Supermarket management and delivery system

MDS

Software engineering project

Accepted by: Igli Hakrama

MDS Requirements Specification

Version 3.0

June 16, 2021

Alban Salla

Elvis Ruci

Erisa Kazaferi

Fane Veizi

Henri Tusku

Xhoana Qosja

Table of Contents

1. Executive Summary

1.1 Project Overview

Despite the situation there have been a few businesses that have been crowded and one of those is supermarkets. We are aiming to create a solution where these types of businesses can have a way of managing their workload for in-store purchases as well as providing a delivery system. This would be helpful for people who for any reason cannot purchase items in-person or do not have the time to. This way they can do so easily. The management system is a way to keep note of daily activities in the business and also keep track of statistics, sales, inventory and more.
Some of the main features we are going to implement:

1. Log-in and register system (different users have different accesses)
2. Pages to keep track of: inventory, orders, sales, statistics.
3. Clients will have a simple page to make their order and check-out.

1.2 Purpose and Scope of this Specification

The purpose of this “Requirements Specification” document is to elucidate its receivers, testers and audience regarding the main compositional columns of the project. The first topic discussed after the summary is the “Product/Service Description” in which details about MDS and what it has to offer will be provided. Other sections, “Requirements” and “User Scenarios/ Use cases” are accountable for the clarification of this project’s objectives and requirements and the illustration of use cases. Target audience for this project are businesses as we aim to offer a service that keeps track of their products, sales and give an overall view on the business. The projects also serves and has a positive impact for the customers since it facilitates their purchasing process by having delivered their order at home and it also avoids in – person shopping, a thing many people would like to do considering the current situation.

In Scope of the Specification:

- Product and Service description.
- Functional, non – functional and domain requirements.
    - Management service
    - Delivery service
- User Scenarios/ Use cases.

Out of Scope:

- Features not involved in the requirements: Administrative decisions such as buying appliances needed for the supermarket or paying the rent (if any).

2. Product/Service Description

We have thought of our application as a management software for the supermarket as well as a delivery service for its customers. The factors affecting our product are divided in the employee’s and owner’s perspective and in the customer’s perspective. The first part aims to provide facilitating

services for owners and managers by having all the information needed about the supermarket in one application. This information includes: procurement, sales, inventory, statistics and more. Having everything monitored in one application will avoid mistakes in supermarket's purchasing decisions, employee's wages and business analytics.

The delivery service is thought of as a requirement facilitating the customer's shopping process. For many reasons like health issues or lack of time, some people are not able to make their purchase in the supermarket's environment. Considering this, creating a delivery service would benefit these types of customers. The service will be created considering also the delivery worker's needs such as access to the location of the order made through a map.

2.1 Product Context

Our product is related to an ordinary supermarket or market. It will be an independent system that will be available to 7 levels of users: Admin, Manager, Client, Economist, Floor employees, Delivery person. All these 7 levels will be connected with each other.

2.2 User Characteristics

There are 7 types of users within our system:

1. Admin

    -Can log in

    -Can check statistics within a given time period

    -Can check sales of a given time period or for each employee

    -Approves manager's requests

    -Can log out

2. Manager

    -Can create an account and log in

    -Can create accounts for the employees, the economist, security and IT.

    -Can delete the accounts of clients, not alter them.

    -Can update/delete the accounts of employees and economists.

    -Can add and update inventory

    -Can check statistics within a given time period

    -Can check sales of a given time period or for each employee

    -Can check on the procurements

    -Checks the declared amounts by the delivery persons with the amount of money brought by them (to counter false tips).

-Can log out

3. Client

-Can create accounts.

-Can log in

-Can place orders

-Can buy online/by cash.

-Can view their orders and their progress

-Gets an electronic receipt for their orders

-Can leave reviews or contact the seller

-Can log out

4. Economist

-Can log in

-Can update their profiles (with the approval of the manager)

-Can look into sales and statistics and update them

-Can look into procurements

-Serves as HR (controls employment for the candidates)

-Checks employees' paychecks

-Can log out

5. Cashier

-Can log in

-Can update their profiles (with the approval of the manager)

-Handles customer invoices for the products.

-Can log out.

6. Floor employee

-Logs in

-Can update their profiles and sales (with the approval of the manager)

-Checks products' availability & helps in the procurement

-Eliminates expired products

-Logs out

7. Delivery person

-Can log in.

-Can update their profiles (with the approval of the manager)

-Collects the products bought at the registry.

-Checks the map to find the right address.

-Delivers the products to the customer.

-Declare the amount paid by the customer (in order to calculate tips).

-Can log out.

2.3 Assumptions

It is assumed that if an item is out of stock the manager can log in and make it unavailable until it is back in stock.

It is assumed that the manager can have access to all the employees accounts and details.

It is assumed that the items ordered online for delivery should be automatically subtracted from the inventory and if it is an in-person purchase the manager should subtract it manually from the inventory.

It is assumed that the manager gets a warning message if an item is low on inventory.

Constraints

- Client's requirements should be completed in detail. There should not be functions out of the scope.
- The system should be easy to be understood by each level of user. The interface should not be too complicated and it should not take too long for the users to be able to understand the system enough to use it.
- The project should be finished by June.

- Since this system is a web application, users should have internet connection in order to access any part of the product.

- Other constraints will be discovered along the way if there are any.

2.4 Dependencies

- The manager or admin is the only level of users to be able to add accounts for the rest of the levels of users.
- Orders made for the restock to suppliers should be approved by the manager.
- Every account must have different login credentials.
- Any other dependencies are to be determined.

3. Requirements

3.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
BR_01	The web application should have different interfaces and functionalities for different types of users.	The 6 levels of users: Admin, Manager, Client, Economist, Floor employees, Delivery person, should all be different	1	22/04/2021	
BR_02	The login credentials should be unique for each user, especially the clients.	When registering and logging in the users should have a unique username or employee ID so there are no mix-ups with the accounts.	1	22/04/2021	
BR_03	The passwords should be valid when logging in and they will be authenticated.	Every user has to log in with a valid password that has been registered to the web app.	1	22/04/2021	

BR_04	The user can have the chance to edit and change the password.	This is done by updating the password in the database. Users can change their passwords easily from the page.	1	22/04/2021	
BR_05	The name of the supermarket should be registered.	Every supermarket that uses this service will have to set up information about their business most importantly the name.	1	22/04/2021	
BR_06	Employee hiring and payments.	Hiring and paychecks have to be handled by the economist.	1	22/04/2021	
BR_07	Create accounts for the employees	Manager and admin are the ones that add the accounts for the employees.	1	22/04/2021	
BR_08	Approve requests	Admin is the one that gets requests mainly from manager or economist in making a big order for the supermarket and other things along this line	1	29/05/2021	

BR_09	View statistics	Manager, admin, economist	2	22/04/2021	
BR_10	View sales	Manager, admin, economist can view the sales of every employee while the cashiers can view only their own sales.	2	22/04/2021	
BR_11	Packaging of the orders made online by customers.	Floor employees are the ones getting the online orders ready.	2	22/04/2021	
BR_12	Handle suppliers and inventory.	The manager has to handle the suppliers and the new orders for the products that will be added to the supermarket. The manager also gets a notification if a certain product is about to run out of stock or is out of stock.	2	22/04/2021	
BR_13	Check financials	Manager checks the financials of the delivery person which is where the declared tips are displayed for every delivery person. There they can confirm if the tips declared are accurate which then goes into their paycheck.	2	29/05/2021	
BR_14	Remove from stock expired products	If a product in the isles of the supermarket is expired so it can no longer be sold it is the floor employees' responsibility to remove it from the stock or mark it as out of stock.	2	29/05/2021	

BR_15	Make deliveries	An employee is a delivery person who collects the order from the supermarket and sends it to the customer.	2	22/04/2021	
BR_16	Make orders for out of stock or low on stock products	Manager makes the orders but it has to go through the admin for approval	2	22/04/2021	
BR_17	Electronic receipts	Clients can have an electronic copy of the receipt for their purchase.	3	22/04/2021	
BR_18	View the information of the clients and employees	The manager and admin have access	3	22/04/2021	
BR_19	Sending notification when a product is low on stock or out of stock	The manager and admin will get a notification when logging in or during their session being logged in.	3	29/05/2021	
BR_20	Subtracting the amount of an item or product in the system when an order is placed for delivery	When a client places an online order the amount of the products that have been ordered should be automatically subtracted by the system in order to not create a problem with the inventory.	3	29/05/2021	
BR_21	Declaring tips	Delivery person declares the tips in the delivery orders that are paid by cash. This amount goes into their financials.	3	29/05/2021	

BR_22	Declaring sales	Cashiers declare the sales made during their shift.	3	29/05/2021	
BR_23	Updating status of the delivery	The status of the delivery will be updated continuously from the delivery person. It will start as ordered => ready for delivery => on the way => delivered successfully	3	29/05/2021	
BR_24	Map locations for online orders	The delivery person can check the location where the delivery will be made on the map.	4	29/05/2021	
BR_25	Update accounts and profiles.	Every employee can do so with the approval of the admin or manager. Clients do not need an approval	4	22/04/2021	
BR_26	Leave feedback and contact business	Customers are the ones that can leave feedback in the web app and contact the business.	4	22/04/2021	

3.1 Non-Functional Requirements

3.2.1 User Interface Requirements

The software will be in the form of a webpage which can be accessed from everyone with a proper device and internet connection through any browser (Google, Mozilla ect). There are different types of users so for each user there will be a separate interface. If admin or manager is logged in then they will have some clickable buttons with given functions for every task that they should perform. Clients' interface will have some general information about products and delivery on the main page and a menu that redirects them to the other sections. Economist, once logged in can view everything about sales and statistics as well as employees' paychecks. And finally, the delivery worker will have an interface of its own where the location of the order made will be shown in the map.

3.2.2 Usability

Once the software is received by the client, we will make sure that all its users feel comfortable with using it.

3.2.2.1 Learnability

- The system is easily used and learned.
- For each user, a set of instructions in PDF format can be downloaded from the webpage.
- In case of errors or mistakes, a dialog box will be shown to help users understand.

3.2.2.2 Capacity

- The number of simultaneous users to be supported: 25
- Per-user memory requirements: 30 MB
- Expected application throughput: 2 data packages/ second

3.2.2.3 Availability

- The webpage is going to operate at every time of the day, or 24 hours a day.
- The webpage is going to operate at every day of the week.
- The webpage will be available to all areas with network connection.

3.2.2.4 Latency

- The maximum acceptable time for a service request should be no more than 5 seconds.
- Web application's modules should not take more than 100 ms to be loaded on the server.
- Users' actions such as: log in, register should take a minimum time.

3.2.3 Performance

Specify static and dynamic numerical requirements placed on the system or on human interaction with the system:

- Static numerical requirements may include the number of terminals to be supported, the number of simultaneous users to be supported, and the amount and type of information to be handled.
- Dynamic numerical requirements may include the number of transactions and tasks and the amount of data to be processed within certain time period for both normal and peak workload conditions.

All of these requirements should be stated in measurable form. For example, "95% of the transactions shall be processed in less than 1 second" rather than "an operator shall not have to wait for the transaction to complete".

3.2.4 Manageability/Maintainability

3.2.4.1 Monitoring

- MDS will monitor the application for every inconsistency it may have in order to be fixed as soon as itcan.
- Regarding the users, once they enter their correct information they can be logged in and if not,

then they can't be logged in. An error message will be shown instead. Admin and manager can monitor every action of the business such as: procurement, sales, deliveries.

- Clients can monitor their orders at any time and they are also shown the products in discounts at the main page. Search bar will make things easier for clients I case they want to access a certain product.
- Economist will monitor sales so that he can make analysis regarding the business progress.

3.2.4.2 Maintenance

- Different users need to maintain different data in the application. Manager will have personalized buttons for adding, deleting and editing the information of the business' database and its employees.Economist will maintain the sales database by updating it every day with the relevant information.

- Regarding the maintenance of the application by MDS, if a crash occurs then the application is going torestart. In case it keeps crashing then it will be disabled to the users (with a message informing them about the situation) and will be solved by MDS.

3.2.4.3 Operations

Operations required by the users are:

- Enter their credential to successfully log in.
- For clients to specify their location.
- In case clients pay with credit card, it is required the information of the credit card.
- Managers should update the database for any change.
- Economist should update the statistics and sales section.
- Admin should approve every action of the manager

3.2.5 System Interface/Integration

The database will be accessible to many users but only admin/manager will have access to modify it.

The connection client – server will be executed by the HTTP protocol. We plan to use these technologies for the development of the website:

- Java
- Spring
- Thymeleaf

3.2.5.1 Network and Hardware Interfaces

Since our application is web – based then the browser will create a connection (TCP) with the server. All browsers can support this kind of connection thus ensuring a successful operation.

3.2.4 Security

3.2.4.1 Protection

- To protect the webpage from malicious or accidental access, destruction or misuse we will take these precautions.
- Encrypt the most sensitive information such as passwords.
- The page will validate passwords and other data for specific conditions before they are stored in the database.
- Each user will only see the information related to them.

3.2.6.2 Authorization and Authentication

- The user authentication will be using username and password.
- Authorization will be based on the level of user type.

3.2.5 Data Management

Entities:

- Employee
- Order
- Inventory
- Sales
- Suppliers

Employee specification:

emp_ID integer

emp_name varchar max 20

emp_surname varchar max 20

emp_bd - format YYYY-MM-DD

emp_role varchar max 20

emp_email varchar 50

emp_wage =0

Order specification:

Id int

item_id int

emp_id int

table_loc_ID int

total int default=0

Inventory specification:

id int

name varchar 100

supplier_id int

amount int

Sales specification:

id int

date DATE - format YYYY-MM-DD

Suppliers specification:

sup_ID int

NAME varchar 50

EMAIL varchar 50

phone_nr int

product varchar 50

3.2.6 Standards Compliance

The process of using and maintaining the application is and will continue to be respectful to any user's privacy. (including admin, manager, client, economist).All personal information will be protected according to the law specifications.

3.2.7 Portability

The system will be web-based therefore it will operate the same regardless of the operating system.

3.2.8 Other Non-Functional Requirements

3.2.10.1 Operational Requirements

3.2.10.1.2 Operations

Periods of interactive operations:

- The system should be available from 9am to 12 am.

Periods of unattended operations

- Unattended operations include the time between 12 am to 9 am.

Data processing support functions

- We will use validations to ensure that each input is appropriate and not malicious.
- Summarize at the end of each working day the sales and expenses in a detailed report by using a sorting algorithm to arrange the data.
- Classify all the items of the menu and inventory according to their category.

Backup and recovery operations

- There is available a backup server, in case that our current server breaks down for any circumstances.

Safety considerations and requirements

- Each user has its own address with an unique ID and password and only he can log in to its page.

Disaster recovery and business resumption

- We are using MySQL for the database. Everything is being recorded and saved in case of any fatal crashes of the system.

3.2.10.2 Potential Threats

3.2.10.2.1 Security Threats

- Security misconfiguration

A web application like the one we are developing requires frequent maintenance and configuration so it can run properly and effectively. The owners of the software should keep communication with the developers to make sure the application is up to standards in handling sensitive data.

- Brute Force

Brute Force happens when hackers try to guess the username of a certain user by trying different tactics and to forcibly gain access on these accounts. The company should keep an audit trail in order to register all the logins and transactions of the users within the system.

3.2.10.2.2 Emerging Technologies

The developers should be aware of the emerging technologies and try to improve the system time by time. The system should be in a process of continuous development to keep up to date and effective.

3.2.10.3 Development requirements

3.2.10.3.1 Client-Side Programming (Front End)

- HTML (Hypertext Markup Language)
- CSS (Cascading Style Sheets)
- JS (JavaScript)

3.2.10.3.2 Server-Side Programming (Back End)

- Programming Language – Java: Spring
- Database - mySQL
- Server - Tomcat

3.2.10.4 External requirements

3.2.10.4.1 Regulatory and Legislative Requirements

3.2.10.4.1.1 Sales & Statistics & Inventory

According to Law No. 9228 dated 29 April 2004 on Accounting and Financial Statements, our client is obliged to apply the National Accounting Standards (NAS), since it consists as a medium-size enterprise. According to taxes on profit, there is a need by law to keep track of every sale that is made and declared in every bill, in order to generate legal profits. These ones are organized in sales and bills functions controlled by the economist and owner. This accounting period consists in 12 months. The currency that is used to keep track is Albanian currency (lekë) and in Albanian language. Accounting books and records should follow a double-entry basis and a chronological arrangement. Businesses should verify their assets and liabilities by declaring an organized inventory. According to taxes on profit, there is a need by law to keep track of every sale that is made and declared in every bill, in order to generate legal profits. Also, TVSH should be included in the receipt, so everything is transparent to the client. In our system, these regulations are organized in sales, statistics, and inventory pages controlled by the economist, the manager and the admin.

3.2.10.4.1.2 Employee's dashboard

According to "Kodi i Punes" in Albania, the owner is obliged to have a detailed list of personal information of the employees, to keep track about the overall period in work of an employee, to declare the employees' wages and to declare and pay their insurances. This is done at the employee's dashboard.

3.2.10.4.1.3 Privacy Policy

According to Law no. 9887, dated 10.03.2008 "On personal data protection", our system protects all the personal information of the employees.

3.2.10.5 Ethical Requirements

3.2.10.5.1 Software

The software should be developed according to the client's requirements. It should be well documented and have the appropriate approvals. The software should be developed in a way that all the data and information collected and saved in its database is secure.

3.2.10.5.2 Developers

The developers should use the property of a client only in properly authorized ways, and with the client's knowledge and consent. They should be accurate in stating the characteristics of software on which they work and avoid false claims. The developers should take responsibility for detecting, correcting, and reporting errors in software and associated documents on which they work.

3.3 Domain Requirements

- In case of discounts the clients should be notified. Also clients should be notified when the discount offer is no more valid, by updating the system.

- Once the order is made, the client cannot retrieve his/her order. For this point the client must agree once entering the application.

4 User Scenarios/Use Cases

4.1 User Scenarios

01 Admin User Scenarios

Sales and statistics

- Admin goes to statistics/sales page
- Gets a general view of statistics/sales
- Defines a certain time period to check statistics/sales for that given time

Employee registration

- Admin logs in
- Goes to the employee management page
- Fills the fields with the information that the employee provides
- Clicks add to add the employee information to the database and create their account
- Now the employee can go to the webpage, enter their credentials and they have access to the page

Procurements

- Admin clicks the procurements tab in his page.
- Can see the procurements

Requests

- Gets notifications about pending requests for approval
- Check requests
- Denies or approves requests

02 Manager User Scenarios

Employee registration

- Manager logs in
- Goes to the employee management page
- Fills the fields with the information that the employee provides
- Clicks add to add the employee information to the database and create their account
- Now the employee can go to the webpage, enter their credentials and they have access to the

page

Sales and statistics

- Manager goes to statistics/sales page
- Gets a general view of statistics/sales
- Defines a certain time period to check statistics/sales for that given time

Procurements

- Manager, admin clicks the procurements tab in his page.
- Can see the procurements

Financials

- Manager clicks the financials tab in his page.
- Manager can check the delivery person financials.

03 Client User Scenarios

Customer Log in

- Customer goes to the webpage
- Goes to the register page
- Enters their information such as username and password and other personal information
- After authentication customer has access to the webpage
- Using the credentials they created customer logs in

Online order

- Customer logs in
- Views the products displayed and searches any product they want
- Clicks add to cart on the products they want
- Reviews cart
- Proceeds to checkout
- Either chooses to pay on the webpage or cash to the delivery person
- Places order

- Receives an electronic receipt

04 Economist User Scenarios

Sales and statistics

- Economist goes to statistics/sales page
- Gets a general view of statistics/sales
- Defines a certain time period to check statistics/sales for that given time
- Can update the sales and statistics

Procurements

- Econimist clicks the procurements tab in his page.
- Can see the procurements
- Can update

HR options

- Goes to employment page
- Views current and past employees as well as possible candidates
- Can view their CV
- Can hire another employee

Paychecks

- Economist clicks on the paychecks page
- Can view information on the paychecks of each employee and amount
- Enter bonuses or subtract amount from paychecks for specific reasons

05 Cashier User Scenarios

Receipts

- Cashier rings up products
- System calculates total
- Cashier prints physical receipt or customer invoice

Sales

- Clicks on the personal sales page
- Enters sales

06 Floor employee User Scenarios

Sales

- Clicks on the personal sales page
- Enters sales

Stock maintaining

- Employee checks products for expiration date
- Removes from stock item that has expired
- Removes items that are out of stock

07 Delivery person User Scenarios

Deliveries

- Receives delivery orders through the system
- Select delivery to complete
- Updates status of delivery
- Enters his tips for the day

08 General User Scenarios

User successful Log in

- User enters their credentials into the system.
- If the credentials are correct, they are redirected into their personal page.

User unsuccessful Log in

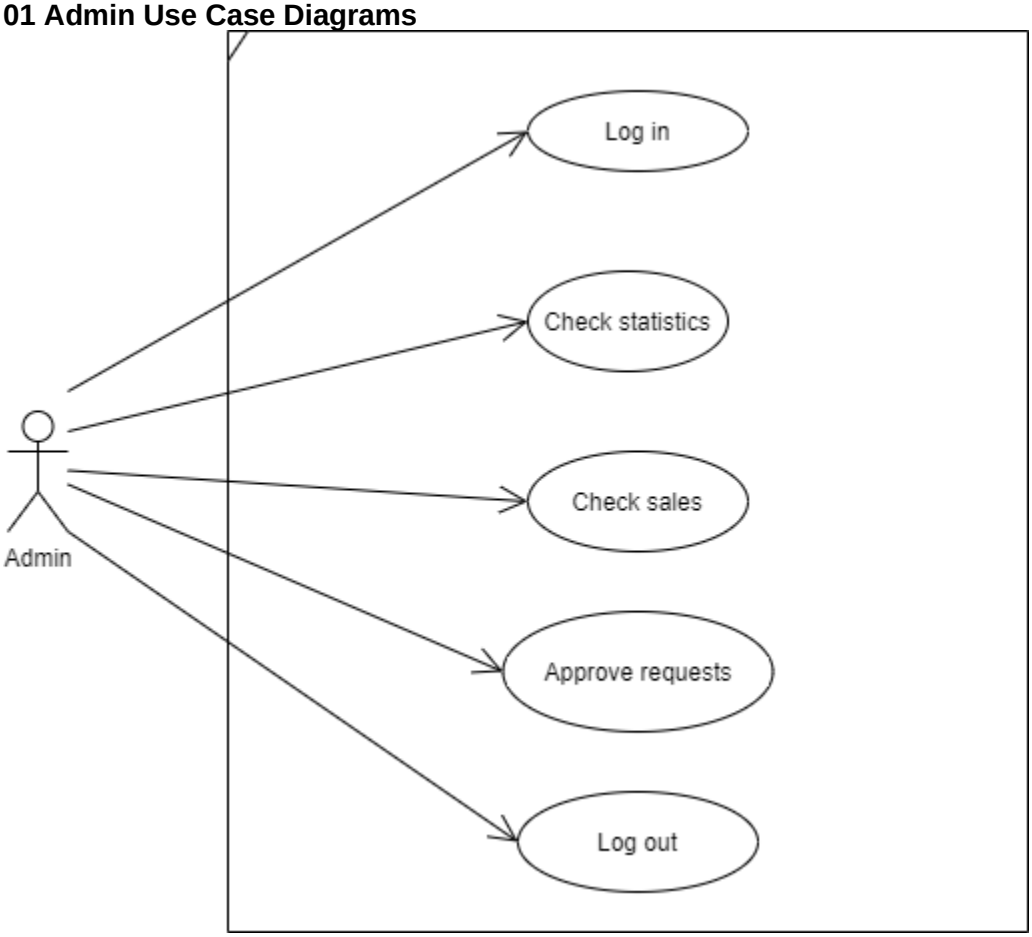
- User enter their credentials into the system.
- If the credentials are wrong, they are not redirected and asked to enter credentials again.

