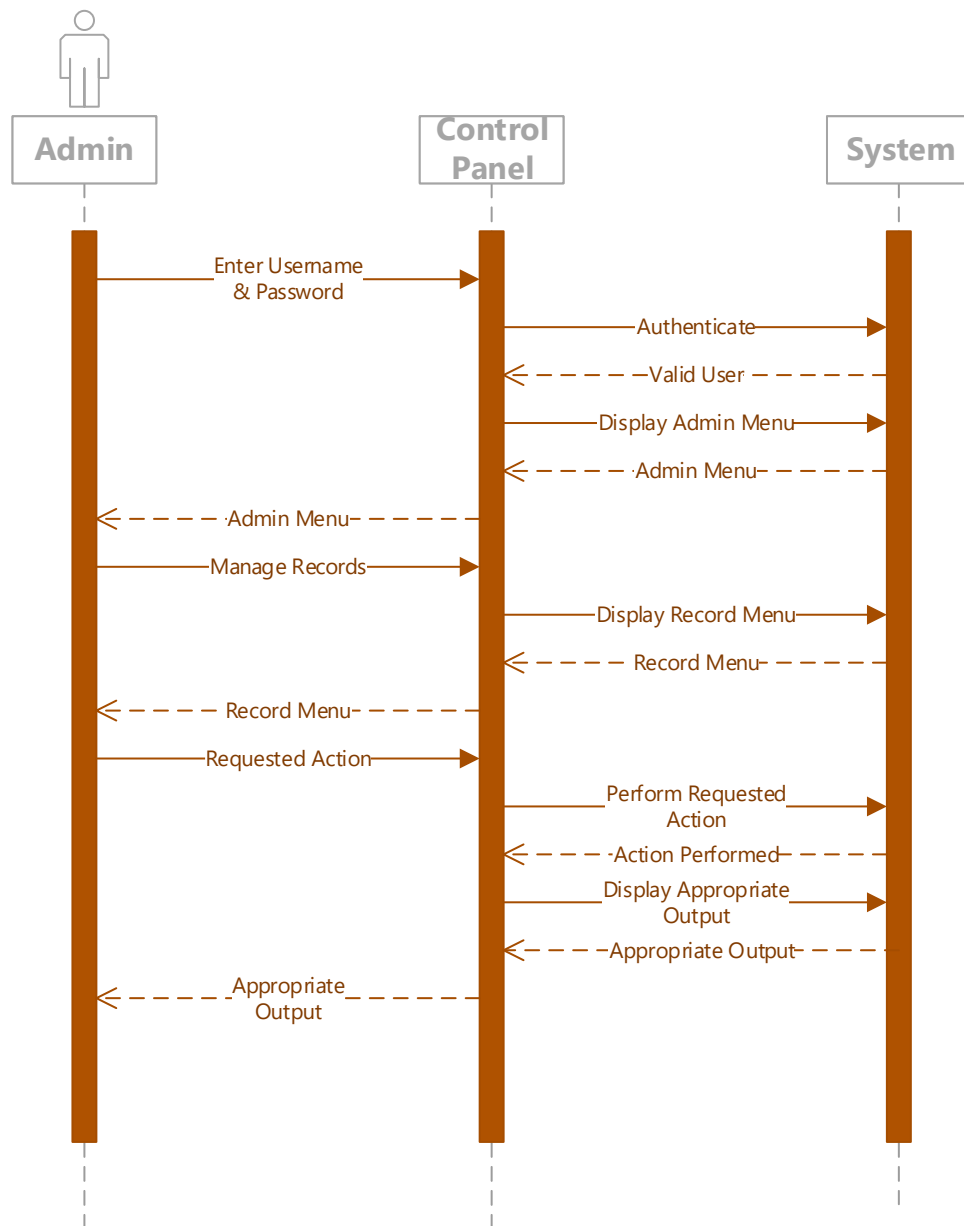
FIGURE 12: SEQUENCE DIAGRAM (MANAGE RECORDS)
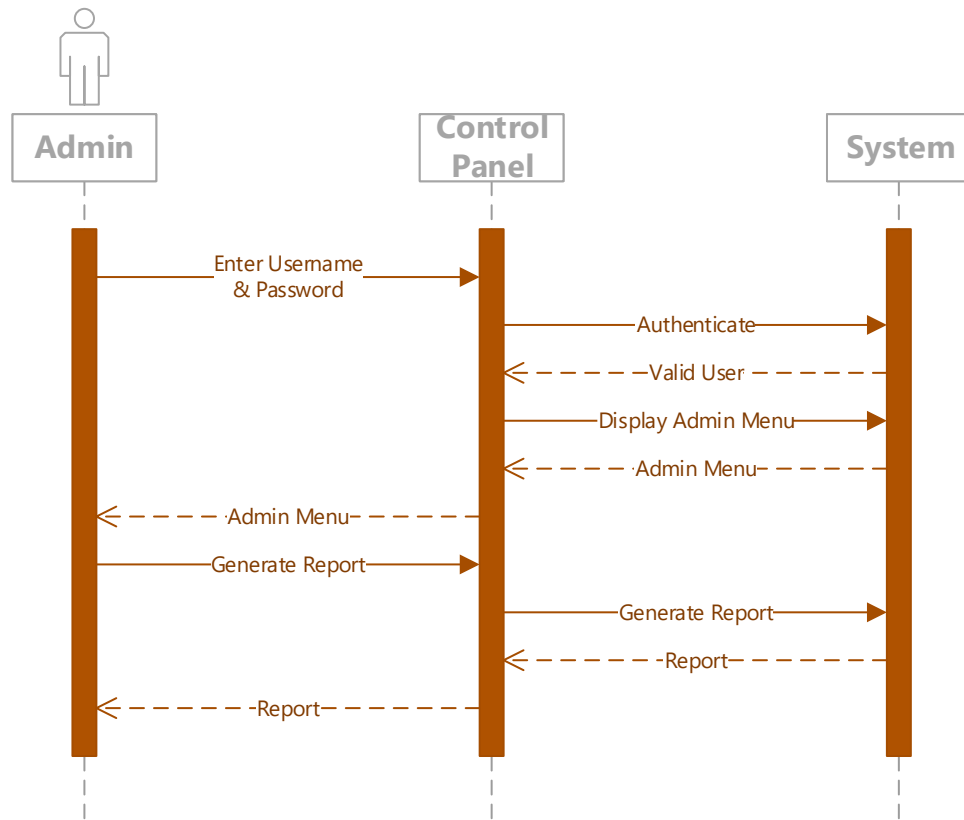
FIGURE 13: SEQUENCE DIAGRAM (GENERATE REPORT - ADMIN)
