INVENTORY MANAGEMENT SYSTEM

BY

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Computer Science and Engineering

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APPROVAL

This Project/internship titled **"Inventory Management System"**, submitted by **Md. Abu Taiab**, ID No: **211-25-934** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **22/01/2022**.

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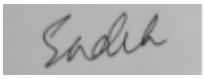

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We hereby declare that, this project has been done by us under the supervision of **Professor Dr. Touhid Bhuiyan,** Professor & Head **Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma. [**Font-12**]

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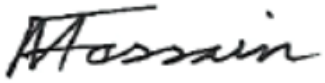

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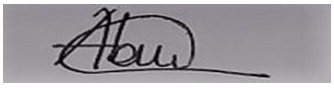

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ABSTRACT

Inventory Management System which is significant to ensure quality control in businesses management that handle transactions revolving around consumer goods and keep the records of purchase and sales. Without proper inventory control, a large retail store may run out of stock on an important item and scale of quantity. A enrich Inventory Management System will notify the retailer when it is time to reorder. As a Management System is also an important means of automation tracing the vast amount of shipments. Inventory Management System can provide a variety of functions in this case. It can help a employee finding the items on the order list in the store or warehouse, it can encode shipping information like tracking numbers and delivery information. Inventory management system which is windows based operating system that focused in the area of inventory control and generate. Inventory Management System make it simple to locate and research, analyze, summarize a data in inventory information in past, previous and real-time data with a simple database search.

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CHAPTER 1: INTRODUCTION

1.1 PURPOSE

This document briefly describes the software requirement analysis of inventory management system web application. It contains the viewpoint of stakeholder of the inventory management system. It also contains normal, expected and exciting requirements and establishes a requirement baseline for the development of the system. The requirements contained in the SRS are independent, uniquely numbered and organized. The SRS serves as an official means of communicating user requirements to the developer and provides a common reference point for both the developer team and the stakeholder community. The SRS will evolve over time as users and developers work together to validate, clarify and expand its contents.

1.2 INTENDED AUDIENCES

This SRS is intended for several audiences who are the stakeholder of our project including the users as well as the admins, designers, developers and testers.

- The designers will use this SRS as a basis for creating the system's design. The designers will continually refer back to this SRS to ensure that the system they are designing will fulfill the customer's needs.
- The developers will use this SRS as a basis for developing the system's functionality. The developers will link the requirements defined in this SRS to the software they create to ensure that they have created software that will fulfill all of the customer's documented requirements.
- The testers will use this SRS to derive test plans and test cases for each documented requirement. When portions of the software are complete, the testers will run their tests on that software to ensure that the software fulfills the requirements documented in this SRS. The testers will again run their tests on the entire system when it is complete and ensure that all requirements documented in this SRS have been fulfilled.
- The customer will use this SRS to verify whether the product created by the developer team is acceptable to the customer.
- This analysis of the audience helped us to focus on the users who will be using our analysis. This overall document will help each and every person related to this project to have a better idea about the project.

CHAPTER 2: INCEPTION OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

Inception is the beginning phase of requirements engineering. It defines how a software project gets started and what the scope and nature of the problem to be solved are. The goal of the inception phase of our project is to identify concurrent needs and conflicting requirements among the stakeholders of Inventory Management System Web Application. At project inception, we establish a basic understanding of the problem they face while using the manual inventory system. To establish the groundwork we have worked with the following factors related to the inception phases:

- List of stakeholders
- Recognizing multiple viewpoints
- Working towards collaboration
- Requirement questionnaire

2.1 List of Stakeholders

Stakeholders are the person who will affected by the inventory management system directly or indirectly. Stakeholders include end-users who interact with the system and everyone else in an organization that may be affected by its installation [1]. For collecting requirements of the inventory management system we need to discuss with the stakeholders. We need to know the features or facilities which we should keep on our software that will consume less time and work.

1. Chairman/Director
2. Maintenance officer
3. General User(Faculties and staff)
4. Designer
5. Developer

1) **Chairman/Director:** Chairman/Director approves maintenance officer registration request and the requisition. Without Directors approval no product will be delivered. He can see inventory status and get report from the system. Chairman/Director can remove general user (faculties and staff) from the system and edit her/his own profile.

2) **Maintenance Officer:** Faculties registration is approved by the Maintenance officer. Maintenance officer can add new product and category in the stock. Category and products can be deleted by this role. Requisition list from the faculties is delivered to the maintenance officer and maintenance officer forward it to the chairman/director. He can see inventory status and edit her/his own profile.
3) **General User:** They can be registered and sent requisition to the system. They can search a product to see either the product is available. They can edit their own profile.
4) **Designer:** They will communicate with all the stakeholders and design according to the demands to provide the documents of the software.
5) **Developers:** Developers are one of the stakeholders because they are also affected by this system. They develop this system and work for further development. If there any system interruption occurs, they will find the problem and try to solve it.

a) Programmer: They will code according to the supplied document.
b) Quality Assurance Engineer: They will test the software after programmers deliver the software.

2.2 Recognizing Multiple Viewpoints

Different stakeholders achieve different benefits from our Inventory Management System. Consequently, each of them has a different view of the system. So we have to recognize the requirements from multiple points of view, as well as multiple views of requirements. Assumptions are given below:

The viewpoint of Chairman/Director-

1. Chairman/Director can approve or cancel Maintenance officer for registration.
2. Chairman/Director can see the status of the product that means which product is available and quantity of the product.
3. Chairman/Director can approve all requisition.
4. Chairman/Director can give power to the maintenance officer.
5. He can see the general user and maintenance officer profile.
6. Product cannot be removed until chairman/director approve.
7. He can search a product.
8. Report can be generated by this role.

The viewpoint of Maintenance Officer-

1. Maintenance officer can approve or cancel general user registration request.
2. Maintenance Officer can add category and product.
3. Maintenance Officer can view product information.
4. Maintenance Officer can see product status.
5. He can add quantity to the existing product.
6. He can approve requisition.
7. He can forward request user list to Chairman/Director.
8. He can forward general user requisition list to Chairman/Director.
9. He can search a product.
10. He can remove product from stock.
11. He can see general users' information.
12. Chairman/Director can see a product status.
13. He can approve user request for registration.

The viewpoint of General user

1. General user can send requisition list.
2. They can search a product.
3. They can only view a product.
4. General user can see other general user profile.

The viewpoint of Designer-

1. Suggestion will be provided during searching products.
2. Allow user to edit their personal information
3. Every confirmation message will be sent to email addresses of the users
4. Chairman/Director can close faculties account.
5. Provide admin a corresponding interface for special access **The viewpoint of Developer-**

1. Cost within budget.
2. Detail documentation.
3. Enough time for development.

2.3 Working towards Collaboration

Every stakeholder has their own requirements. There are some common and conflicting requirements of our stakeholder. That's why we followed the following steps to merge these requirements-

- ✓ Find the common and conflicting requirements
- ✓ Categorize them
- ✓ List the requirements based on stakeholder's priority points
- ✓ Make final decision about requirements

- ➢ Each user must have a personal account
- ➢ Maintenance officer must be approved by chairman
- ➢ User can view product information
- ➢ User can search product
- ➢ Maintenance officer can add category and product

- General user can send requisition

Conflicting Requirements-

- Chairman/Director can approve requisition
- Maintenance officer can approve requisition
- Chairman/Director can approve user request for registration
- Maintenance officer can approve user request for registration
- Maintenance officer can remove product from stock
- Maintenance officer cannot remove product from stock until Chairman/Director approve

Final Requirement-

- Maintenance officer request for registration is approved by Chairman/Director
- General user request for registration is approved by the maintenance officer
- Maintenance officer can add category and product
- General user sends requisition to the maintenance officer
- Maintenance officer forward the requisition to chairman
- Requisition list is approved by the chairman/director
- User can search a product
- Chairman/Director can approve or cancel user reque

❖ Admin User activities

- Create All Products.
- Create All Supplier Name.
- Create All User Information.
- Create Different Type Of Users.
- Access User wise Page Access.
- Delete General User.
- Determine the order quantity for the single-period inventory case.
- Describe the rationale behind the retail discounting.
- Purchase All types of Product and Posting in Software.

❖ Project Requirements

- ✓ Displaying Dashboard
- ✓ Displaying total requisition
- ✓ Displaying daily total requisition
- ✓ Displaying Total Numbers of Products in stock
- ✓ Displaying all user Information
- ✓ Displaying Administration, Officer Information & General User
- ✓ Current requisition & purchase & issue report shown in the application.
- ✓ Displaying this application any type of browser.

CHAPTER 3: ELICITATION OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

3.1 QUALITY FUNCTION DEPLOYMENT

QFD is the methods or quality management technique that translates the needs of the customer into technical requirements for the software. Ultimately the goal of QFD is to translate often subjective quality criteria into objective ones that can be quantified and measured and which can then be used to design and manufacture the product. It is a method for maximizing customer satisfaction from the software engineering process. We followed this methodology to identify the requirements for the project which are given below:

3.1.1 NORMAL REQUIREMENTS

Normal requirements are generally the objectives and goals that are stated for a product or system during meetings with the customers. The presence of these requirements fulfills satisfaction to the customers. These are the normal requirements for our inventory management system web application:

- General user can send requisition
- Maintenance officer forward requisition to chairman.
- Requisition list is approved by the chairman/director
- Maintenance officer can add category and product
- Maintenance officer can update and delete the product
- User can search the product
- User can see the product information
- An alert of the least amount products from the system
- Chairman and maintenance officer can see the product status by using the product name

3.1.2 EXPECTED REQUIREMENTS

These requirements are intrinsic to the product or system and may be so elementary that the customer does not explicitly state them. Their absence will be a cause for significant dissatisfaction. Below the expected requirements for our project are briefly described.

- Each user must have a personal account in the inventory management system
- Maintenance officer must be approved by the chairman/director
- General user must be approved by the maintenance officer

- Allow user to edit personal information
- Allow chairman to remove general user account
- Create a report of the product
- Provide admin a corresponding interface for add and remove departments

3.1.3 EXCITING REQUIREMENTS

These requirements are for features that go beyond the customer's expectations and prove to be very satisfying when present. Following are some exciting requirements of our project.

- Report generation based on range of date

3.2 USAGE SCENARIO OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

The inventory management system web application provides facility to create own inventory for a department. The inventory will help them to store their product information. For using these facilities a chairman/director of the department must create an account. The admin will approve chairman registration. With the registration of chairman/director the inventory for the department will be created. Chairman/Director can approve registration request of the maintenance officer. After being a valid member maintenance officer can approve request of general user. User can search a product. General user can send requisition list to the maintenance officer and maintenance officer forward it to the chairman/director. Once chairman/director approves the request then the requisition status will be delivered and product will be decreased from stock. Maintenance officer can add new category and product.

3.2.1 REGISTRATION

For using the service of the application, firstly there must be a user who will register as a chairman/director using name, email, department name, university name, designation, phone number, and password. The system will check whether any account exists under the same email or not. If any account exists under the same email address, it will inform the user that the email already exists. Chairman/Director is approved by the admin. Maintenance officer must provide her/his name, email, department name, university name, designation and password for registration. Registration will be completed if the chairman/director approves him. General user can send request for being registered using their name, email, department name, university name, designation and password. Request is sent to the maintenance officer for approval. Maintenance

officer can approve or cancel the request. Once Maintenance officer approves the request then the general user is registered.

3.2.2 AUTHENTICATION

User can enter to his/her personal homepage after being authenticated by the email address and password. If the email address and password do not match with the stored database value, s/he will be informed for the wrong password. One can try again or select forgot password option. If anyone chooses the "forgot password" option, s/he will get an email containing a password. Using this password and email a user can login.

3.2.3 EDIT PERSONAL INFORMATION

User can edit her/his personal information. Personal information includes name and password. User must login to the system before editing information. Personal information is updated in the database.

3.2.4 ADD CATEGORY AND PRODUCT

Maintenance officer can add category and product. Category contains name only. Product contains lot number, name and quantity. Maintenance officer also can add quantity to the existing product. Category and product information is stored in the category and product table in database.

3.2.5 EDIT PRODUCT INFORMATION

Maintenance officer can edit product information including product name, lot number and quantity. Product information is updated in the database.

3.2.6 DELETE CATEGORY AND PRODUCT

Maintenance officer can delete category using the category name. For deleting product must be select product from a category. Deleted category and product is not erasing from the database just make visible false.

3.2.7 SEARCH CATEGORY AND PRODUCT

User can search category and product using the name of the category and product.

3.2.8 REQUISITION

General user can send requisition to the maintenance officer. Requisition list contains product name and quantity. Maintenance officer forward it to the chairman/director. Chairman/Director can approve or cancel the request. Once chairman/director approves requisition, product will be decreased from the stock. Updated information of the product is stored in the database.

3.2.9 REPORT GENERATION

Chairman/Director and maintenance officer can make a report on a range of date. Report contains product name, quantity and who use this product.

3.2.10 ADMIN SECTION

Admin will have a different interface for their convenience. They will have to login into the system to perform the administrative activities. Using email and password admin can login. Admin can add new department and remove department from the system.

CHAPTER 4: SCENARIO-BASED MODEL OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

Although the success of a computer-based system or product is measured in many ways, user satisfaction resides at the top of the list. If we understand how end users (and other actors) want to interact with our inventory management system, our software team will be able to characterize requirements and build meaningful analysis and design models properly. Hence, requirements modeling begin with the creation of scenarios in the form of Use Cases, activity diagrams and swimlane diagrams.

4.1 DEFINITION OF USE CASE

A Use Case captures a contract that describes the system behavior under various conditions as the system responds to a request from one of its stakeholders. In essence, a Use Case tells how an end user interacts with the system under a specific set of circumstances. A Use Case diagram simply describes a story using corresponding actors who perform important roles in the story and makes the story understandable for the users.

The first step in writing a Use Case is to define that set of "actors" that will be involved in the story. Actors are the different people that use the system or product within the context of the function and behavior that is to be described. Actors represent the roles that people play as the system operators. Every user has one or more goals when using the system.

Primary Actor

The primary actor of a use case is the stakeholder that calls on the system to deliver one of its services. It has a goal with respect to the system – one that can be satisfied by its operation. The primary actor is often, but not always, the actor who triggers the use case. [2]

Secondary Actor

Actors that the system needs assistance from to achieve the primary actor's goal. [3]

4.2 USE CASE DIAGRAM

The use case diagram which is given below describes the non technical view of the inventory management system.

