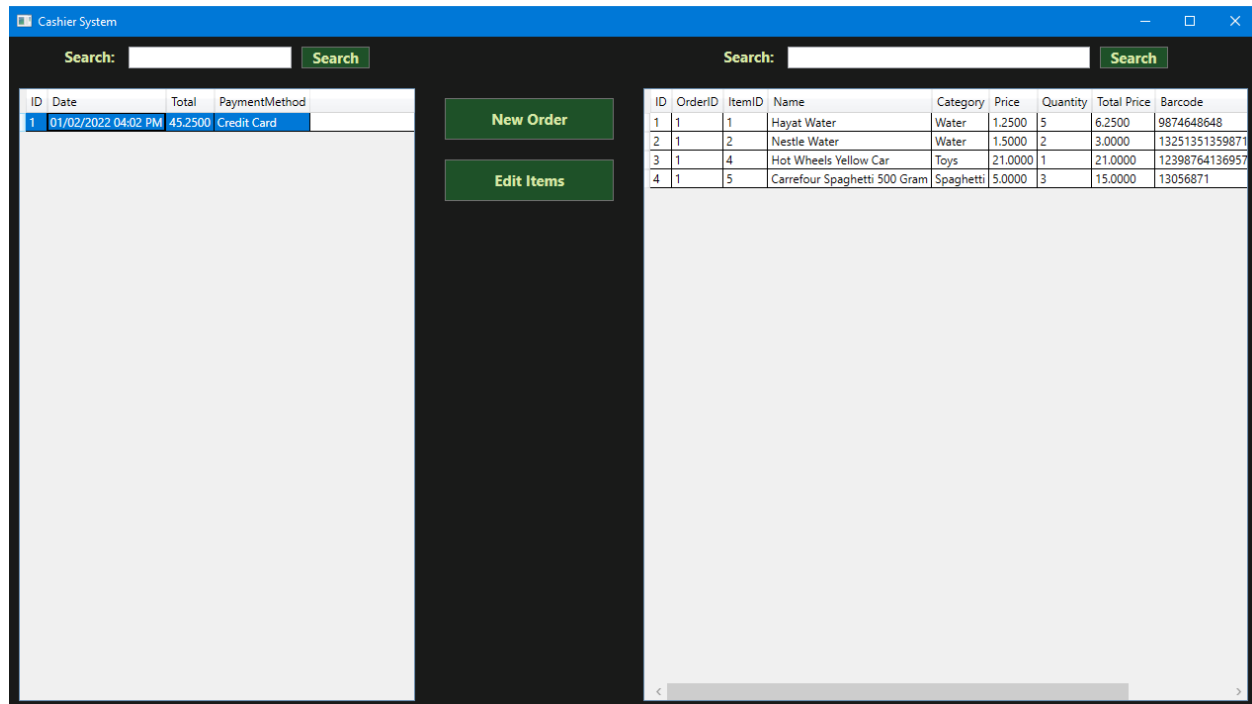


# Software Engineering Report

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Github Link: [https://github.com/amarhany20/Cashier\\_System](https://github.com/amarhany20/Cashier_System)



# 1. Version History

# Cashier_System	2
Cashier System for Software Engineering Project in Toros University	3
It was developed into 2 versions (Version systems was created locally)	4
V0.1 Main window design	5
V0.2 Database Design and bind datagrid to them	6
V0.5 Home page responsive design and Created a new order window with it's desgin	7
v 1.0 had the user and he can see history of orders and each order details, he could also create a new order by inserting items into order details	8
v1.1 I added the stock system	9
v1.2 users and login systems	10
v1.3 access types admin and users	11
v1.5 designed new edit windows for admin (EDIT USER, EDIT ORDERS, EDIT ORDER DETAILS, EDIT ITEMS)	12
v1.6 I added Insert windows for users and items.	13
v1.8 Functionality of all these previous windows	14
v1.9 I added Insert into orderdetails from items window	15
V2.0 Fixed errors from removing items won't save stock back in new orders and blocked deleting signed in users and users that already have orders bind to them. Try Caughted SQL errors	16
v2.1 Fixed Minor Issues during video record	16