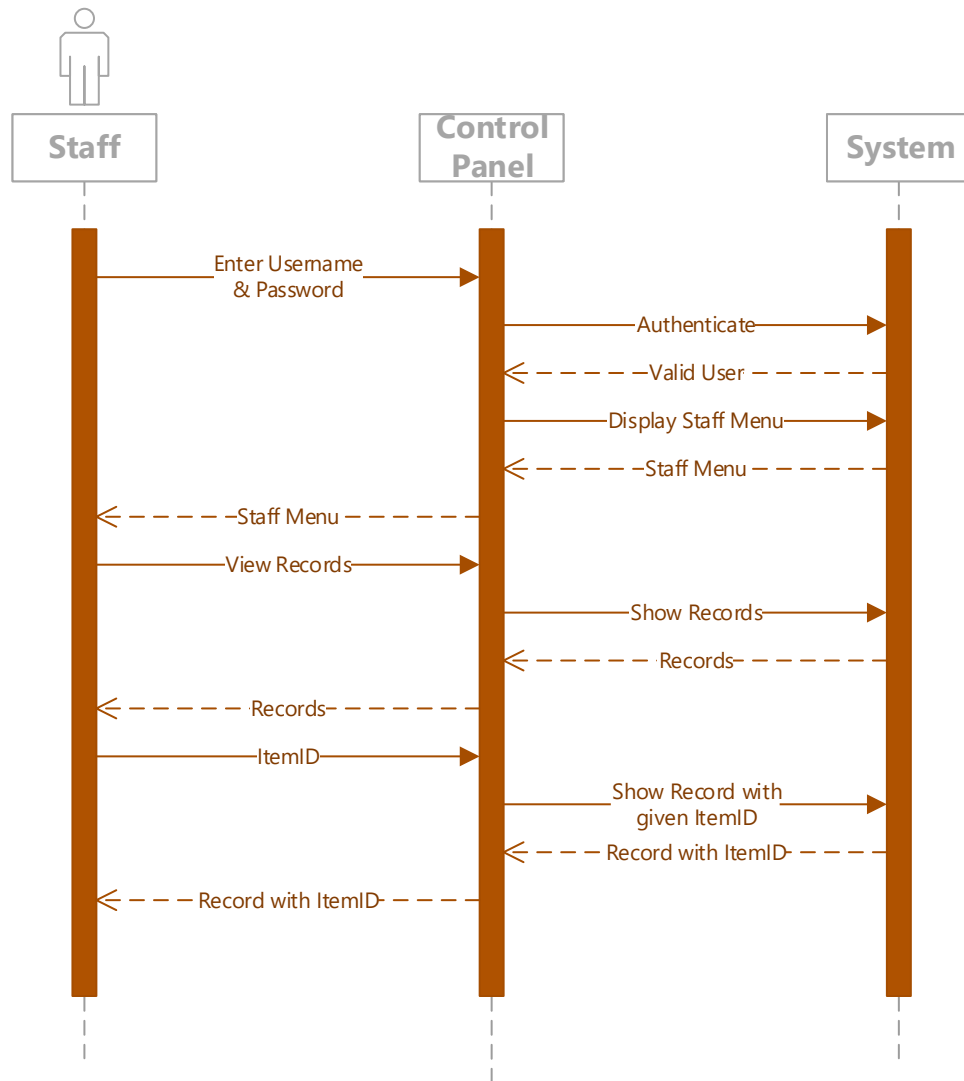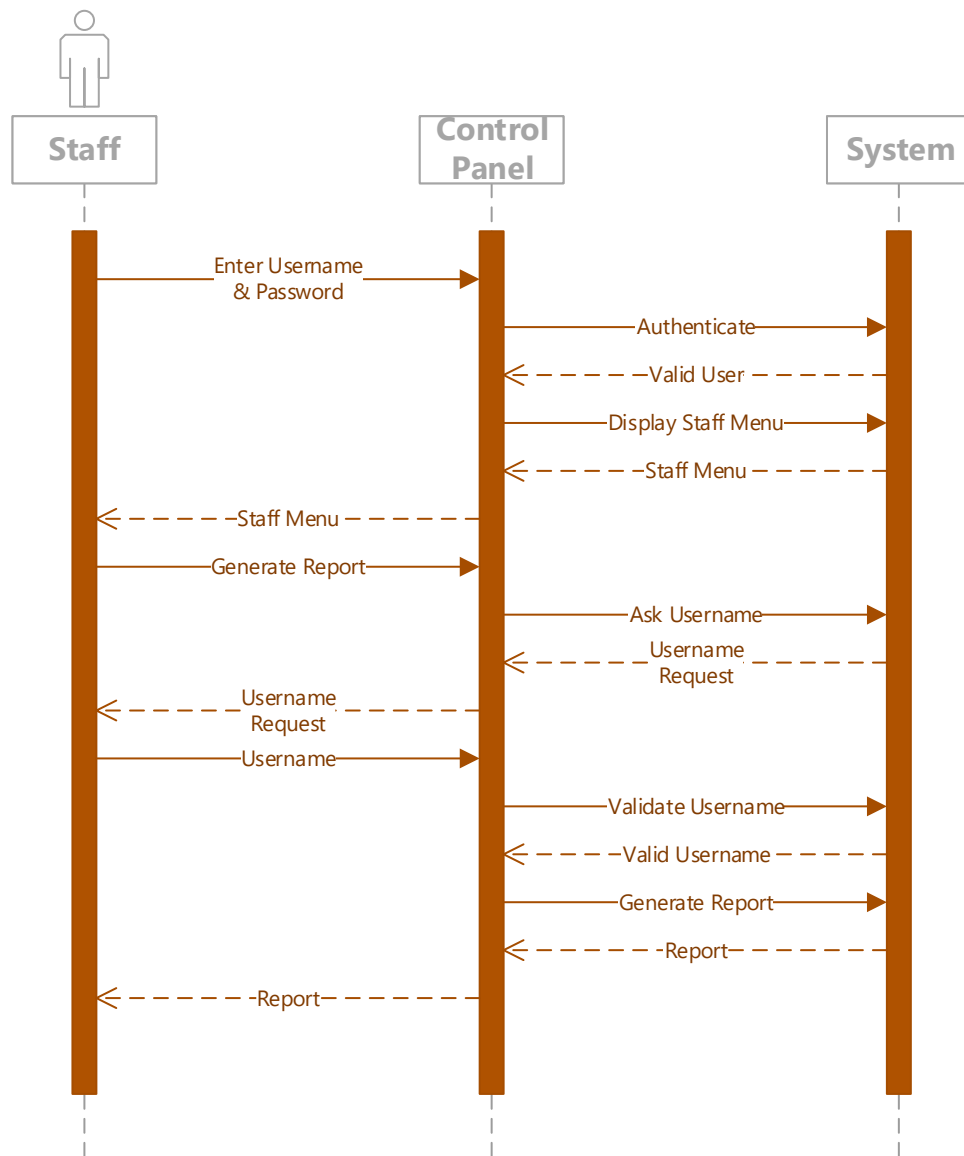
FIGURE 14: SEQUENCE DIAGRAM (VIEW RECORD)

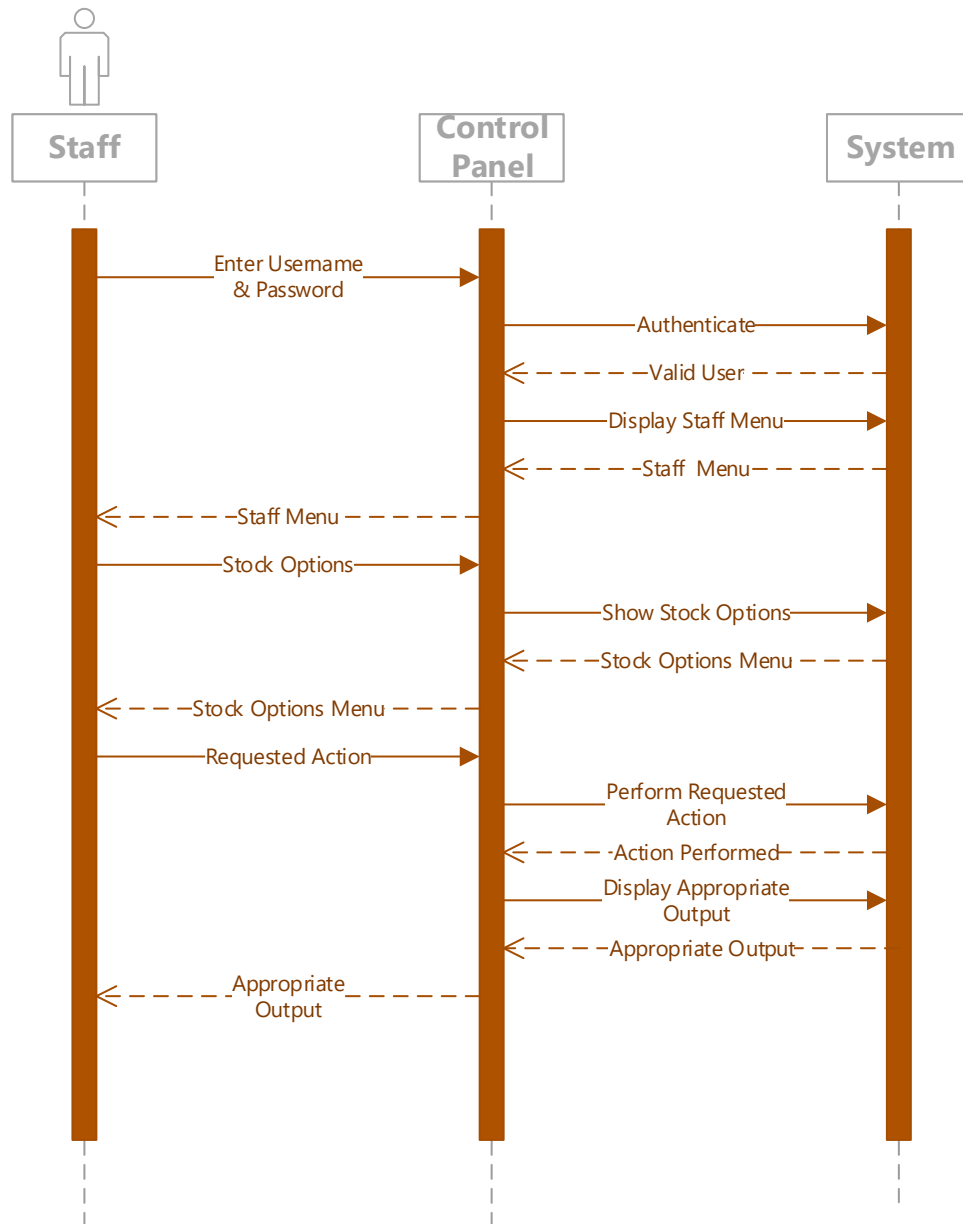**FIGURE 15: SEQUENCE DIAGRAM (GENERATE REPORT - STAFF)**

All Sequence Diagrams are made assuming that the user is logging in and performing the action immediately. If the user is already logged in, they will not be asked for username and password before every action, they will only need to enter username and password once for the first time.