4.2.1 LEVEL-0 USE CASE DIAGRAM OF IMS

In figure 1, the level 0 diagram of IMS is shown-

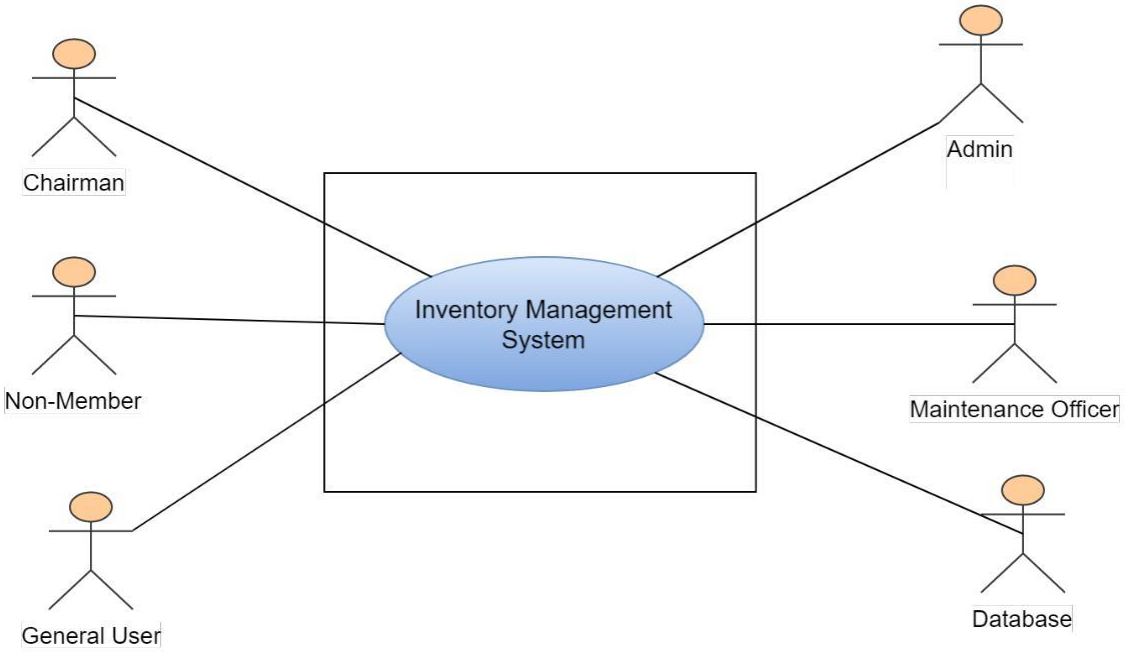


Figure 1: LEVEL-0 USE CASE DIAGRAM OF IMS

Description of Use Case Diagram Level 0:

After analyzing the user story we found six actors who will directly use the inventory management system as a system operator. Primary actors are those who will play action and get a reply from the system whereas secondary actors only produce or consume information. Following are the primary and secondary actor of the IMS-

Primary Actor:

1. Chairman/Director.
2. Maintenance officer.
3. General user
4. Admin.

Secondary Actor:

1. Database.
2. Non-member.

4.2.2 LEVEL-1 USE CASE DIAGRAM-SUBSYSTEMS OF IMS

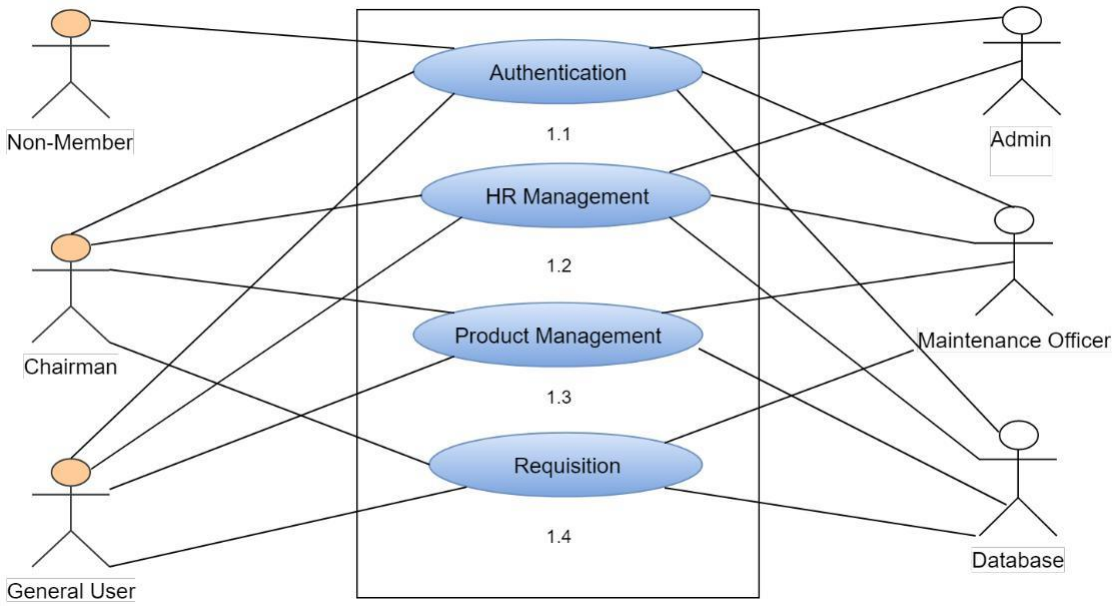


Figure 2: LEVEL-1 USE CASE DIAGRAM-SUBSYSTEMS OF IMS

Description of Use Case Diagram Level 1:

Following are the primary and secondary actor of level-1

Primary Actor: Chairman/Director, Maintenance Officer, General user, Admin.

Secondary Actor: Database, Non-member.

There are four subsystems in our inventory management system. They are-

1. Authentication.
2. HR management.
3. Product management.
4. Requisition.

4.2.3 LEVEL-1.1 USE CASE DIAGRAM-AUTHENTICATION

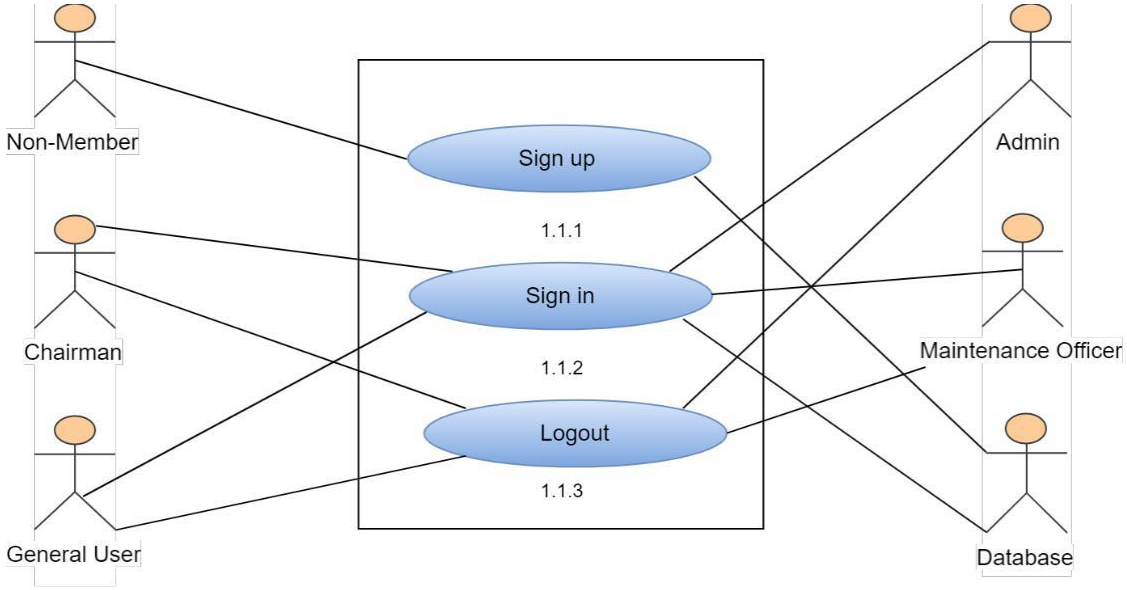


Figure 3: LEVEL-1.1 USE CASE DIAGRAM-AUTHENTICATION

Description of Use Case Diagram Level 1.1:

Following are the primary and secondary actor of level-1.1

Primary Actor: Chairman/Director, Maintenance Officer, General user, Admin.

Secondary Actor: Database, Non-member. Authentication

subsystem can be divided into three parts-

1. **Sign Up:** User who is not a member of the system can register using name, email, designation, university name, department name and password.
2. **Sign In:** User who is a member of the system can login into the system using email and password.
3. **Logout:** After working session every user need to logout from the system.

Action Reply of use case diagram level – 1.1.1(Sign Up)

- Action 1**:** User will enter name, email, designation, university name, department name and password.
- Reply 1**:** From database system will check whether any personal account exists under the same email or not. If the request is valid, the applicant request is sent for approval.

Action Reply of use case diagram level – 1.1.3(Logout)

- Action 1: User selects logout.

- Reply 1: System again will give a prompt to confirm the logout. If user confirms logout, then user will be logged out from the system.

4.2.4 LEVEL-1.1.2 USE CASE DIAGRAM-SIGN IN

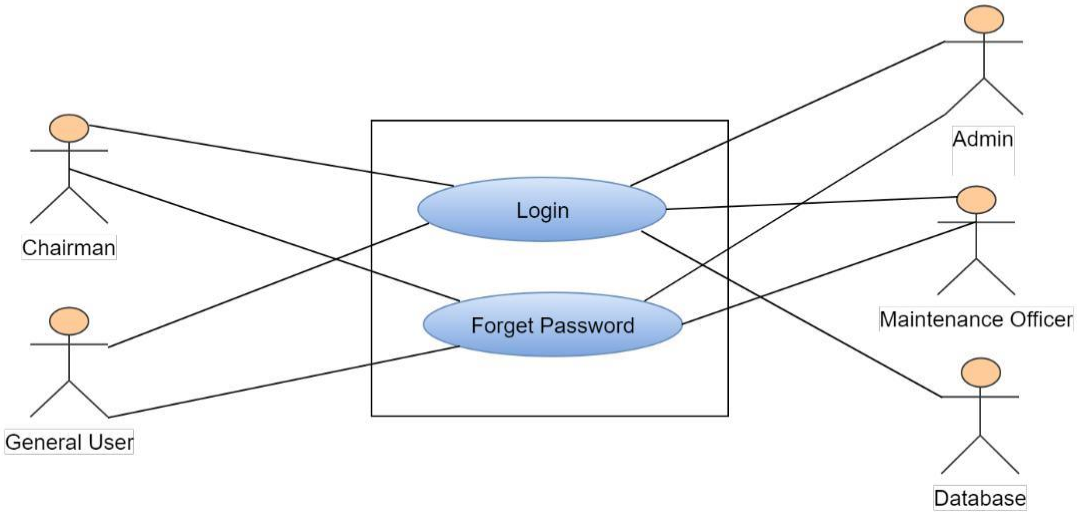


Figure 4: LEVEL-1.1.2 USE CASE DIAGRAM-SIGN IN

Description of Use Case Diagram Level 1.1.2:

Following are the primary and secondary actor of level-1.1.2

Primary Actor: Chairman/Director, Maintenance Officer, General user, Admin.

Secondary Actor: Database.

We can divide sign in into two parts-

1. **Login:** User can login using email and password.
2. **Forget password:** If user forgets the password then they get a new password using the registered email.

Action Reply of use case diagram level – 1.1.2(Sign In)

- Action 1: User enters email and password for login.
- Reply 1: System will check email and password whether it is available or not in database. If available then user login to the system.
- Action 2: If user forgets password then selects the forget password option and give the email address which was registered.
- Reply 2: System sends a new password to the corresponding email.

4.2.5 LEVEL-1.2 USE CASE DIAGRAM-HR MANAGEMENT

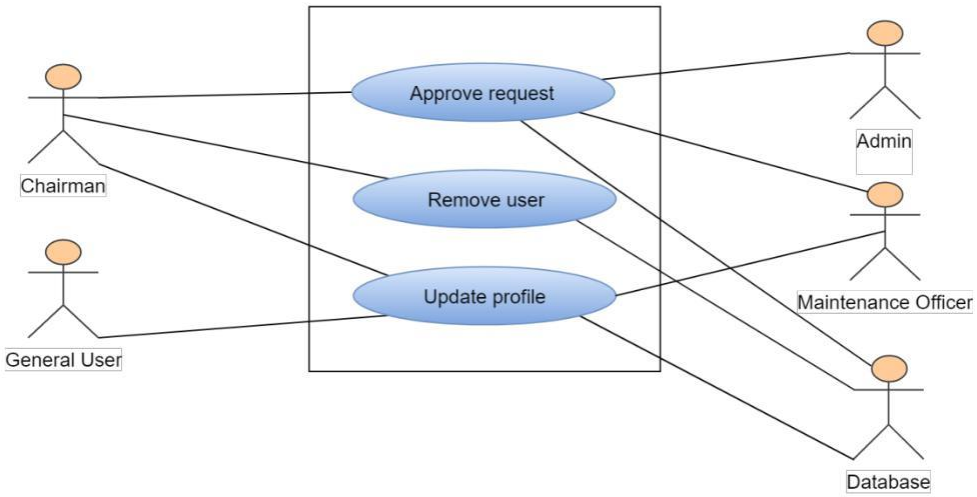


Figure 5: LEVEL-1.2 USE CASE DIAGRAM-HR MANAGEMENT

Description of Use Case Diagram Level 1.2:

Following are the primary and secondary actor of level-1.2

Primary Actor: Chairman/Director, Maintenance Officer, General user, Admin.

Secondary Actor: Database.

We can divide HR management into three parts-.

1. **Approve Request:** Admin approves the request of chairman/director for registration. Maintenance officer is approved by the chairman/director. When Chairman/Director approves the request then the maintenance officer will be registered. General user is approved by the maintenance officer.
2. **Remove user:** Chairman/Director can remove the general user from the system.
3. **Update profile:** Every user can edit/update their personal information.

Action Reply of use case diagram level – 1.2(HR Management)

- Action 1: Chairman/Director sends request for registration.
- Reply 1: Admin can approve or cancel the chairman/director request. If chairman/director is approved by the admin then chairman can manage the inventory. If admin approve then the chairman/director information is stored in the database.
- Action 2: Maintenance officer send request to the chairman/director.

- Reply 2: Chairman/Director approves the request then maintenance officer is registered and user information is stored in the database.
- Action 3: General user sends request for registration.
- Reply 3: Maintenance officer approves the general user request then they are registered and user information is stored in the database.
- Action 4: Chairman/Director selects remove user then enter the user email.
- Reply 4: User will be removed from the system, but not deleting user information from the database.
- Action 5: User selects edit personal information, they enter the new information they wants to update.
- Reply 5: User information is updated in the database.

4.2.6 LEVEL-1.3 USE CASE DIAGRAM-PRODUCT MANAGEMENT

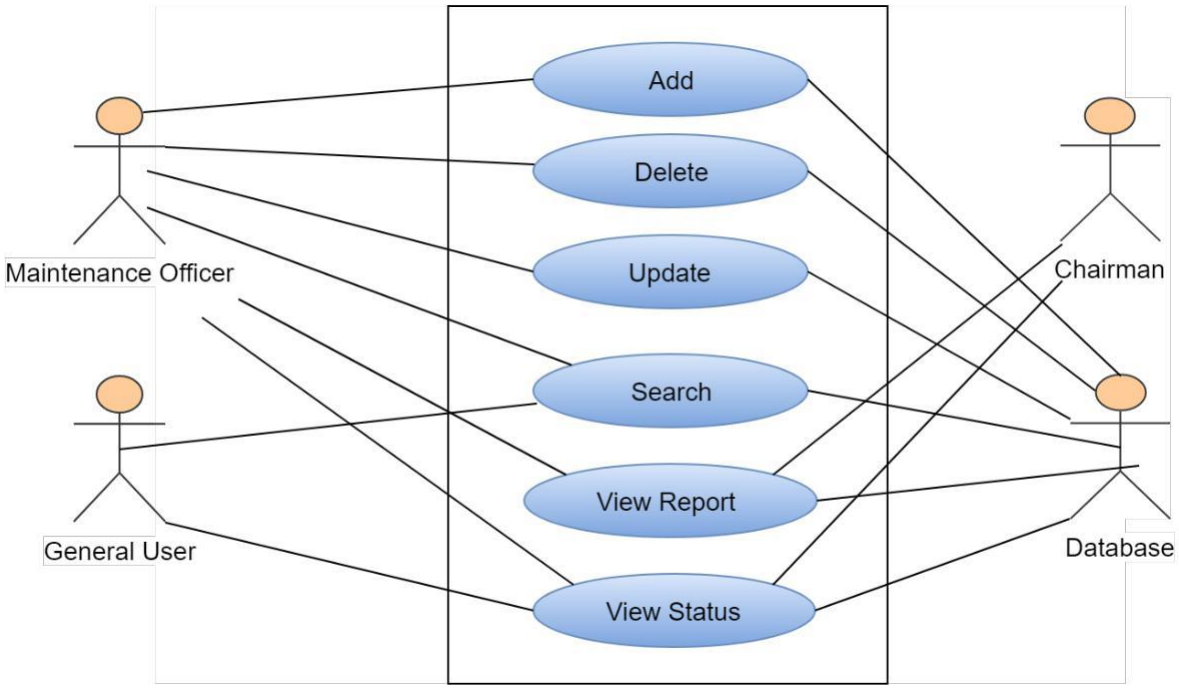


Figure 6: LEVEL-1.3 USE CASE DIAGRAM-PRODUCT MANAGEMENT

Description of Use Case Diagram Level 1.3:

Following are the primary and secondary actor of level-1.3

Primary Actor: Chairman/Director, Maintenance Officer, General user.

Secondary Actor: Database.

