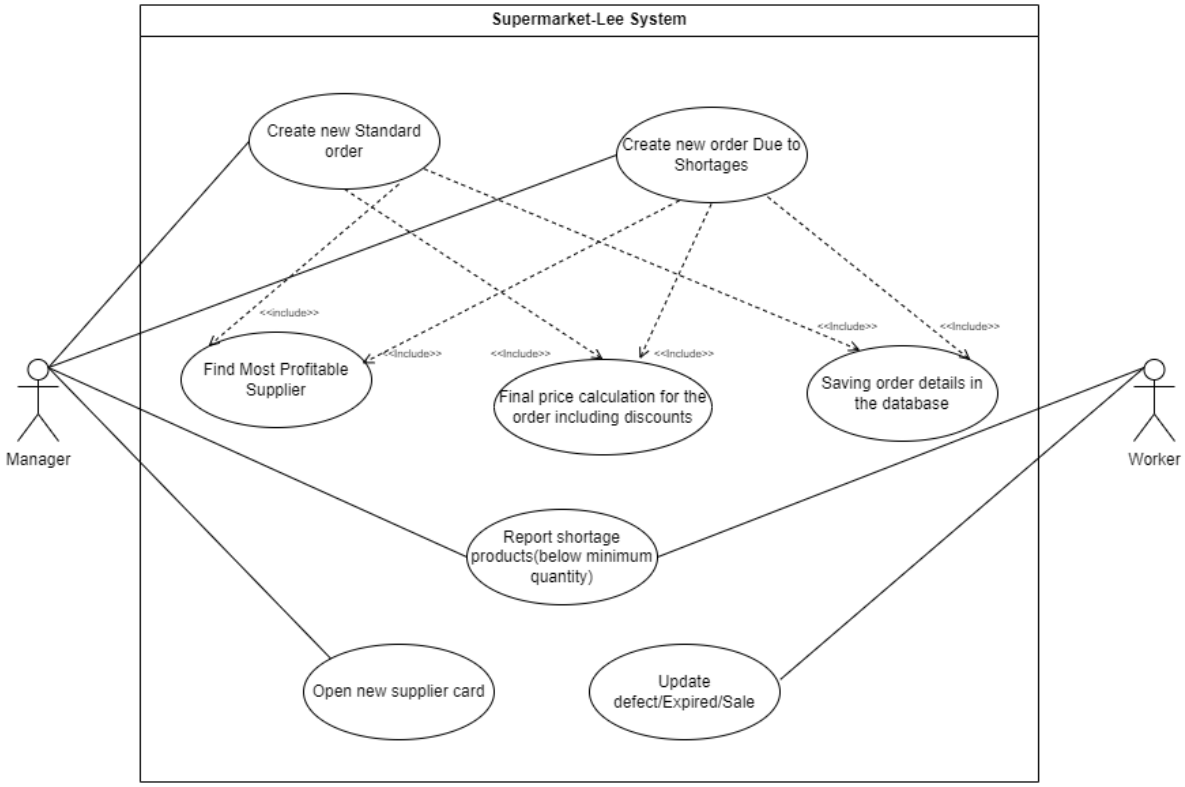
חלק תאורטי-ניתוח ועיצוב
עבודה פרקטית חלק 2

גיא אמזלג - 207698911 עומרי הרשקוביץ -318760477 (מלאי)
הדר כנפו - 206747792 עמית דבש - 316127653 (ספקים)

חלק א – ניתוח ועיצוב

1.1

Use cases: c, d, e, f.



1.2

Use Case Name:
Issuing an order from a supplier due to a shortage

Textual Description:
This use case describes the process where the manager selects the option "Placing a new order due to shortage" from the main menu after performing an inventory update. The system scans the internal inventory system for current product shortages. If shortages are found, the system proceeds to create an order for the required products and saves the order details in the "Orders on the way" table in the database. If no shortages are found, the system informs the manager and returns them to the main menu. If the manager exits the process at any point, the system cancels the order and returns to the main menu without saving any details.

List of Actors:

- Manager: The manager (senior or junior) who interacts with the system to issue the order.

Pre-conditions:

- The manager is logged into the system with sufficient privileges (manager role).
- The inventory system has been updated, ensuring current shortage information is available.
- There are shortages available in the internal inventory system.
- Supplier product details, pricing, and agreements are available in the system.

Post-conditions:

- An order is successfully created for the products that are in shortage.
- The order details are saved in the "Orders on the way" table in the database.

Main success scenario:

1. The manager selects the option "Placing a new order due to shortage" from the main menu.
2. The system scans the internal inventory system for current shortages.
3. The system finds shortages and proceeds to create the order.
4. The system saves the order details in the "Orders on the way" table in the database.
5. The system informs the manager that the order was created successfully.
6. The manager is returned to the main menu.