Employee edits information of the profile

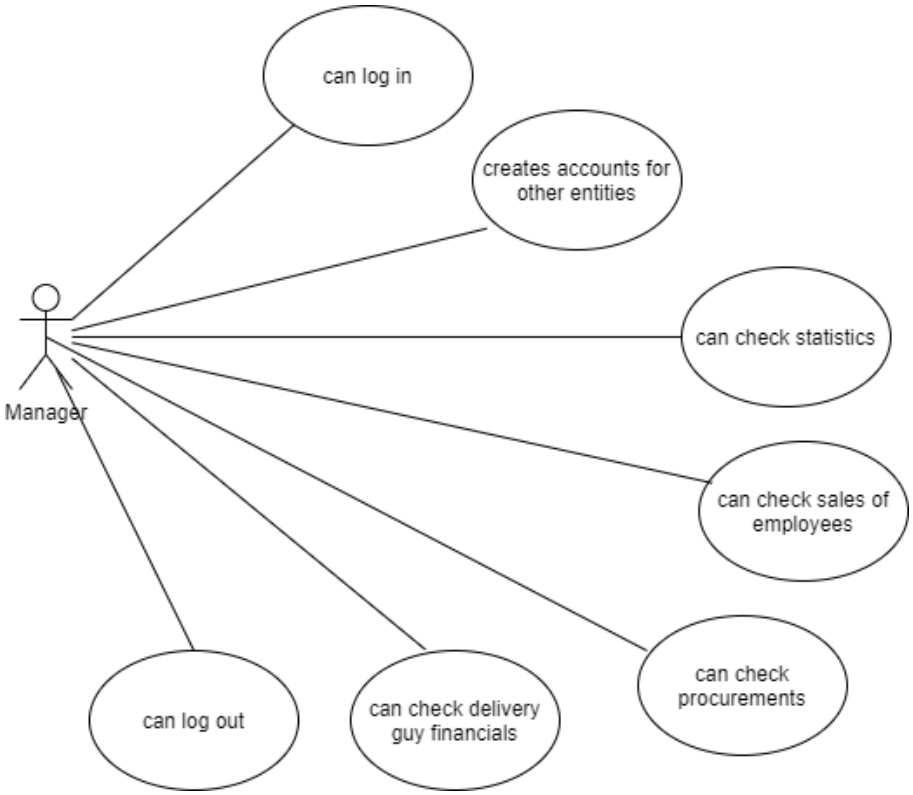
- Employee logs in
- Clicks on the name at the top which gives them access to the profile information
- Edits the wanted information besides the ID which cannot be edited by employee
- Request's approval of change

4.2 Use Case Diagrams

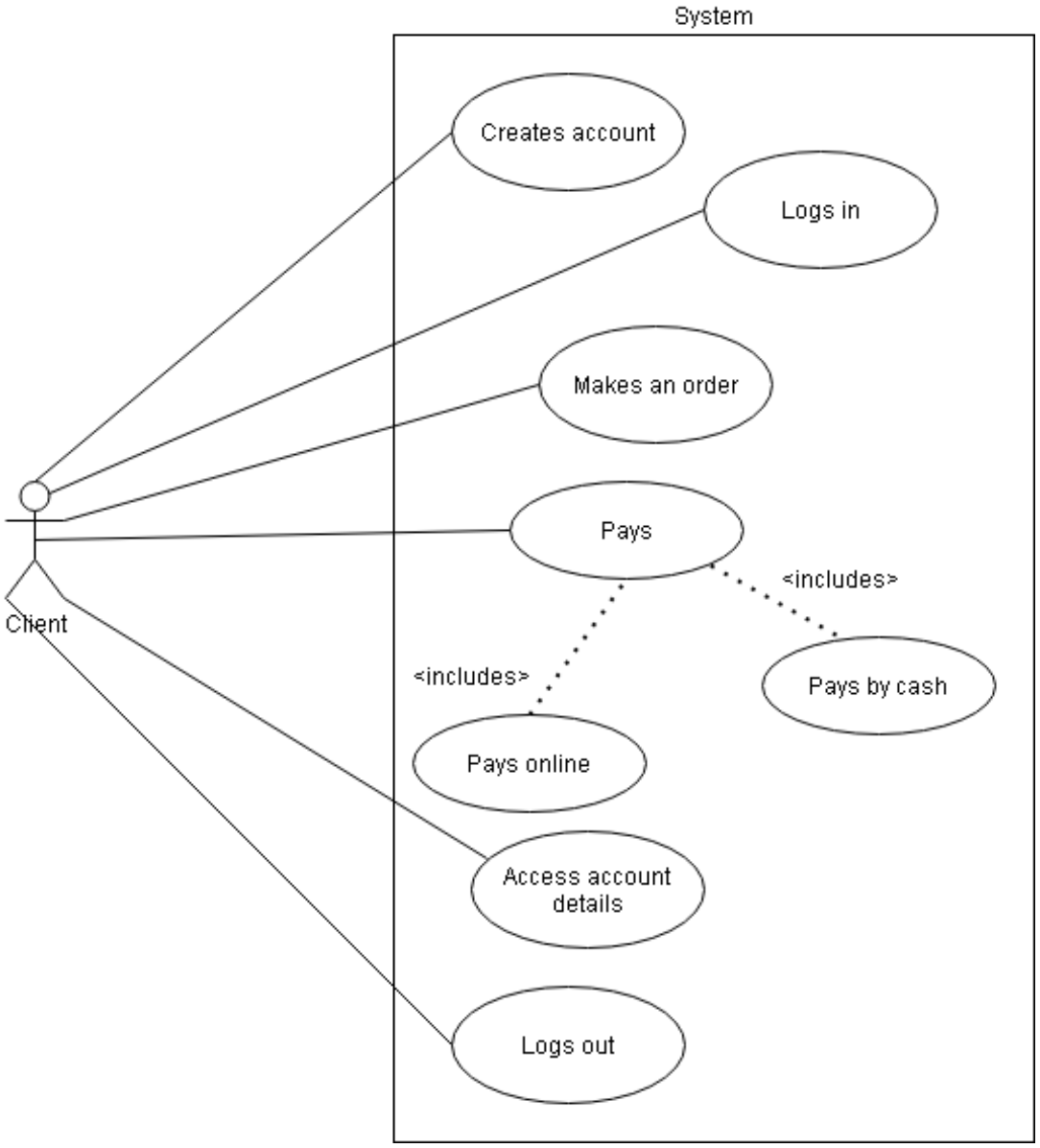
01 Admin Use Case Diagrams



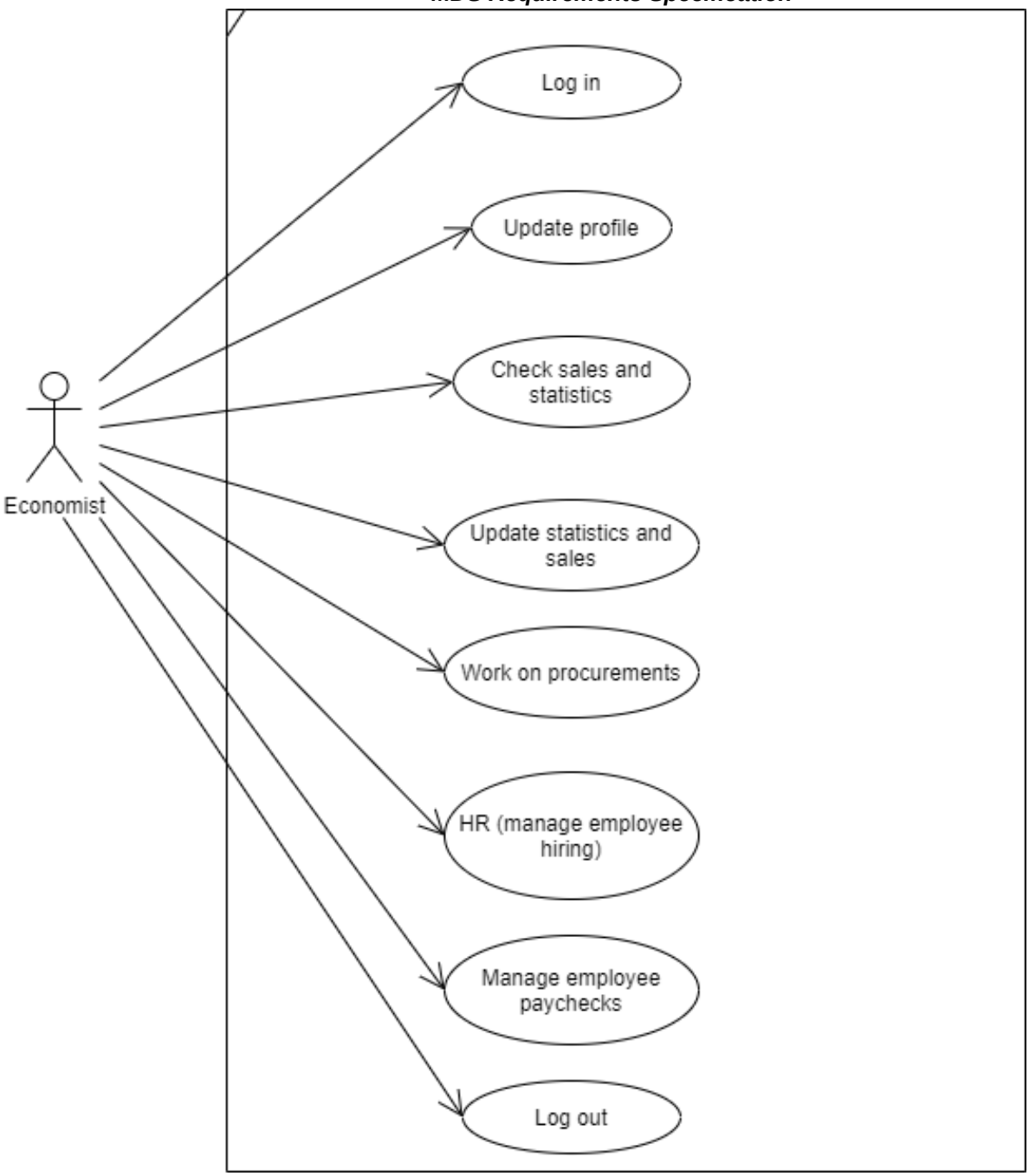
02 Manages Use Case Diagrams



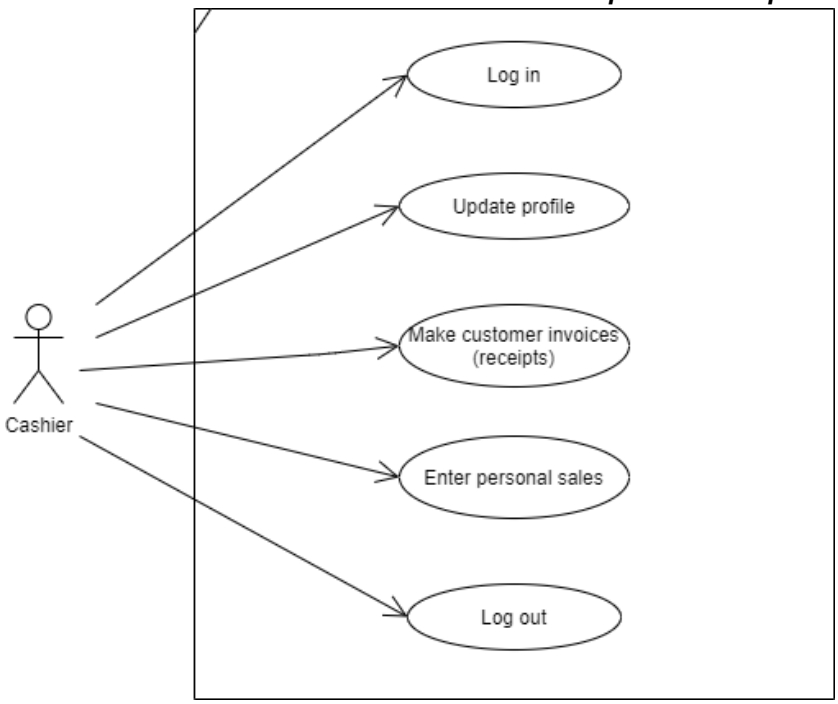
03 Client Use Case Diagrams



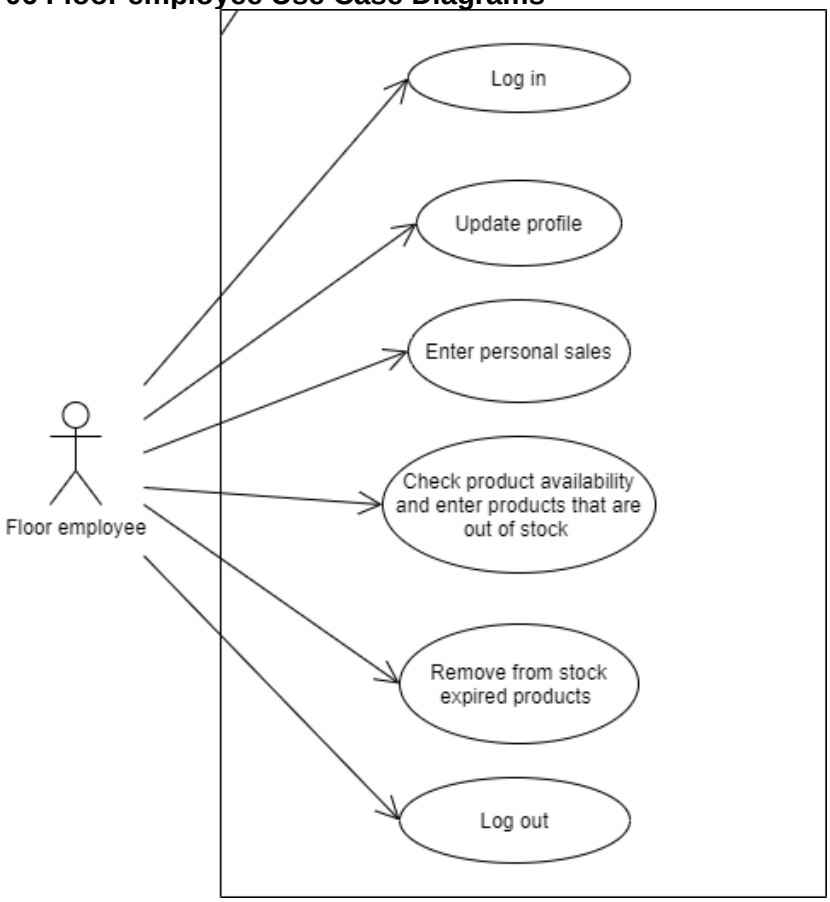
04 Economist Use Case Diagrams



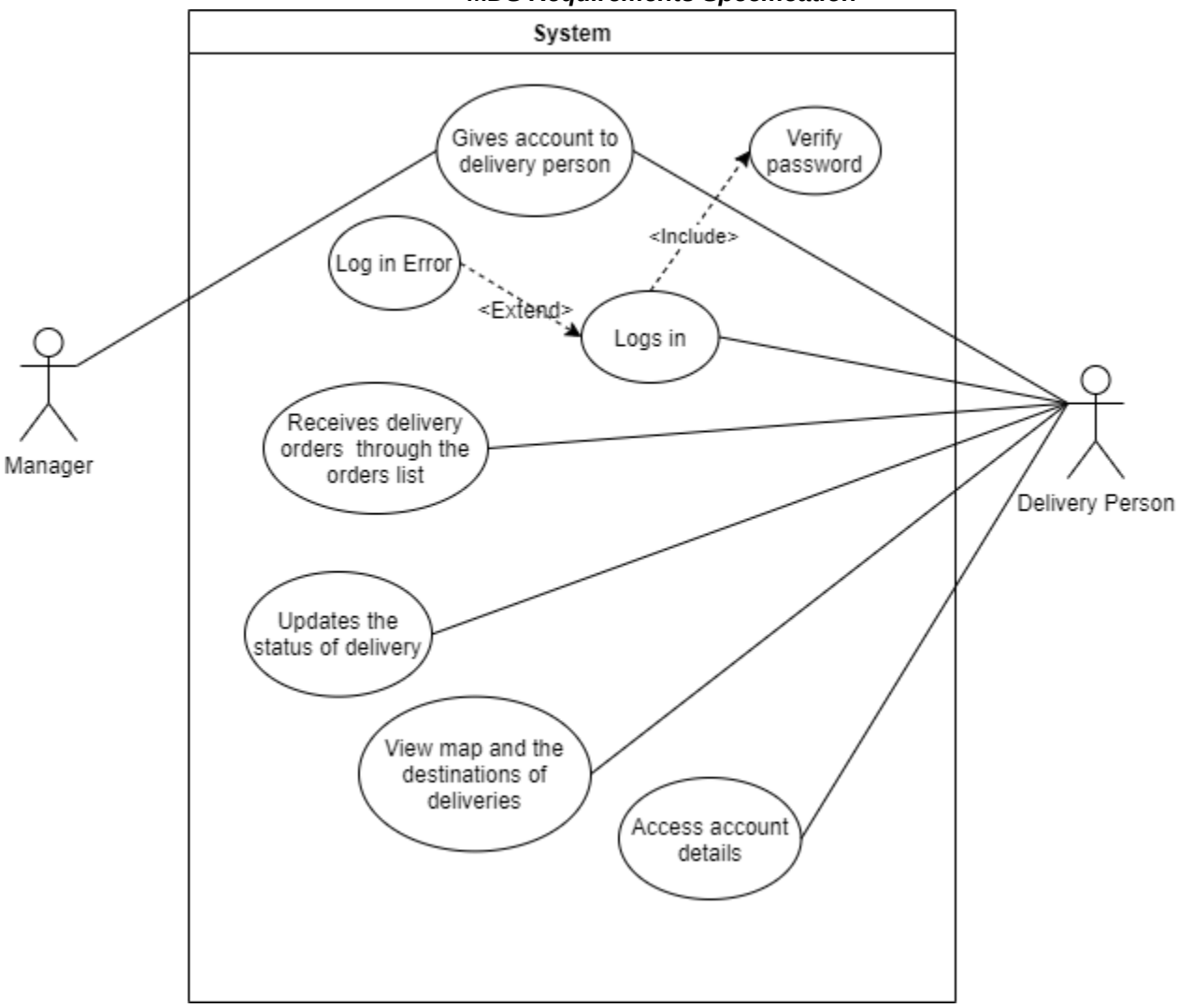
05 Cashier Use Case Diagrams



06 Floor employee Use Case Diagrams



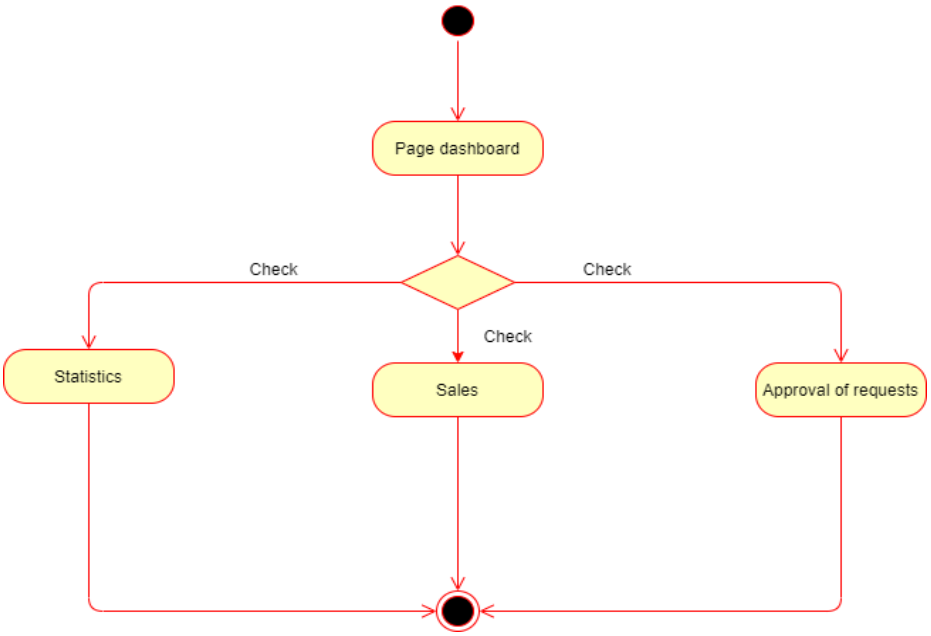
07 Delivery person Use Case Diagrams


System
Gives account to delivery person
Verify password
<Include>
Log in Error
<Extend>
Logs in
Receives delivery orders through the orders list
Updates the status of delivery
View map and the destinations of deliveries
Access account details
Manager
Delivery Person