## 2. Screenshots from my application and database

### 1. Login Page

Cashier System Sign In

Sql Server:

Set

Username:

Password:

Sign In

### 2. Home Page (Admin)

Cashier System

Search:  Search

ID: 1  
admin

Search:  Search

ID	Date	Total	Username	Payment Method
1022	06/02/2022 03:02 AM	113.0000	admin	Credit Card
1025	07/02/2022 10:02 AM	21.0000	admin	Credit Card
1026	07/02/2022 10:02 AM	624.0000	Ammar1	Credit Card
1030	08/02/2022 01:02 AM	193.8500	Ammar	Cash

New Order

Edit Items

Edit Users

Edit Orders

ID	OrderID	ItemID	Name	Category	Current Price	Price	Quantity	Total Price
1022	1022	1	Hayat Water	Water	1.3500	5.0000	15	75.0000
1023	1022	4	Hot Wheels Yellow Car	Toys	21.0000	21.0000	1	21.0000
1024	1022	5	Carrefour Spaghetti 500 Gram	Spaghetti	5.5000	5.5000	1	5.5000
1026	1022	2	Nestle Water	Water	1.5000	1.5000	1	1.5000
1027	1022	2	Nestle Water	Water	1.5000	1.5000	1	1.5000
1028	1022	2	Nestle Water	Water	1.5000	3.0000	1	3.0000
1030	1022	5	Carrefour Spaghetti 500 Gram	Spaghetti	5.5000	5.5000	1	5.5000

### 3. New Order

New Order

Item  Search

1031

Search:  Search

ID	Name	Category	Price	Stock	Barcode
1	Hayat Water	Water	1.3500	9	9874648648
2	Nestle Water	Water	1.5000	9	13251351359871235
4	Hot Wheels Yellow Car	Toys	21.0000	10	123987641369578 513698
5	Carrefour Spaghetti 500 Gram	Spaghetti	5.5000	9	13056871
7	Cars 2 Movie	Movies	20.5000	10	1346871643781643...1354

→

1

ID	OrderID	ItemID	Name	Category	Price	Quantity	Total Price	Barcode	Des
1048	1031	5	Carrefour Spaghetti 500 Gram	Spaghetti	5.5000	1	5.5000	13056871	
1049	1031	2	Nestle Water	Water	1.5000	1	1.5000	13251351359871235	Min

Total Price: 7

Payment Method:

Cancel

Remove

Complete

### 4. Edit Items

Cashier System

Search:  Search

ID	Name	Category	Barcode	Price	Stock	Description	ShowItem
1	Hayat Water	Water	9874648648	1.3500	9	Mineral Water	<input checked="" type="checkbox"/>
2	Nestle Water	Water	13251351359871235	1.5000	10	Mineral Water	<input checked="" type="checkbox"/>
4	Hot Wheels Yellow Car	Toys	123987641369578 513698	21.0000	10	From HotWheels Company	<input checked="" type="checkbox"/>
5	Carrefour Spaghetti 500 Gram	Spaghetti	13056871	5.5000	10		<input checked="" type="checkbox"/>
7	Cars 2 Movie	Movies	1346871643781643...1354	20.5000	10	From Disney	<input checked="" type="checkbox"/>
8	chicken strips	Frozen Food	12357813876	50.2500	10		<input type="checkbox"/>

Name:

Category:

Barcode:

Price:

Stock:

Description:

Back

Insert

Update Selected

Show/Hide

Delete

## 5. Edit Users

Cashier System

Search:

ID	Username	Password	IsAdmin	Gender	Birthday	CreationDate	Activated
1	admin	admin	<input checked="" type="checkbox"/>	male	25/02/2010	05/02/2022 12:02 PM	<input checked="" type="checkbox"/>
4	Ammar1	ammar	<input checked="" type="checkbox"/>	male	25/02/2000	07/02/2022 09:02 AM	<input type="checkbox"/>
5	Ammar	ammar	<input checked="" type="checkbox"/>	male	25/02/2000	07/02/2022 09:02 AM	<input type="checkbox"/>

Username:

Password:

Gender:

Birthday:

Update Selected

Back

Insert

Activate/Deactivate

Set Admin/User

Delete

## 6. Edit Orders

Edit Orders

Search:

ID	Username	UserID	Date	Total	PaymentMethod	IsOrderCompleted
1022	admin	1	06/02/2022 03:02 AM	113.0000	Credit Card	<input checked="" type="checkbox"/>
1025	admin	1	07/02/2022 10:02 AM	21.0000	Credit Card	<input checked="" type="checkbox"/>
1026	Ammar1	4	07/02/2022 10:02 AM	624.0000	Credit Card	<input checked="" type="checkbox"/>
1030	Ammar	5	08/02/2022 01:02 AM	193.8500	Cash	<input checked="" type="checkbox"/>