Alternatives/Extensions:

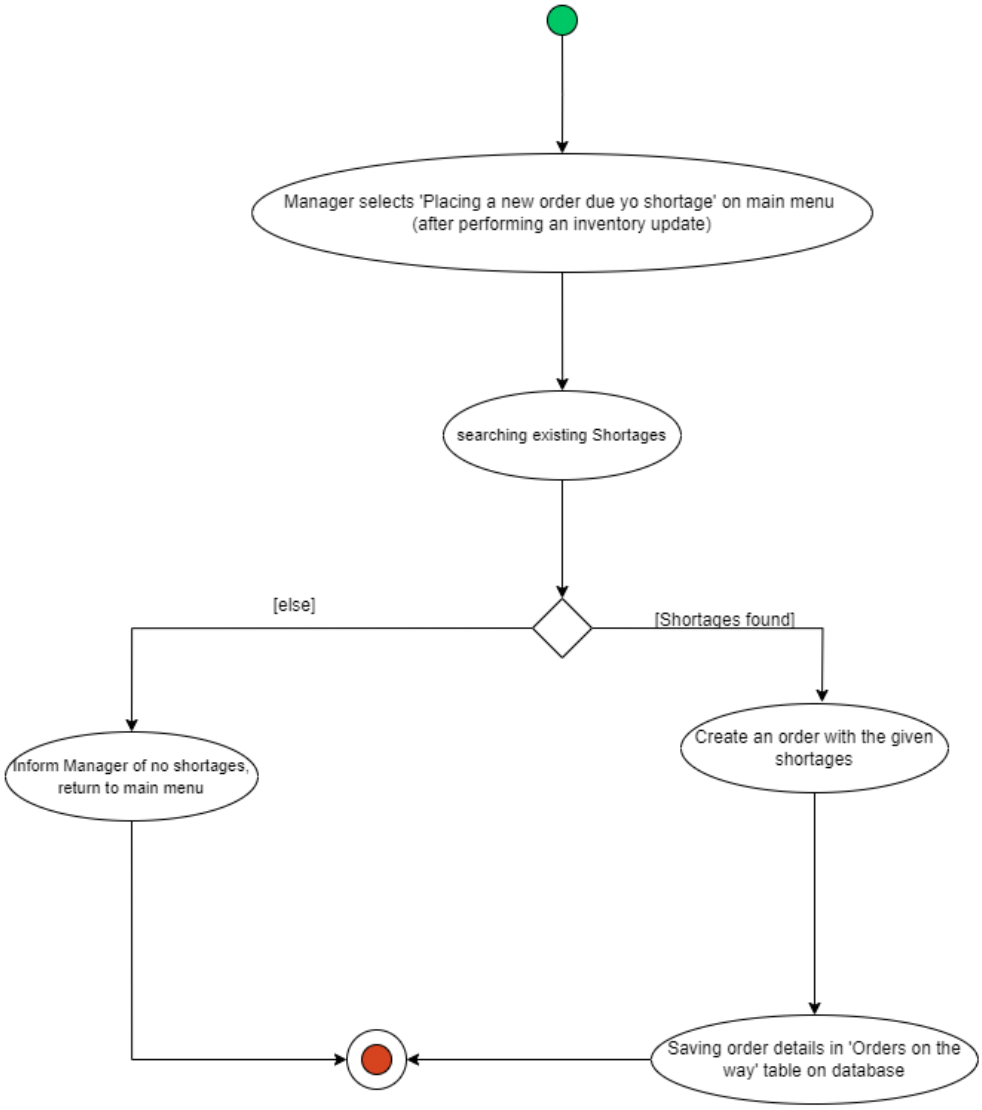
1. No shortages found:

- The system informs the manager that no shortages were found, and the manager is returned to the main menu.

2. Manager exits during the process:
    - The system cancels the order and returns the manager to the main menu without saving any data.

Activity Diagram:

- The attached diagram visually represents the flow of placing an order due to shortages.



2.1+2.2.

1Action: Manager selects 'Placing a new order due to shortage'

Operation:
Selecting the option to "place a new order due to shortage" from the main menu.

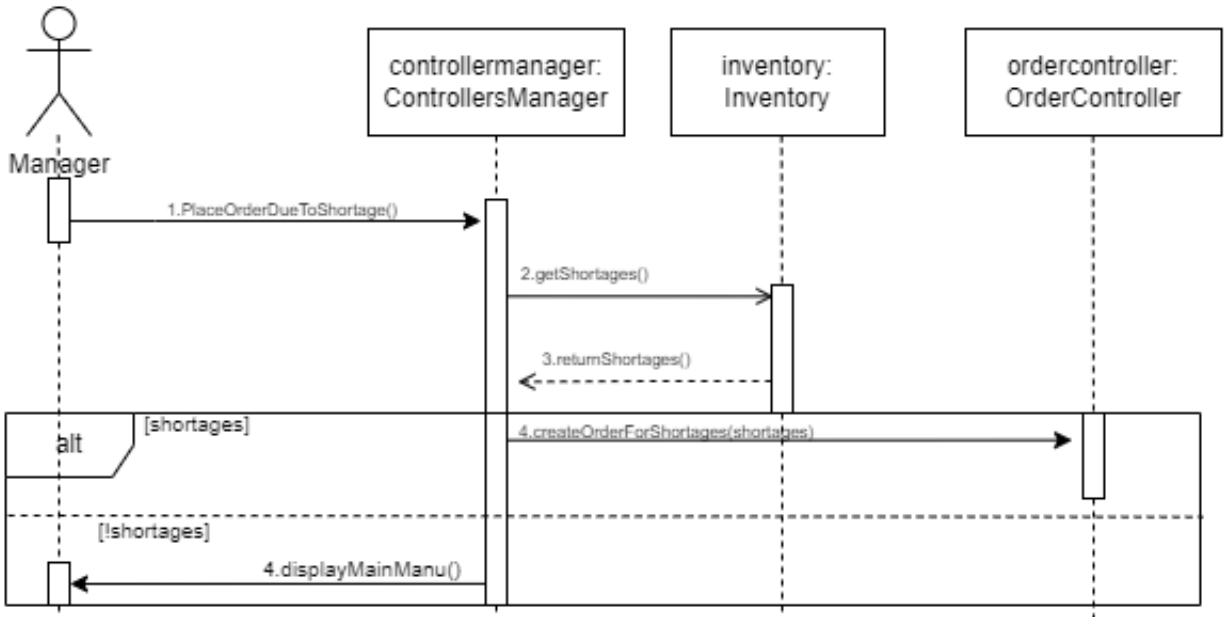
Cross References:
Issuing an order due to a shortage.