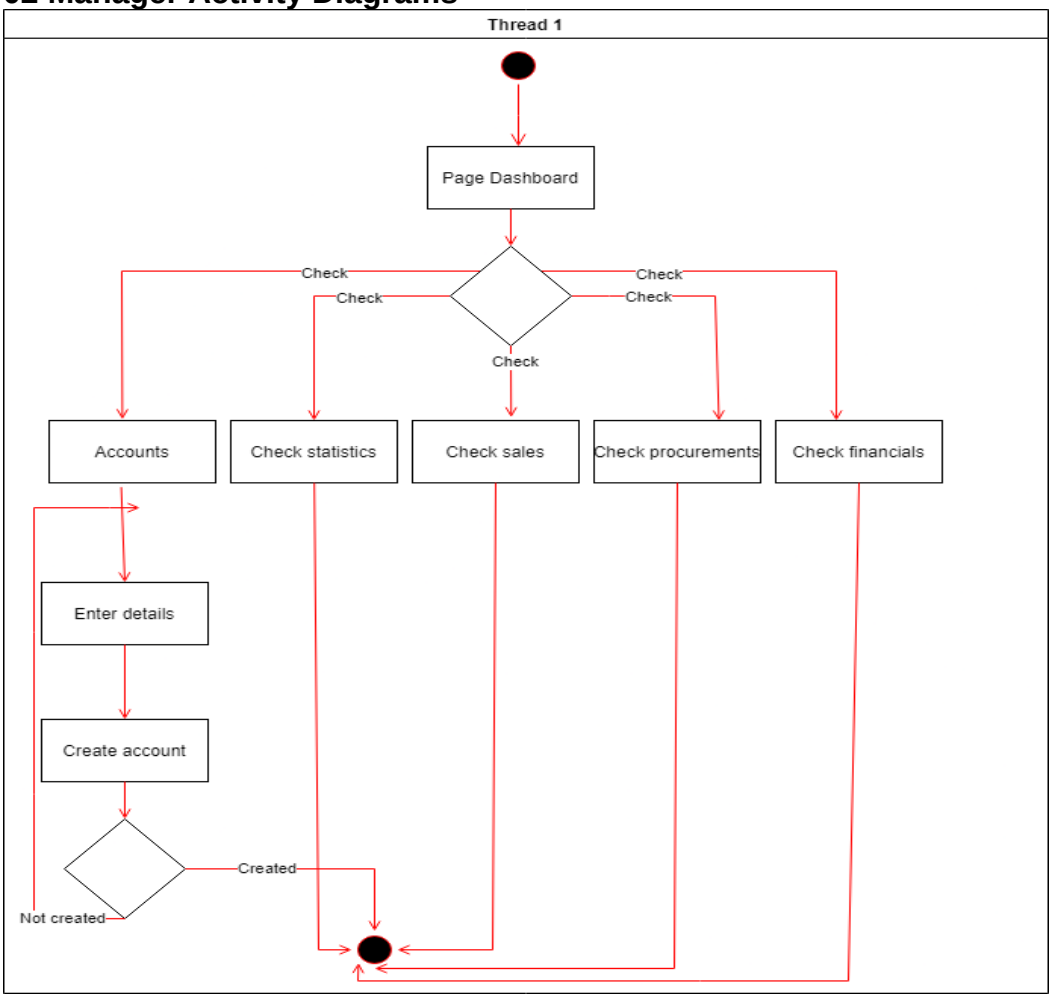
08 General Use Case Diagrams

4.3 Activity Diagrams

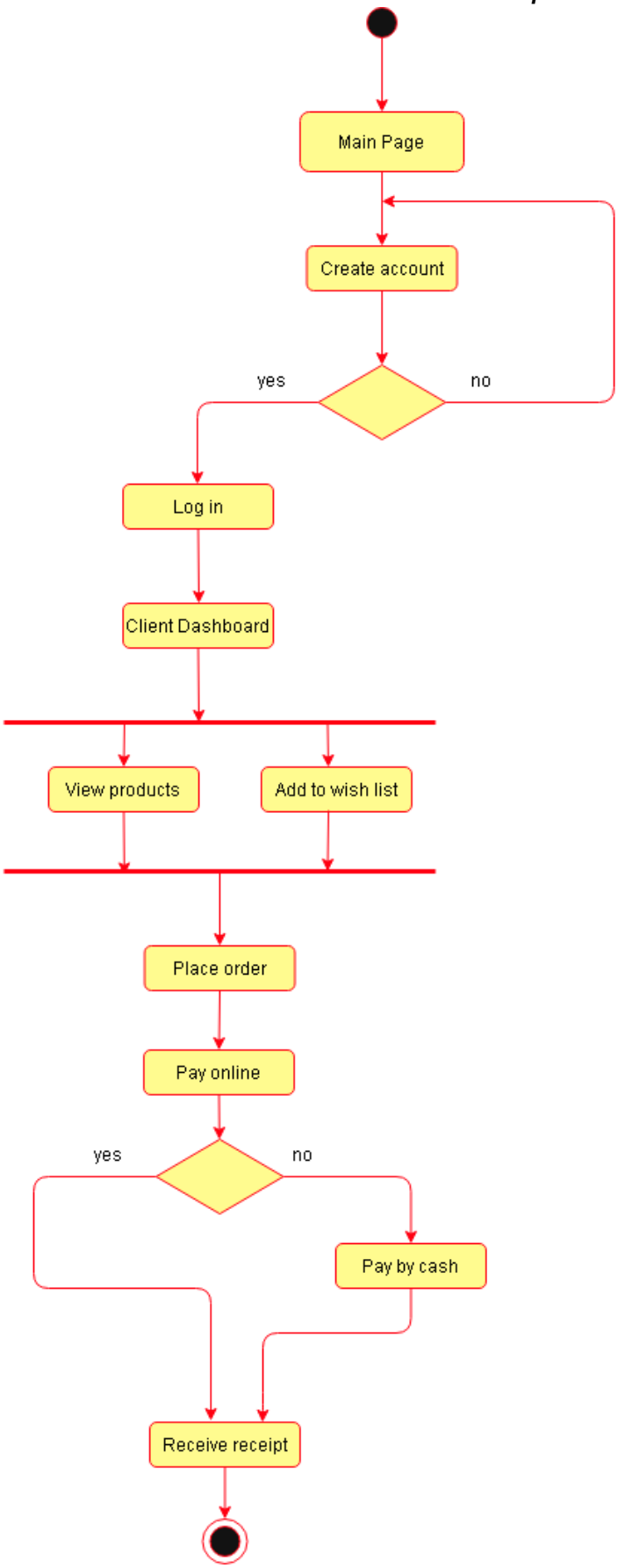
01 Admin Activity Diagrams



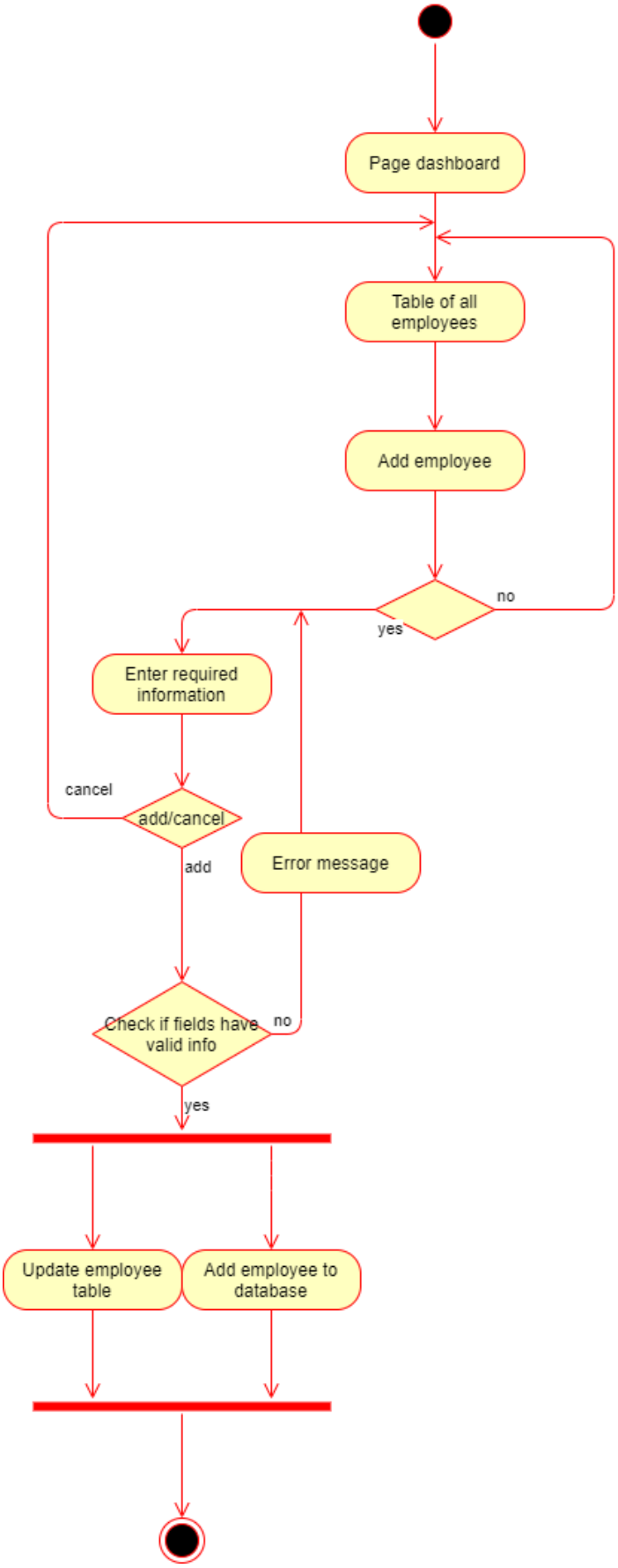
02 Manager Activity Diagrams

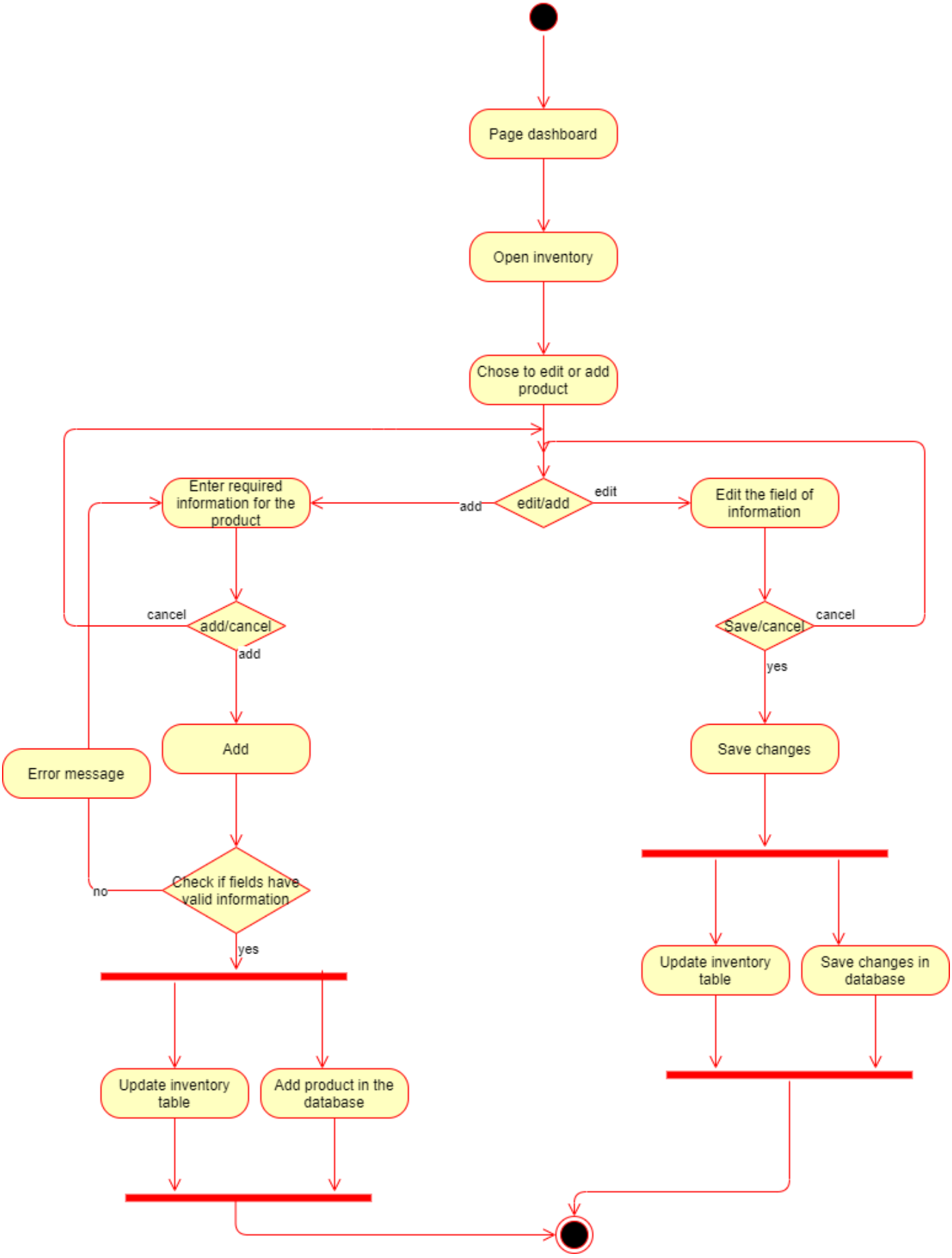


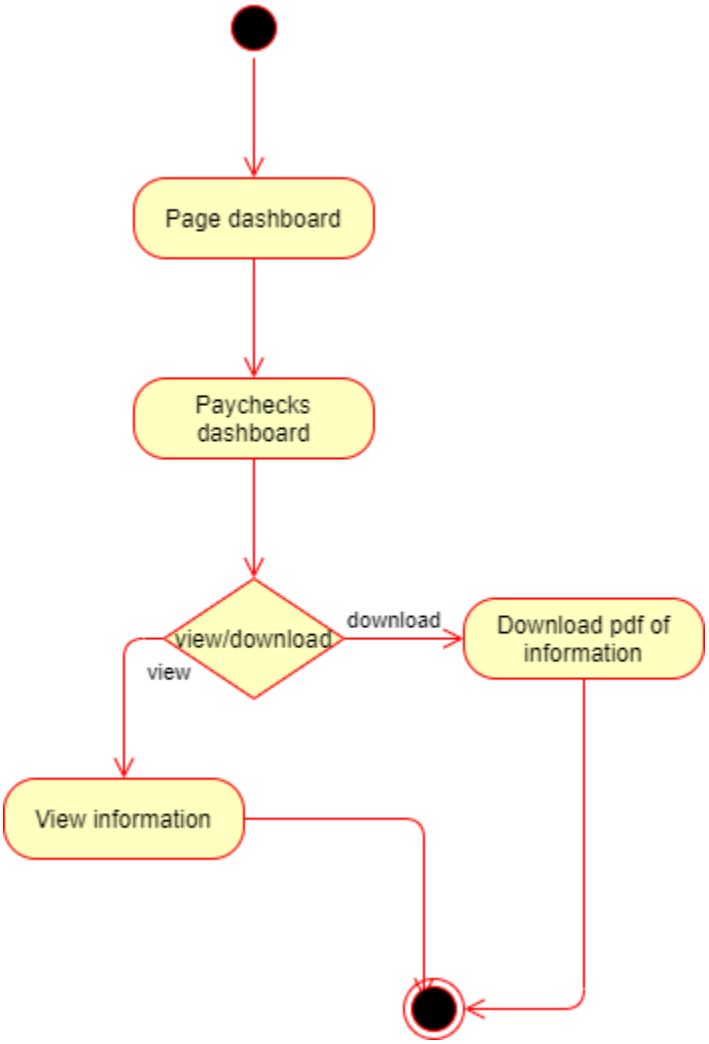
03 Client Activity Diagrams



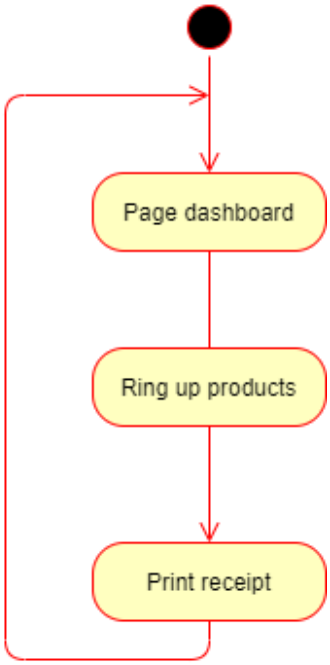
04 Economist Activity Diagrams


Page dashboard
Table of all employees
Add employee
no
yes
Enter required information
cancel
add/cancel
add
Error message
Check if fields have valid info
no
yes
Update employee table
Add employee to database

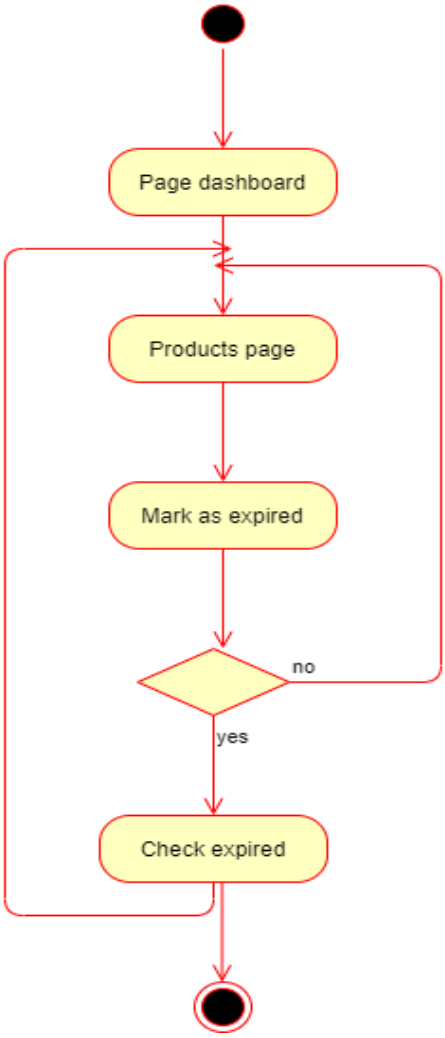

Page dashboard
Open inventory
Chose to edit or add product
edit/add
add
edit
Enter required information for the product
Edit the field of information
add/cancel
cancel
add
Save/cancel
cancel
yes
Add
Save changes
Error message
Check if fields have valid information
no
yes
Update inventory table
Add product in the database
Update inventory table
Save changes in database


Page dashboard
Paychecks dashboard
view/download
download
view
Download pdf of information
View information