Back

Delete

Cash

admin

Change Payment Method

Change Username

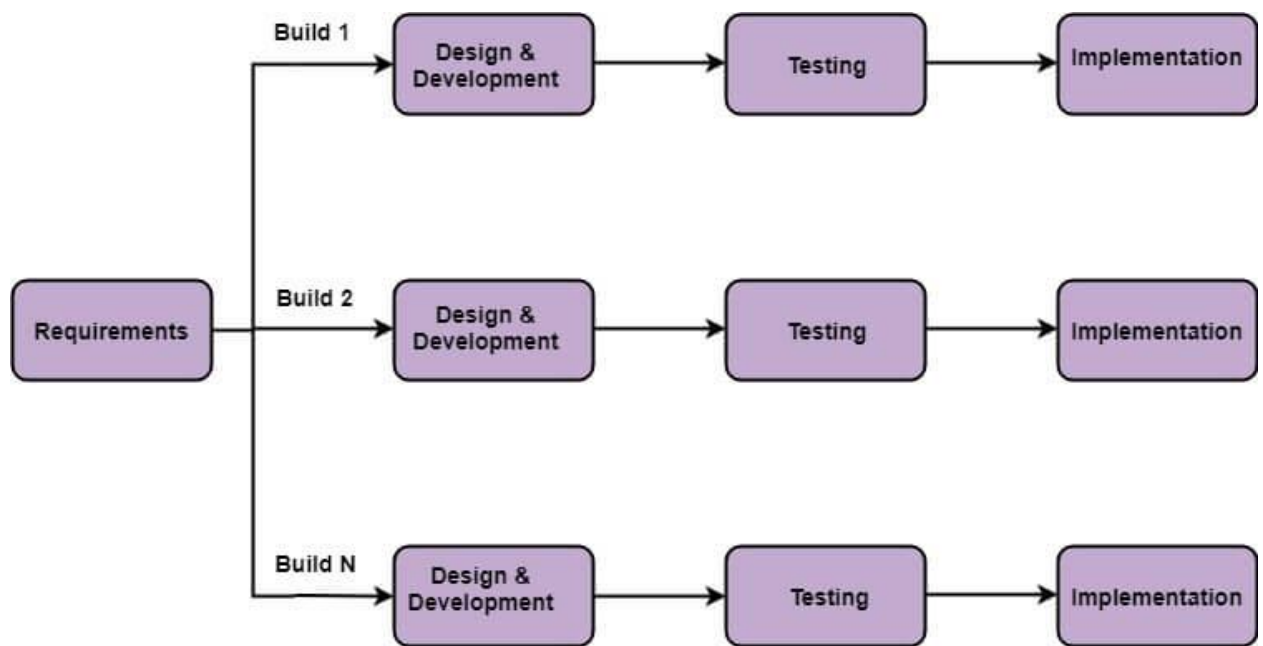
View Order Details

## 7. Database Screen shot

Results		Messages						
	ID	User_ID	Date	Total	Payment_Method	IsOrderCompleted		
1	1022	1	2022-02-06 03:26:11.020	113.0000	Credit Card	1		
2	1025	1	2022-02-07 10:17:39.943	21.0000	Credit Card	1		
3	1026	4	2022-02-07 10:18:34.563	624.0000	Credit Card	1		
4	1030	5	2022-02-08 01:14:46.057	193.8500	Cash	1		
	ID	Username	Password	IsAdmin	Gender	Birthday	CreationDate	Activated
1	1	admin	admin	1	male	2010-02-25	2022-02-05 12:32:24.993	1
2	4	Ammar1	ammar	1	male	2000-02-25	2022-02-07 09:37:52.283	0
3	5	Ammar	ammar	1	male	2000-02-25	2022-02-07 09:38:10.053	0
	ID	Order_ID	Item_ID	Price	Quantity	Total_Item_Price		
1	1022	1022	1	5.0000	15	75.0000		
2	1023	1022	4	21.0000	1	21.0000		
3	1024	1022	5	5.5000	1	5.5000		
4	1026	1022	2	1.5000	1	1.5000		
5	1027	1022	2	1.5000	1	1.5000		
6	1028	1022	2	3.0000	1	3.0000		
7	1030	1022	5	5.5000	1	5.5000		
8	1031	1025	4	21.0000	1	21.0000		
	ID	Name	Category	Barcode	Price	Stock	Description	Show_Item
1	1	Hayat Water	Water	9874648648	1.3500	9	Mineral Water	1
2	2	Nestle Water	Water	13251351359871235	1.5000	10	Mineral Water	1
3	4	Hot Wheel...	Toys	123987641369578 ...	21.0...	10	From HotW...	1
4	5	Carrefour S...	Spagh...	13056871	5.5000	10		1
5	7	Cars 2 Movie	Movies	134687164378164...	20.5...	10	From Disney	1
6	8	chicken stri...	Frozen...	12357813876	50.2...	10		0

## 1. Project Model: Incremental

### 8. What is Incremental Model



**Fig: Incremental Model**

- 1. Requirement analysis:** In this phase I started on thinking about what I want for my project. I needed good c# knowledge, so I bought a course on Udemy and followed it. Then I needed a good xaml knowledge, so I bought a course for it too. I decided that it will have three windows
- 2. Design & Development:** In this phase I have decided that it will have three builds. For the first build I have designed the first window then coded it to function as a home page showing order history and each order details about what it has. It will also have two buttons one for new orders and one for editing all the items that the store has. After that in the second build I designed the second window which is about new orders, and it is all about adding items to the order and calculating the order and choosing the payment method. The third and final window was all about the items in the store, editing, deleting, showing, updating, and inserting into them.
- 3. Testing:** In this phase I decided to build and test each window by inserting some items in the database and creating a new order in the new order window then I tested



whether it would work successfully or not then I tested each window after building and designing it.

- 4. Implementation:** I updated the insert to a window after the tests because it was not working well and confusing.

I decided to add login

I decided to make admin and users for security

I decided to hide any edits and keep them visible only to the admin

I added a stock system

I added some information

I added update connection string and check connection string for making the connection much easier.

I added a lot of features for the admin, edit users, add users, delete users, activate users, edit orders, edit their payment methods, edit each order details, add, delete, edit their price, edit their quantity,

## 9. Why did I use Incremental Model?

I used it because of a lot of things. But mainly because I wanted to build and evaluate each window alone as it helped at finding errors faster and it was easier to test and debug. Mainly:

- Errors are easy to be recognized.
- Easier to test and debug
- More flexible.
- Simple to manage risk because it handled during its iteration.
- The Client gets important functionality early.

But I had some disadvantages as I had to plan a lot for it.