Preconditions:

- Manager is logged into the system with sufficient privileges.
- The inventory system has been updated, ensuring that the information is current.

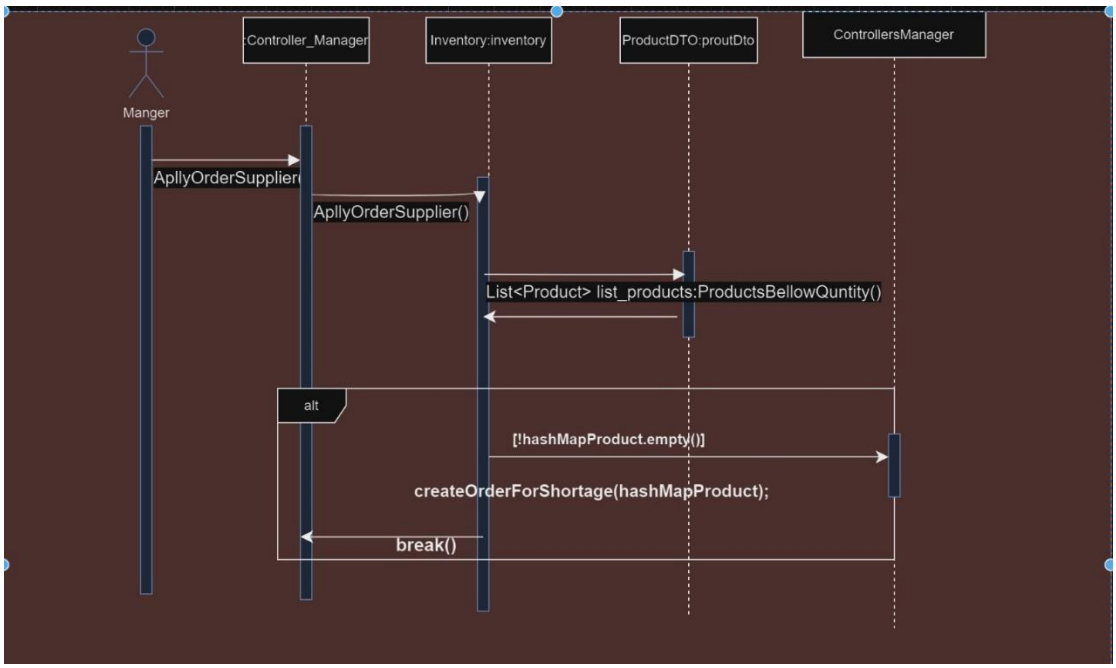
Postconditions:

- The system begins the process of searching for shortages in the inventory.
- The system transitions to the next step: either finding shortages or informing the manager if no shortages are found.