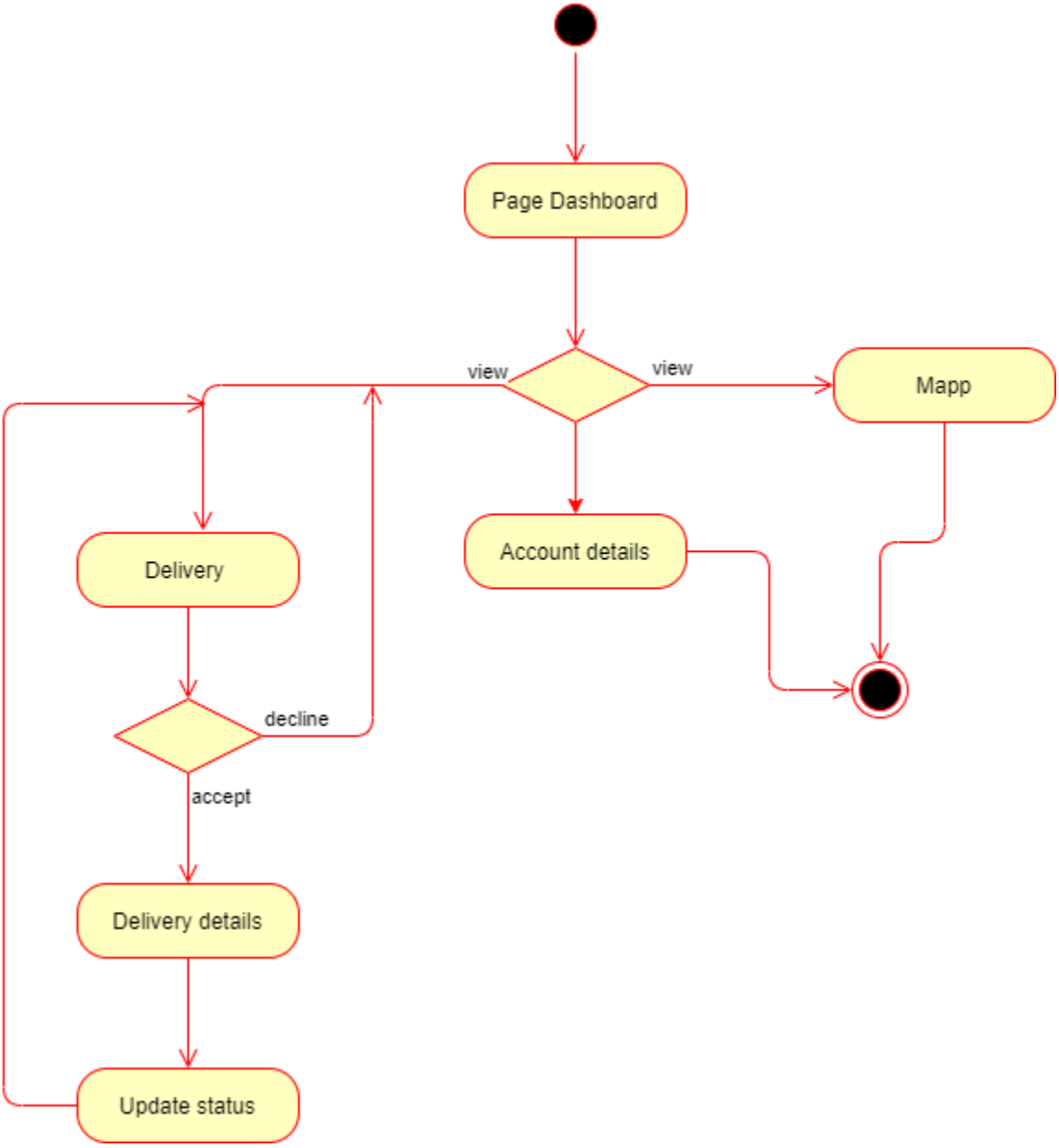
05 Cashier Activity Diagrams



06 Floor employee Activity Diagrams

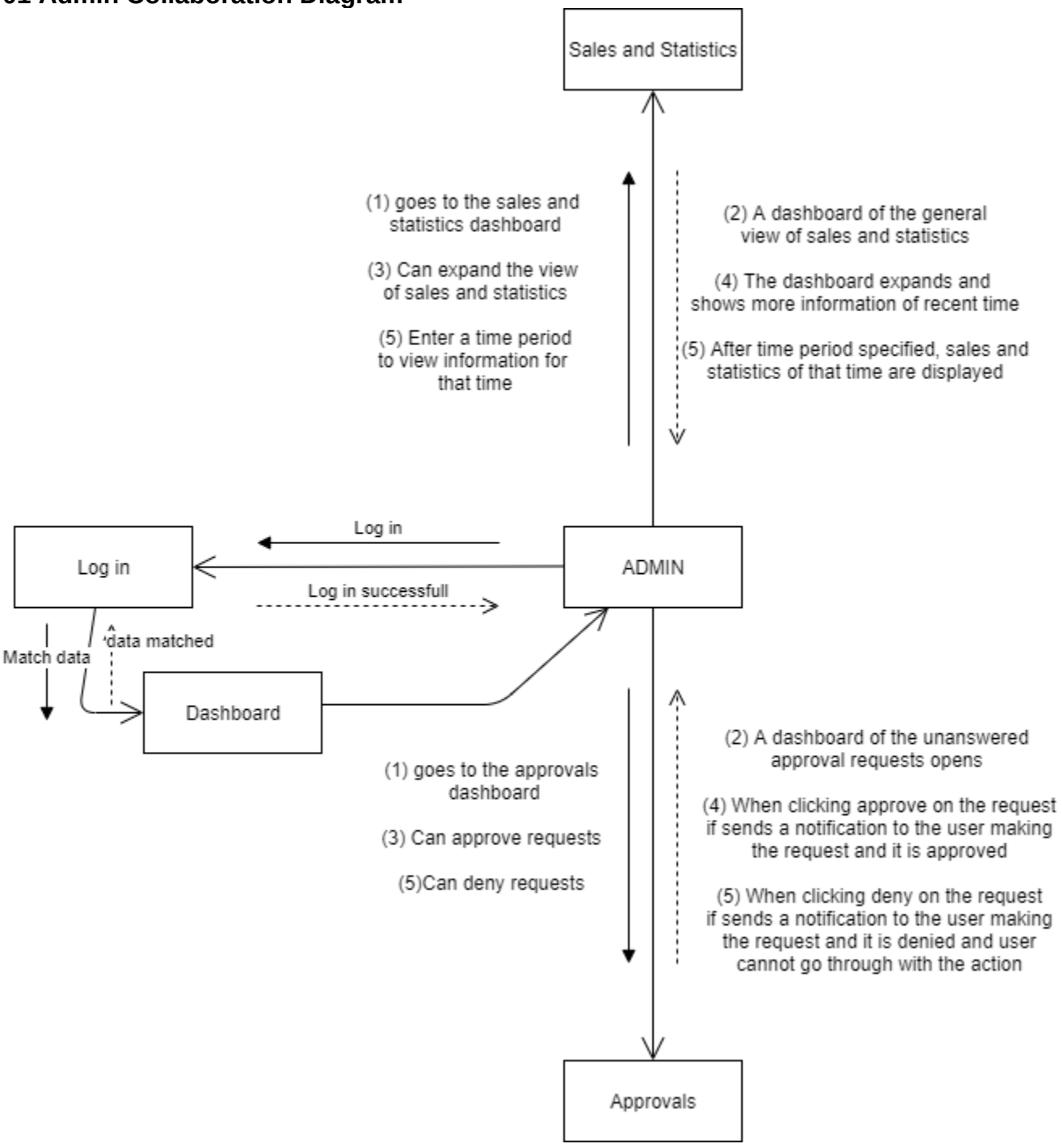


07 Delivery person Activity Diagrams

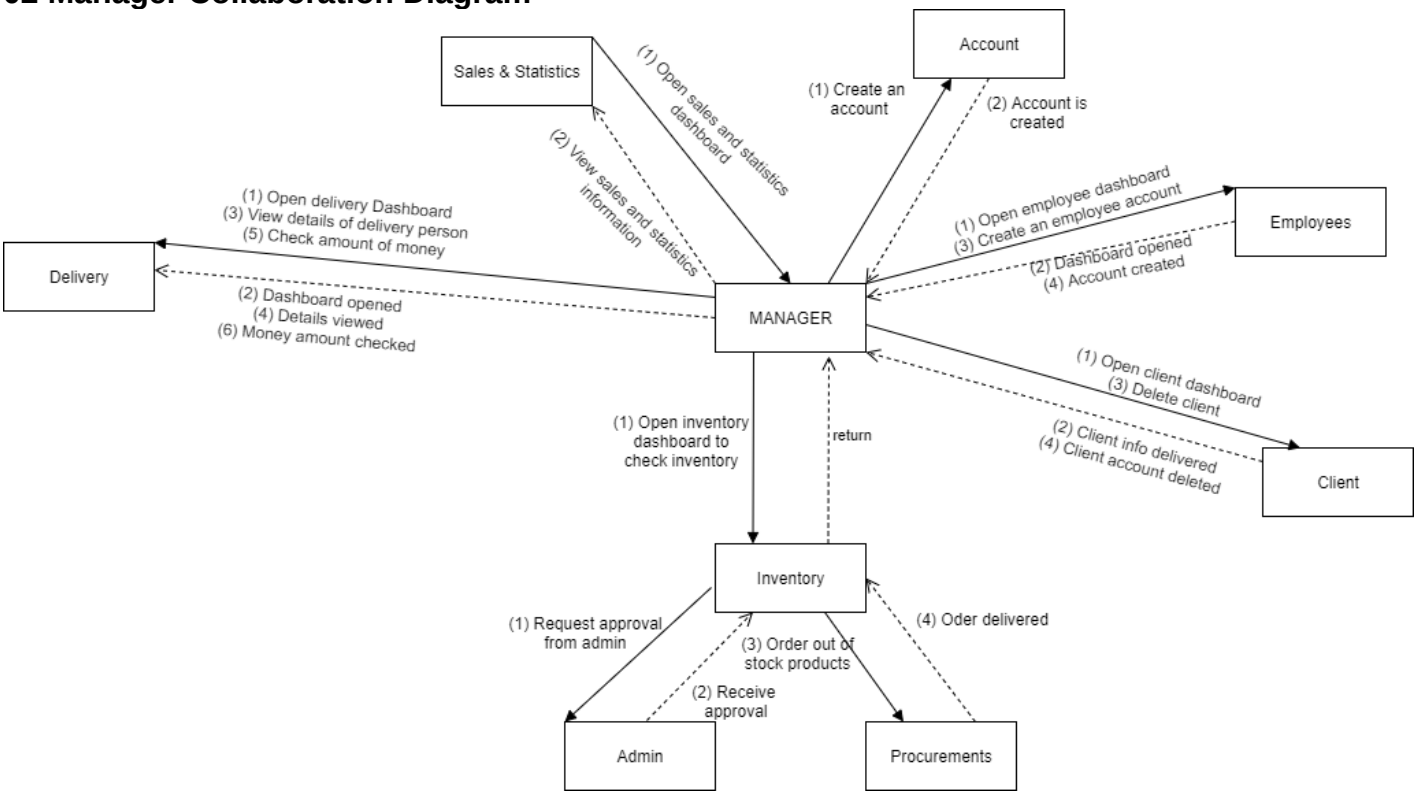


4.4 Collaboration Diagrams

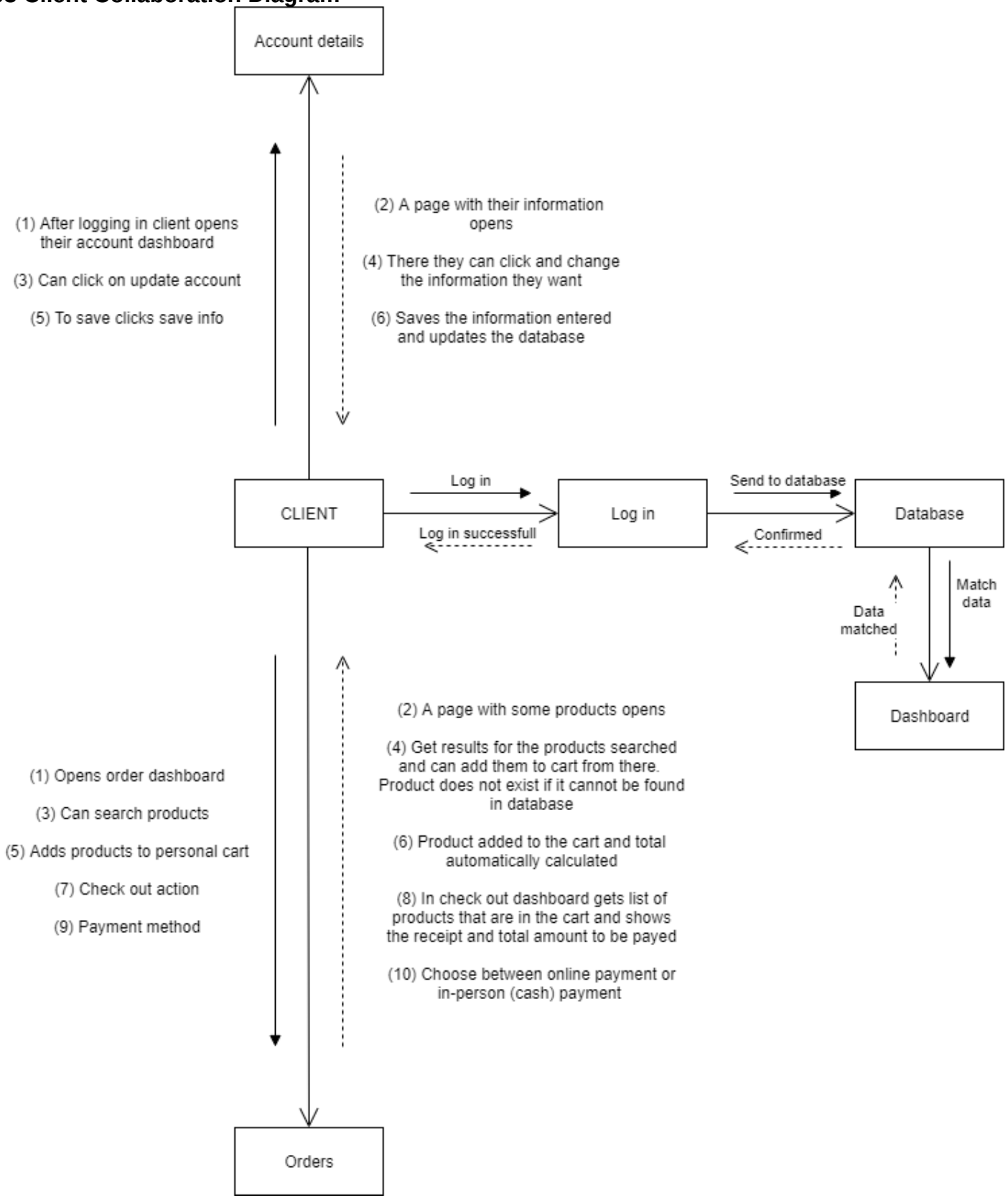
01 Admin Collaboration Diagram



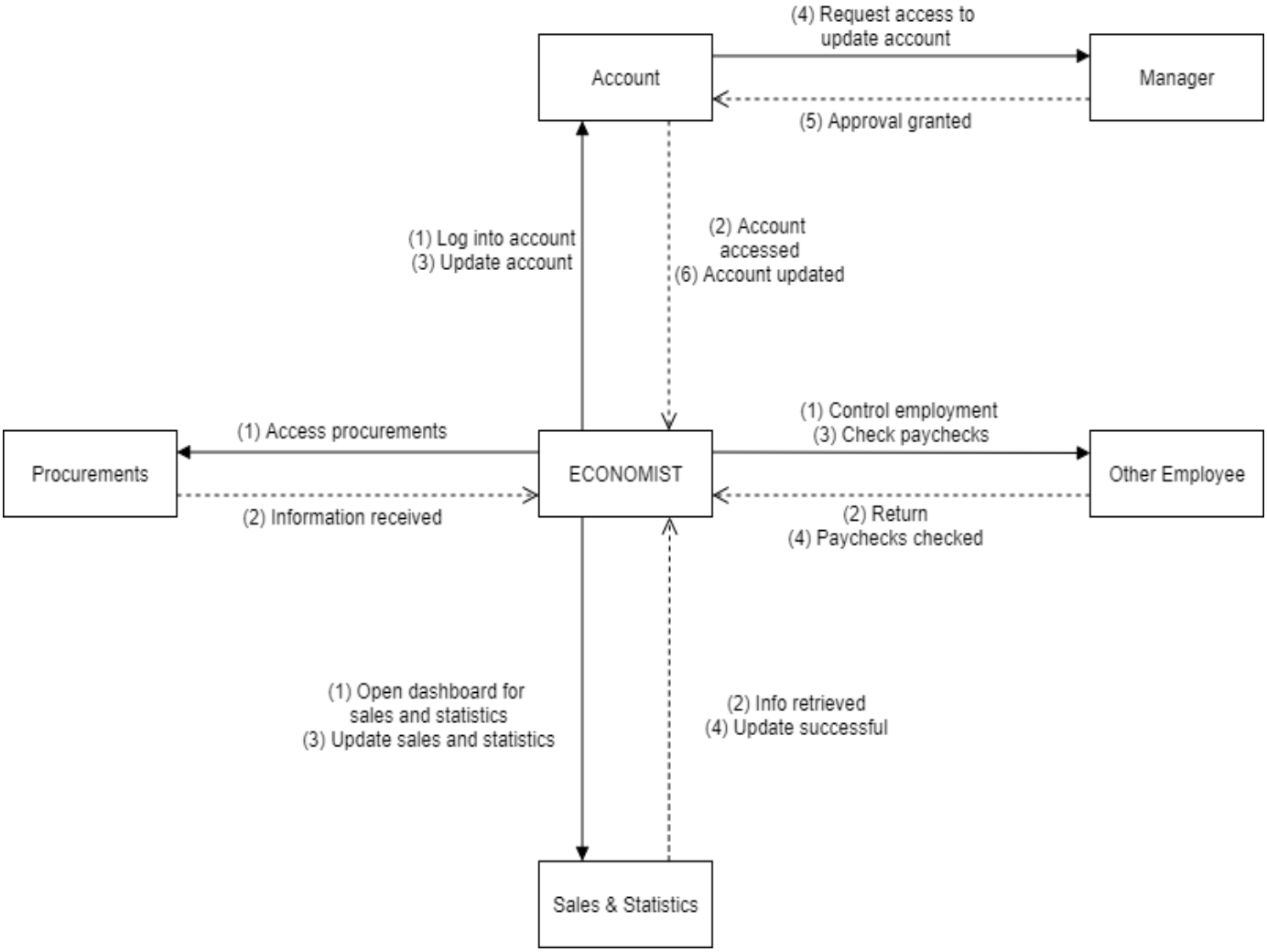
02 Manager Collaboration Diagram



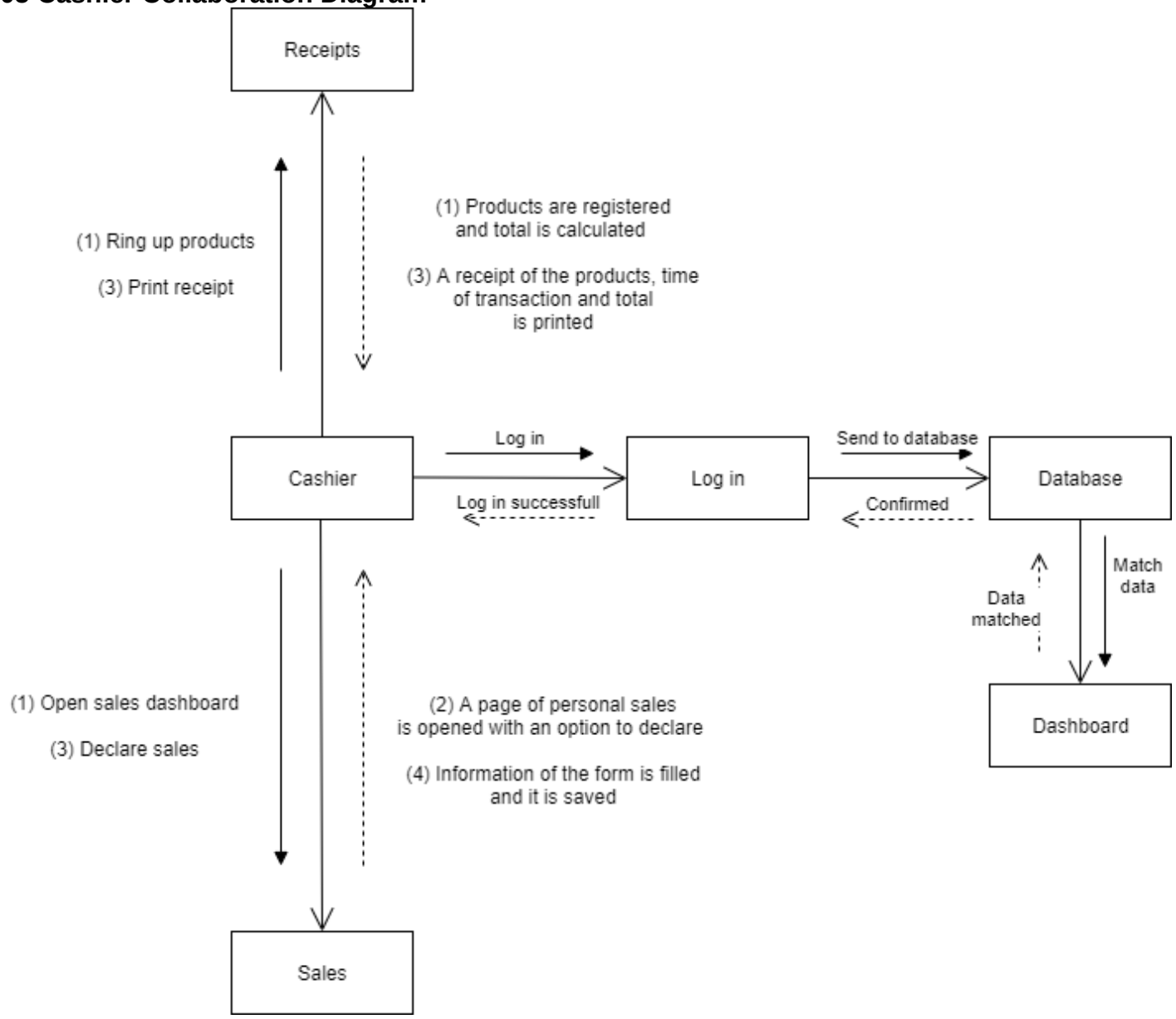
03 Client Collaboration Diagram



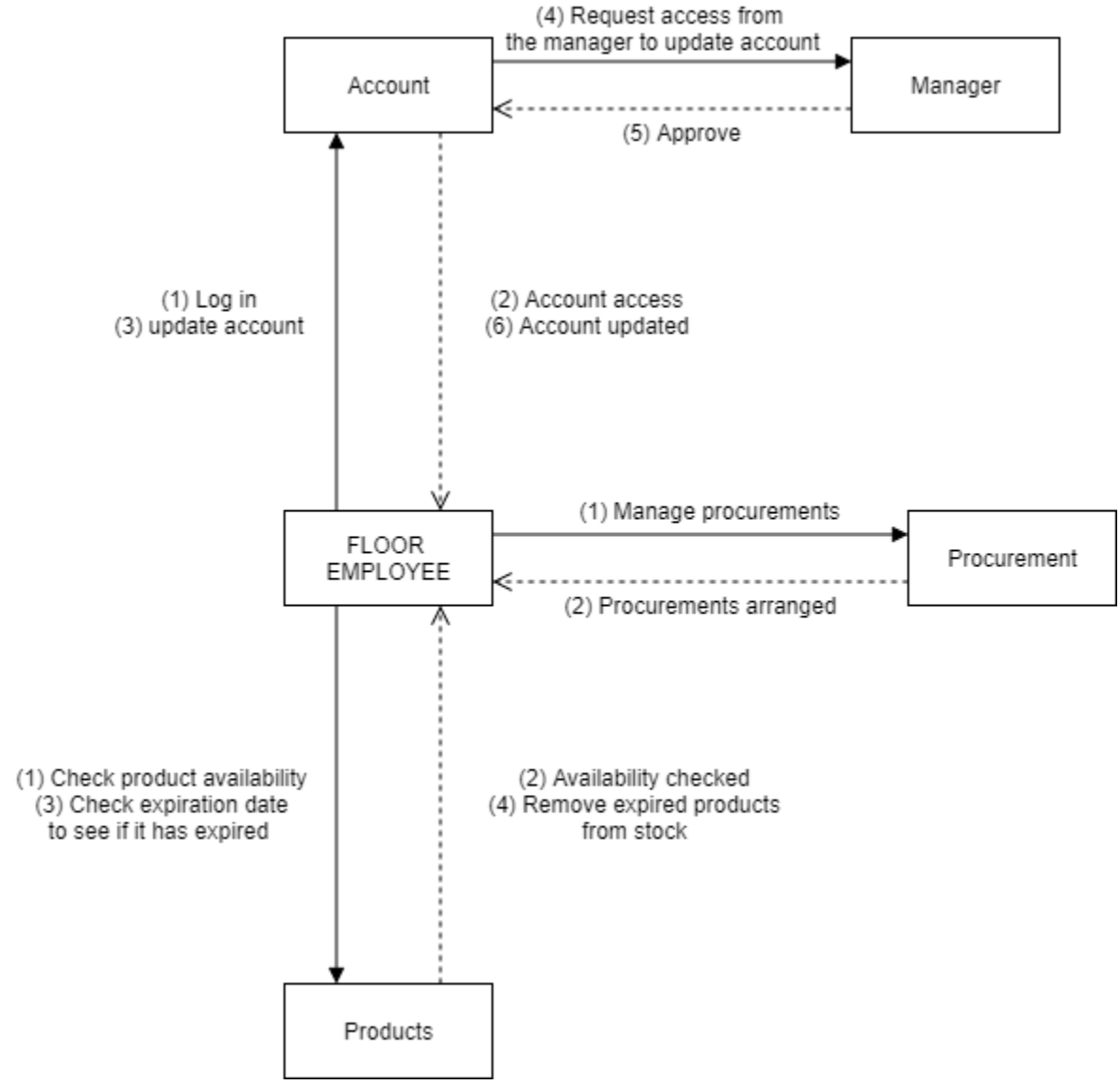
04 Economist Collaboration Diagram



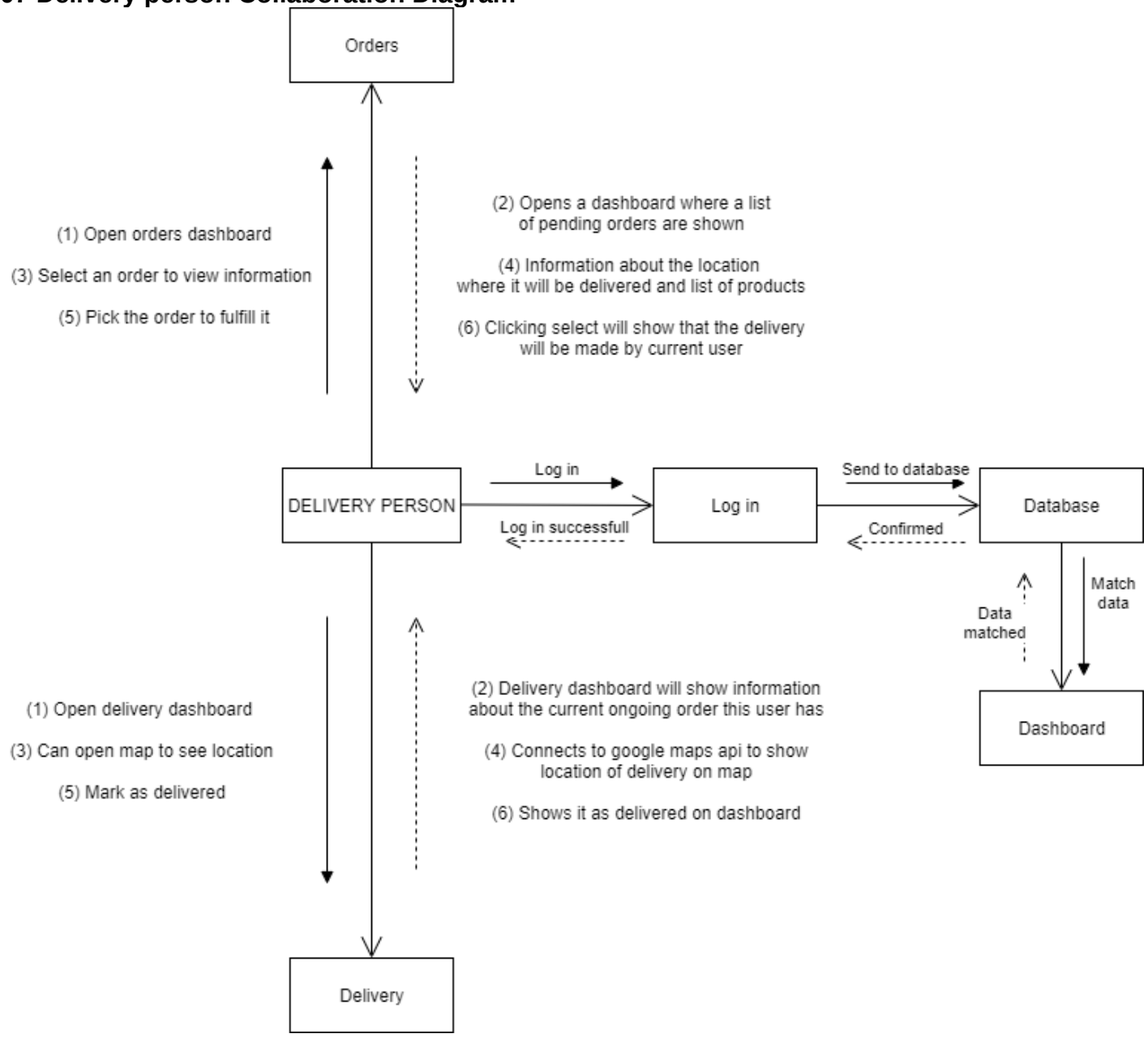
05 Cashier Collaboration Diagram



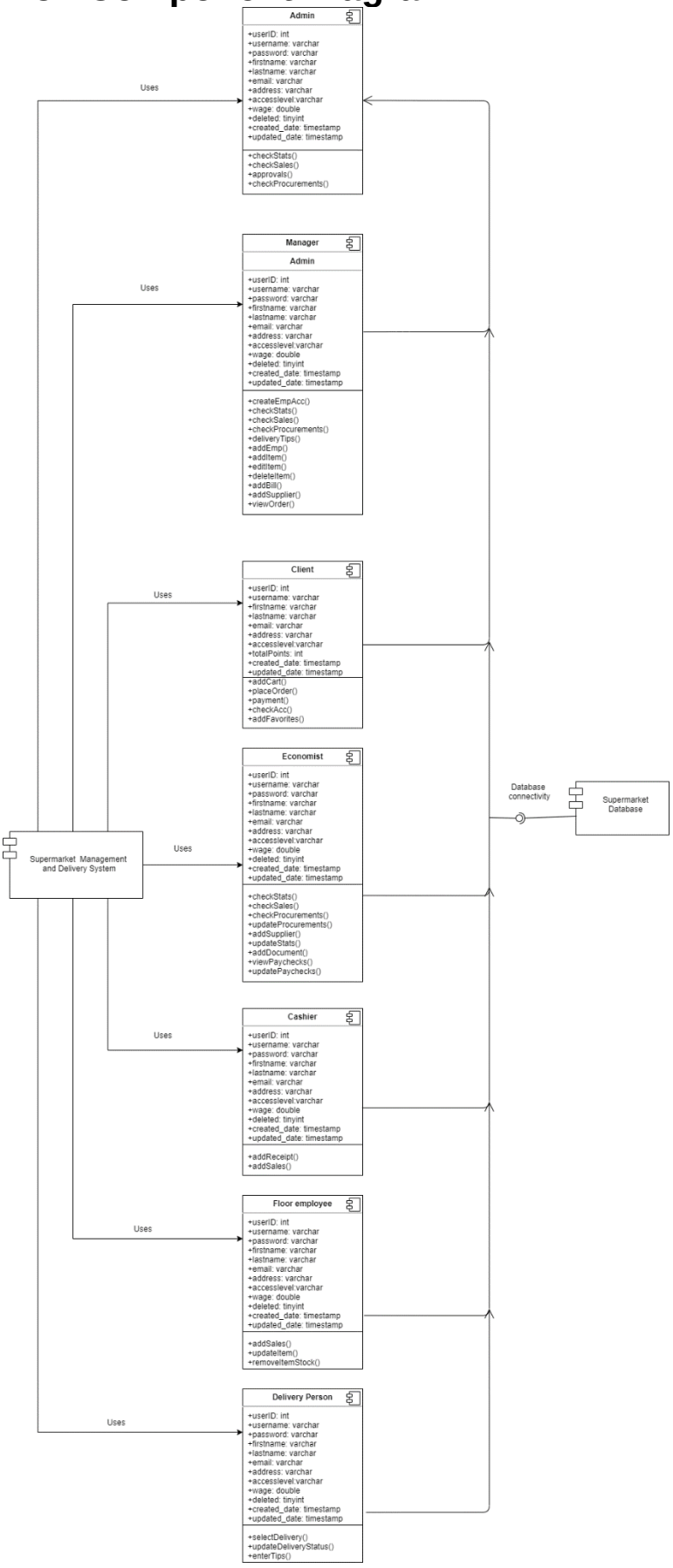
06 Floor employee Collaboration Diagram