We can divide product management into six parts-

1. **Add:** Maintenance officer can add new category and product.
2. **Delete:** Maintenance officer can delete category and product.
3. **Update:** Maintenance officer can update the product information. Update product information include product name, quantity and a lot number.
4. **Search:** User can search for a product.
5. **View report:** User can view the report by category and product wise and the user who got that product by requisition.
6. **View status:** Maintenance officer and chairman/director can view the status of the product. Status means the quantity of the product if it is available or not.

Action Reply of use case diagram level – 1.3(Product Management)

- Action 1: Maintenance officer selects add a category and enter the category name.
- Reply 1: System will check in the database whether the entered name of the category is available or not. If not then the category is added and category information is stored in the database.
- Action 2: Maintenance officer selects a category and under the category selects add new product. S/he enters the product name, lot number and quantity of the product.
- Reply 2: Product information under the selected category is added.
- Action 3: Maintenance officer selects delete category and enter the category name.
- Reply 3: Category is removed from the user view but not from the database.
- Action 4: Maintenance officer selects a category and under the category selects remove product. S/he enters the product name.
- Reply 4: Product is removed from the user view but not from the database.
- Action 5: Maintenance officer selects update product then selects a product under a category and enter the updated information.
- Reply 5: Product information is updated in the database.
- Action 6: User searches a product using the product name.
- Reply 6: If product available then shows the product.
- Action 7: User can view the report by category and product wise and the user who got that product by requisition.
- Reply 7: Report is viewed to the user.
- Action 8: User selects product to view the product status.

- Reply 8: Product status is shown to the user.

4.2.7 LEVEL-1.4 USE CASE DIAGRAM-REQUISITION

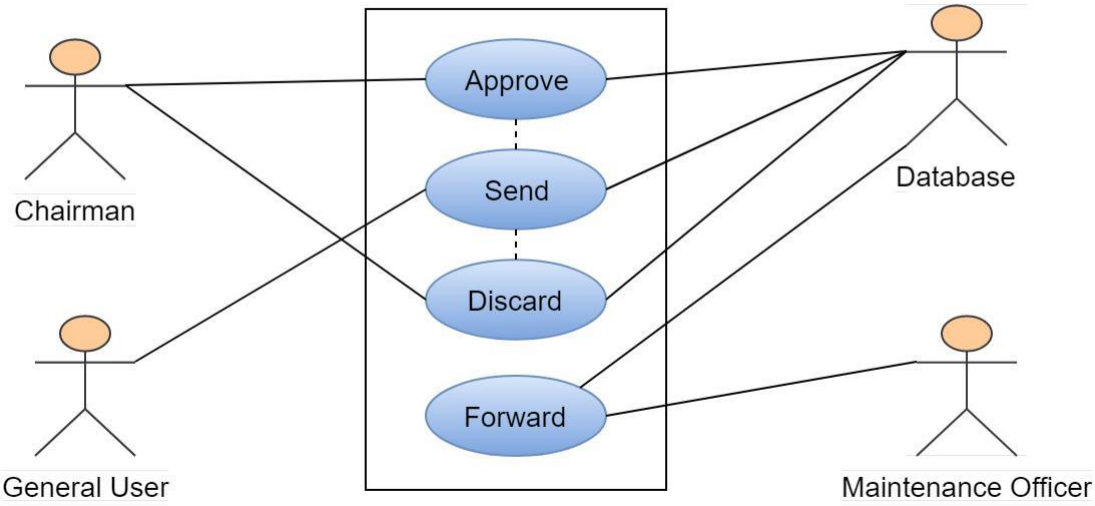


Figure 7: LEVEL-1.4 USE CASE DIAGRAM-REQUISITION

Description of Use Case Diagram Level 1.4:

Following are the primary and secondary actor of level-1.4

Primary Actor: Chairman/Director, Maintenance Officer, General user.

Secondary Actor: Database.

Requisition is performed using the following procedure:

1. **Approve**: Chairman/Director approve the user requisition list which is forwarded by the maintenance officer.
2. **Send:** Faculties send the requisition list to the maintenance officer for the chairman approval.
3. **Discard:** Chairman can discard the requisition list.
4. **Forward:** Maintenance officer forward the list to the chairman/director.

Action Reply of use case diagram level – 1.4(Requisition)

- Action 1: Faculty sends requisition to the maintenance officer.
- Reply 1: Requisition is stored in the database.
- Action 2: Maintenance officer forward requisition to the chairman/director.
- Reply 2: Requisition is forwarded to the chairman/director.
- Action 3: Chairman/director approves or discards the requisition request.

- Reply 3: If chairman/director approves, requisition list requisition status will be delivered and product is decreased from the database.

4.3 Activity Diagrams of IMS

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency

The activity diagrams of the modules described in the previous chapter is shown in the following figures:

4.3.1 Activity diagram of registration

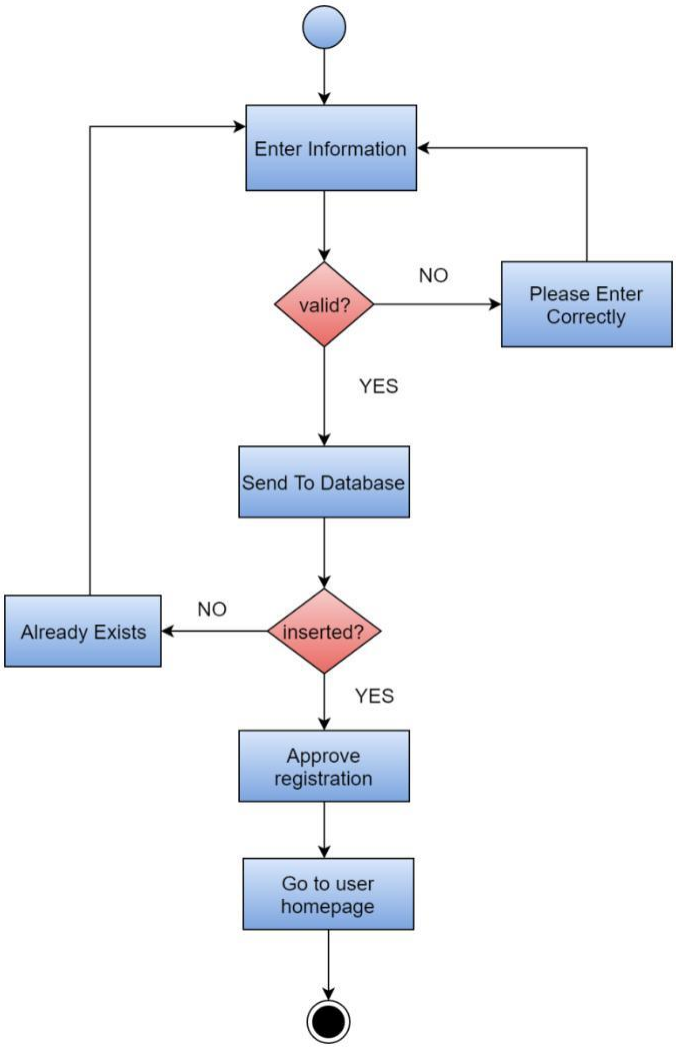


Figure 8: Activity diagram of registration

4.3.2 Activity diagram of login

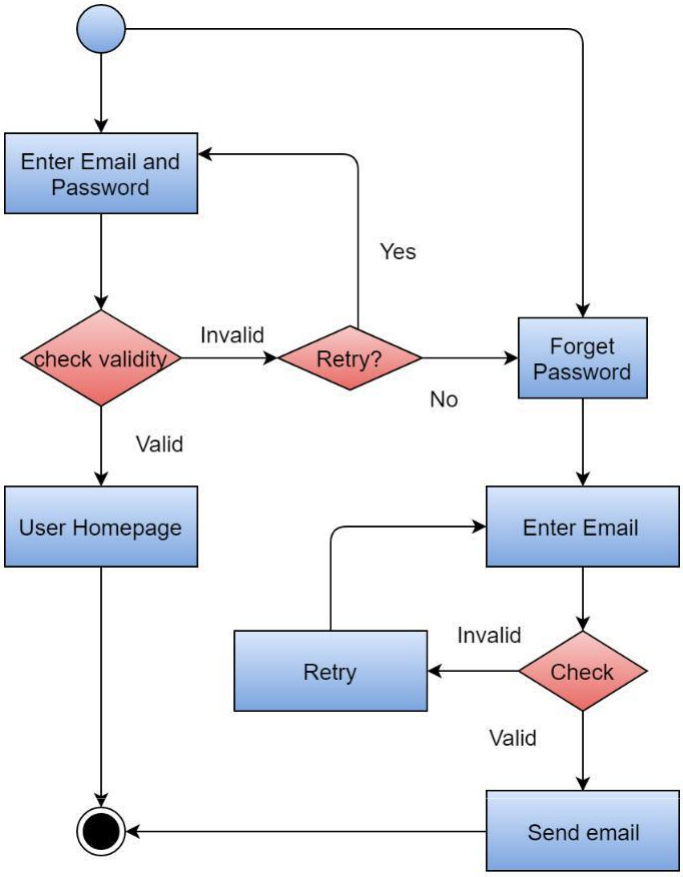


Figure 9: Activity diagram of login

4.3.3 Activity diagram of user approve

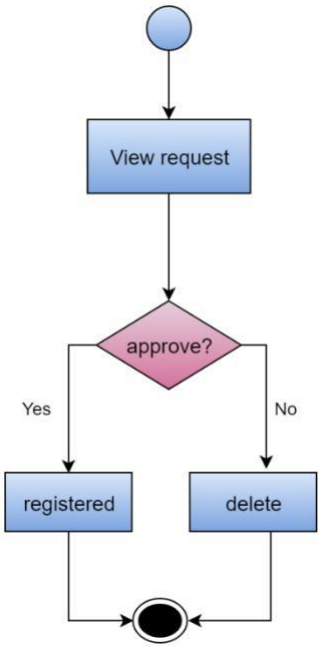


Figure 10: Activity diagram of user approve

4.3.4 Activity diagram of user remove

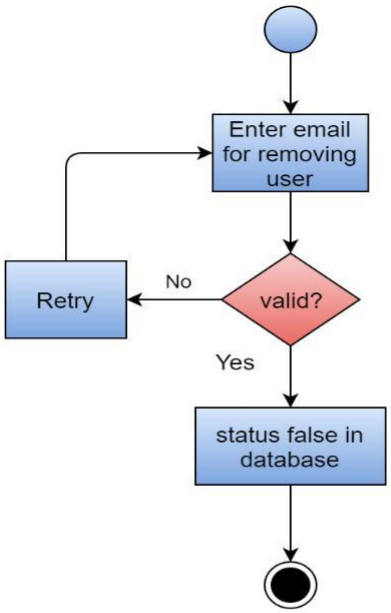


Figure 11: Activity diagram of user remove

4.3.5 Activity diagram of edit profile

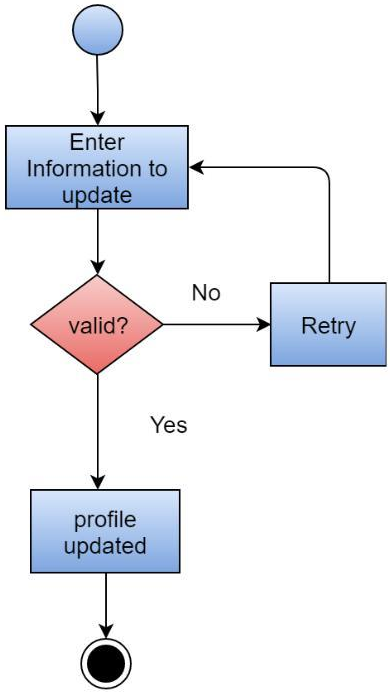


Figure 12: Activity diagram of edit profile

4.3.6 Activity diagram of add product and category

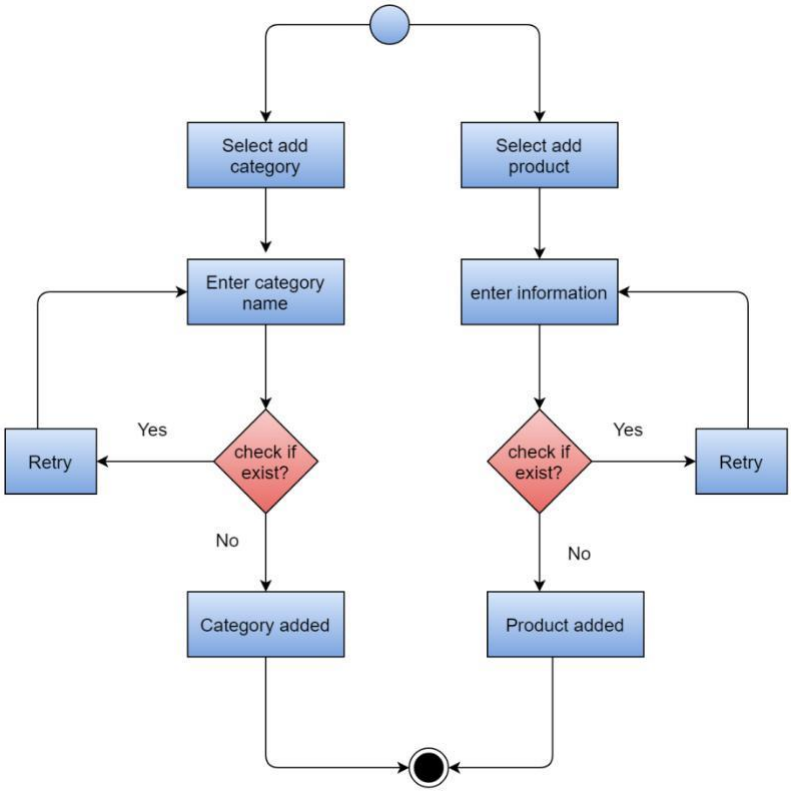


Figure 13: Activity diagram of add product and category

4.3.7 Activity diagram of remove category and product

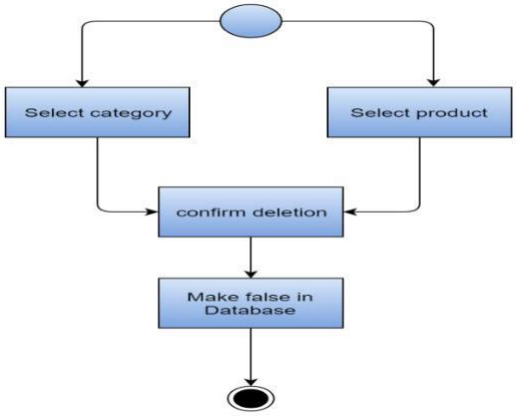


Figure 14: Activity diagram of remove category and product

4.3.8 Activity diagram of update product

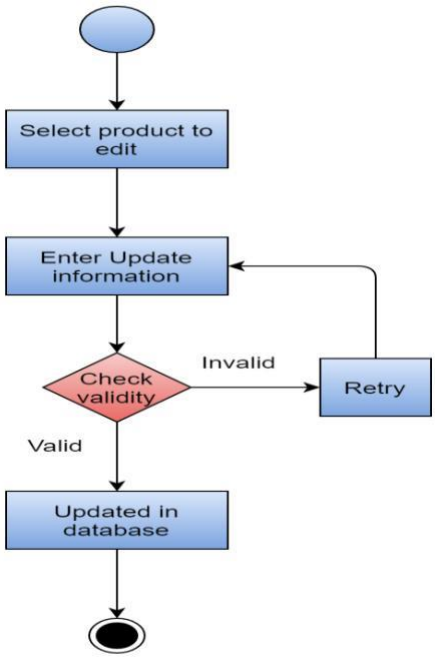


Figure 15: Activity diagram of update product

4.3.9 Activity diagram of search product

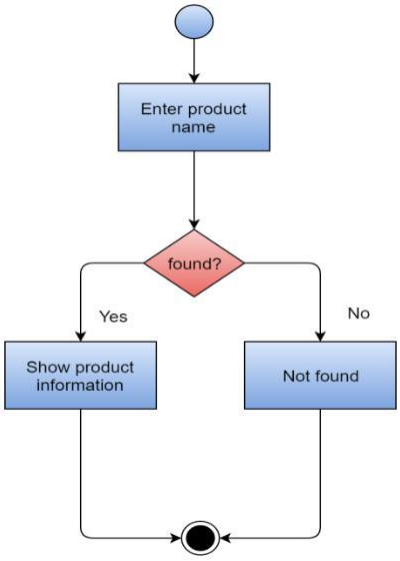


Figure 16: Activity diagram of search product

4.3.10 Activity diagram of report generation

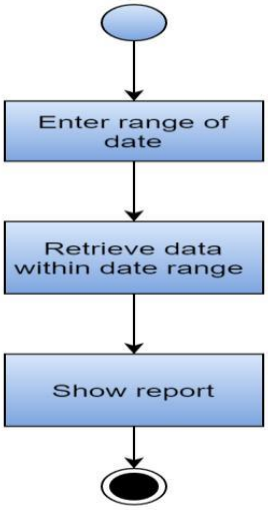


Figure 17: Activity diagram of report generation

4.3.11 Activity diagram of view product status

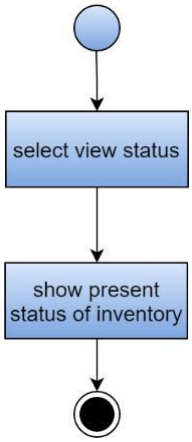


Figure 18: Activity diagram of view product status

4.3.12 Activity diagram of requisition

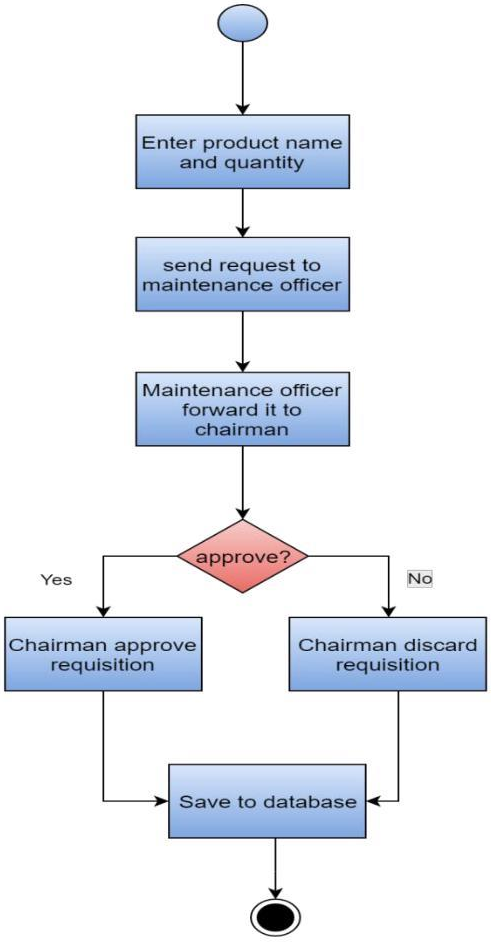


Figure 19: Activity diagram of requisition

4.4 Swimlane diagrams of IMS

A swimlane diagram is a visual element used in process flow diagrams, or flowcharts, which visually distinguishes job sharing and responsibilities for sub-processes of a business process. The swimlane diagrams of the modules described in the previous chapter is shown below:

4.4.1 Swimlane diagram of registration

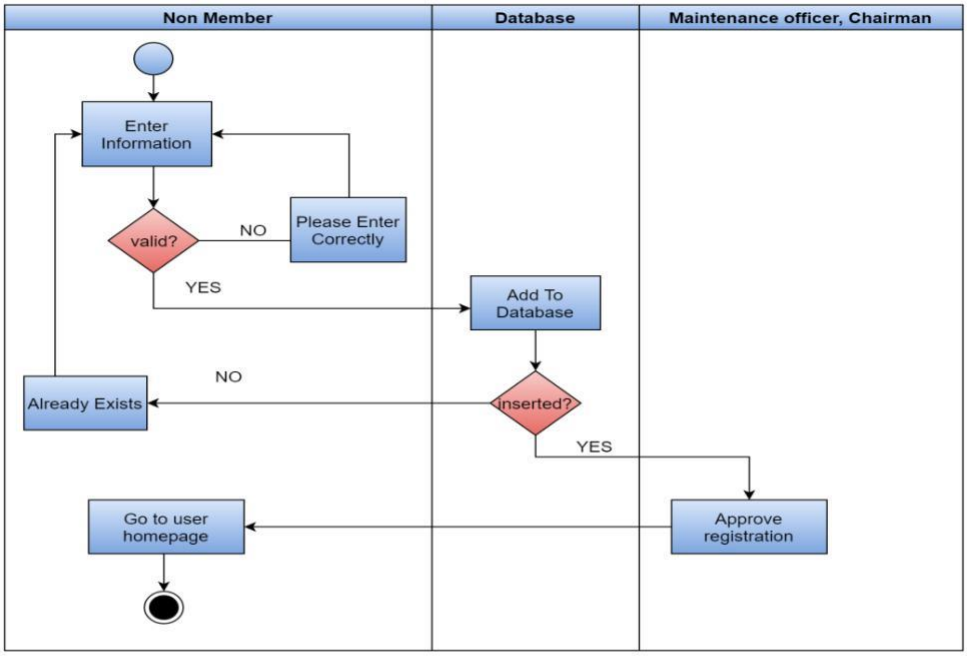


Figure 20: Swimlane diagram of registration

4.4.2 Swimlane diagram of login

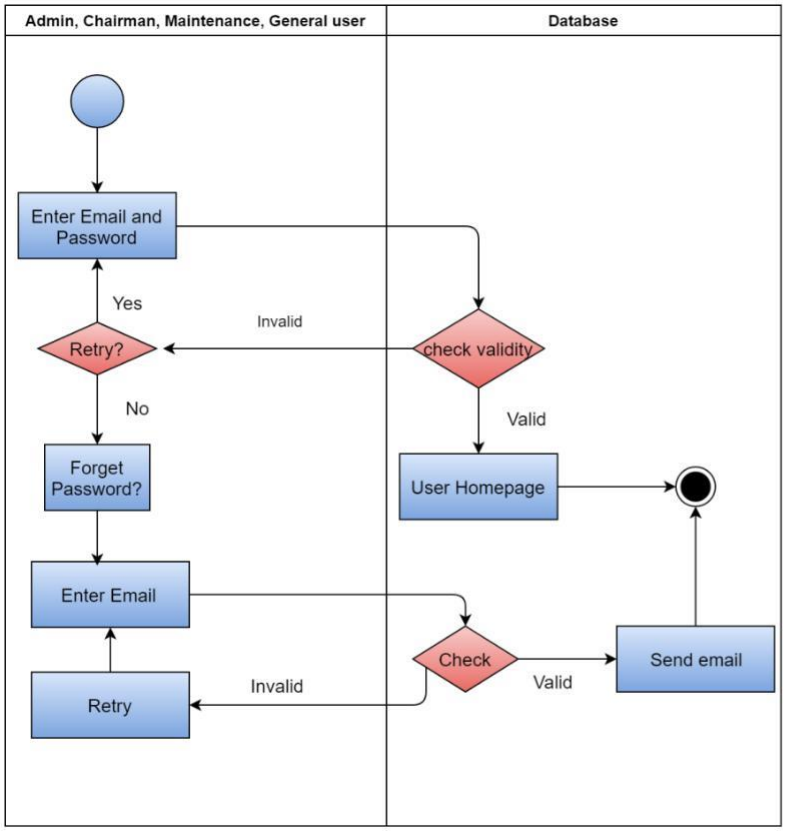


Figure 21: Swimlane diagram of login

4.4.3 Swimlane diagram of hr approve

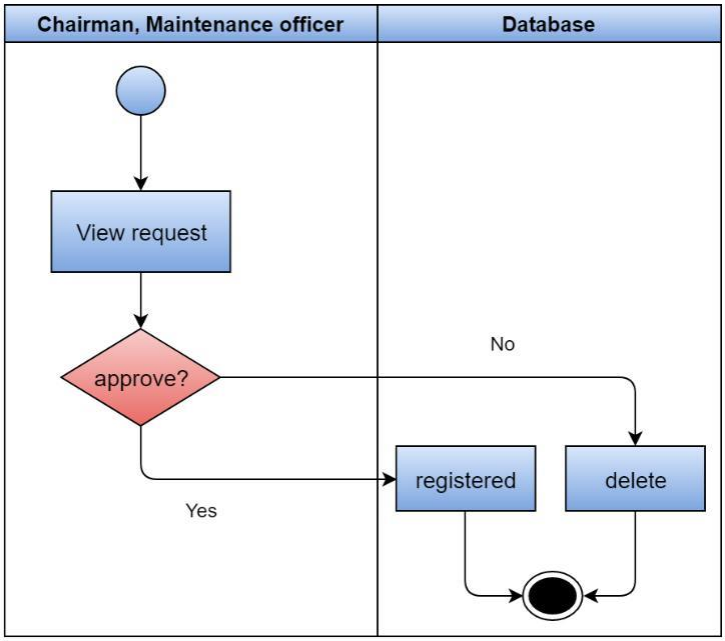


Figure 22: Swimlane diagram of hr approve

4.4.4 Swimlane diagram of hr remove

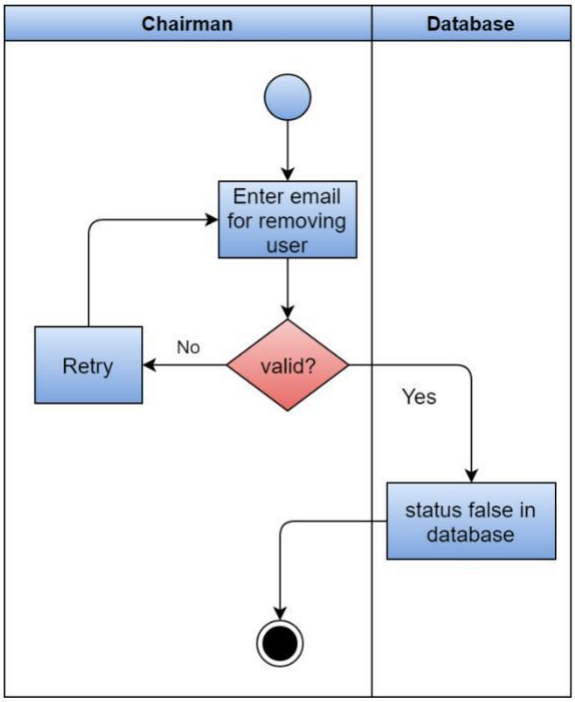


Figure 23: Swimlane diagram of user remove

4.4.5 Swimlane diagram of edit profile

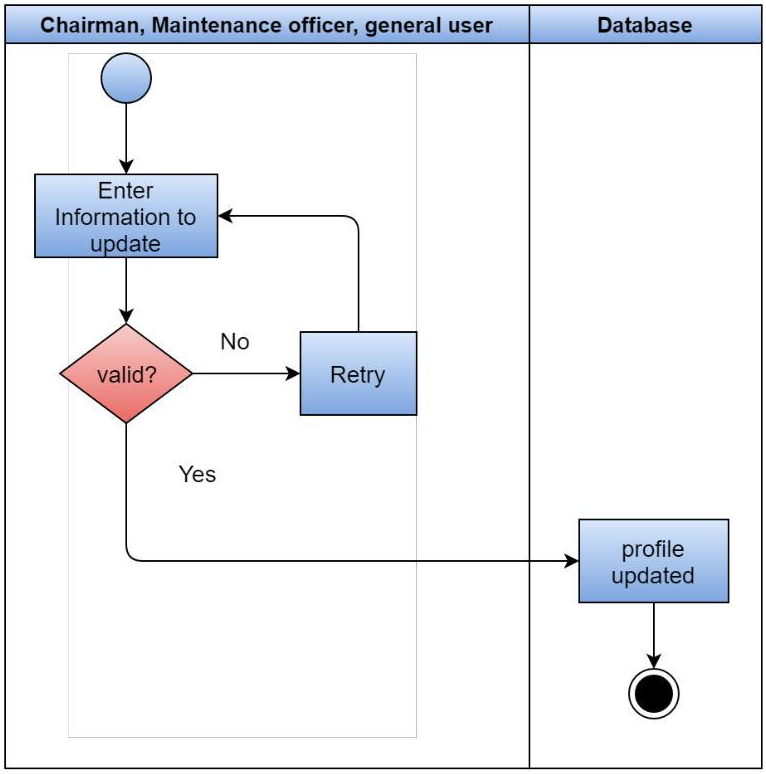


Figure 24: Swimlane diagram of profile update

4.4.6 Swimlane diagram of add category and product

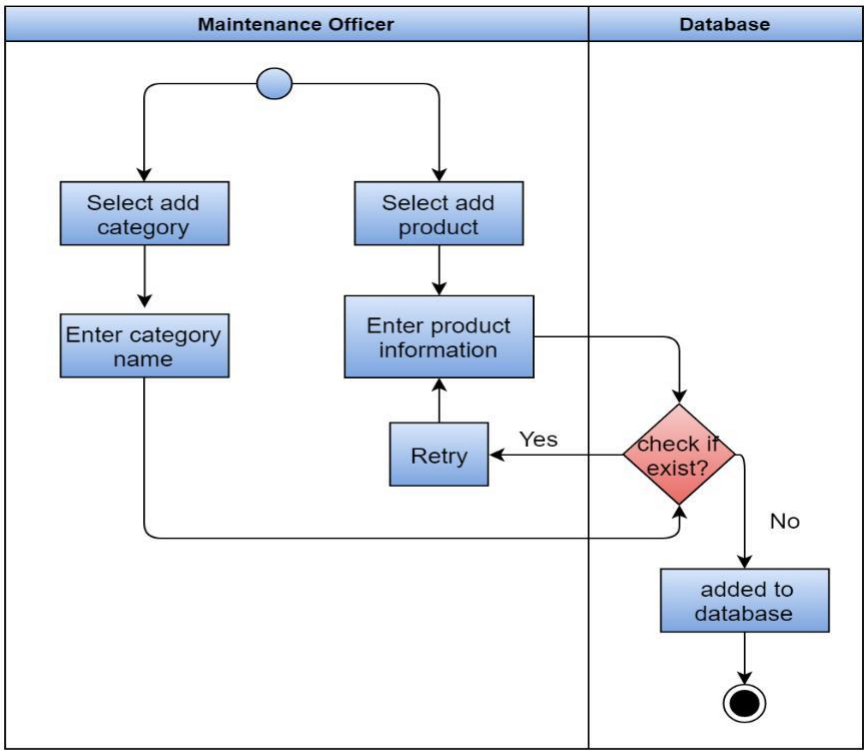


Figure 25: Swimlane diagram of add category and product

4.4.7 Swimlane diagram of remove category and product

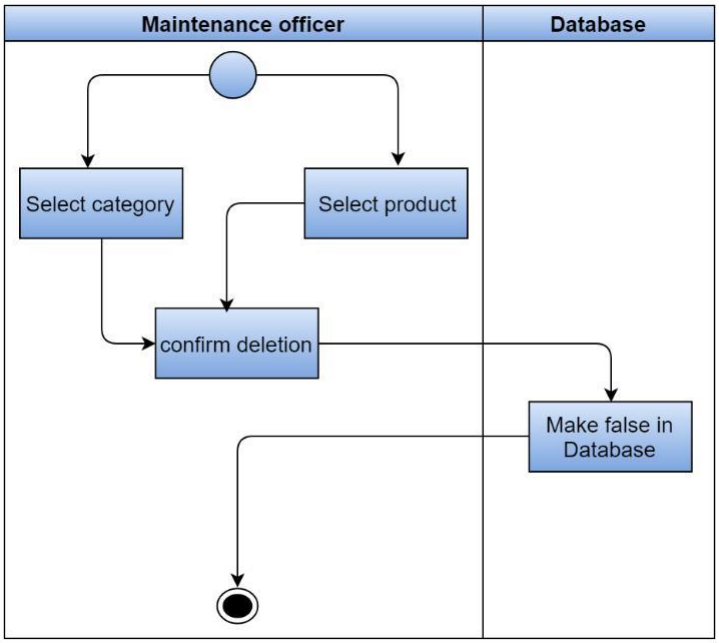


Figure 26: Swimlane diagram of remove category and product

4.4.8 Swimlane diagram of search product

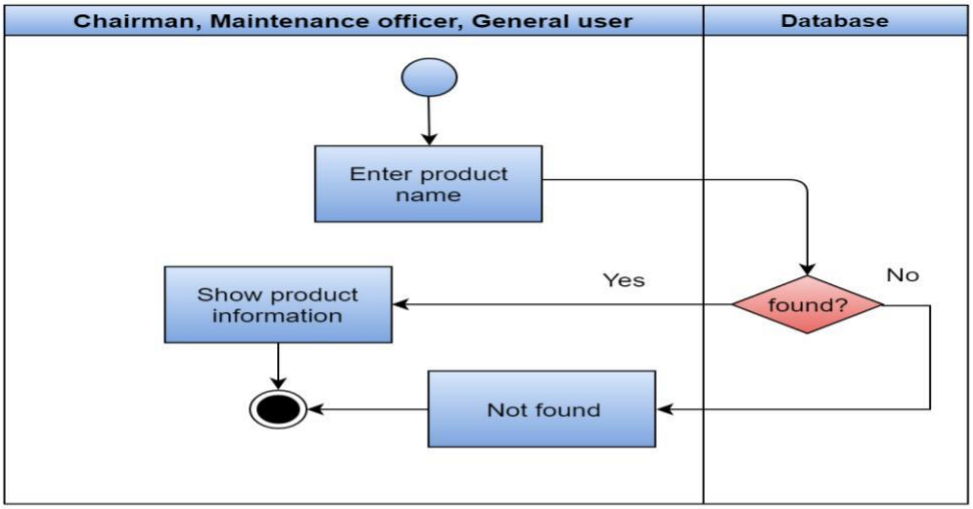


Figure 27: Swimlane diagram of search product

4.4.9 Swimlane diagram of update product

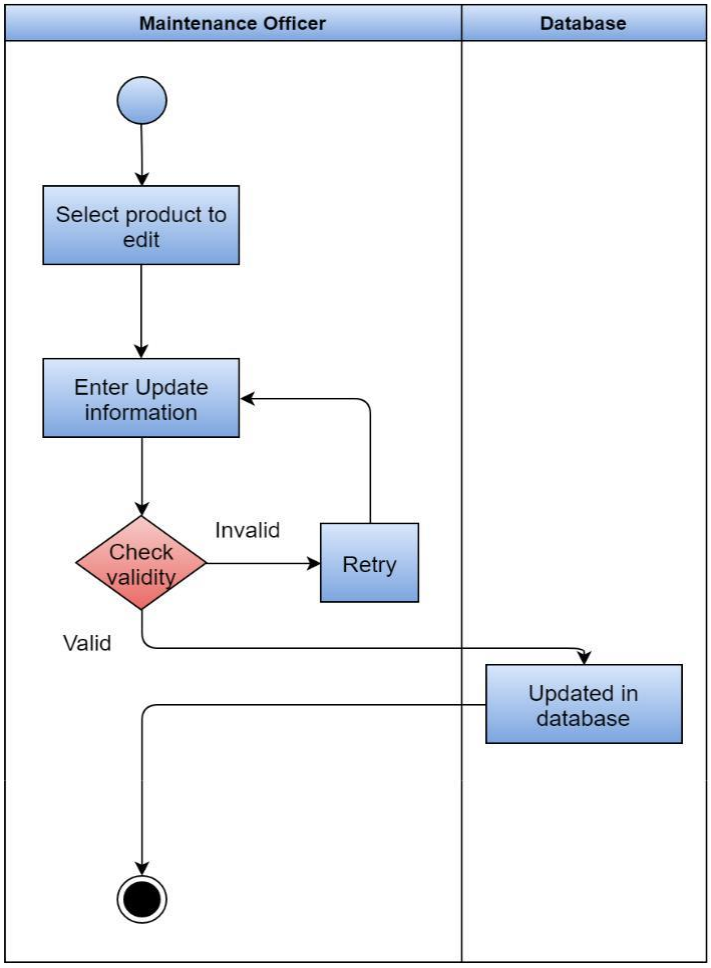


Figure 28: Swimlane diagram of update product

4.4.10 Swimlane diagram of product status

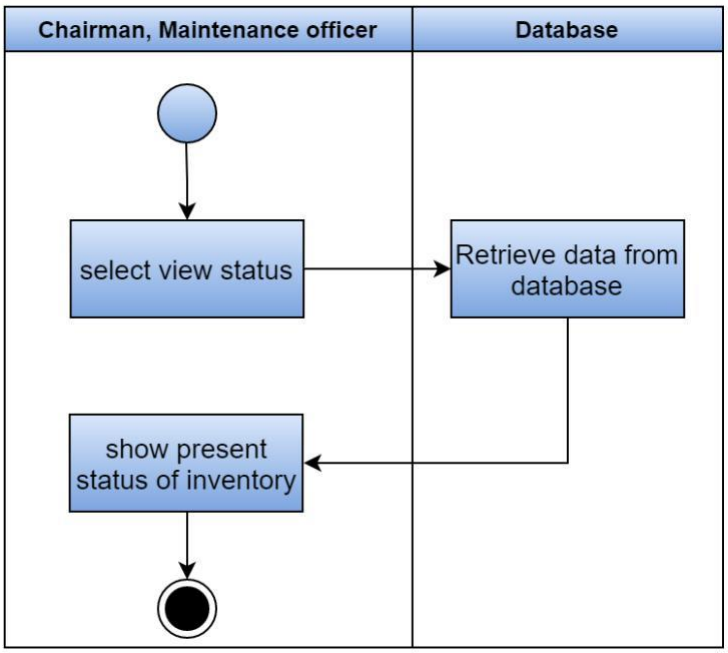


Figure 29: Swimlane diagram of product status

4.4.11 Swimlane diagram of requisition

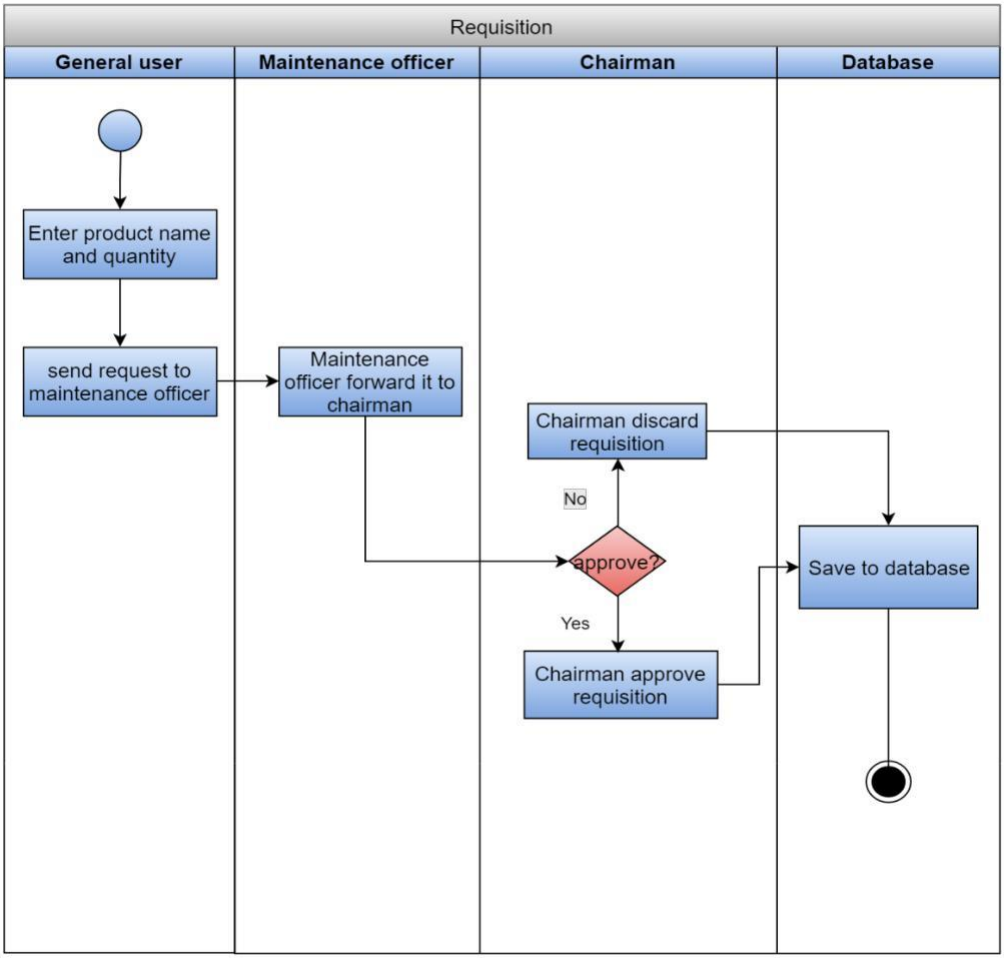


Figure 30: Swimlane diagram of requisition

4.4.12 Swimlane diagram of report generation

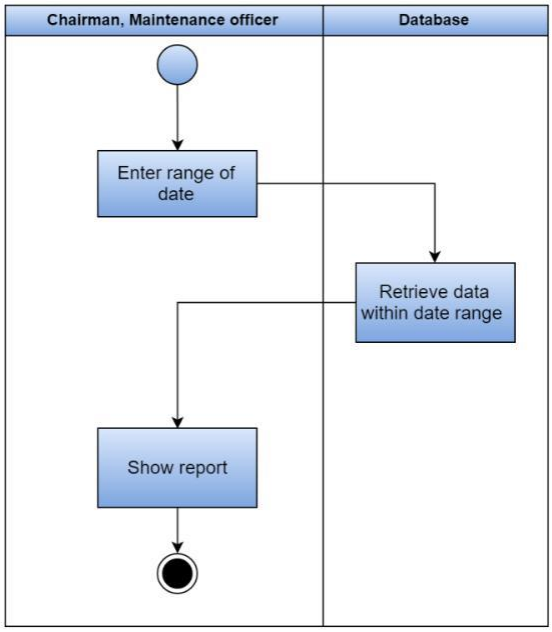


Figure 31: Swimlane diagram of report generation

CHAPTER 5: DATA BASED MODEL OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

5.1 GRAMMATICAL PARSING AND ANALYSIS

We identified all the nouns whether they are in problem space or in solution space from our usage scenario and categorized them according to their attributes. In the following table, "P" stands for problem domain and "S" stands for solution space. In table 1, the nouns are identified from the usage scenario of the inventory management system web application which is described in chapter 4.**Table 1: Noun Identification**

Serial No.	Noun	P/S	Attributes of
1.	IMS	P	-
2.	Web application	P	-
3.	Chairman/Director	S	
4.	Application	P	-
5.	User	S	
6.	Id	P	-
7.	Name	S	3,5,15,16,22
8.	Email	S	3,5,15,16
9.	Department name	S	3,16,22
10.	University name	S	3,16,22
11.	Phone number	S	3,16,22
12.	Password	S	3,5,15,16,22
13.	System	P	-
14.	Account	P	-
15.	Admin	S	
16.	Maintenance officer	S	
17.	Designation	S	3,5,15,16,22
18.	Registration	P	-
19.	Login	P	-
20.	Retry	P	-
21.	Forget password	P	-

22.	General user	S	
23.	Valid user	P	-
24.	Homepage	P	-
25.	Database	P	-
26.	Information	P	-
27.	Personal information	P	-
28.	Category	S	
29.	Category id	S	28
30.	Category name	S	28
31.	Product	S	
32.	Product id	S	31
33.	Product name	S	31
34.	Lot number	S	31
35.	Product quantity	S	31
36.	Existing product	P	-
37.	Category information	P	-
38.	Product information	P	-
39.	Category table	P	-
40.	Product table	P	-
41.	Category deletion	P	-
42.	Product deletion	P	-
43.	New product	P	-
44.	Requisition	S	
45.	Requisition id	S	44
46.	Requisition product name	S	44
47.	Requisition product quantity	S	44
48.	Stock	P	-
49.	Updated information	P	-

50.	Interface	P	-
51.	Administrative	P	-
52	Date	S	44

5.2 Potential data objects

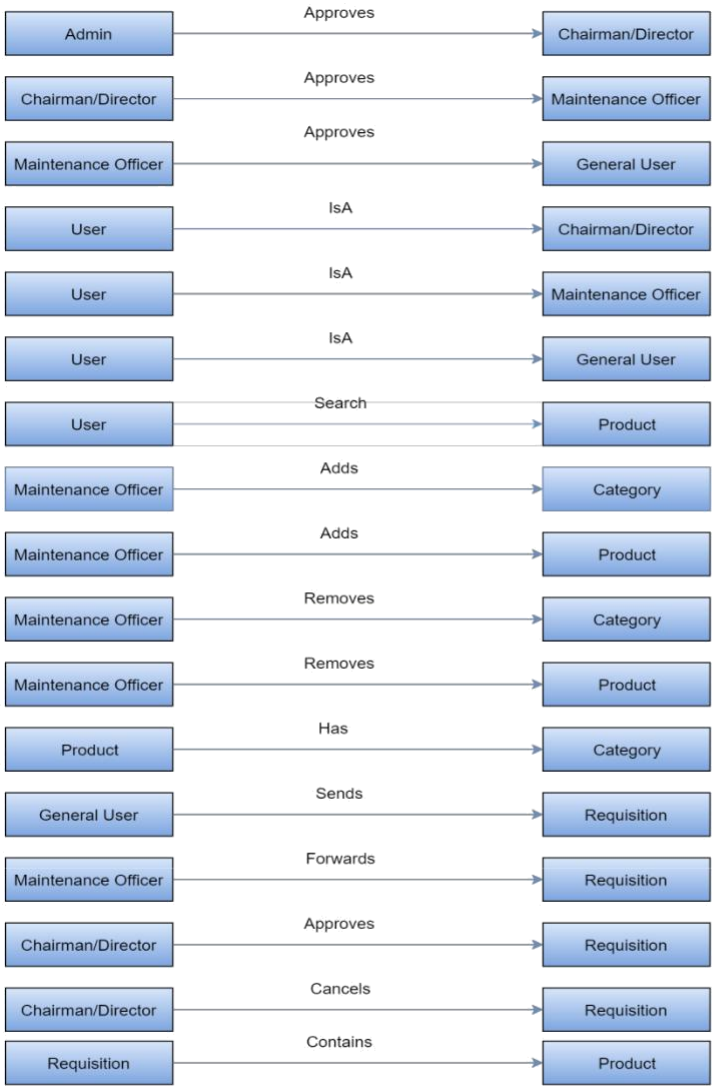
After grammatical parsing we identified the following data object which needs to store for running the system-

Serial No.	Entity	Attribute
1.	User	id, email, password
2.	Chairman/Director	name, email, university name, department name, designation, password
3.	Maintenance Officer	name, email, university name, department name, designation, password
4.	Faculty	name, email, university name, department name, designation, password
5.	Category	category_ID, category name
6.	Product	product_ID, product name, lot number, product quantity
7.	Requisition	requisition_ID, requisition product name, requisition product quantity, Date