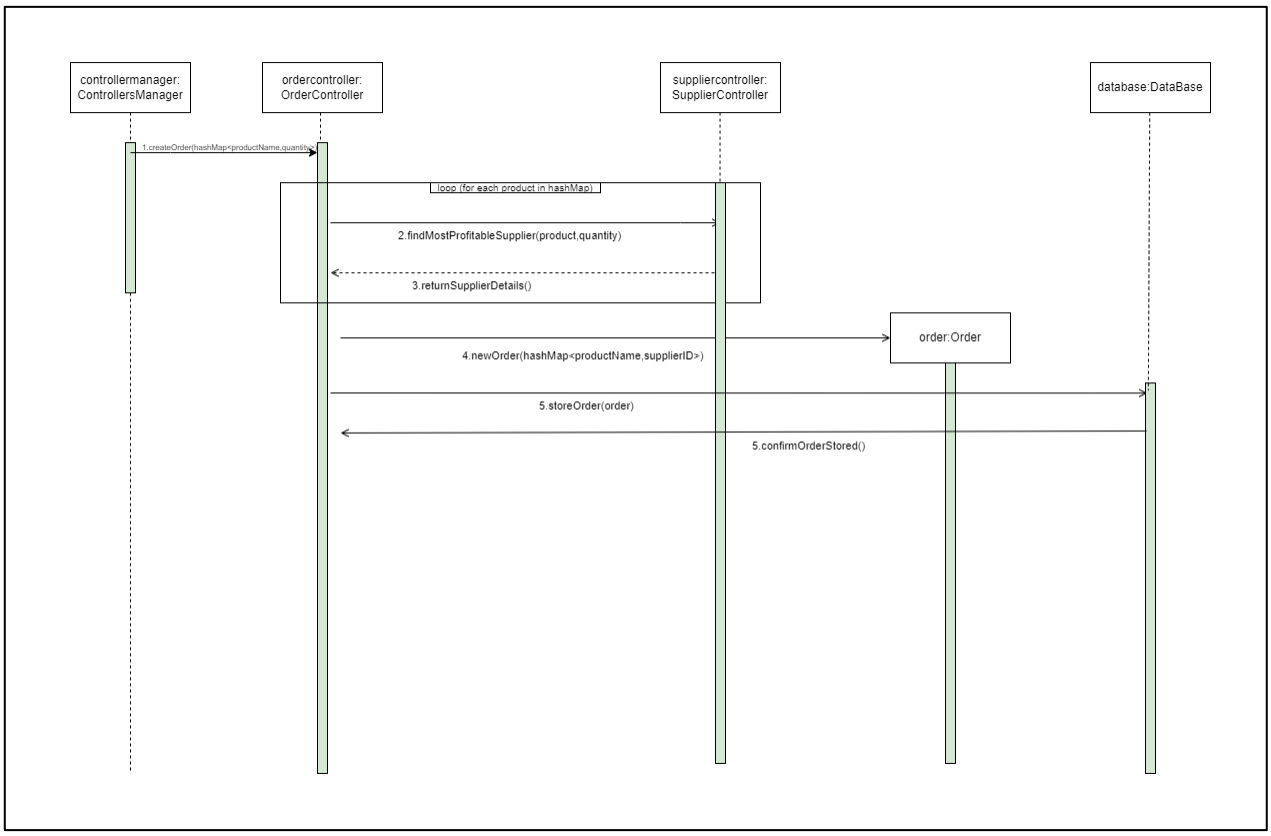
2.Action: Apply order to Supplier because shortage in the inventory

- **Operation**: Searching the inventory system for shortages
- **Cross References**: Issuing an order due to a shortage.
- **Preconditions**:
    - Inventory must have products
    - In the inventory there should be shortage in some product
- **Postconditions**: The system sends hash map that the key is the name of product that shortage and the value is the quantity this send to supplier.



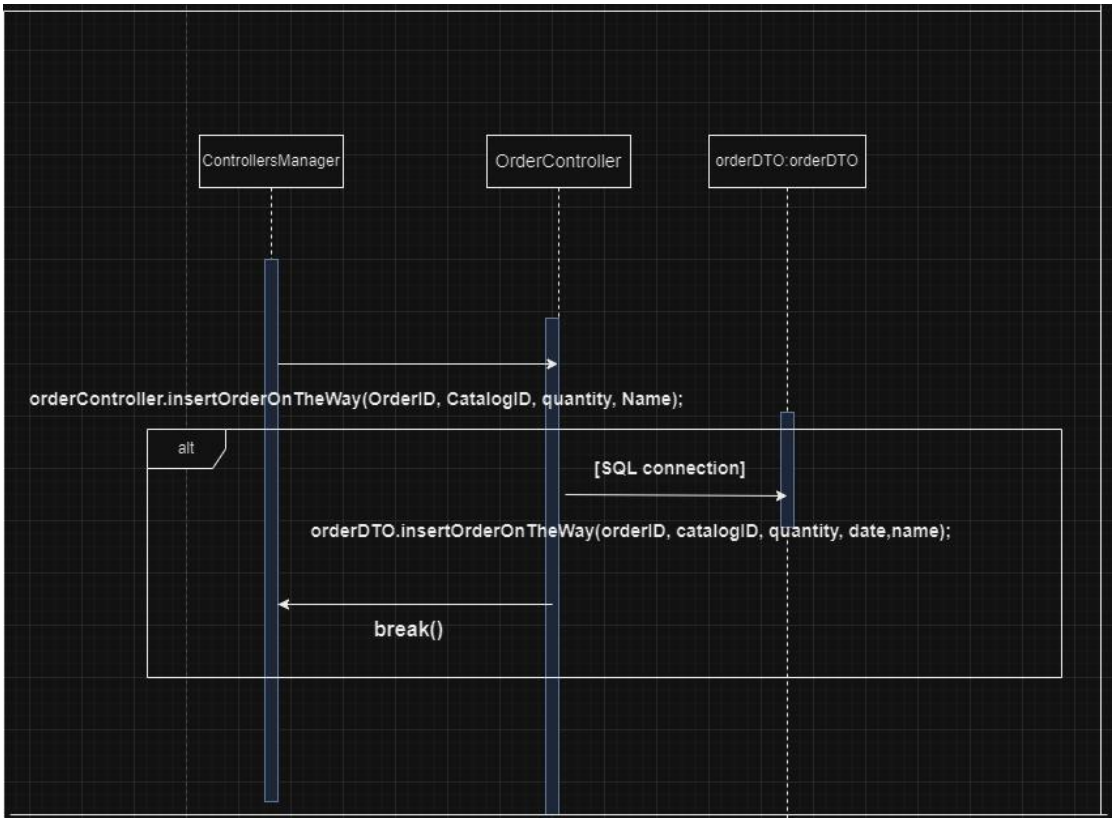
3. Action: Create an order with the given shortages