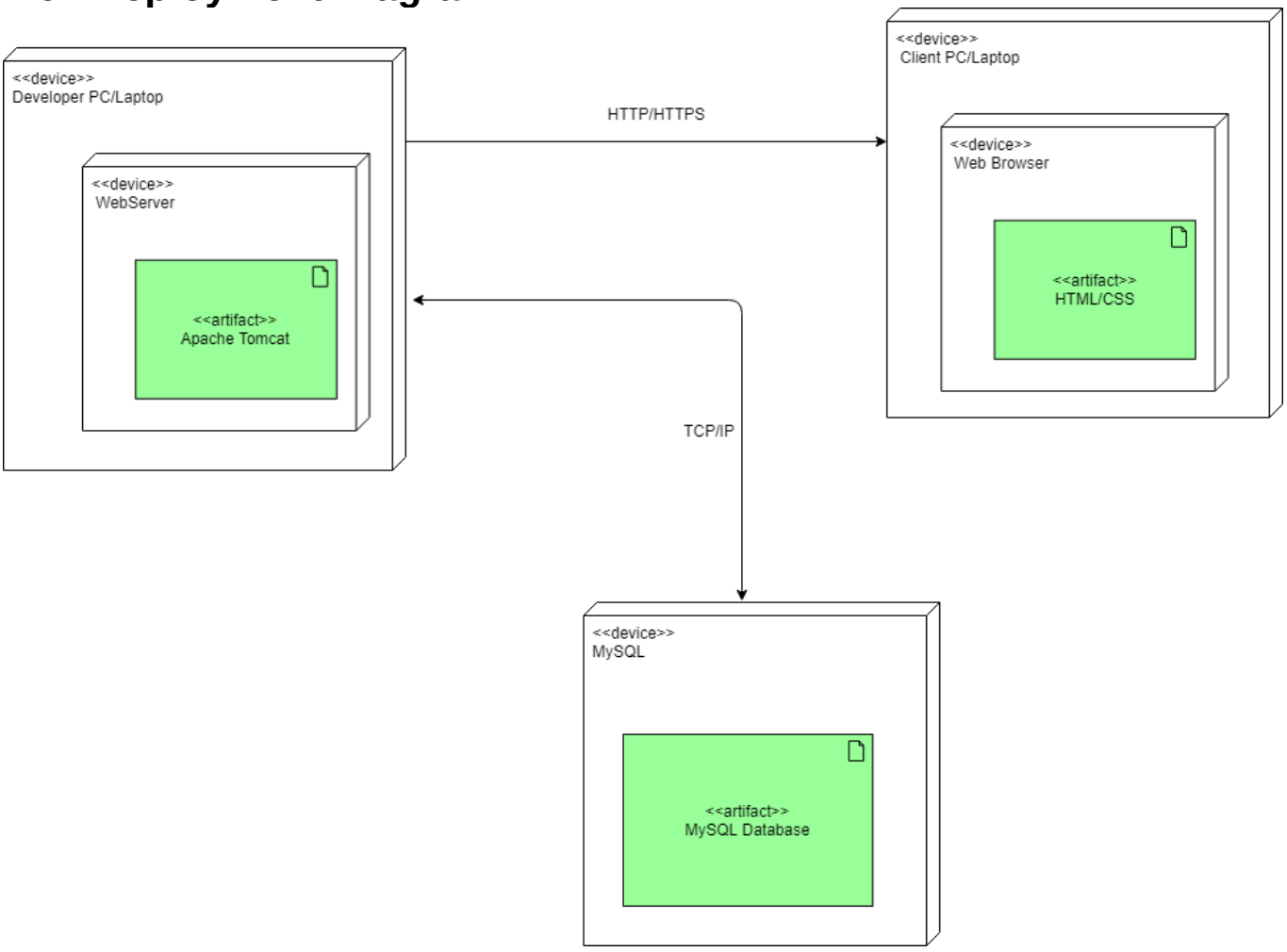
07 Delivery person Collaboration Diagram



4.5 Component Diagram

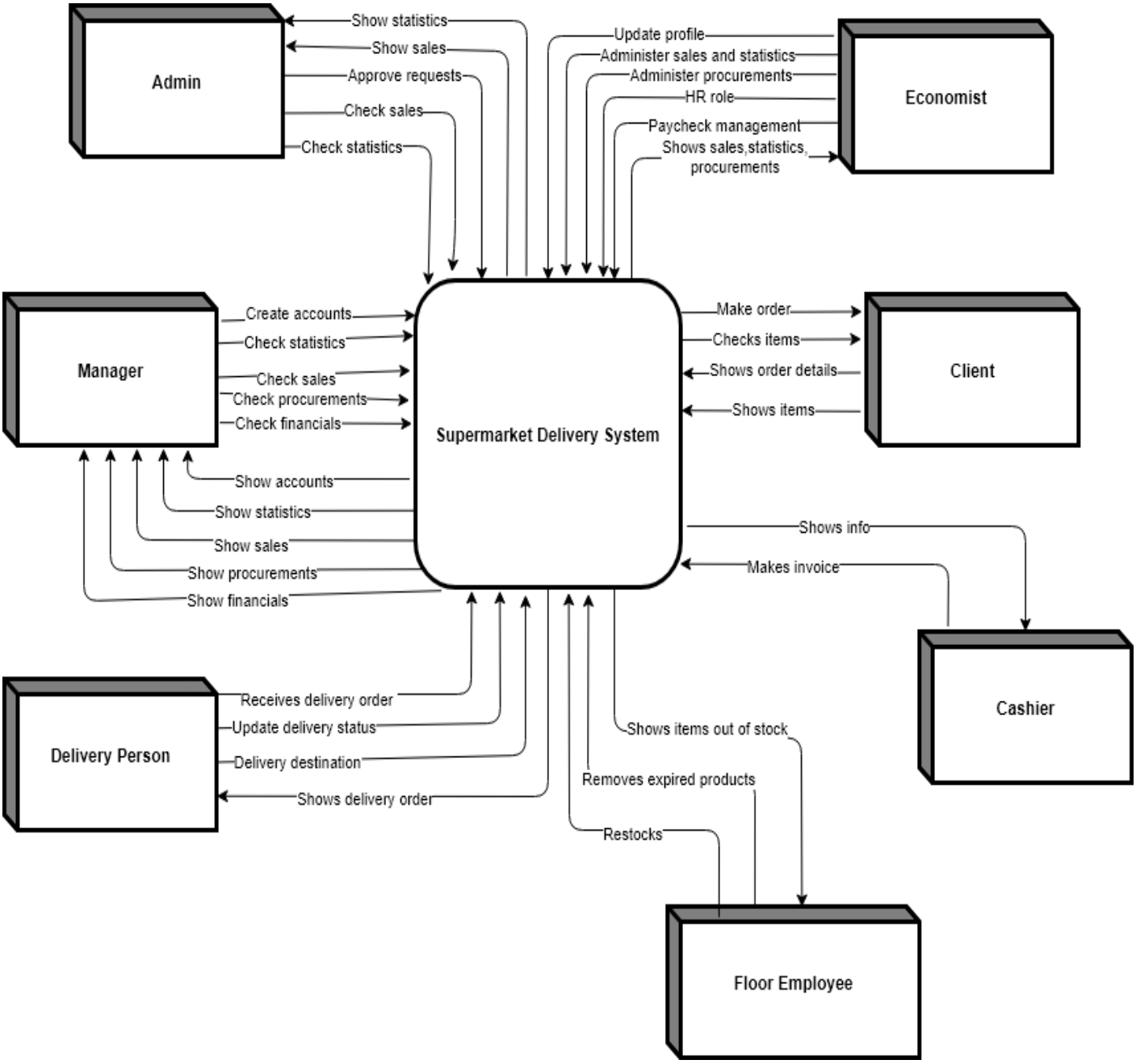


4.6 Deployment Diagram

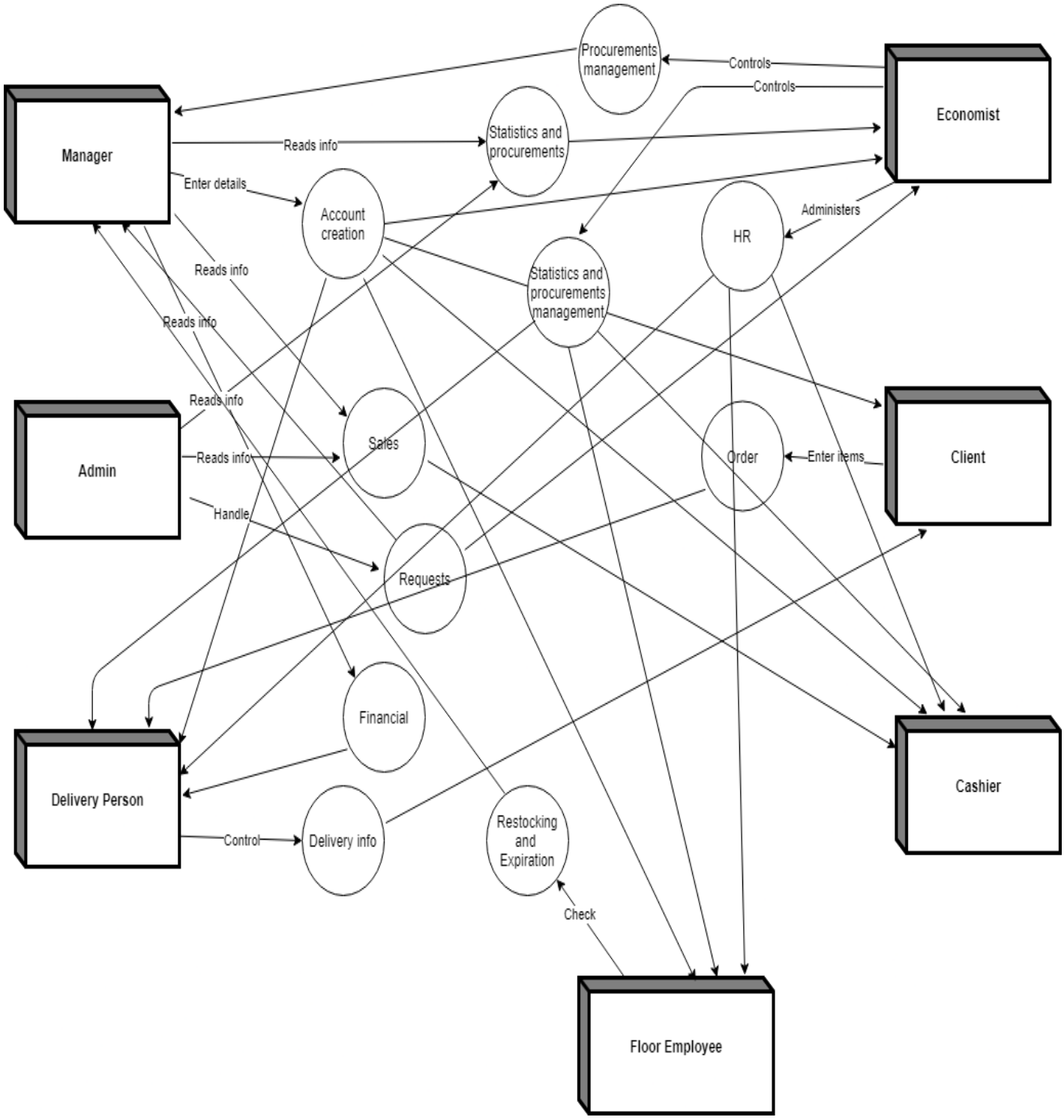


4.7 Data Flow Diagrams

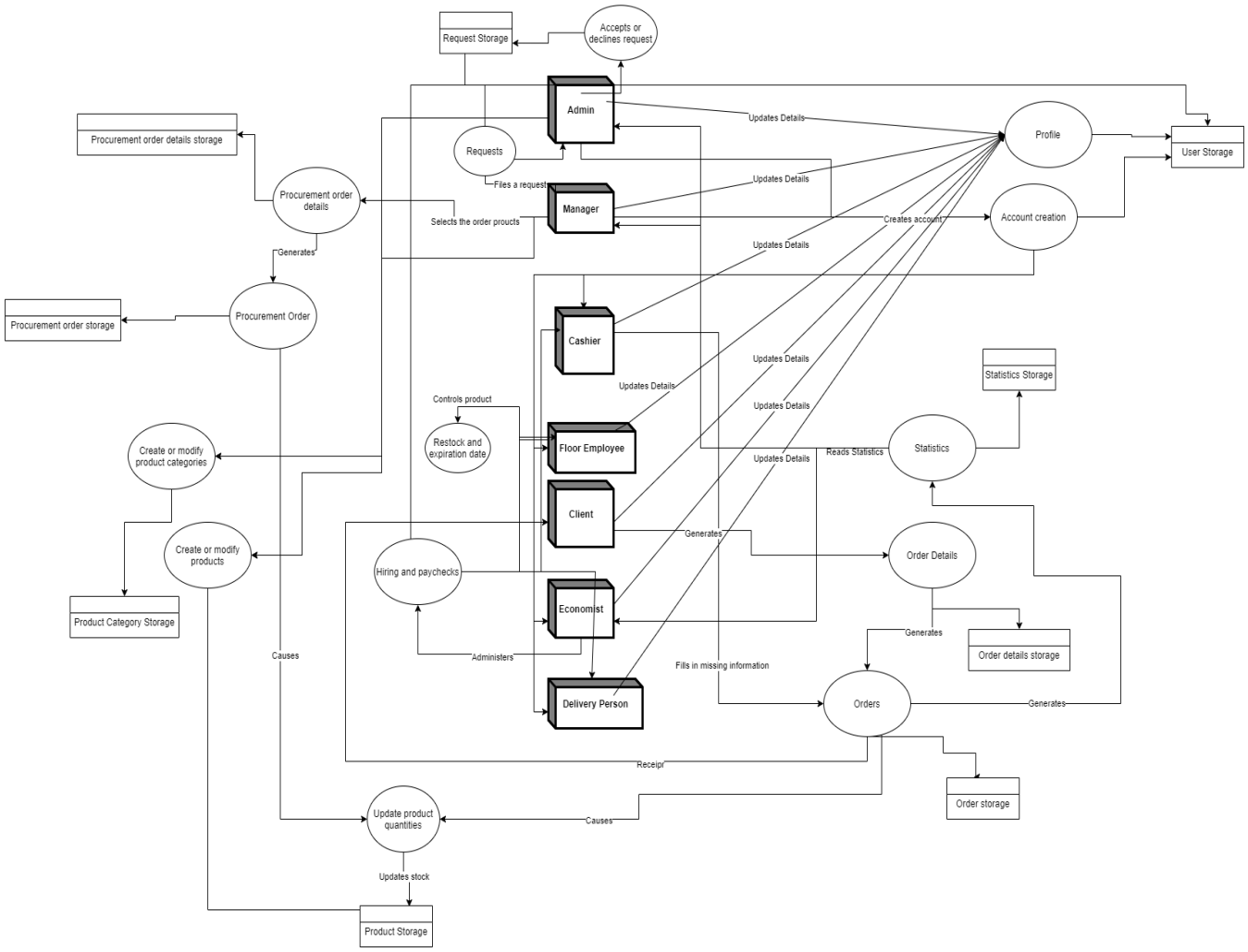
DFD0 – Level 0



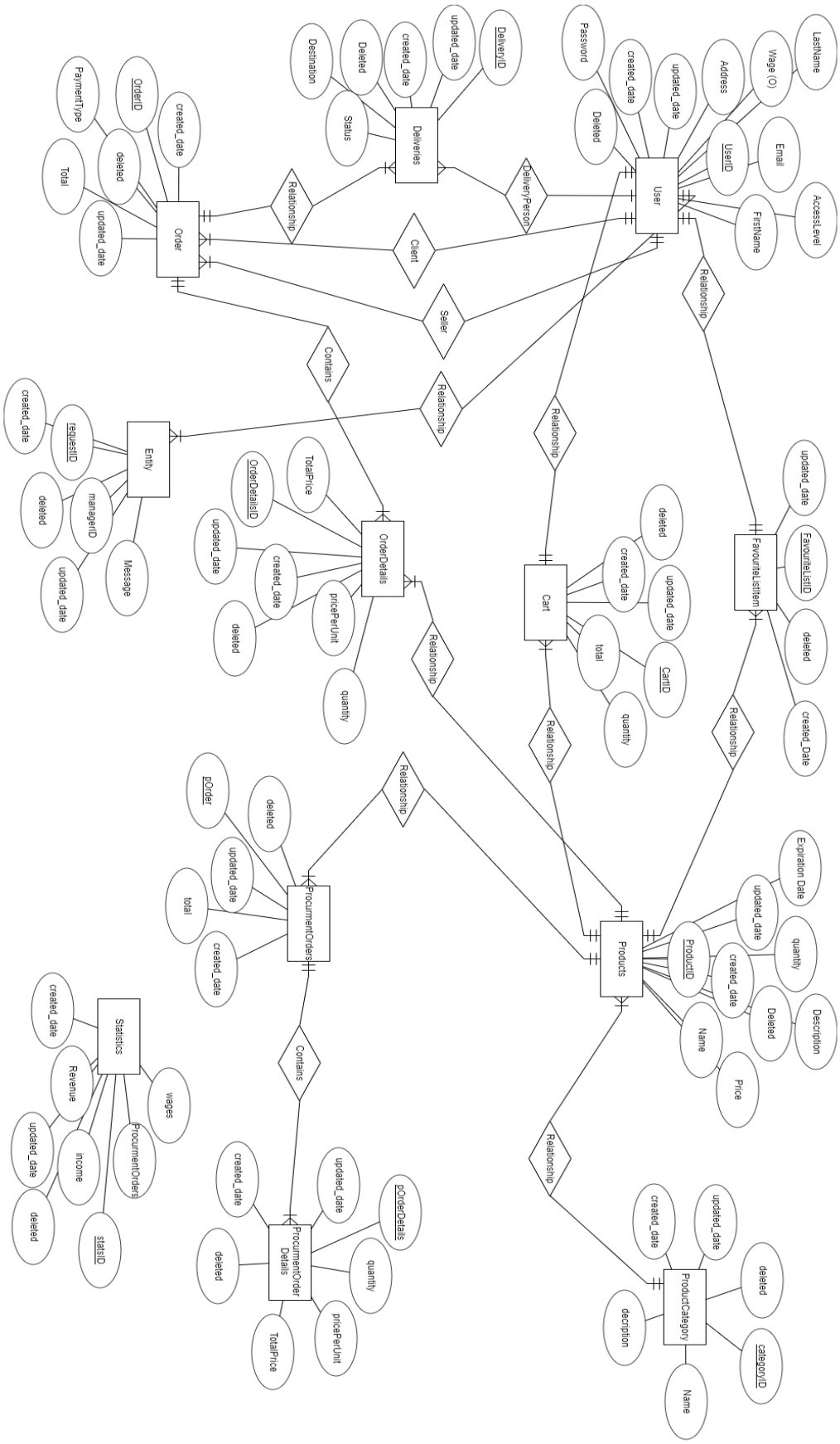
DFD1 – Level 1


Procurements management
Controls
Controls
Economist
Manager
Reads info
Statistics and procurements
Enter details
Account creation
Administers
HR
Reads info
Statistics and procurements management
Reads info
Reads info
Admin
Sales
Order
Enter items
Client
Reads info
Handle
Requests
Financial
Delivery Person
Cashier
Control
Delivery info
Restocking and Expiration
Check
Floor Employee