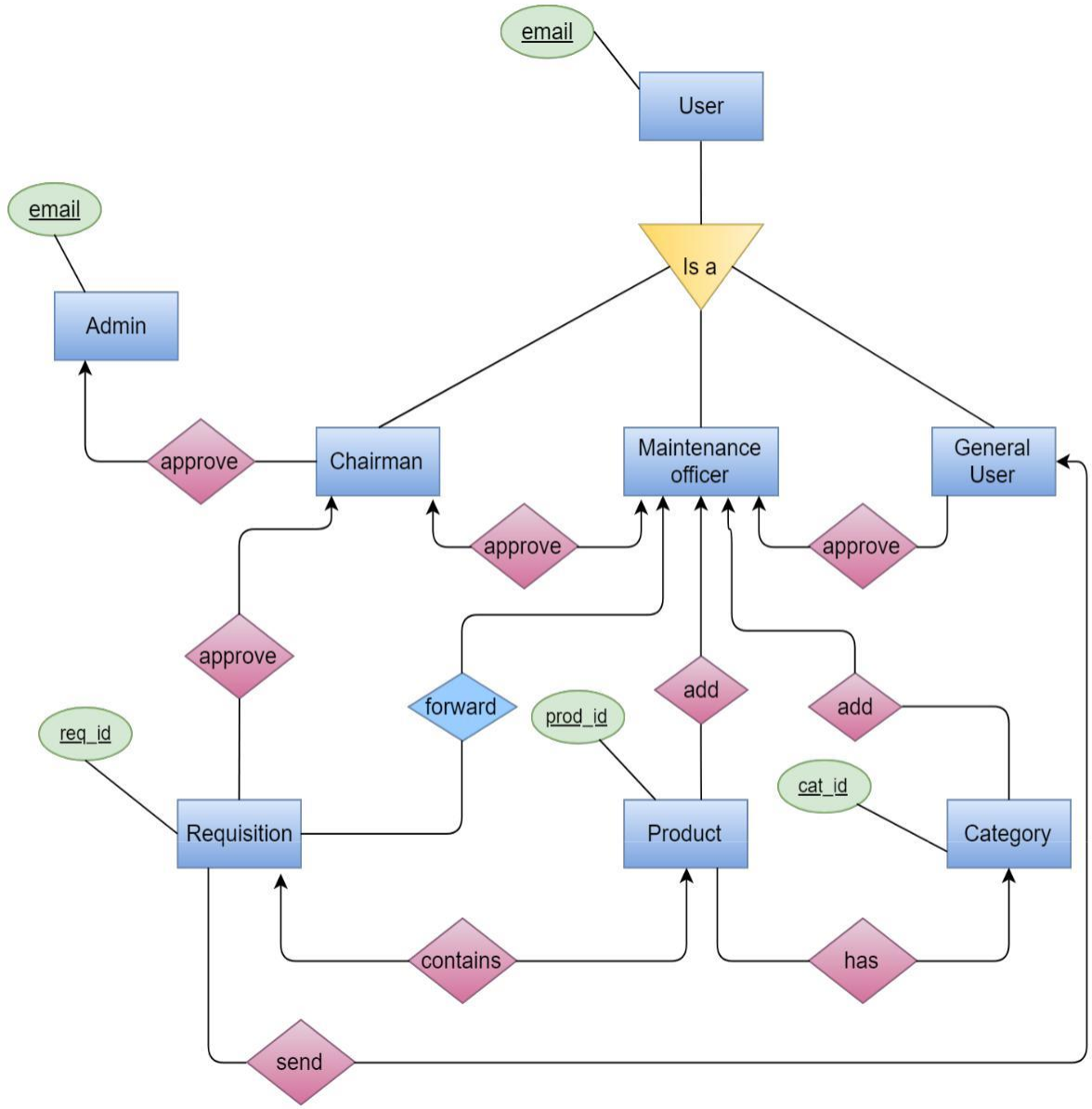
Table 2: Potential data objects

Data object relationship

The relationship among the data object user, chairman/director, maintenance officer, faculty, category, product and requisition are shown below-



5.3 Entity Relationship Diagram



5.4 Table Translation

From the entity relation diagram, the finalized form of the tables are shown below-

Serial No.	Data Table
1.	User(user-email, name, password, university-name, department-name, designation, status)
2.	Admin(admin-email, name, password, designation)
3.	Chairman(chairman-email, *admin-email*)
4.	Maintenance Officer(officer-email, *chairman-email*)
5.	General User(faculty-email, *officer-email*)
6.	Category(c-id, c-name, *officer-email*)
7.	Product(p-id, p-name, lot-number, quantity, *officer-email*)
8.	Requisition(r-id,*p-id,officer-email,faculty-email,chairman-email,status,date*)

Schema table for User -

1. User		
Attribute	Types	Size
user_email	VARCHAR	30
name	VARCHAR	30
password	VARCHAR	15
university_name	VARCHAR	50
department_name	VARCHAR	50
designation	VARCHAR	50
status	VARCHAR	20

Schema table for Admin –

Table 3: Schema table for admin

2. Admin		
Attribute	Types	Size
admin_email	VARCHAR	30
name	VARCHAR	30
designation	VARCHAR	50
password	VARCHAR	30

Schema Table for Chairman/Director –

Table 4: Schema table for chairman/director

3.Chairman/Director		
Attribute	Types	Size
chairman_email	VARCHAR	30
admin_email	VARCHAR	30

Schema Table for Maintenance Officer –

Table 5: Schema table for maintenance officer

4.Maintenance Officer		
Attribute	Types	Size
officer_email	VARCHAR	30
chairman_email	VARCHAR	30

Schema Table for general user –

Table 6: Schema table of faculty

5.General user		
Attribute	Types	Size
faculty_email	VARCHAR	30
officer_email	VARCHAR	30

Schema table for Category

Table 7: Schema table of category

Attribute	Types	Size
c_id	NUMBER	10
c_name	VARCHAR	30
officer_email	VARCHAR	30

Schema table for Product

Table 8: Schema table of product

7.Product		
Attribute	Types	Size
p_id	NUMBER	10
p_name	VARCHAR	30
lot_number	VARCHAR	30
quantity	NUMBER	10
officer_email	VARCHAR	30

Schema table forRequisition-

Table 9: Schema table of requisition

8.Requisition		
Attribute	Types	Size
r_id	NUMBER	10
p_id	NUMBER	10
officer_email	VARCHAR	30
chairman_email	VARCHAR	30
faculty_email	VARCHAR	30
status	BOOLEAN	5
date	DATE	15

CHAPTER 6: CLASS BASED MODEL OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

This Chapter is intended to describe class based modeling of Inventory Management System.

6.1 CLASS BASED MODELLING CONCEPTS

Class-based modeling represents the objects that the system will manipulate, the operations that will applied to the objects, relationships between the objects and the collaborations that occur between the classes that are defined.

6.1.1 Class identification with general criteria

To identify the potential classes, we have first selected the nouns from the solution space of the story. These were then characterized in seven general classifications. The seven general characteristics are as follows:

1. External entity
2. Things
3. Occurrences or events
4. Roles
5. Organizational units
6. Places
7. Structures

Table 10: Class Identification with General Classification

Serial No.	Noun	P/S	General Classification(GC)
1.	IMS	P	-
2.	Web application	P	-
3.	Chairman/Director	S	4,5
4.	Application	P	-
5.	User	S	4,5
6.	Id	P	-
7.	Name	S	2
8.	Email	S	2
9.	Department name	S	2
10.	University name	S	2

11.	Password	S	2
12.	System	P	-
13.	Account	P	-
14.	Admin	S	4
15.	Maintenance officer	S	4,5
16.	Designation	S	2
17.	Registration	S	3
18.	Login	S	3
19.	Retry option	P	-
20.	Forget password	P	-
21.	General User	S	4,5,7
22.	Valid user	P	-
23.	Homepage	P	-
24.	Database	S	1
25.	Information	P	-
26.	Personal information	P	-
27.	Category	S	2,5,7
28.	Category id	S	2
29.	Category name	S	2
30.	Product	S	2,5,7
31.	Product id	S	2
32.	Product name	S	2
33.	Lot number	S	2
34.	Product quantity	S	2
35.	Existing product	P	-
36.	Category information	P	-
37.	Product information	P	-
38.	Category table	P	-
39.	Product table	P	-
40.	Category deletion	P	-

52.	Product deletion	P	-
53.	New product	P	-
54.	Requisition	S	3
55.	Requisition id	S	2
56.	Requisition product name	S	2
57.	Requisition product quantity	S	2
58.	Stock	P	-
59.	Updated information	P	-
60.	Interface	P	-
61.	Administrative activities	P	-
102.	status	P	-
103	Date	P	-

6.1.2 CLASS IDENTIFIED WITH SELECTION CRITERIA

Nouns having minimum one criteria of general classification section are selected for selection criteria. After that step, we compared them with the following criteria list. That are-

1. Retained information
2. Needed services
3. Multiple attributes
4. Common attributes
5. Common operations
6. Essential requirements

Serial No.	Noun	Special Classification (GC)	Remarks
1.	User	1,2,3,4,5	Accepted
2.	Chairman/Director	1,2,3,4,5	Accepted
3.	Id	-	Rejected
4.	Name	-	Rejected
5.	Email	-	Rejected

6.	Department name	-	Rejected
7.	University name	-	Rejected
8.	Phone number	-	Rejected
9.	Password	-	Rejected
10.	Designation	-	Rejected
11.	Admin	1,2,3,4,5	Accepted
12.	Maintenance Officer	1,2,3,4,5	Accepted
13.	Registration	1,3,4,5	Accepted
14.	Login	-	Rejected
15.	General user	1,2,3,4,5	Accepted
16.	Database	6	Accepted
17.	Category	1,3,4	Accepted
18.	Category id	-	Rejected
19.	Category name	-	Rejected
20.	Product	1,3,4	Accepted
21.	Product id	-	Rejected
22.	Product name	-	Rejected
23.	Lot number	-	Rejected
24.	Product quantity	-	Rejected
25.	Requisition	1,3,4,5	Accepted
26.	Requisition id	-	Rejected
27.	Requisition product name	-	Rejected
28.	Requisition product quantity	-	Rejected

6.2 Preliminary Classes

From above table, we have taken the entire noun that passed three or more accepted criteria. So these are the candidate classes who are selected primarily-

1) User
2) Admin
3) Chairman/Director
4) Maintenance Officer
5) General User
6) Registration
7) Database
8) Category
9) Product

6.3 Verb Identification

We have identified the verbs from our scenery to find out the necessary methods for the classes. In the following table "P" stands for problem domain and "S" stands for solution space. Using this table we identified the method of classes.

Table 11: Verb Identification

Serial No.	Verb	Remarks P/S
1.	Register	S
2.	Check	S
3.	Exist	P
4.	Prompt	P
5.	Approve	S
6.	Provide	P
7.	Cancel	S
8.	Complete	P
9.	Send	S
10.	Request	P
11.	Forward	S
12.	Approve	S
13.	Cancel	S
14.	Enter	P
15.	Authenticate	S
16.	Match	P

17.	Retry	S
18.	Forget	S
19.	Choose	P
20.	Get	P
21.	Login	S
22.	Edit	S
23.	Include	P
24.	Update	S
25.	Add	S
26.	Contain	P
27.	Store	S
28.	Retrieve	
29.	Delete	S
30.	Search	S
31.	Make	P
32.	Use	P
33.	Perform	P
34.	View	S

6.4Attributes and methods of preliminary classes

Analyzing the above table, we have categorized the verbs and convert them into method names. We put them to their respective classes and showed them in the following table-

Serial No.	Preliminary class	Nouns	Verbs
1.	User	name, email, password, university name,	login, forget password

		department name, designation	
2.	admin	name, email, password	approve chairman, discard chairman request, remove chairman
3.	Chairman/Director	name, email, password, university name, designation, department name	approve M/O, approve requisition, view product, search product, edit profile
4.	Maintenance Officer	name, email, password, university name, designation, department name	approve faculty, add product, delete product, add category, delete category, forward requisition, edit profile
5.	General User	name, email, password, university name, designation, department name	send requisition, edit profile
6.	Non member	name, email, password, university name, designation, department name	sign up
7.	Database	-	update, retrieve, store
8.	Category	category id, category name	-
9.	Product	product id, product name, lot number, quantity	-

6.5 Analysis of Potential Classes

Here user has some similarities with chairman/director, maintenance officer and faculty.

Category and product are data class.

6.6 Final Classes

From the above analysis we identified the following final

classes 1. User

a. Chairman/Director

b. Maintenance officer

c. General User

2. Admin

3. Non member

4. Database

5. Category

6. Product

6.7 Attributes and Methods of Final Classes

Attributes and methods of the final classes are shown in the following tables.

Attributes and methods of User class-

1.User	
Attributes	Method
id, name, email, university_name, department_name, designation, Password	login(), forgetPassword(), searchProduct(), searchCategory(), editProfile(), viewStock(), viewProfile()

Attributes and methods of Chairman/Director class-

	1.a. Chairman/Director
Attributes	Methods
-	approveMaintenanceOfficer(), approveRequisition(), removeFaculty()

Attributes and methods of MaintenanceOfficer class-

	1.b. MaintenanceOfficer
Attributes	Methods
-	approveFaculty(), forwardRequisition(), addProduct(), addCategory(), deleteCategory(), deleteProduct(), updateProduct()

Attributes and methods of General User class-

	1.c. General User
Attributes	Methods
-	sendRequisition()

Attributes and method of Admin class-

	2. Admin
Attributes	Methods
name, email, password	approveChairman(), cancelChairmanRequest(), removeChairman()

Attributes and methods of Non-member class-

	3.Non-member
Attributes	Methods
name, email, password, university name, designation, department name	signup()

Attributes and methods of Database class-

	4.Database
Attributes	Methods
-	update(), retrieve(), store()

Attributes and methods of Category class-

	5. Category
Attributes	Methods
category_ID, category_name	

Attributes and methods of Product class-

	6. Product
Attributes	Methods
product_ID, product_name, lot_number, product_quantity	

6.8 Class Responsibilities and Collaborators Card of Final Classes

In the class card, we have shown the responsibilities of a class and the collaborative classes to perform the responsibilities. One responsibility may need one or more methods to carry out. These class cards will be needed to make CRC model in the next step. We will see the association among the classes from their collaboration and the name of the association will be named after the responsibilities.

Class cards of user class is given below-

1.User	
Responsibilities	Collaborator
Authenticating Searching product and category Editing profile	Database

Class cards of Chairman/Director is given below-

1.a.Chairman/Director	
Responsibilities	Collaborator
approving Maintenance officer removing faculties approving requisition	Database

Class cards of MaintenanceOfficer is given below-

1.b. MaintenanceOfficer	
Responsibilities	Collaborator
approving faculties forwarding requisition adding product and category updating product removing product	Product, Category, Database

Class cards of General User is given below-

1.c. General User	
Responsibilities	Collaborator
sending requisition	Database

Class cards of Admin is given below

2.Admin	
Responsibilities	Collaborator
Approving chairman/director Removing chairman/director Cancel chairman request	Database

Class cards of Non-member is given below-

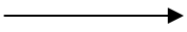
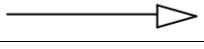
3. Non-member	
Responsibilities	Collaborator
getting registered	Database