- **Operation**: Create an order with the given shortages.
- **Cross References**: Issuing an order due to a shortage.
- **Preconditions**:
  - The system has retrieved the list of product shortages from the inventory system.
  - There is at least one shortage identified that needs to be ordered.
  - Supplier details, including product prices and availability, are available in the system
- **Postconditions**:
  - An order is created for the products that are in shortage.
  - The order is associated with the most profitable supplier for each product based on the existing agreements.
  - The order details, including products, quantities, suppliers, and expected delivery times, are saved in the Orders on the way table in the database.
  - **Instance creation**:
    - Order object is instantiated and populated with the relevant product and supplier information



4. Action: Save order details in 'Orders on the way' table in the database

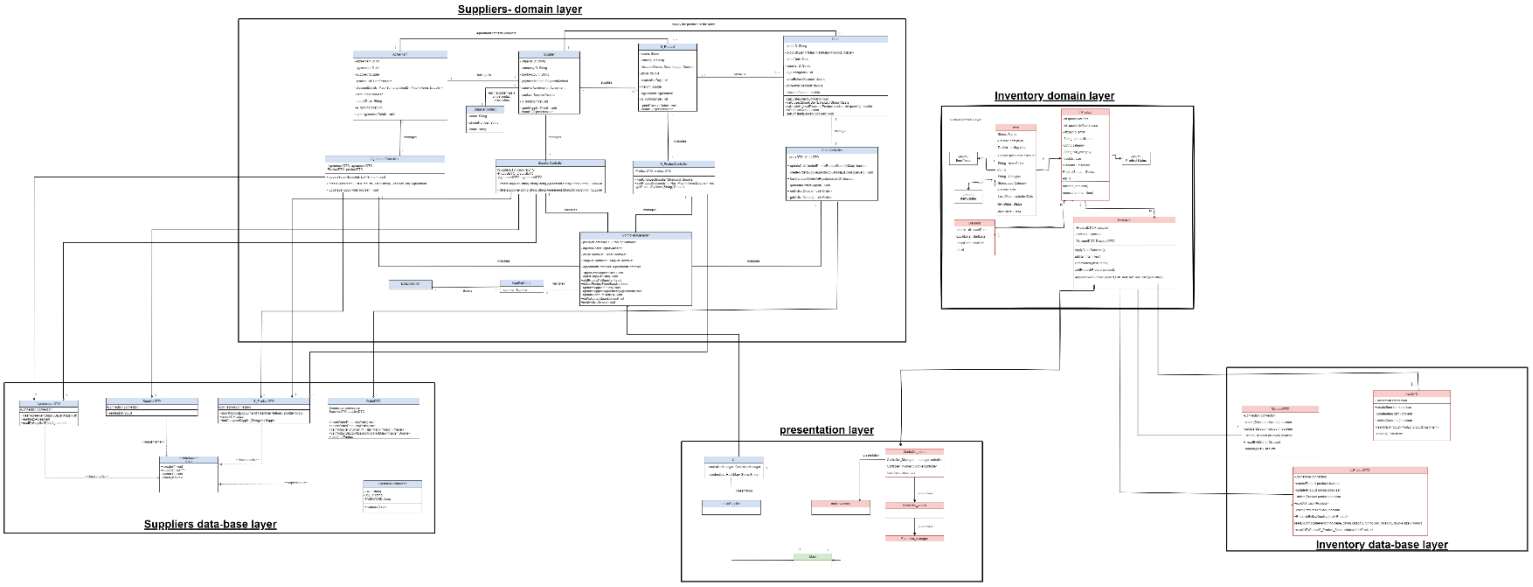
- **Operation**: Saving the order details to the 'Orders on the way' table in the database.
- **Cross References**: Issuing an order due to a shortage.
- **Preconditions**:
    - The order has been successfully placed.
    - Database connection is available.
- **Postconditions**:
    - Order details are stored in both the "Orders" table and the "Orders on the way" table in the database.
    - The system reflects the current status of the order as "on the way".



3. עדכון תוצרי עבודה 1

Class diagram:

Supermarket Lee System



Inventory part:

ID	Module	Func/Non Fun	Decription	Priority	Risk	Status
1	מלאי	Non - Func	העובדים יעקבו אחרי ההוסרים בחנות ובמחסן האחורי			
2	מלאי	Func	המערכת חייבת לתמוך בהוספת מוצר חדש לחנות הוספה תתבצע מהמלאי של הספק	MH	L	Done!
3	מלאי	Func	המערכת חייבת לדעת להציג את מלאי החנות(בולל המחסן האחורי) – נתונים שיהיו מסונכרנים על פי מעקב העובדים	MH	L	Done!
4	מלאי	Func	המערכת חייבת לתמוך בסימון פריטים כחסרים במלאי(אחריות העובד לסמן)	MH	L	Done!
5	מלאי	Func	המערכת תדע להתריע להנהלה על מוצרים שמסומנים כ"עומדים להסתיים".	MH	L	Done!
6	מלאי	Func	כמות מינימלית נדרשת תחושב לכל מוצר בהתאם לזמן האספקה וביקוש המוצר	MH	L	Done!
7	מלאי	Func	המערכת תהיה חייבת לתמוך במכירה של פריט ועדכון המלאי	MH	H	Done!
8	מלאי	Func	המערכת חייבת לתמוך בהעברת פריט מהמחסן לחנות ולהפך	MH	L	Done!
9	מלאי	Func	המערכת תדע להציג עבור כל פריט מחיר עלות ומחיר מכירה	MH	L	Done!
10	מלאי	Func	המערכת חייבת לדעת להציג אחוזי הנחה ללקוחות עבור קטגוריות מסוימות	MH	L	Done!
11	מלאי	Func	המערכת תהיה חייבת לתמוך בשינוי עלות מכירה , קנייה ואחוזי הנחה של פריט מסוים	MH	L	Done!
12	מלאי	Func	המערכת תציג את חלוקת המלאי לפי קטגוריות ולפי תת קטגוריות	MH	H	Done!
13	מלאי	Func	המערכת חייבת לאפשר להנהלה להנפיק דוחות על כמות פריטים קיימים במלאי ומיקומם	MH	H	Done!
14	מלאי	Func	המערכת תדע להתריע על מוצרים שתוקפם עומד לפוג או פג(3 ימים קדימה) על בסיס תאריך התפוגה של המוצר וגישה לתאריך הנוכחי.	MH	L	Done!
15	מלאי	Func	המערכת תוכל להציג את המוצרים במלאי על פי סינונים ומיונים נבחרים – מיקום(חנות או מחסן אחורי), מחיר קנייה, מחיר מכירה, רווחיות(מכירה\קנייה).	NTH	H	Done!
16	מלאי	Func	המערכת תהיה חייבת לספק לספק דוח של חוסרים לספק של כמה פריטים חסרים לכל מוצר בשביל להגיע לכמות המינימלית שלו	MH	H	Done!
17	מלאי	Func	המערכת תהיה צריכה להוסיף את כמות הפריטים שחסרה לה לכל מוצר בשביל להגיע לכמות המינימלית שלו באופן אוטומטי על פי הזמנה של הספק יצר לנו	MH	H	Done!
18	מלאי	Func	המערכת תהיה יכולה להוסיף מוצרים רק מהזמנות שהספק יצר למלאי בלבד	MH	H	Done!

Changes in Requirements and Justifications

Addition of Requirement 16

Original Requirement: Not present in the previous version

Updated Requirement: The system MUST provide a report detailing inventory shortages to ensure products reach their minimum required quantities

Justification: This addition ensures proactive inventory management by sending alerts to replenish items before they run out, maintaining operational continuity

:Addition of Requirement 17

Original Requirement: Not present in the previous version

Updated Requirement: The system MUST automatically add the missing quantities to each order to meet the minimum required stock levels

Justification: This requirement automates the replenishment process, reducing manual intervention and ensuring that minimum stock levels are maintained efficiently

Addition of Requirement 18

Original Requirement: Not present in the previous version

Updated Requirement: The system MUST only allow adding products to orders based on inventory shortages

Justification: This addition optimizes the ordering process by restricting orders to items that are needed to cover shortages, reducing the risk of overstocking and improving inventory management

Update to Requirement 2

Original Requirement: The system MUST support adding a new product to inventory.

Updated Requirement: The system MUST support adding a new product to inventory and including the supplier's full label.

Justification: This update adds the requirement to include the supplier's label when adding a new product to the inventory, allowing better management and tracking of products by their suppliers.

Defining Terms

Worker: A system user who can add items to the inventory and make changes to the inventory and can remove items also

Inventory: The collection of all items stored in the system that are currently available in stock for tracking and management

Supplier: A company or individual that provides products or services to the organization .as part of the supply chain

Order: A request generated within the system to be sent to a supplier for the delivery of specific products, materials, or services

Discount: A price reduction offered by the supplier, often based on factors like quantity purchased, seasonal promotions, or other negotiated terms

Shortage situation where the number of items falls below the minimum required .quantity in the product number,

System assumptions:

טבלה 2 :