## 2. My Project Story

### 1. Case 1: New User

First Case is about a new user that's new assigned to work. Firstly, he will have to go to the admin/owner. He will create his account there. Then, the admin must activate his account to make it work on the cashier computer.

### 2. Case 2: User Creating Order for a customer

In the second case, there is a customer buying some items. The user has to open the application, if it's not open already, then he have to sign in to his user account. After he signs in, he will see 2 tables and one button. This button is called new order. The 2 tables are all about showing the order history with each order details. He can't change or have any access on these tables. He must click on the new order button. Now there is a new window that will be opened. This new window has 2 tables and some buttons. The first table shows all the store items and their information which are: Item's name, category, price, stock, barcode, and description. The second table shows the items taken by the customer that he added. There is an arrow button in the middle. He/she must select the item that the customer wants to buy from the left table and double click on it or clicks on the arrow button and it will be added to the second table (He can search for the items too using the search textbox and he can input the name, category, description or even using a barcode reader, he can search for it by barcode). He can also specify the quantity of each item (If the quantity is more than the stock an error will appear telling him to decrease the stock or if it's out of stock a message will appear telling him it's out of stock). After that, there is a label showing the total price appearing under the second table. The user must tell the customer the total price and ask him about his payment method whether it's cash or credit card and then must select it from the combo box. If he added an item by mistake or the customer wants to return an item there is a remove button. He must select the item's row which he wants to remove then click on the remove button and the item will be removed. Finally, he can click on complete the order and the order will be completed and added to the database. Or, if the users refused to pay, he can click on cancel the order and its details will be deleted from the system.

### 3. Case 3: Admin want to add items to stock

Firstly, the admin has to sign into his admin account. Then in the homepage instead of only one button appearing, there will be 3 more buttons. Edit Items, Edit Users, Edit Orders. Now, he must click on Edit Items. A new window will be opened containing a table and some textboxes and some buttons. These textboxes are for updating the table. When the admin selects any store items and information from the row will be taken automatically and written in each textbox. Then, the admin can edit whatever he wants and after that click on update selected. In this case he needs to add stock so, he will have to write his current stock and then click on update and congrats his stock is updated.

#### 4. Case 4: Admin wants to hide/show item in store

The admin has to sign in to his admin account. Then click on edit items after that he will search for the item that he/she wants to hide or show then select it then click on hide/show item and it will be hidden or shown. What does that do is that it hides and shows items from the new order window so, that it can't be purchased.

#### 5. Case 5: Admin wants to change the price of an item

The admin must sign into his admin account. Then he must click on edit items. Then, the items table will appear in a new window, he must search for the item that he wants to increase its price. After that he must click on it and its information will be written in the textboxes that exists under the table. After that, he will have to write the price that he wants. It must be in a correct format, or the system will show an error. After that he must click on update and the item new price will be saved to the system. This new item price doesn't affect old order total prices or old orders' item's prices.

#### 6. Case 6: Admin wants to add a new item to the store

The admin must sign in to his/her admin account. Then he has to go to edit Items window after that there is an insert button, When he/she clicks on it another new window will appear having some labels and textboxes. He/she will have to enter the item's name, category, price, barcode, description and stock. Writing the name, category, stock and price is mandatory. New items are hidden by default. If the admin wants to show them he/she will have to select the new item and click on Show/Hide Button.

#### 7. Case 7: Admin want to delete an item from the store

If the admin an item by mistake he/she can delete it by signing into his/her admin account. Then, he/she must go to edit items and select the item that he wants to delete then he should choose it from the table and click on delete. BUT, if he wants to delete an item from the store that has already been purchased before he can't delete the item until he deletes that item from the order that has been purchased. That's made for preventing errors like deleting an item by mistake that has been purchased before then when checking that item in the order it won't be found.