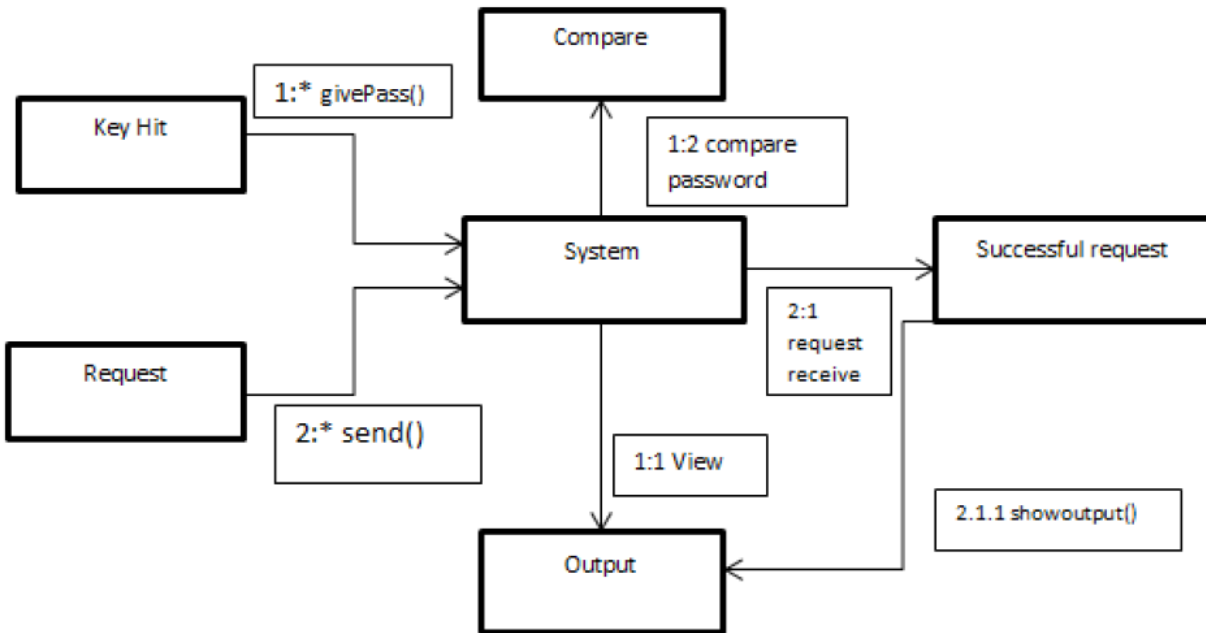
11. Collaboration Diagram

Collaboration diagrams belong to a group of UML diagrams called Interaction Diagrams. Collaboration diagrams, like Sequence Diagrams, show how objects interact over the course of time. However, instead of showing the sequence of events by the layout on the diagram, collaboration diagrams show the sequence by numbering the Commands on the diagram. This makes it easier to show how the objects are linked together, but harder to see the sequence at a glance.