ID	כותרת	פירוט
1	הזנת סחורה חדשה	מי אחראי על הסימון ומאיזו מערכת
2	רישום יצרן עבור כל פריט במלאי	מי אחראי ומאיזו מערכת
3	תכולה של כמות הפריטים במחסן	האם יש הגבלה?
4	תכולה של כמות הפריטים בחנות	האם יש הגבלה?
5	הבדלת מוצר אחד מהשני	שילוב התכונות שם , קטגוריה תת קטגוריה וגודל הם המפתח הייחודי למוצר?
6	חלוקת מלאי	איך מתבצעת פריקת הַסְחוֹרָה מהספקים וְהַאִם ניתן להניח שכל הסחורה המתקבלת היא קודם למחסן ולאחר מכן לחנות
7	אחוזי הנחה	האם ניתן לעשות כפל הנחות?
8	דוחות תקופתיים	האם קיים פורמט מסודר לדוח או שהדפסה מפורטת על המלאי הקיים מספיקה?
9	פרטים אודות היצרן	האם יש צורך לשמור על היצרן עוד פרטים מלבד השם?
10	כמות מקסימלית	האם לכל מוצר יש כמות מקסימלית?
11	הזמנה אוטומטית של חוסרים	האם בעקבות התראת המערכת על חוסר יש לשלוח גם פקודה להזמנת החוסר?או שזה נתון לשיקול המנהל והדבר יתבצע ידנית
12	בדיקת מוצרים פגומים ופגי תוקף	האם בדיקה ושינוי סטטוסים של מוצרים בתחילת כל יום היא מספקת ?
13	תזכורת להנפקת דוח?	האם לאחר תקופה מסוימת שלא הופק דוח המערכת תתריע על כך לאחראי בנושא?

Changes Made in the System

Database Integration:

We added an SQLite database to manage and store all the system data, such as products, items, discounts, and orders. The integration includes functionality to create tables and interact with the database through queries.

Item Addition Process:

We modified the **item addition process** so that all items must be linked to the **order** table before they can be added to the inventory. This ensures consistency and that every item being added has an associated order, streamlining inventory management.

Shortage Reports with Apply Order:

We added a report generation feature that displays items with shortages and links them to the supplier responsible for fulfilling the order. The system also includes an apply order function that automates the process of placing an order with the supplier to resolve the shortage, ensuring that stock levels are replenished efficiently.

Presentation Layer Update:

We updated the **presentation layer** to add new functionality related to **supplier** management.

suppliers part:

Requirements						
ID	**Module**	**Functional / Non-Functional**	**Description**	**Priority**	**Risk**	**Status**
1	Suppliers	Functional	The system **MUST** support registration of new supplier.	MH	Low	**done**
2		Functional	The system **MUST** manage for each supplier the following details: supplier name, supplier ID, company ID, bank account, payment method, phone number, email including supplier agreement.	MH	high	**done**
3		Functional	The system **MUST** allow defining whether the supplier has fixed delivery days or not.	MH	Low	**done**
4		Functional	The system **MUST** save for each supplier the items which the supplier can supply including the prices.	MH	High	**done**
5		Functional	The system **MUST** save for each supplier and each of its products the discount conditions if exsist for the supplier.	MH	High	**done**
6		Functional	The system **MUST** allow storing a uniqe catalog number for each product supplied by each supplier.	MH	Low	**done**
7		Functional	The system **MUST** allow the company and the suppliers to manage the agreements and its details.	MH	Low	**done**
8		Functional	The system **MUST** be able to create a new order from a supplier.	MH	Low	**done**
9		Functional	The system **MUST** select the best price from multiple suppliers based on quotes and required quantity.	MH	High	**done**
10		Functional	The system **MUST** generate reports detailing all products and their uniqe catalog number that purchased from each supplier.	MH	Low	**done**
11		Functional	The system **SHOULD** allow to generate all the suppliers details	NTH	Low	**done**
12		Functional	The system **MUST** allow the creation of new supplier's products in the system.	MH	Low	**done**
13		Functional	The system **MUST** specify who is responsible for delivering the product - either Super Lee or the supplier.	MH	Low	**done**
15		Functional	The system **MUST** enable suppliers to edit their fixed delivery days.	MH	Low	**done**
16		Functional	The system **MUST** save all the past orders	NTH	Low	**done**
17		Non-Functional	The system **SHOULD** support payment to the supplier either credit card or cash or bank transfer	NTH	Low	**done**
18		Functional	The system **MUST** generate orders from suppliers based on inventory shortages	MH	Low	**done**
19		Functional	The system **MUST** handle periodic orders from suppliers based on predetermined supply days	MH	Low	**done**
20		Functional	The system **MUST** support editing the periodic orders until one day before the delivery day	MH	Low	**done**
21		Non-Functional	The system **MUST** store, retrieve and update supplier data using a database	MH	high	**done**

Changes in Requirements and Justifications

1. **Addition of Requirement 18:**
    - **Original Requirement:**
      Not present in the previous version.
    - **Updated Requirement:**
      The system MUST generate orders from suppliers based on inventory shortages.
    - **Justification:**
      This requirement ensures that the system can handle automatic ordering from suppliers when there are shortages in inventory. This functionality improves communication between the system and suppliers, streamlining inventory management and avoiding potential delays.
2. **Addition of Requirement 19:**
    - **Original Requirement:**
      Not present in the previous version.
    - **Updated Requirement:**
      The system MUST handle periodic orders from suppliers based on predetermined supply days.
    - **Justification:**
      This requirement addresses the need for periodic ordering from suppliers. By automating this process based on predefined supply days, the system ensures a consistent flow of products, helping the company meet its operational goals.
3. **Addition of Requirement 20:**
    - **Original Requirement:**
      Not present in the previous version.
    - **Updated Requirement:**
      The system MUST support editing periodic orders until one day before the delivery date.
    - **Justification:**
      This requirement adds flexibility by allowing modifications to periodic orders up to one day before delivery. This is important to meet changing business needs and ensure that outdated orders are avoided, ensuring efficient operations.
4. **Addition of Requirement 21:**
    - **Original Requirement:**
      Not present in the previous version.
    - **Updated Requirement:**
      The system MUST store, retrieve, and update supplier data using a database.
    - **Justification:**
      This requirement emphasizes the need for a database to handle supplier information. By using a database, the system ensures efficient management, storage, and updating of supplier data, which is critical for maintaining accurate supplier details.