Class cards of Database is given below

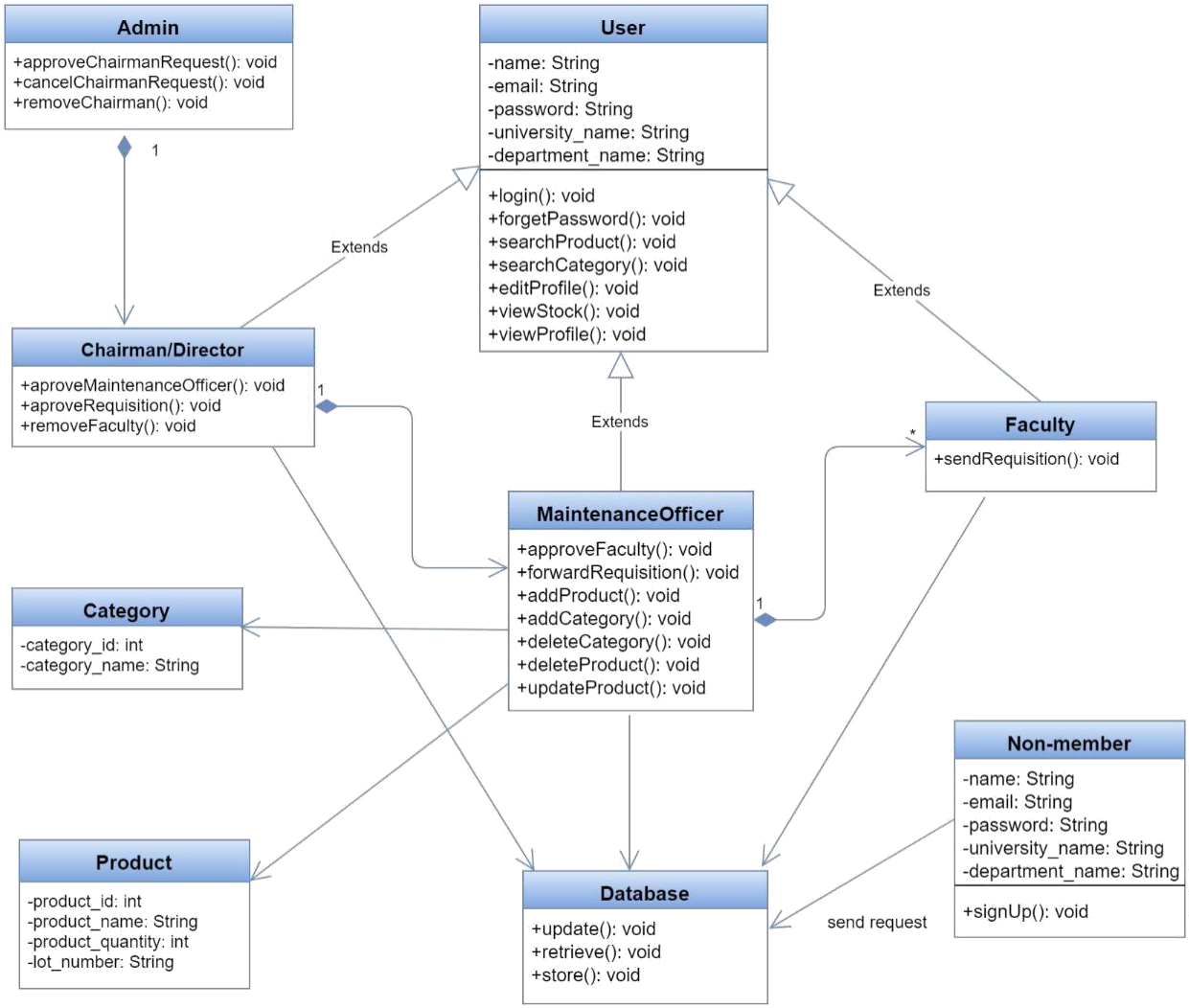
4. Database	
Responsibilities	Collaborator
storing data retrieving data updating data	-

6.9 Class Diagram

Class diagram is a diagram where dynamics of object interaction and collaboration are represented through UML diagrams and their networks. Here composition, association and inheritance of the classes are shown in the diagram. The notations are

Relationship	Notation
Association	
Composition	
Inheritance	

The class diagram shows the relation among the classes of our system



CHAPTER 7: BEHAVIORAL MODEL OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

The behavioral model indicates how software will respond to external events. Two different behavioral representations are discussed in this chapter. The first indicates how individual class changes state based on external events and the second shows the behavior of the software as a function of time.

7.1 Event Identification

We have identified all the events, their initiators and collaborators of the total system. Those are shown in the following table:

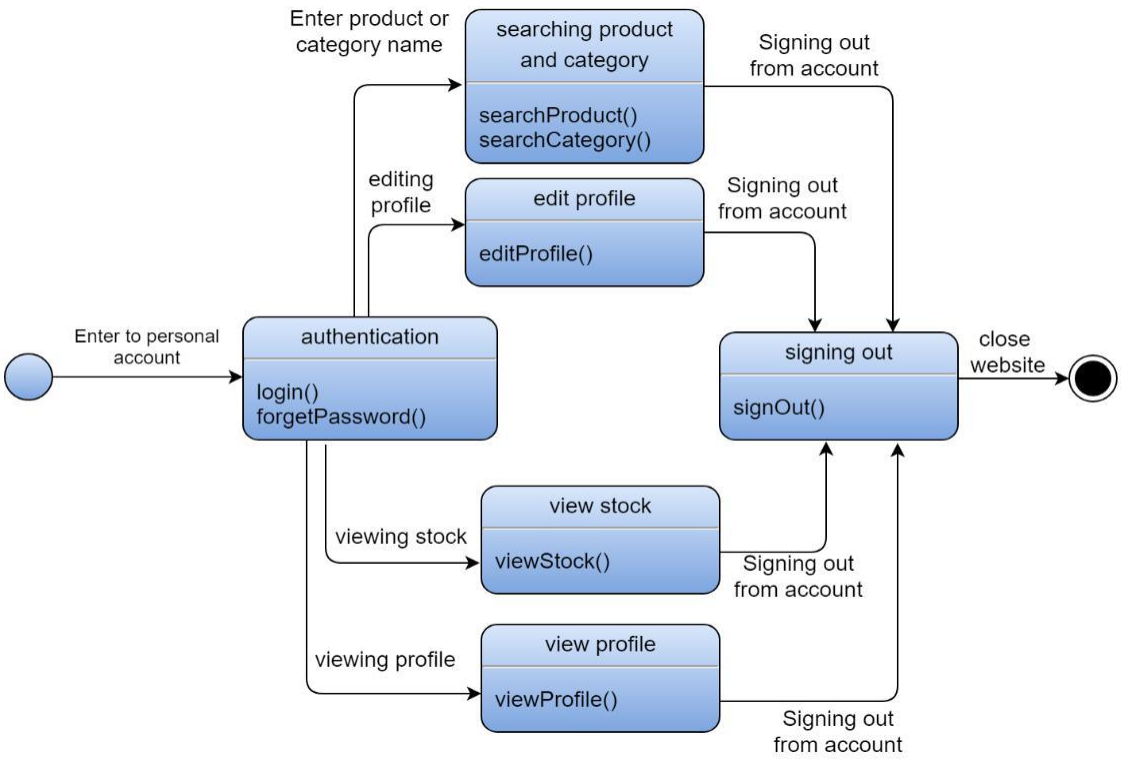
Serial No.	Event	Initiator	Collaborator
1.	Register to the system	Non-member	Database
2.	Login to the system	User	Database
3.	Send approve request for registration		
4.	Approve chairman request	Admin	Database
5.	Cancel chairman request	Admin	Database
6.	Enter admin account	Admin	User
7.	Approve maintenance officer	Chairman/Director	Database
8.	Approve faculty	MaintenaceOfficer	Database
9.	Remove chairman from the system	Admin	Database
10.	Search product	User	Database
11.	Search category	User	Database
12.	View Product	User	Database
13.	View Category	User	Database
14.	Edit profile	User	Database
15.	View profile	User	Database
16.	Add category	MaintenanceOfficer	Database, Category
17.	Add product	MaintenanceOfficer	Database, Product
18.	Update product	MaintenanceOfficer	Database
19.	Delete product	MaintenanceOfficer	Database

20.	Delete category	MaintenanceOfficer	Database
21.	Remove general-user	Chairman/Director	Database
22.	Send requisition	General User	Database
23.	Forward requisition	MaintenanceOfficer	Database
24.	Approve requisition	Chairman/Director	Database
25.	Cancel requisition	Chairman/Director	Database
26.	Sign out from account	Admin, User	Database

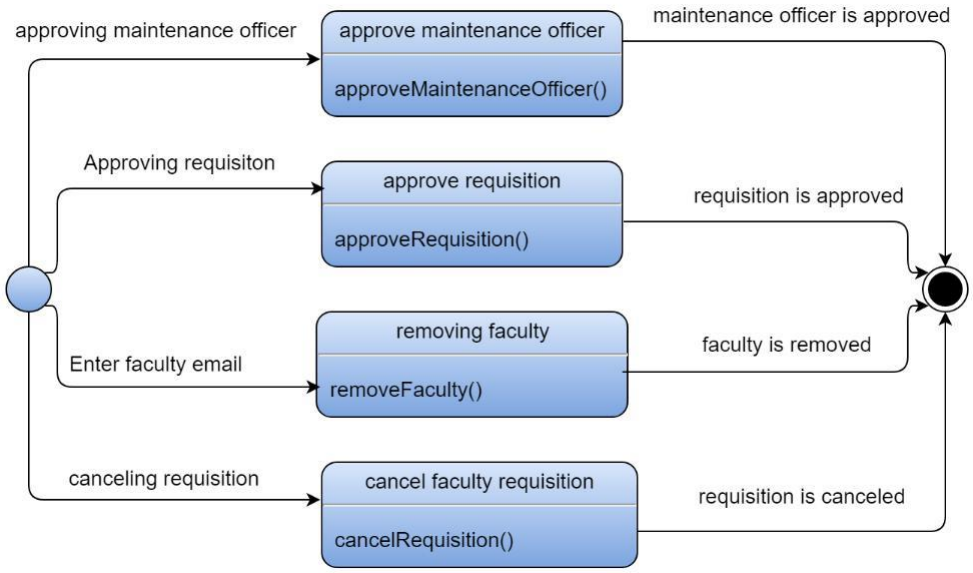
7.2 State Diagram

A state diagram is a diagram used in computer science to describe the behavior of a system considering all the possible states of an object when an event occurs. This behavior is represented and analyzed in a series of events that occur in one or more possible states. We have shown the state diagram of the classes in the following diagrams