#### 8. Case 8: Admin wants to add a new user or admin

Firstly, the admin must sign into his admin account, then he will have to go to edit users. A new window will appear containing a table and some textboxes and buttons. The textboxes are for updating the username, password, gender, birthday. The buttons are for inserting new users, activating, and deactivating them and deleting them too. Now he must click on insert then a new window will appear containing some textboxes and labels, he has to write his username and password, gender and birthday. And that's it, his account is registered but not activated. Now, the admin must activate his account if he/she wants that user to access his/her new account.

#### 9. Case 9: Admin wants to delete a user from the system.

Firstly, the admin will have to sign in to his/her account then he must click on edit users and then he will choose the user that he wants to delete. If this user has never completed any orders using his account, then he can be deleted else, he can't be deleted from the system and he must delete the order that he completed from the system.

#### 10. Case 10: Admin wants to check the order history

There are ways, firstly he can check it from the main menu that he sees after signing in or he can go to edit orders window.

#### 11. Case 11: Admin wants to change the payment method for a completed order

The admin must sign in to his/her account and click on edit orders after that there is a combo box and a change payment method. He must choose the order that he wants to edit then click on change payment method.

#### 12. Case 12: Admin wants to delete an order

The admin has to go to his/her account then click on edit orders then select the order that he wants to delete then click on delete. A prompt will appear asking whether he is sure or not because this will delete the order and all of its details from the system.

#### 13. Case 13: Admin wants to add some items to an old order or check its details.

The admin has to sign in to his/her account then he should go to edit orders then select the order that he wants to edit then there is a view order details. He should click on it after that he will see all the order details with old price that the order has been recorded at that time with and the current price, there is a lot of information there like the item name, category, barcode(for searching), current price, price, quantity, and total price. If the admin wants to update the price and the quantity he can select that item and then its information will be taken automatically to the textboxes under the table then he can edit them then click on update selected. if he wants to delete the item he/she has to select that item then click on delete item. The Total price is updated automatically. If he wants to add items, he can easily add items and it won't affect the stock. He/she has to click on add items and a window will appear like the new order window. In this window, there is 2 tables and an arrow button, he can select whatever item he wants to add then add it easily and when he goes back these item will be added and the total price will be automatically calculated again.

### 3. Test Case

#### 1. Case 1

Input	Username and password
Tests	Username that doesn't exist Capital username Password that's wrong Capital password that's not the same Username and password that exists User account Admin account Inactivated account Try to close without sign in
Output	<ul style="list-style-type: none"><li>• Sign in successful if it exists else error username doesn't exist or password wrong or error inactive account</li><li>• If user only new order button appears else if admin all the edit buttons will appear</li><li>• Username and id should appear above if sign in successfully</li><li>• If no sign in then the application will shut itself down. For privacy control</li></ul>

#### 2. Case 2

Input	Add new SQL server Ip
Tests	If the server exists or not If it's empty and the add server button is clicked If it's a valid server
Output	Message containing server connected successfully will appear and the server will be set else error message declaring that if failed and nothing will be saved or the server textbox is empty

### 3. Case 3

Input	Add an item in a new order
Tests	If it's out of stock If its quantity is more than that's available in stock If the selected item quantity is 0 If the item is hidden
Output	<ul style="list-style-type: none"><li>• If the item quantity is less than the stock it will be added, and the stock will decrease that same amount</li><li>• If the quantity is more than the stock error will appear saying that we should decrease the quantity to be less than the stock or equal it.</li><li>• If the item is out of stock then a message will appear telling us that it's out of stock and it won't be added</li></ul>

### 4. Case 4

Input	Item Price increased
Tests	Old order total prices Old order details' item prices New order's item prices
Output	If an item's price increase then, all the new orders after the change will be affected using the new price but all the old orders will keep their old prices as and when checking the history there will be a current price showing the difference between the old price and current price.