5. **Update of Requirement 9:**
    - **Original Requirement:**
      The system MUST select the best price from multiple suppliers based on quotes.
    - **Updated Requirement:**
      The system MUST select the best price from multiple suppliers based on quotes and required quantity.
    - **Justification:**
      The updated version adds consideration for the required quantity when selecting the best price. This ensures that the system is not only looking at the base price but also optimizing the total cost based on the quantity being ordered, which is crucial for cost efficiency.
6. **Removal of Requirement 11:**
    - **Original Requirement (Removed):**
      The system SHOULD be accessible and work efficiently for all branches of the company, supporting a variety of suppliers and products.
    - **Justification:**
      This requirement was removed because it did not meet the specific guidelines for functional requirements. It was too vague in its description and did not add measurable value to the system's design.

Defining Terms

1. **Supplier:**
   A company or individual that provides products or services to the organization as part of the supply chain.
2. **Order:**
   A request generated within the system to be sent to a supplier for the delivery of specific products, materials, or services.
3. **Inventory:**
   The collection of products, materials, and supplies held by the company to meet current and future operational needs or sales demands.
4. **Agreement:**
   A formal contract between the organization and a supplier that outlines the terms and conditions for supplying goods or services, including pricing, delivery schedules, and payment terms.
5. **Periodic Order:**
   An order that is automatically scheduled and sent to a supplier at regular intervals based on predefined supply days or other conditions.
6. **Product:**
   Any item, material, or service provided by a supplier that is tracked and managed within the system for the purposes of procurement and inventory control.
7. **Discount:**
   A price reduction offered by the supplier, often based on factors like quantity purchased, seasonal promotions, or other negotiated terms.

8. **Database:**
   A structured digital repository that the system uses to store, manage, and retrieve critical data related to suppliers, products, orders, agreements, and other related information.
9. **Shortage:**
   A situation where the available stock of a specific product falls below a predefined threshold, prompting the system to generate a new order to replenish inventory levels and meet demand.

System assumptions:

question to the client			
ID	**Topic**	**Issue**	**Client's Respons**
1	Delivery Days	How is the update of fixed delivery days handled? Is this a fixed or dynamic field?	The client responded that it should be possible to update it.
2	Pricing	Can the supplier submit the written price agreement to the company?	The client responde(
3	Contact Details	What specific contact details should be stored for suppliers? For example: phone number, email, fax?	Phone number and (
4	Products Details	What specific product details are required to be stored for each product provided by the supplier?	SKU for each product is nessecery
5	Products Details	Can the same product from different suppliers have a different catalog number?	The client responded
6	Automatic Reordering	Should there be automatic reordering support, for example, presenting an automatic suggestion when inventory runs out?	The client responde(
7	Supplier ID	How should the supplier ID be managed? Should it follow a unique format like an ID number?	The client responded that a unique supplier ID should be used.
8	Stock Management	Should there be a notification system for products that are not in stock, allowing reordering?	The client responde(
9	Create order	When placing an order for a product supplied by multiple suppliers, is there no specific supplier preference, and should the system select the cheapest option available?	The customer replied that the order must be associated to the supplier, because the prices are within the bill of quantities.
10	orders	Do we need to keep / record the order history from each supplier?	The client responded
11	prices	When comparing prices between suppliers, should the product be assumed to have the same catalog number across suppliers, or should it be compared by name?	The customer replied that it is necessary by name, for each supplier a catalog number different.

Changes Made in the System

1. **Integration of Data Access Layer (DAL) and SQLite Database:**
    - Implemented a new data access layer to manage interactions with the database.
    - Configured SQLite as the engine for storing both supplier and inventory-related data.
    - Established a connection to the SQLite database using JDBC, enabling seamless data management across both systems.
2. **Implementation of Repository Pattern:**
    - Developed repositories for managing data retrieval and persistence.
    - Created repositories for entities such as Supplier, Product, and Order to abstract database access logic from business logic.
    - Ensured a unified structure for handling data across the inventory and supplier management modules.
3. **Handling Periodic Orders:**
    - Added functionality for managing periodic supplier orders based on predefined supply days.
    - Enabled editing of periodic orders until one day before the scheduled delivery to allow for last-minute changes.
4. **Price Comparison Among Suppliers:**
    - Developed logic to compare prices from multiple suppliers when ordering products.
    - Ensured the system selects the supplier offering the best price based on quotes and required quantities, considering available discounts or special offers.
5. **Main Menu and User Interface Updates:**
    - Integrated the inventory management system into the main menu, offering users the choice between accessing supplier management or inventory management functionalities.
    - Updated the command-line interface (CLI) to include options for managing automatic and periodic orders.
    - Improved prompts and feedback messages to guide users through the new features, enhancing the overall user experience.