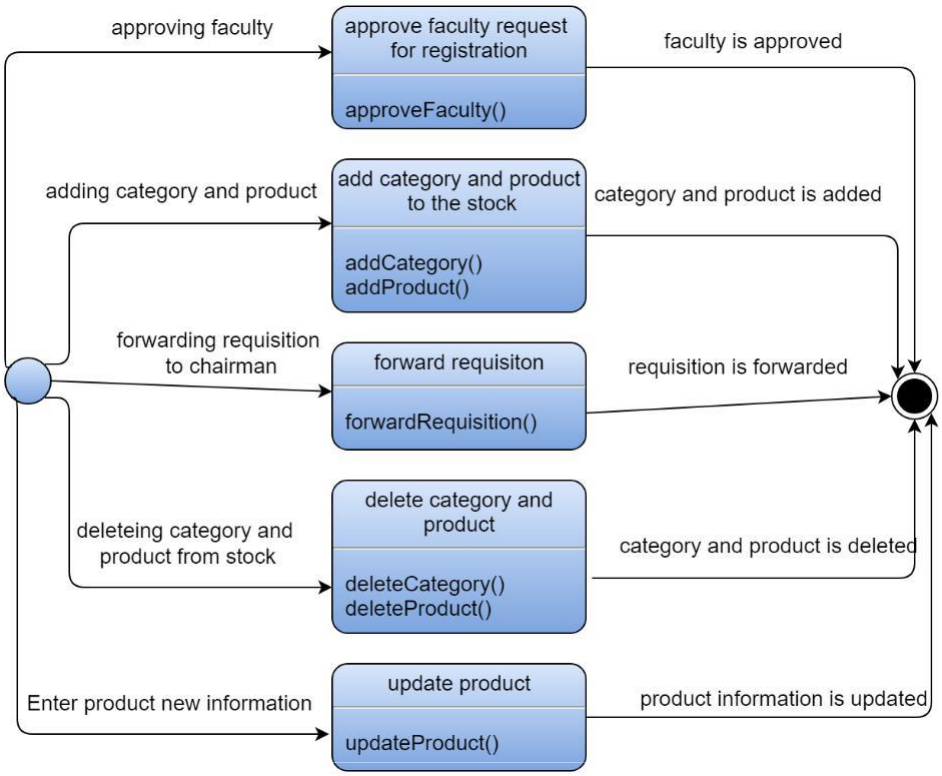
7.2.1 USER



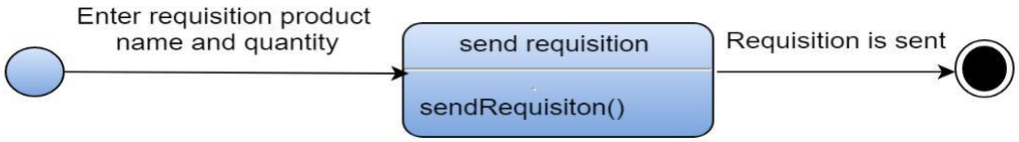
7.2.2 CHAIRMAN/DIRECTOR



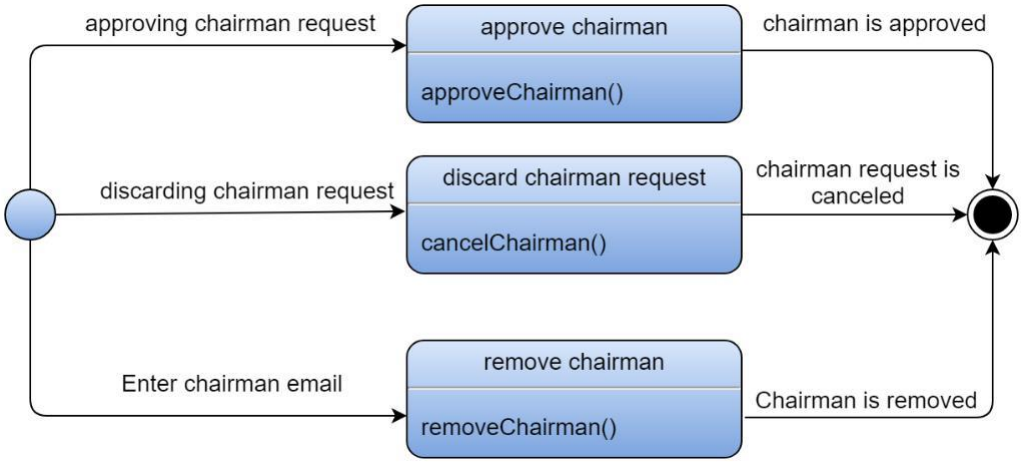
7.2.3 MAINTENANCE OFFICER



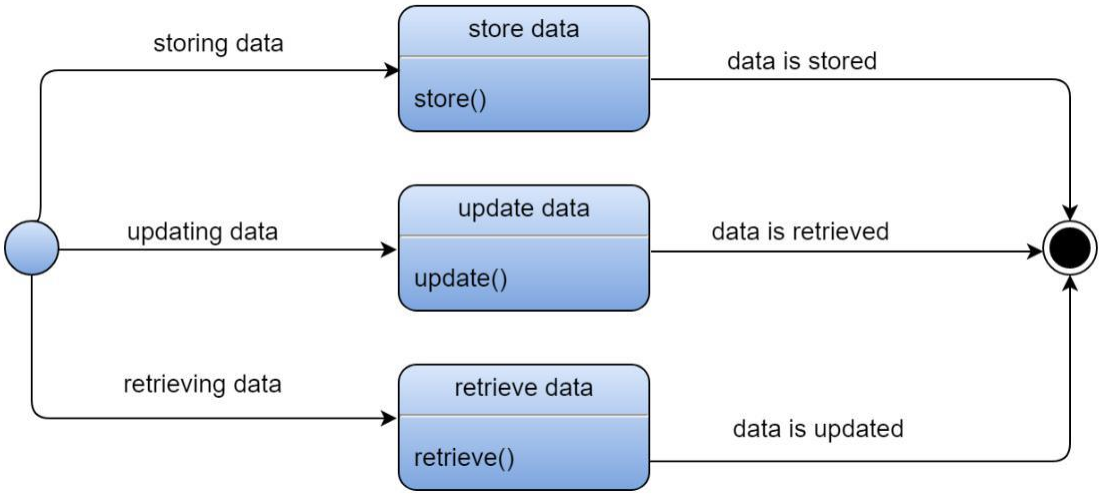
7.2.4 GENERAL USER



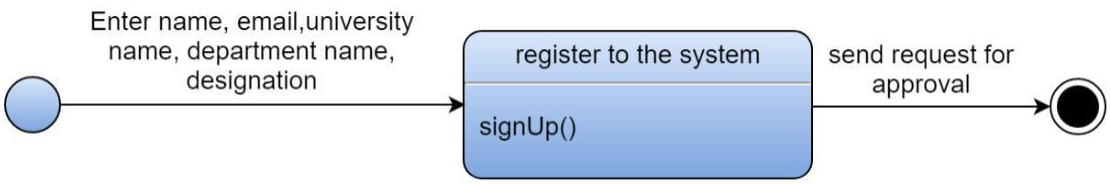
7.2.5 ADMIN



7.2.6 DATABASE

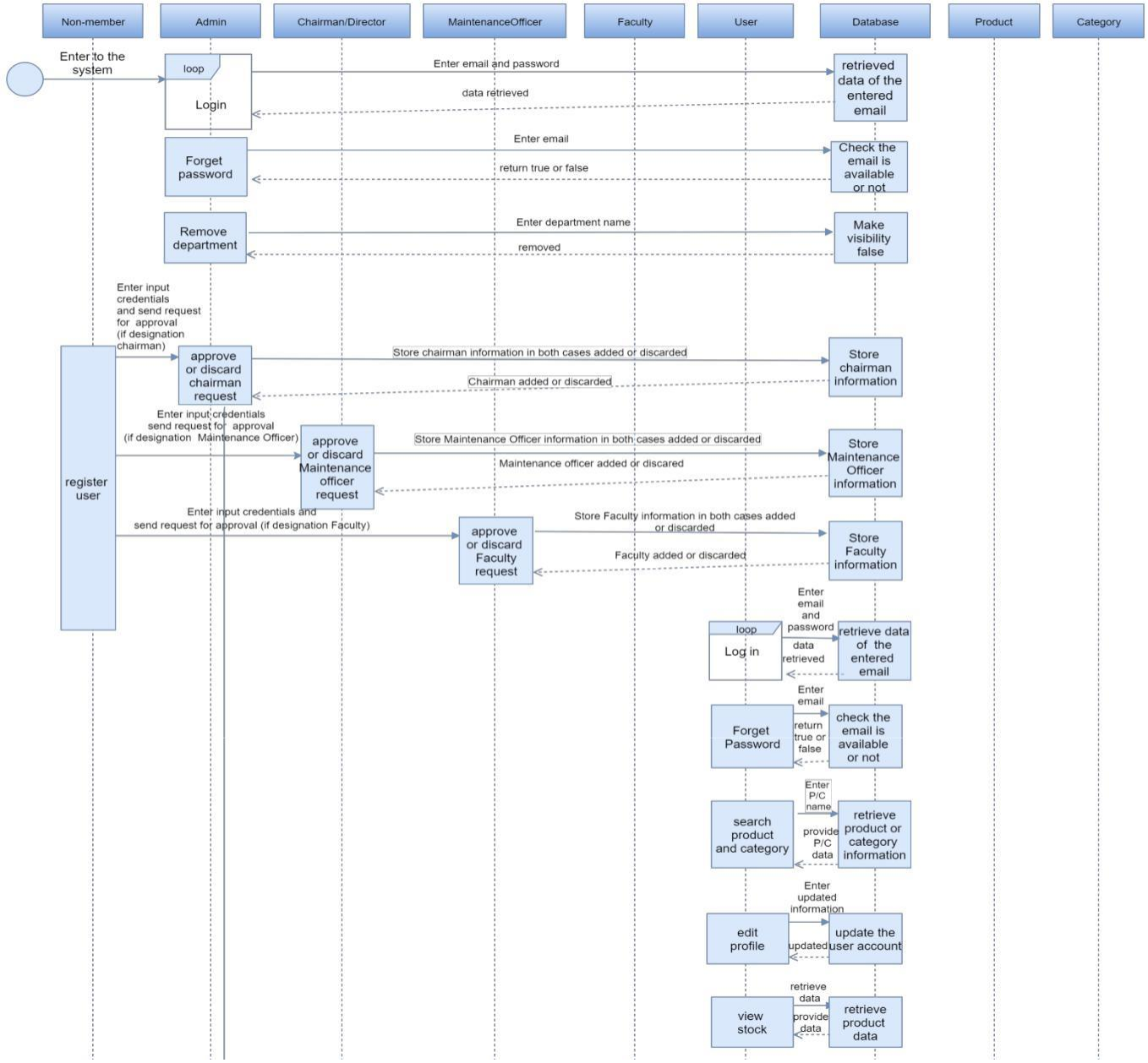


7.2.7 NON-MEMBER

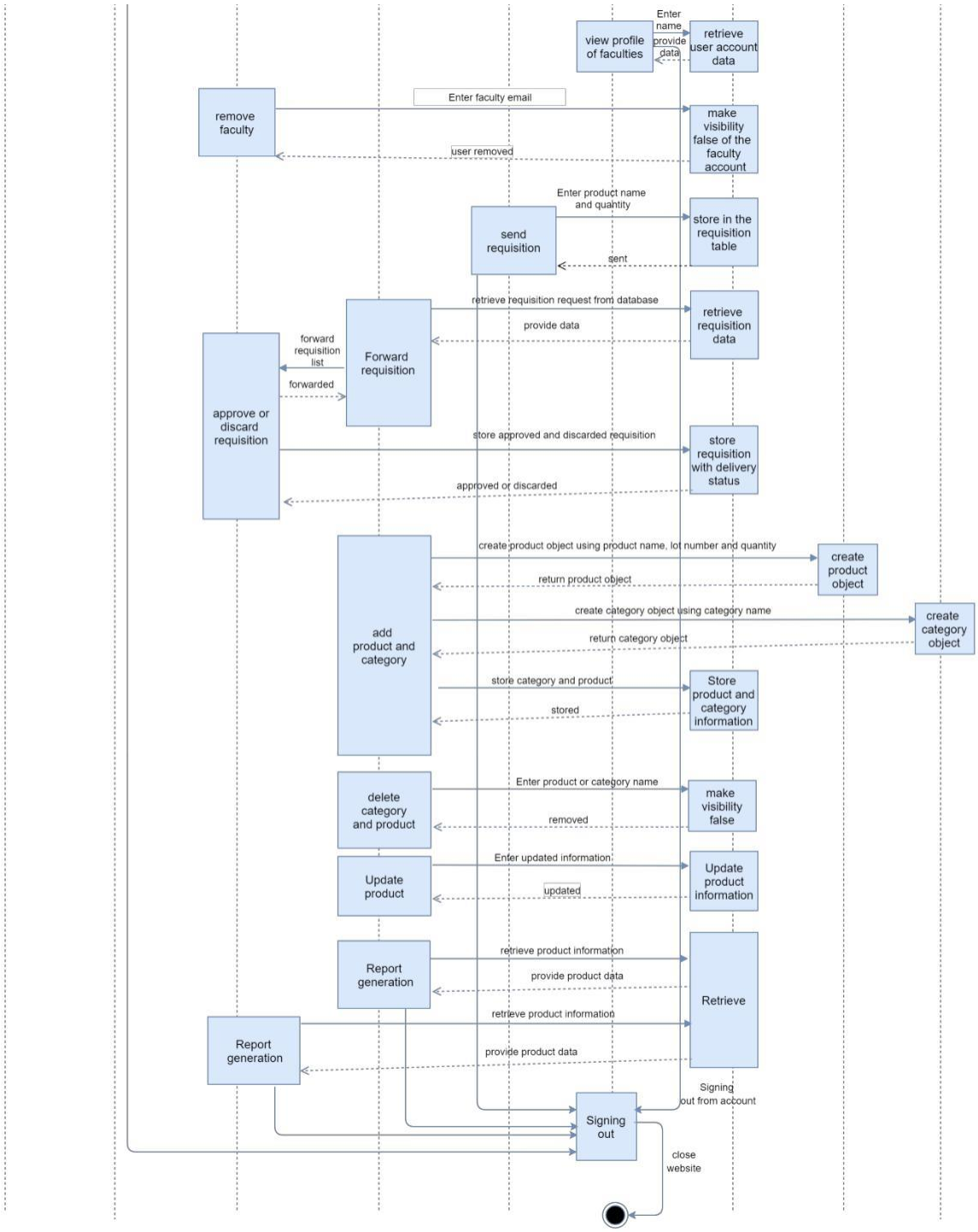


7.3 Sequence Diagram

A sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. It is a construct of a message sequence chart. A sequence diagram shows object interactions arranged in time sequence. We have shown the sequence diagram of three modules- Homepage, personal account and administration. Sequence diagram (first part):



Sequence diagram (second part)



CHAPTER 8: FLOW ORIENTED MODEL OF THE INVENTORY MANAGEMENT SYSTEM WEB APPLICATION

A Data Flow Diagram (DFD) is traditional visual representation of the information flows within a system. It shows how information enters and leaves the system, what changes the information and where information is stored. The purpose of a DFD is to show the scope and boundaries of a system as a whole. There are four components in a data flow diagram.

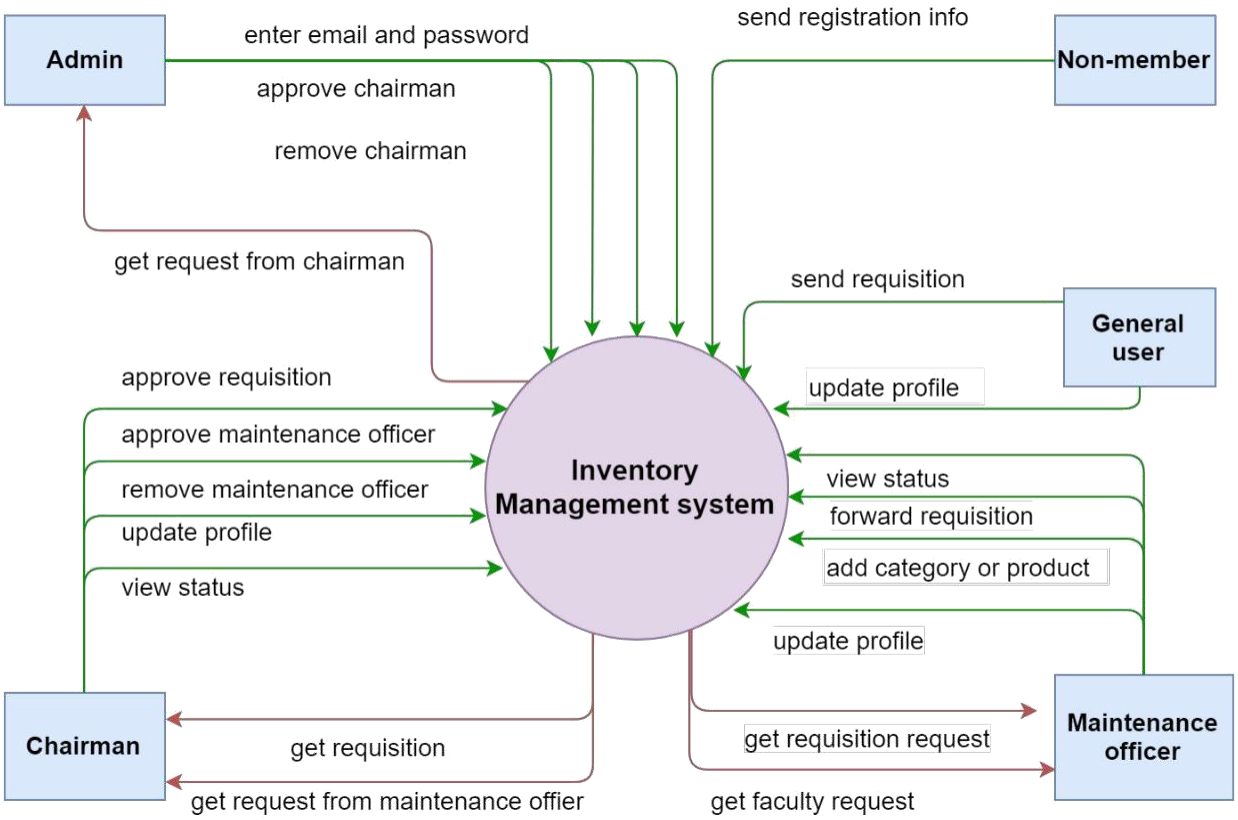
1. External entity: An outside system that sends or receives data, communicating with the system being diagrammed. They are the sources and destinations of information entering or leaving the system. They might be an outside organization or person, a computer system or a business system. They are also known as terminators, sources and sinks or actors. They are typically drawn on the edges of the diagram.

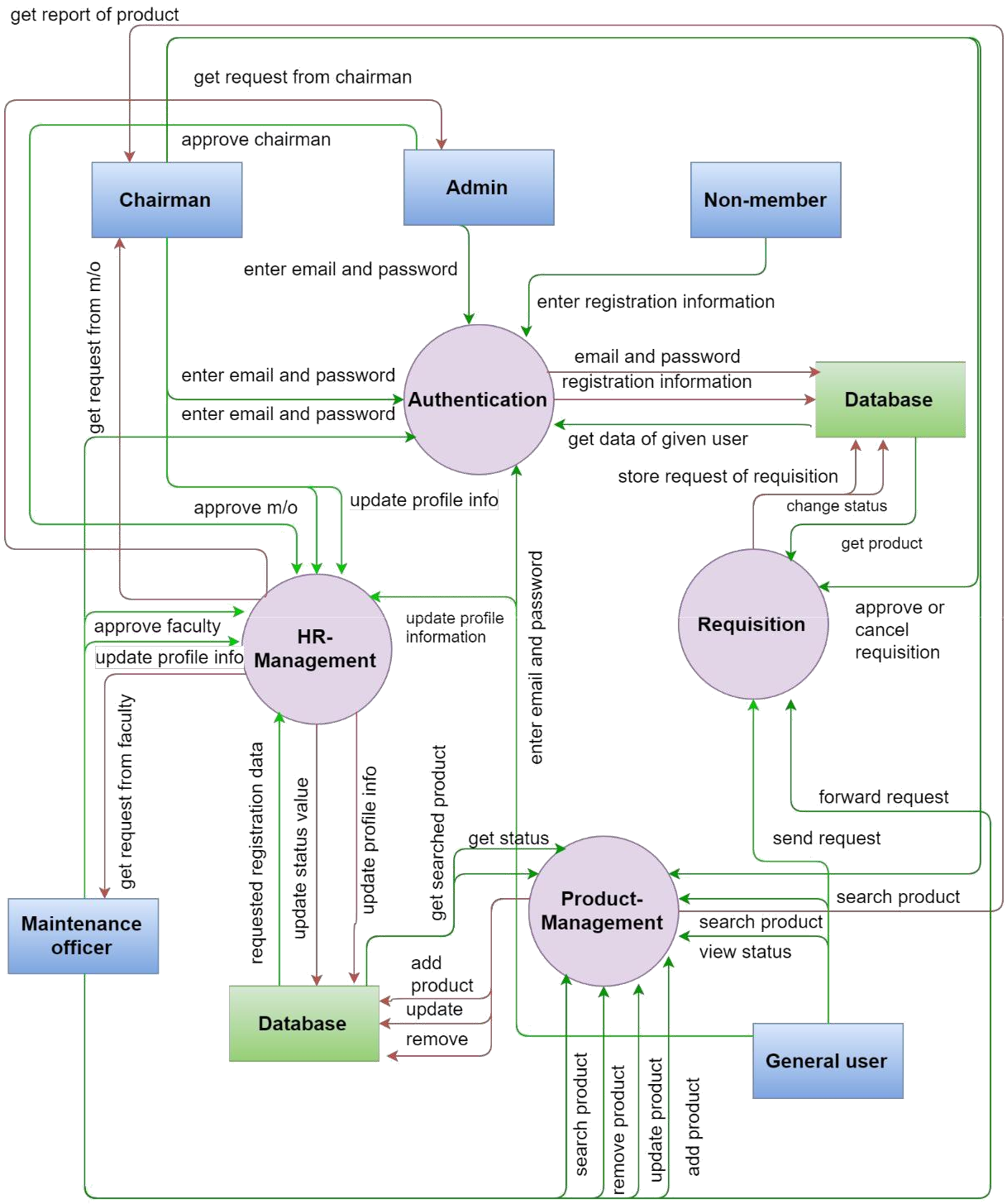
2. Process: Any process that changes the data, producing an output. It might perform computations, or sort data based on logic, or direct the data flow based on business rules. A short label is used to describe the process, such as "Submit payment".

3. Data store: Files or repositories that hold information for later use, such as a database table or a membership form. Each data store receives a simple label, such as "Orders".

4. Data flow: The route that data takes between the external entities, processes and data stores. It portrays the interface between the other components and is shown with arrows, typically labeled with a short data name, like "Billing details".

The following DFD shows the flow of data inside the inventory management system-





CHAPTER 9: CONCLUSION

We are pleased to submit the final SRS report on the inventory management system web application. From this, the readers will get a clear and easy view of the overall system. This SRS document can be used effectively to maintain the software development cycle. It will be very easy to conduct the whole project using this SRS.

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