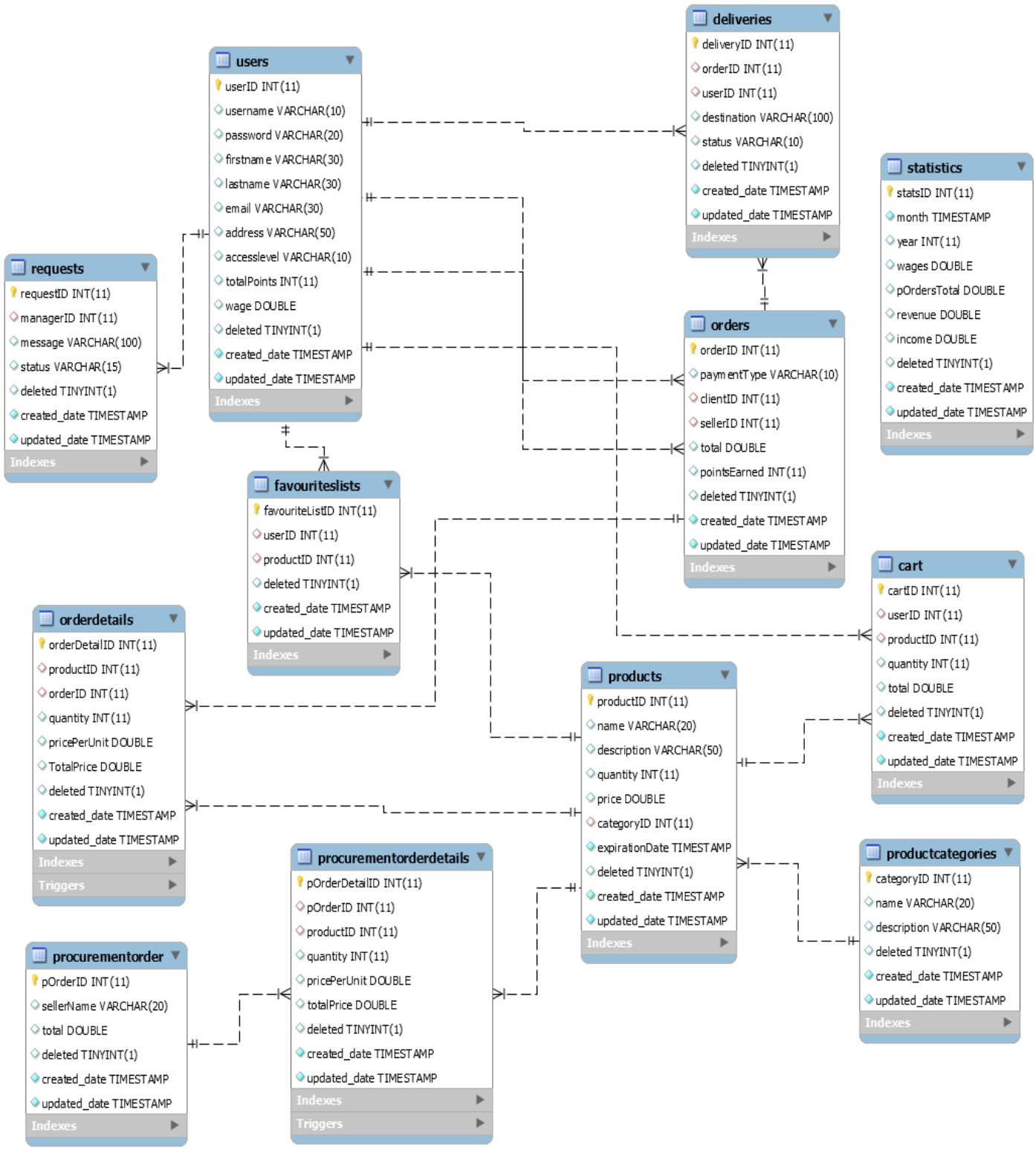
DFD2 – Level 2



4.8 Entity Relationship (ER) Diagram

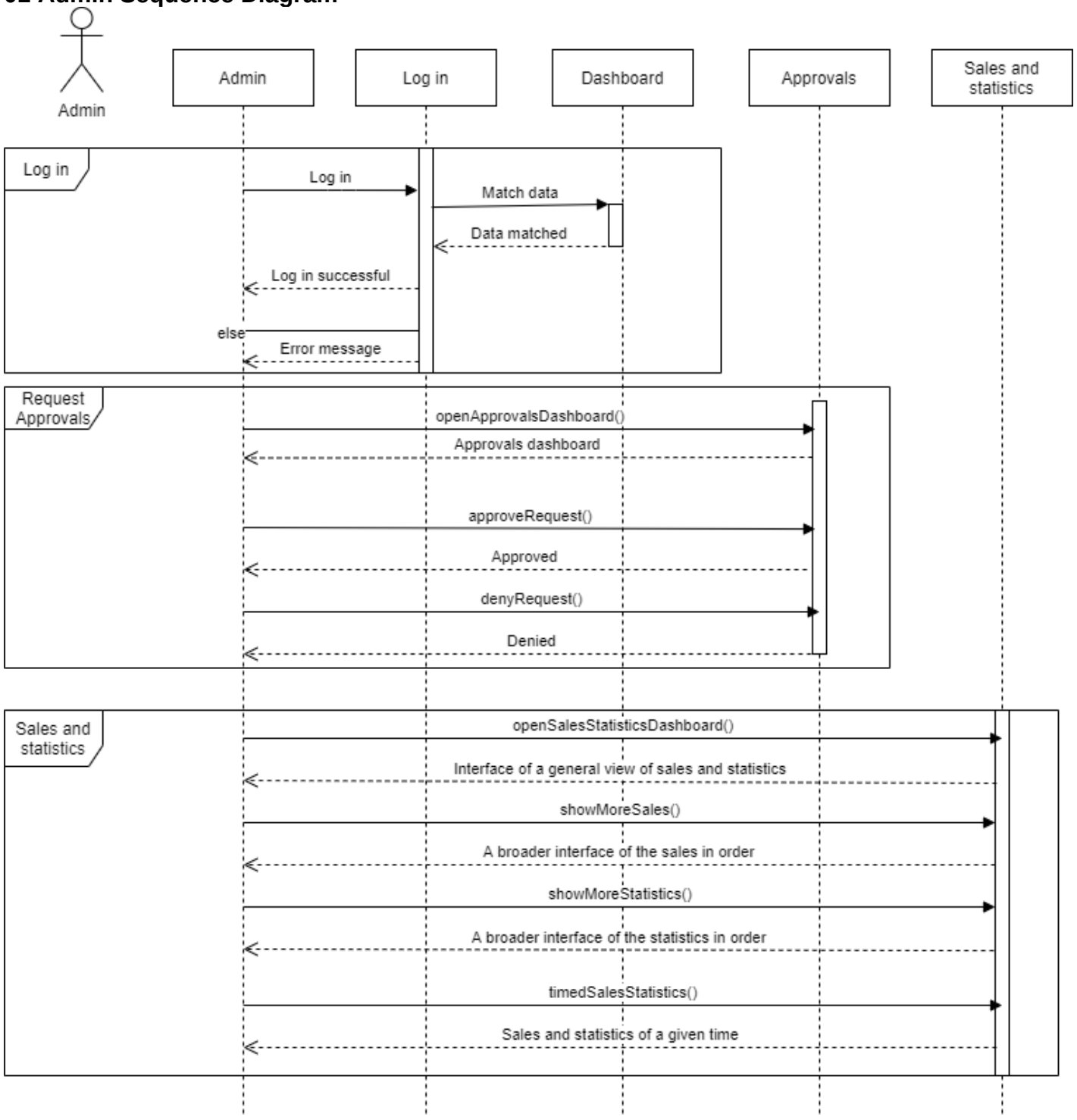


4.9 Relation Schema

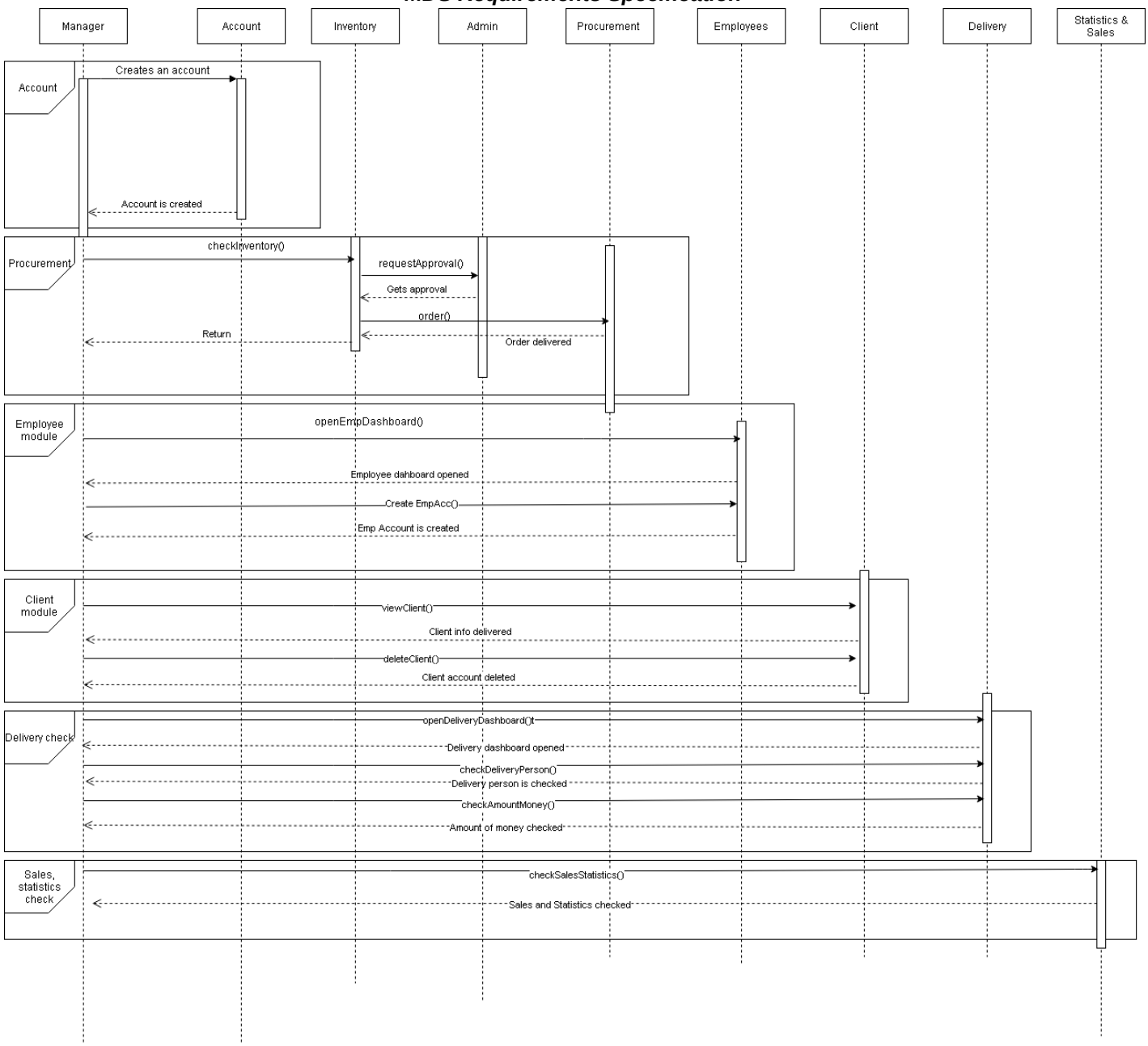


4.10 Sequence Diagrams

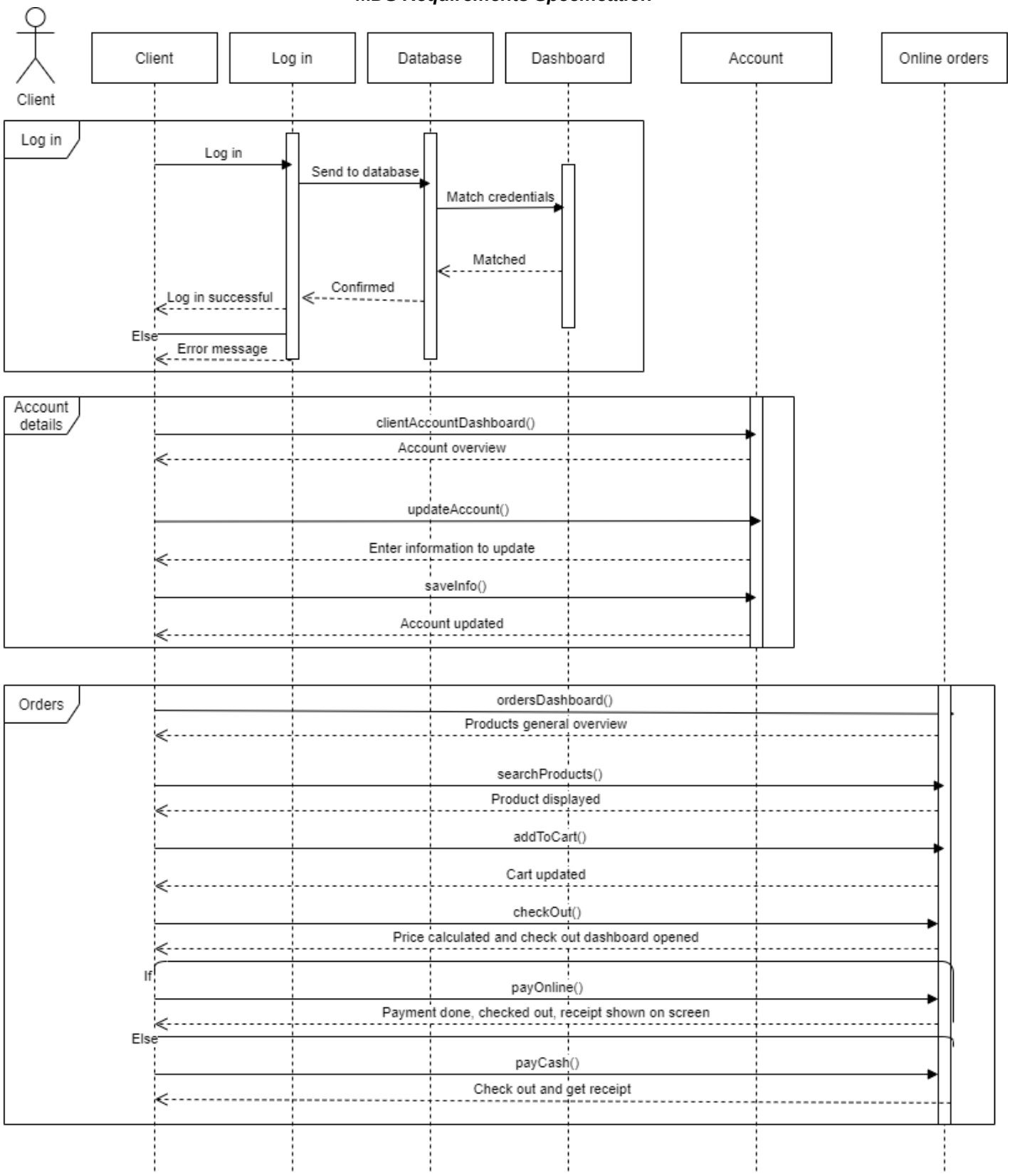
01 Admin Sequence Diagram



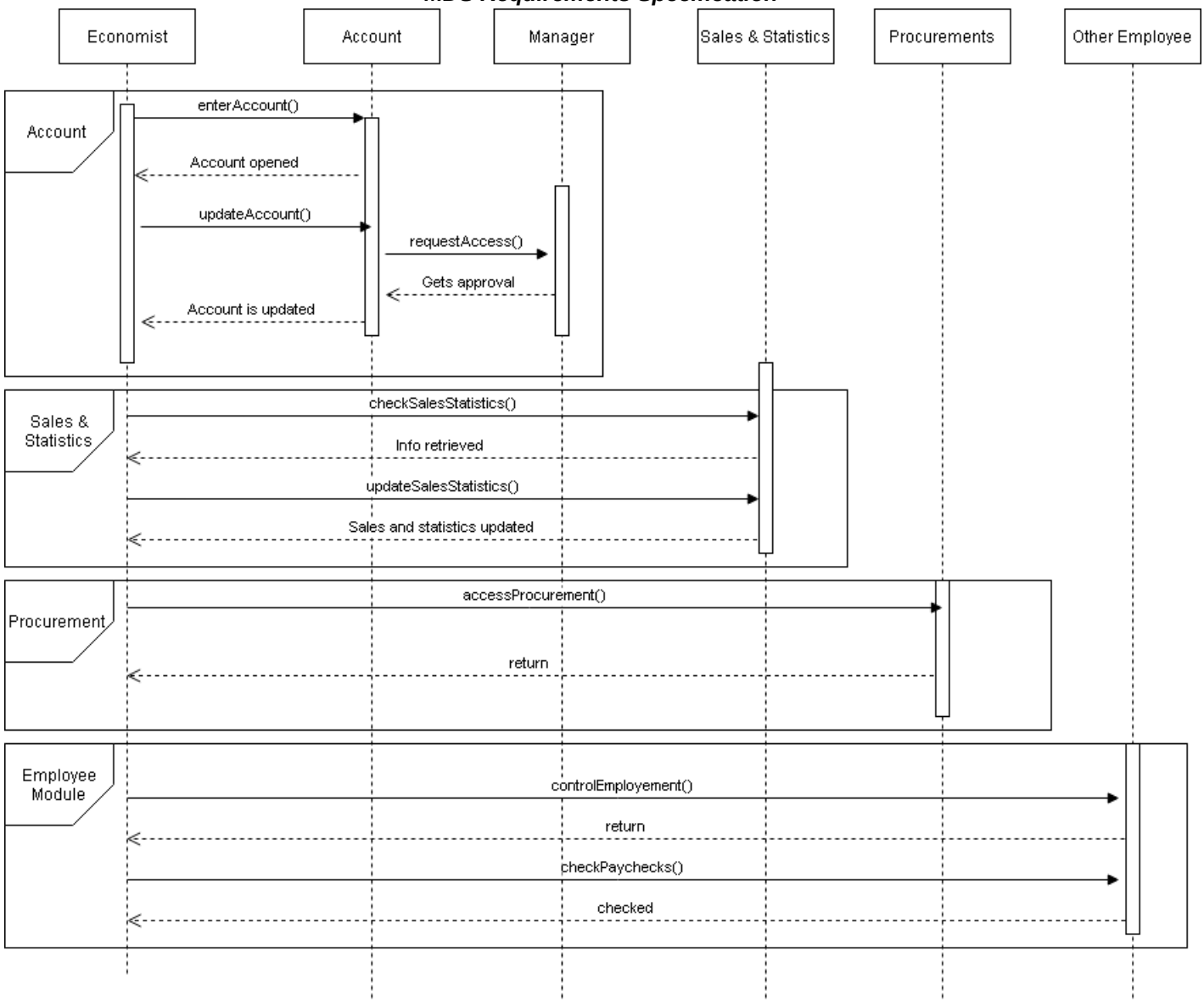
02 Manager Sequence Diagram



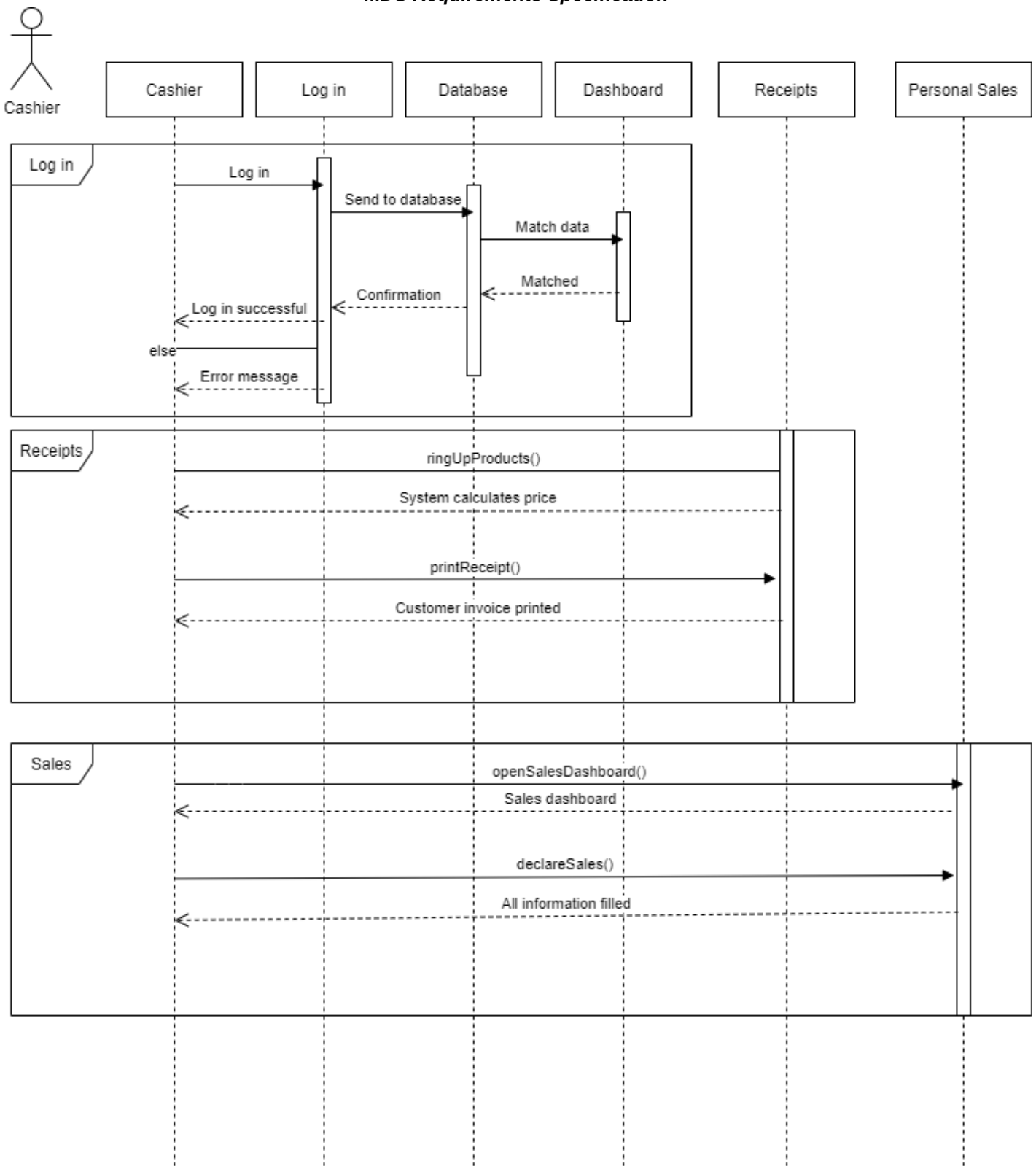
03 Client Sequence Diagram



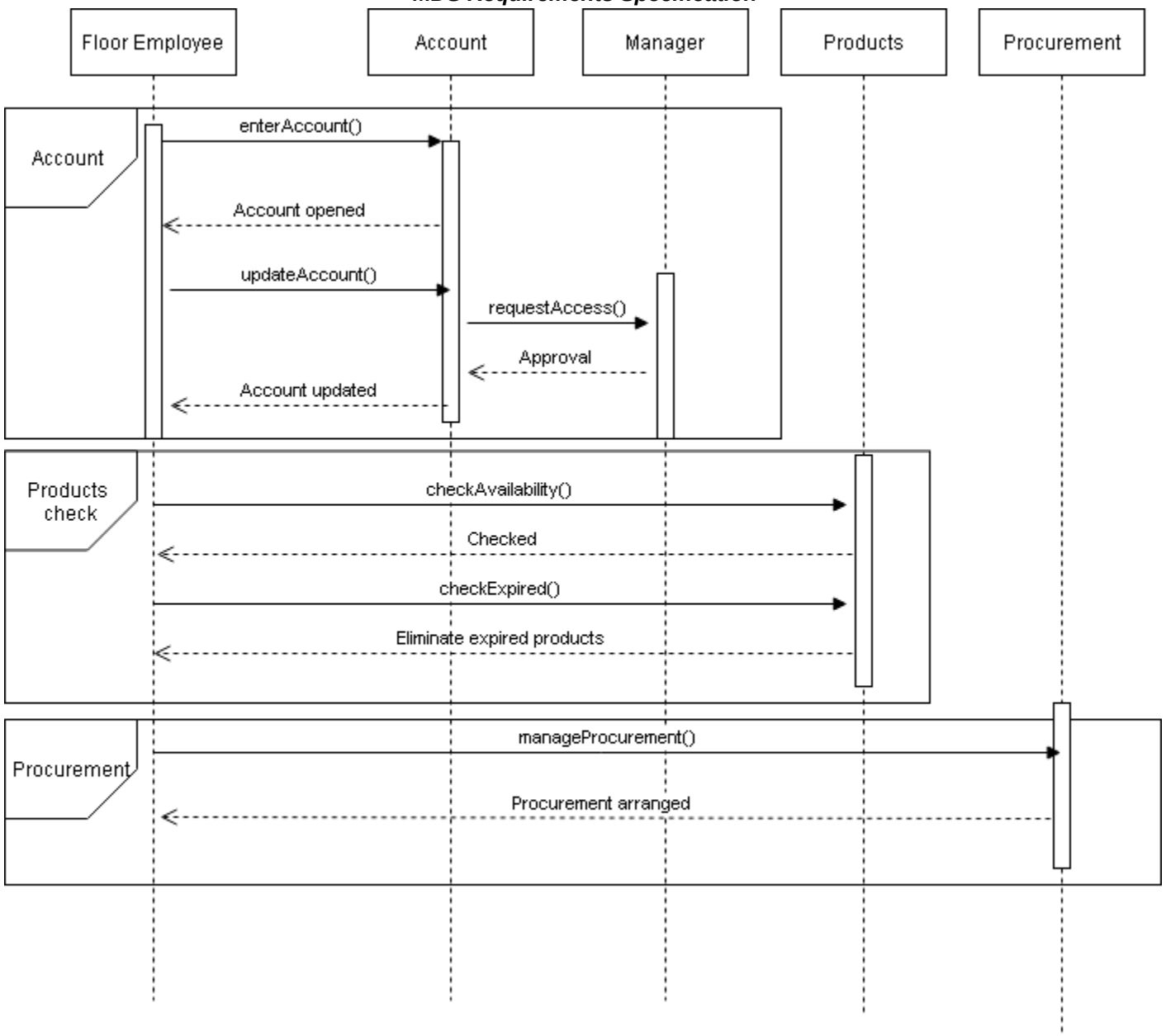
04 Economist Sequence Diagram



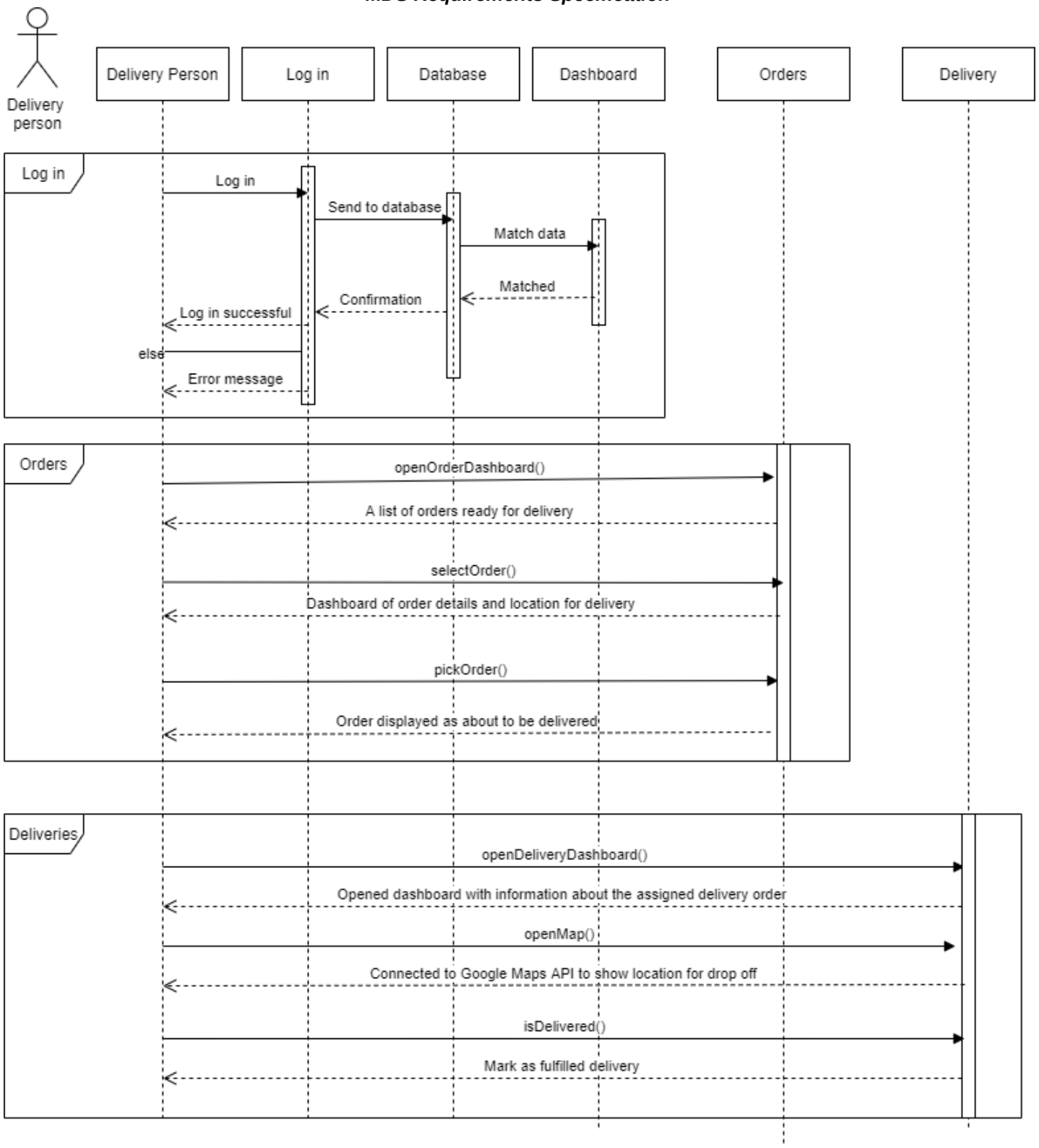
05 Cashier Sequence Diagram



06 Floor employee Sequence Diagram

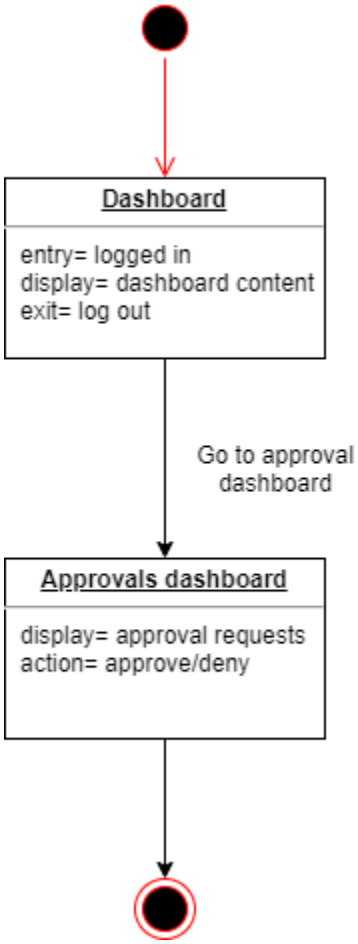


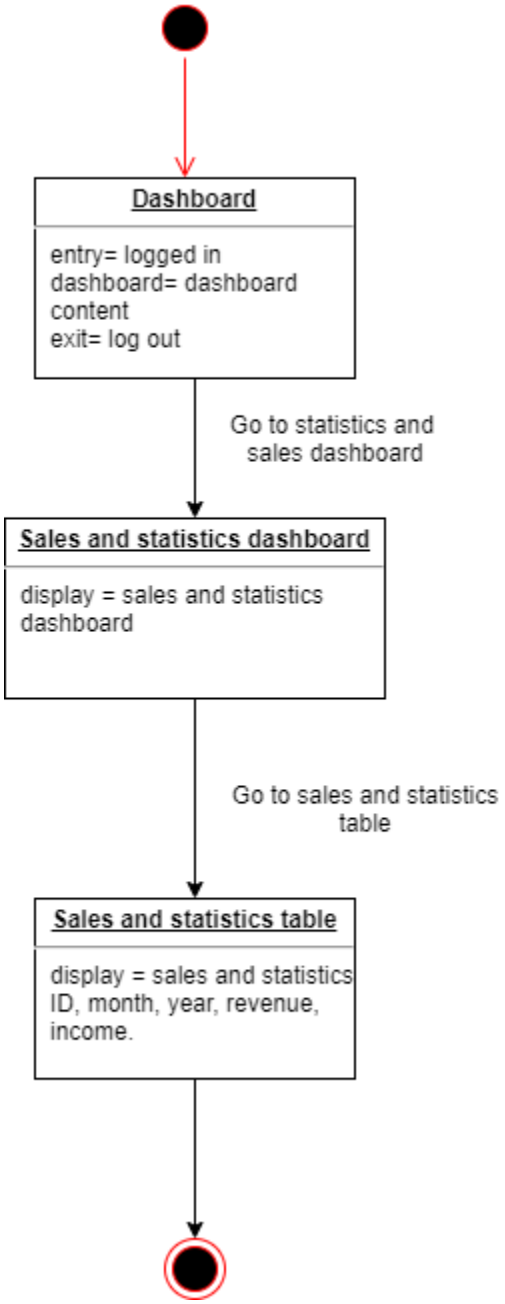
07 Delivery person Sequence Diagram



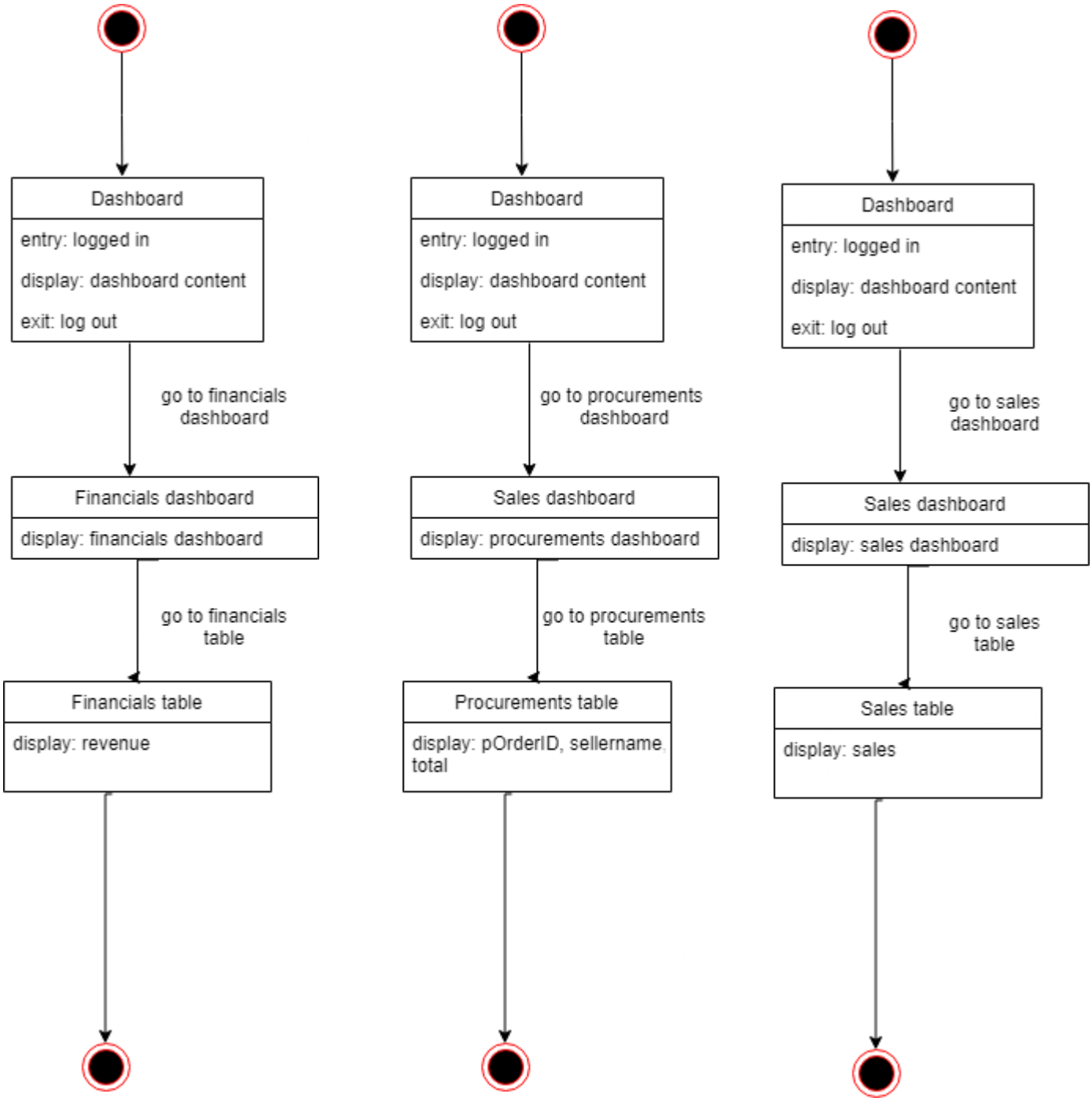
4.11 State Charts

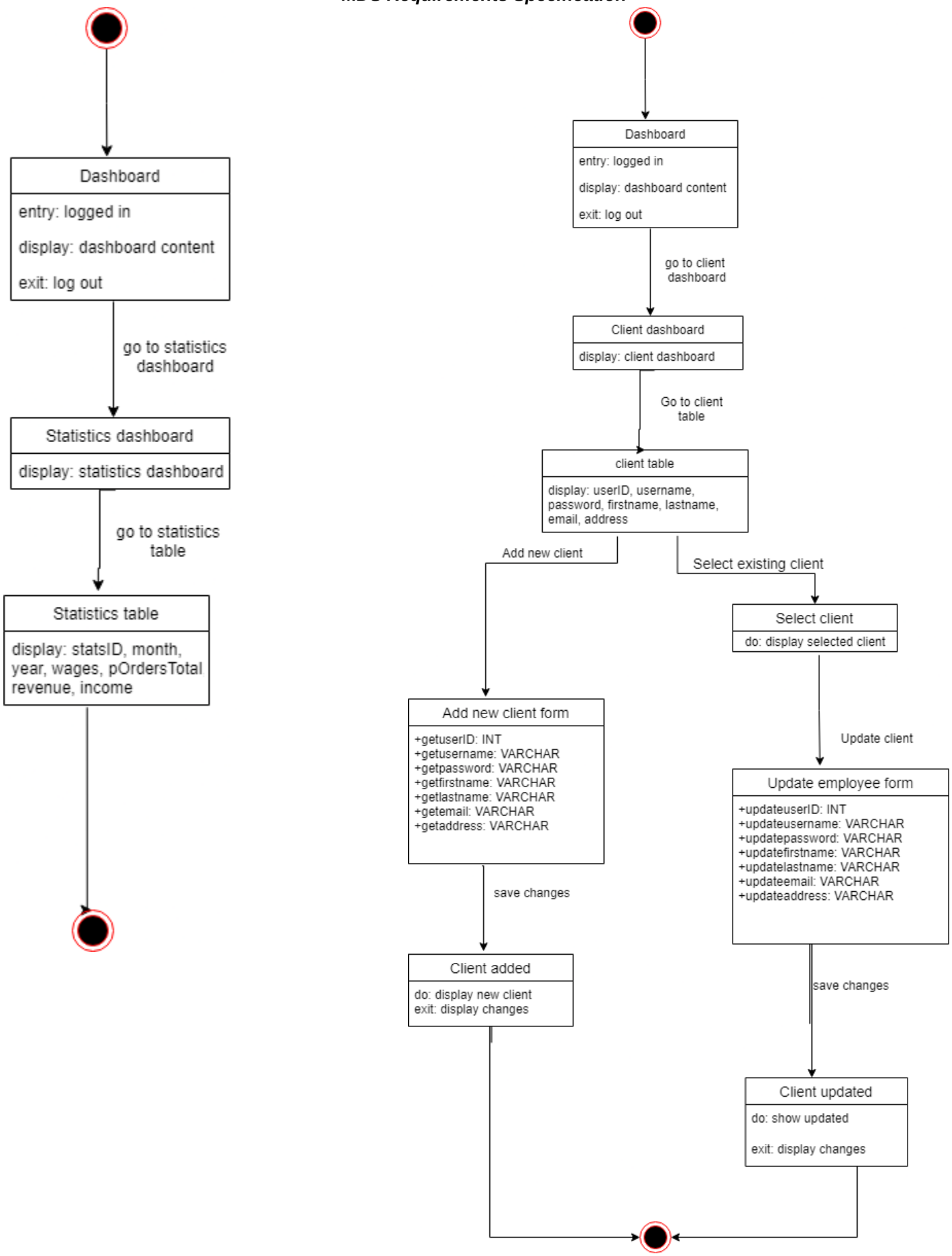
01 Admin State Charts

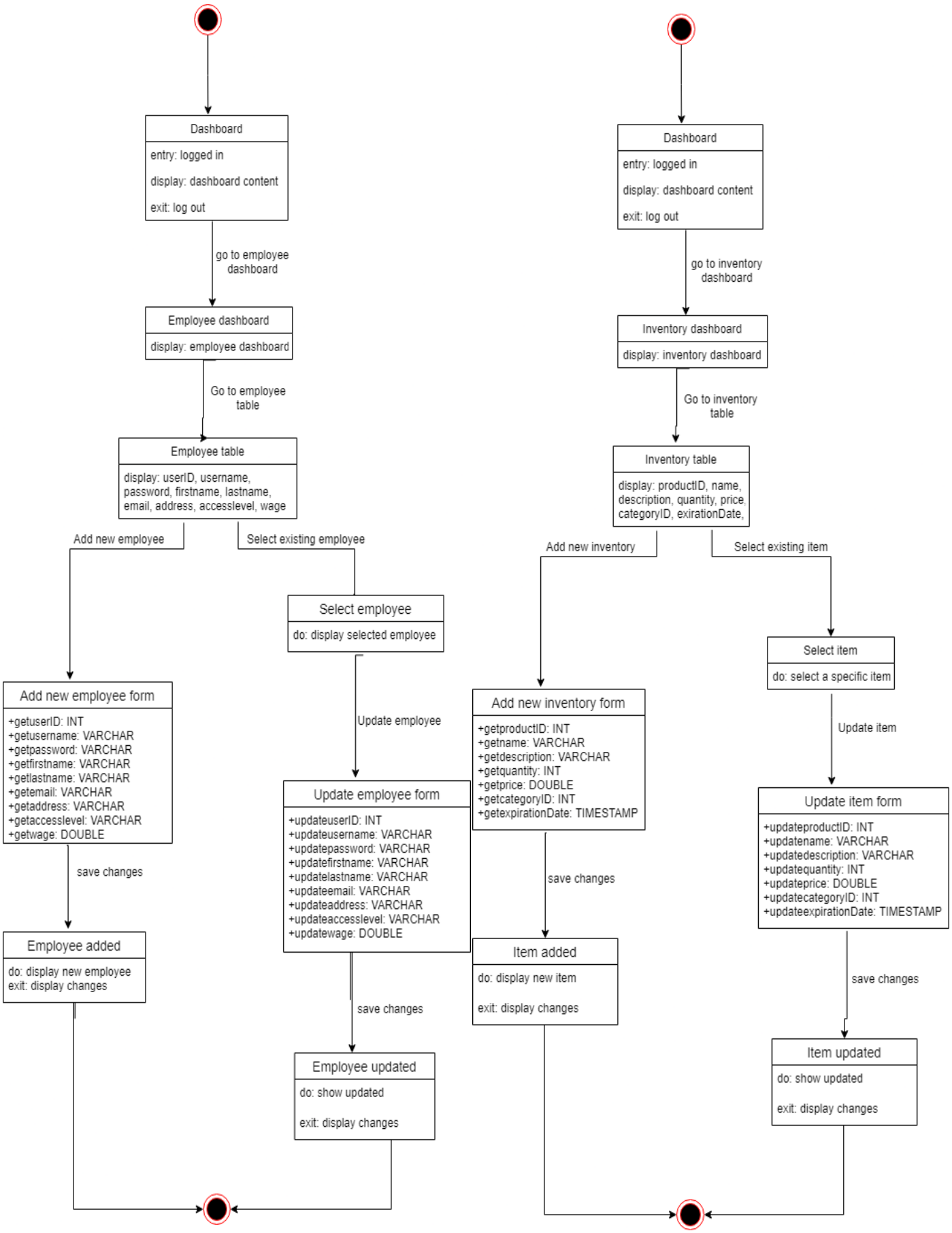




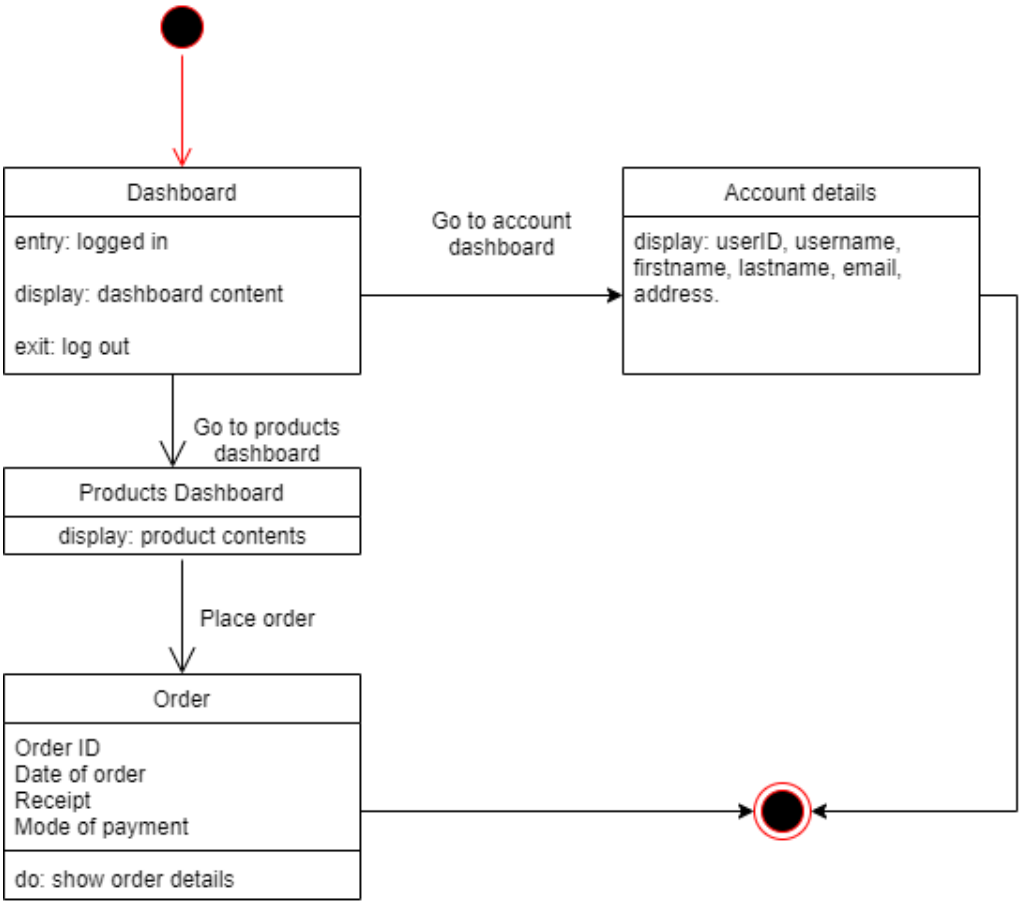
02 Manager State Charts



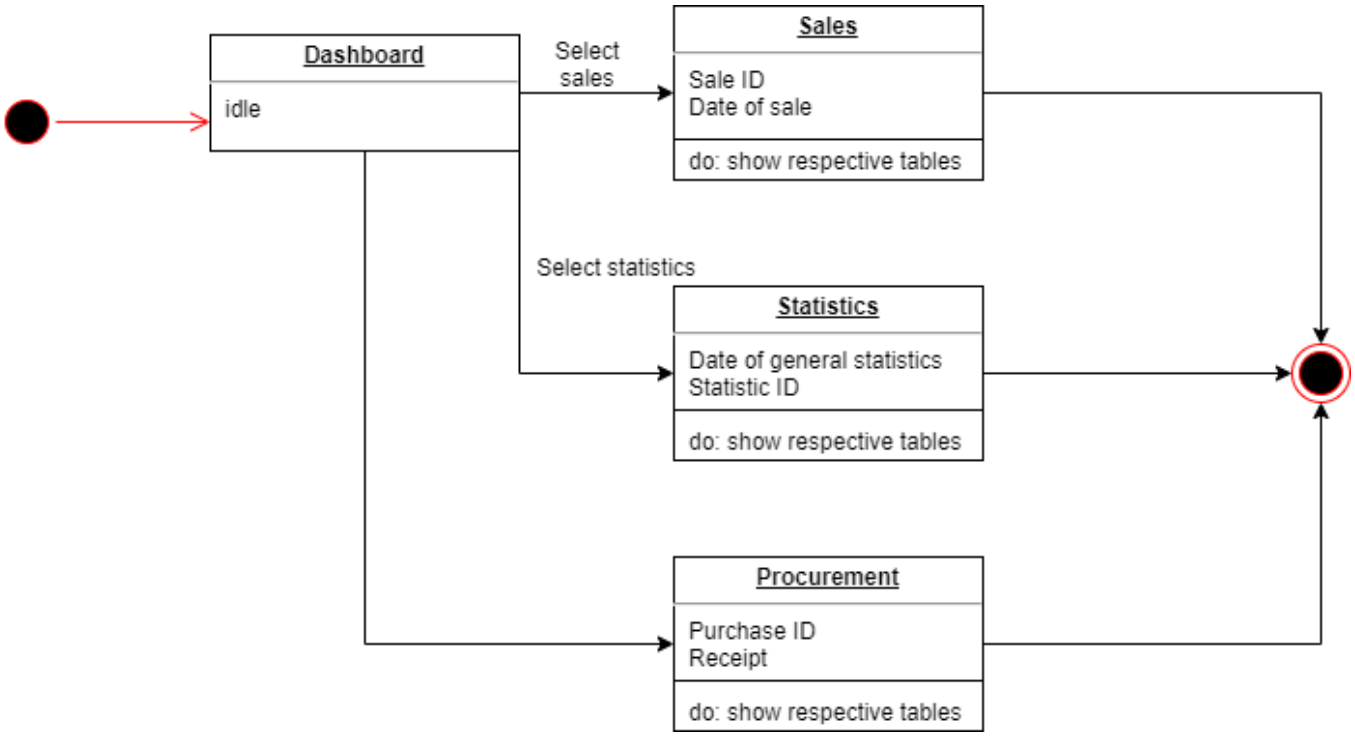

Dashboard
entry: logged in
display: dashboard content
exit: log out
go to statistics dashboard
Statistics dashboard
display: statistics dashboard
go to statistics table
Statistics table
display: statsID, month, year, wages, pOrdersTotal revenue, income
Dashboard
entry: logged in
display: dashboard content
exit: log out
go to client dashboard
Client dashboard
display: client dashboard
Go to client table
client table
display: userID, username, password, firstname, lastname, email, address
Add new client
Select existing client
Add new client form
+getuserID: INT
+getusername: VARCHAR
+getpassword: VARCHAR
+getfirstname: VARCHAR
+getlastname: VARCHAR
+getemail: VARCHAR
+getaddress: VARCHAR
save changes
Client added
do: display new client
exit: display changes
Select client
do: display selected client
Update client
Update employee form
+updateuserID: INT
+updateusername: VARCHAR
+updatepassword: VARCHAR
+updatefirstname: VARCHAR
+updatelastname: VARCHAR
+updateemail: VARCHAR
+updateaddress: VARCHAR
save changes
Client updated
do: show updated
exit: display changes

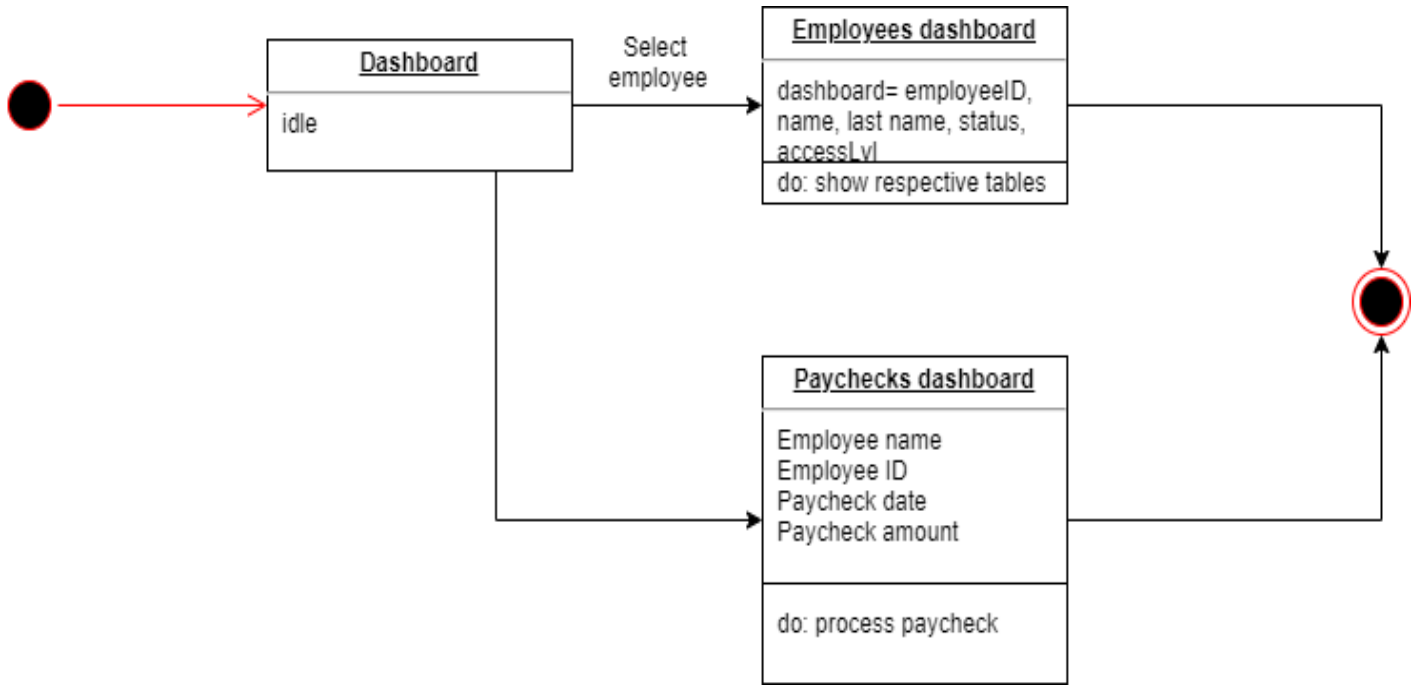

Dashboard
entry: logged in
display: dashboard content
exit: log out
go to employee dashboard
Employee dashboard
display: employee dashboard
Go to employee table
Employee table
display: userID, username, password, firstname, lastname, email, address, accesslevel, wage
Add new employee
Select existing employee
Add new employee form
+getuserID: INT
+getusername: VARCHAR
+getpassword: VARCHAR
+getfirstname: VARCHAR
+getlastname: VARCHAR
+getemail: VARCHAR
+getaddress: VARCHAR
+getaccesslevel: VARCHAR
+getwage: DOUBLE
save changes
Employee added
do: display new employee
exit: display changes
Select employee
do: display selected employee
Update employee
Update employee form
+updateuserID: INT
+updateusername: VARCHAR
+updatepassword: VARCHAR
+updatefirstname: VARCHAR
+updatelastname: VARCHAR
+updateemail: VARCHAR
+updateaddress: VARCHAR
+updateaccesslevel: VARCHAR
+updatewage: DOUBLE
save changes
Employee updated
do: show updated
exit: display changes
Dashboard
entry: logged in
display: dashboard content
exit: log out
go to inventory dashboard
Inventory dashboard
display: inventory dashboard
Go to inventory table
Inventory table
display: productID, name, description, quantity, price, categoryID, exirationDate,
Add new inventory
Select existing item
Add new inventory form
+getproductID: INT
+getname: VARCHAR
+getdescription: VARCHAR
+getquantity: INT
+getprice: DOUBLE
+getcategoryID: INT
+getexpirationDate: TIMESTAMP
save changes
Item added
do: display new item
exit: display changes
Select item
do: select a specific item
Update item
Update item form
+updateproductID: INT
+updatename: VARCHAR
+updatedescription: VARCHAR
+updatequantity: INT
+updateprice: DOUBLE
+updatecategoryID: INT
+updateexpirationDate: TIMESTAMP
save changes
Item updated
do: show updated
exit: display changes

03 Client State Charts

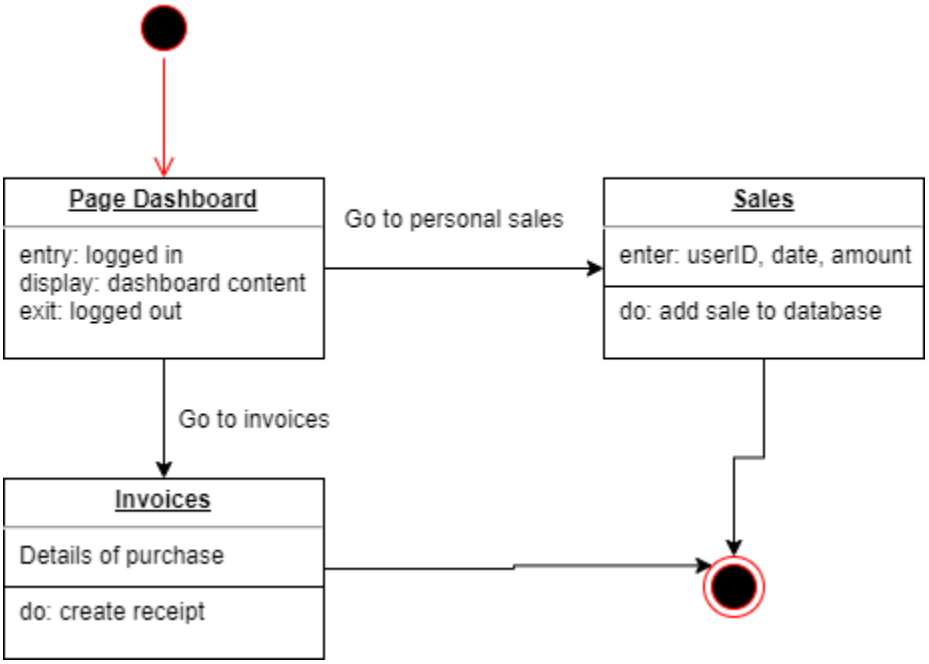


04 Economist State Charts

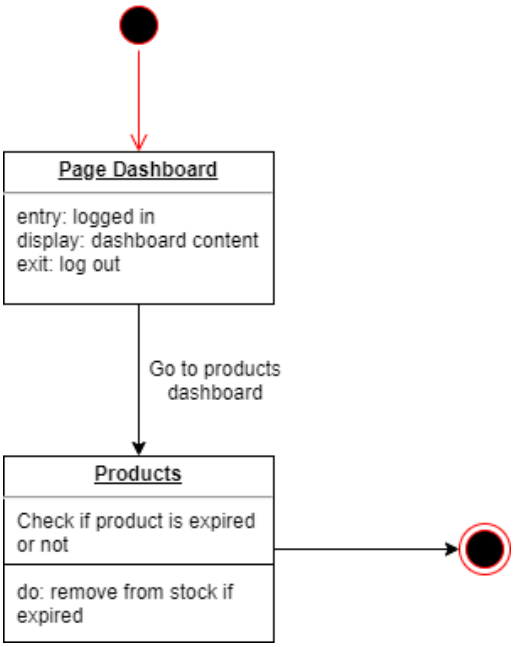




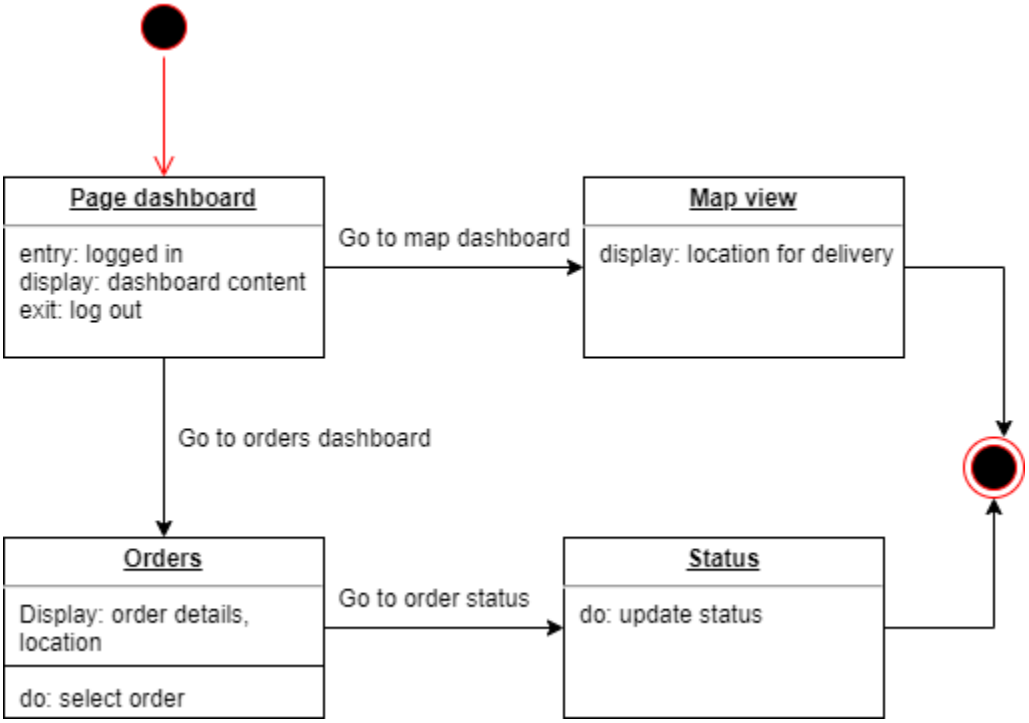
05 Cashier State Charts



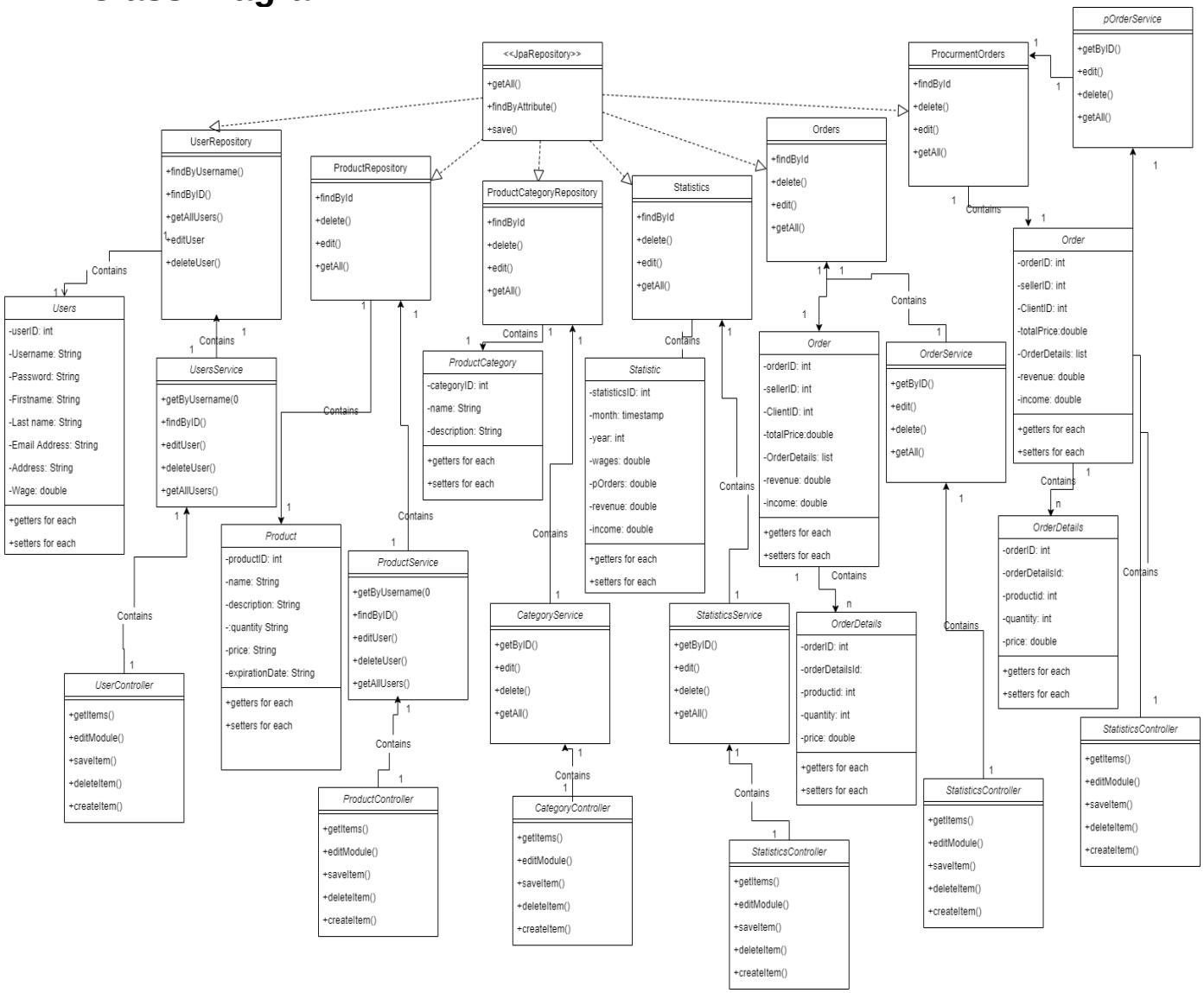
06 Floor employee State Charts



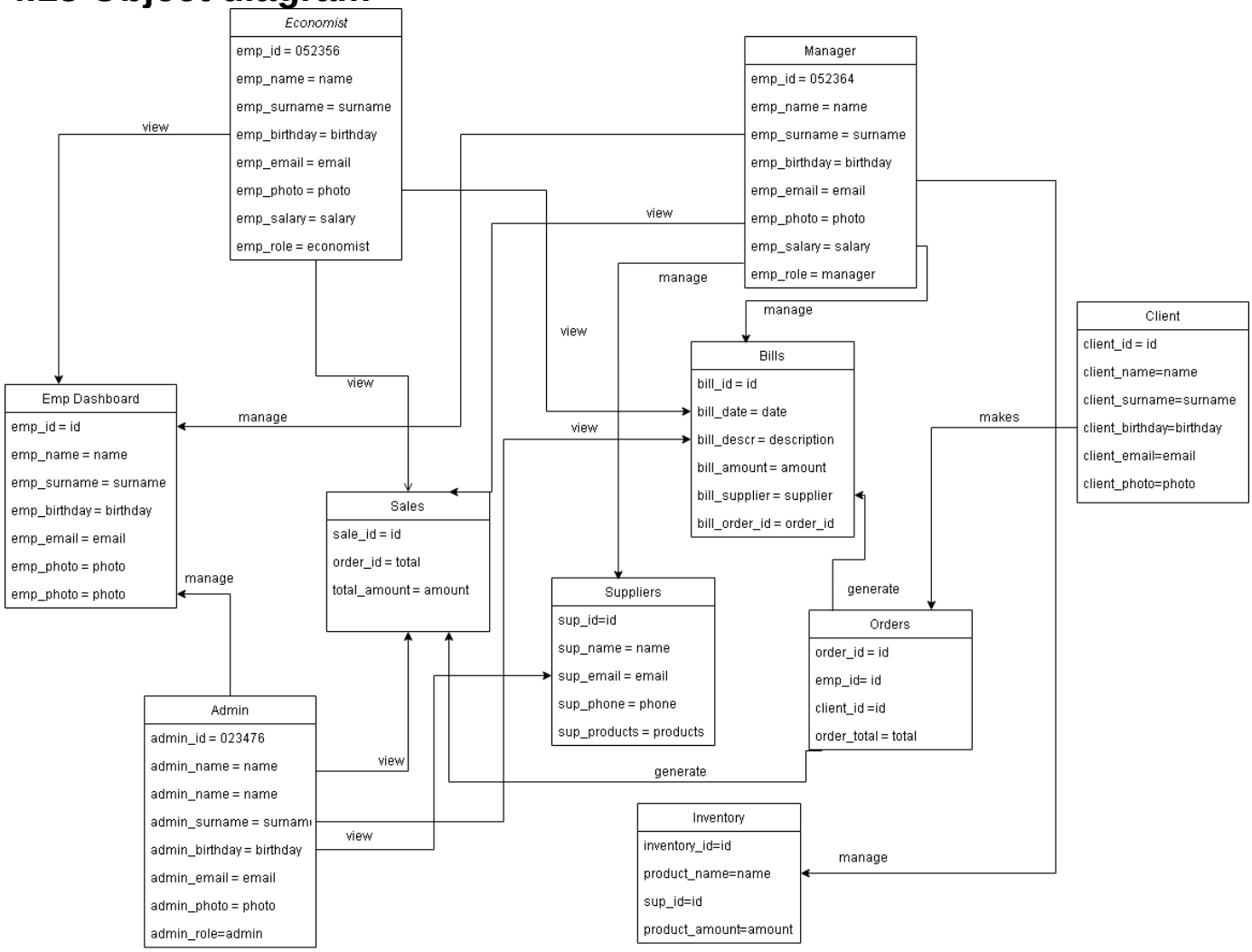
07 Delivery person State Charts



4.12 Class Diagram



4.13 Object diagram



5. Implementation

5.1 Technologies used

Frontend
For our front-end part of the system, we used several technologies. We have used Thymeleaf, which is a parsing library, in order to create dynamic HTML pages. Which we then have enhanced with the use of several languages and libraries. We used Bootstrap to create a responsive and easily customizable website along with CSS for the design. For a more progressive design and a lot of functionalities we used JavaScript programming language. JQuery, which is a JavaScript library, was then used for more extensive functionalities to the frontend of our system.

Backend
With respect to the backend of the system, we used Java Spring. For the entire application we chose Spring boot. It came packing with an inbuilt Tomcat webserver for testing so it was the best choice for developing. When it comes to repositories, we are managing them through the Java Persistence API. As an object relational mapping tool, we are using Hibernate as it is the default ORM for Spring. In regards to security, we have chosen to use Spring Security as it is the standard security library even for great enterprises.

Database
As for the database, we chose MySQL database when building this system. This was a choice based on previous knowledge we had of MySQL and the high usability of this database. With regards to the security of the database, MySQL has high data security so that was not a problem.

5.2 Installation manual

The following steps are the steps needed to install and deploy the MDS system.

- First, the computer where the system will be installed and deployed must have XAMPP installed.
- Second, download the folder from our GitHub repository found with this link: https://github.com/ekazaferi18/Software_Engineering_2021
- Third, open XAMPP and start MySQL and Apache.
- In the installed folder of XAMPP, locate a folder called htdocs and place .war file provided in the folder that was downloaded in step 2 in this folder. This is the file needed to do the deployment.
- Next step will be setting up the database. The properties file where the modification for the databases' username, password and url is done. Then import the SQL script from the GitHub repository under Code/Database Code.
- Finally, to deploy the system use the following link: http://localhost:8080

5.3 User manual

This software has 7 users total, Administrator, Manager, Client, Economist, Cashier, Floor employee, Delivery person. Each of these users have their own view of the system and their own functionalities. To access the users, below we have given the username and passwords of each type of user.

1. Admin-> Username: admin, Password: admin1234
2. Manager-> Username: manager, Password: manager1234
3. Client-> Username: client1, Password: client1234

4. Economist-> Username: economist, Password: economist1234
5. Cashier-> Username: cashier1, Password: cashier1234
6. Floor employee-> Username: employee1, Password: user1234
7. Delivery person-> Username: delivery, Password: fordelivery12

Each user has different functionalities, but they do share some functionalities at times. The functionalities of each user have been explained in better detail in the first sections of this document in the User Characteristics section. For a specific functionality follow the user manual and the user characteristic part to find the user that has the wanted functionality.

5.4 Screenshots

6. Appendix

APPENDIX A: Project Planning

Start date: 30/03/2021
End date: 16/06/2021
Duration: 78 days or 11 weeks

No.	Activities	Start	End	Duration
1	Project topic proposal and planning	30/03/2021	02/04/2021	4
2	Feasibility study	02/04/2021	07/04/2021	6
3	Project description	07/04/2021	09/04/2021	2
4	Sketch design	07/04/2021	14/04/2021	7
5	Requirement specification	14/04/2021	24/04/2021	10
6	Use case diagrams and user scenarios	06/05/2021	11/05/2021	5
7	Activity Diagrams	11/05/2021	18/05/2021	3
8	ER and relation schema	11/05/2021	18/05/2021	7
9	DFD, collaboration and sequence diagrams	19/05/2021	26/05/2021	7
10	State charts	26/05/2021	02/06/2021	7
11	Component, object, class and deployment	28/05/2021	03/06/2021	6
12	Programming planning	02/06/2021	09/06/2021	7
13	Programming, configuration and testing	09/06/2021	16/06/2021	7
				78 days 11 weeks