### 5. Case 5

Input	Deleting an item from the store
Tests	If the item is new and haven't been purchased before If the item has been purchased before
Output	It will be deleted successfully as long as it has never been purchased before. But if it was purchased even once it won't be deleted and it will show an error saying that this item can't be deleted because it has been purchased N times

### 6. Case 6

Input	Deleting a user
Tests	If we delete that user and there is an already order that he bought
Output	It will be deleted unless there are no orders that he completed, but if there is an order then an error will be outputted showing that this user can't be deleted

## 4. Full Requirements

### 1. User Requirements

The user requires an application to follow all the store stock, items, preventing customers from buying certain items, orders, total incoming orders, checking each order daily and check the history of orders and requires privacy for this information, not any user can access this information.

Also ease of search is essential.

### 2. System Requirements

1. There is order history, and each order has it's details with it's price even if the price is changed the old price is saved.
2. There is stock system that if the item is out of stock it can't be purchased.
3. Users can't change the stock, only admin can change it.
4. Privacy Control, users can't edit anything only create new orders and check order history, so, in case of emergency there must be an admin available in the store 24/7.
5. The admin can delete, edit, deactivate or activate user accounts so, if any users leaves his job his account can be easily deactivated.
6. Search feature to each order by date in the format of dd/MM/yyyy
7. All orders are saved on their date of completion so, the system must have the right time and region on the operating system
8. The user can search using a barcode reader.

## 5. Nonfunctional Requirements

### 1. Product Requirement

The Cashier System application supports various windows operating system versions: Windows XP, Windows Vista SP2, Windows 7 SP1, Windows 8.1, Windows 10 and Windows 11

It can work on any pc but it should be connected to the store's system computer as there will be a server installed on that system computer

There must be network connection wired (preferred) or wireless.

### 2. Organization Requirement

Users can sign into their accounts using their personal accounts and admins can sign into their accounts using their admin accounts. Only admin can create other admin accounts. Password isn't visible to other users but visible to admins so, don't use your global password.

Password can be edited by admin upon request from the user.

Admins can activate or deactivate users accounts

### 3. External Requirement

There must be a network connection to an Admin Computer. This Admin computer must have SQL server and SQL management studio installed on it. It must have that cashier system installed on it for local editing the database. and then the main cashier computers must be connected to that database.

The Database must be installed on the admin computer or the system computer and it's connection server allowed through the firewall and implemented in the applications.

The system computer should have a static Ip set by the router.



## 6. Nonfunctional requirements metrics table

Property	Measure
Speed	Response time <1 second 1 Processes per input
Size	Software < 100MB Database < based on how large the data is but recommended 5GB for small stores
Ease Of Use	Very Easy for users. Normal for admins who understand English well. Training Time: 1 hour is enough Help Frames: Everything Is written in messegebox when mistakes happen for error control
Robustness	Time To Restart: Instant Percentage of events causing failure: about 1% know and it's only from sql server disconnection
Portability	Can work on Windows Operating Systems starting from Window Vista sp2 Windows XP SP2, Windows 7 SP1 or higher

## 7. Write full requirements of each part of your project

### 1. Admin Requirement

The system requires an admin to be available at all time to edit the stock, users, orders, and store items

### 2. User Requirement

The user has to be available at the cashier points to calculate the customers order's price and save his order on the system and check the stock

### 3. Stock Follow up requirement

The admin has to check his stock from edit items and he has to refill his stock because all out of stock items can't be sold.

### 4. Deleting Records from database

This require a lot of focus because if you delete an order the items won't restock it self because if it's a mistake then the item should stay the same

## 8. Full Structure Requirements

### 1. Record a new order

Function	Record a new order for a customer
Description	A customer wants to buy some store items and he/she has to pay. The user has create a new order and add all the items that the customer wants to buy and take the money from the customer and record that the order is complete
Inputs	<ol style="list-style-type: none"><li>1. Create New Order</li><li>2. Input all the items and their quantity by selecting them by searching for their names, categories or barcode</li><li>3. Selecting the payment method</li><li>4. Completing the order after taking the money from the customer</li></ol>
Source	Items tables from the cashier database Items that the customer wants to buy
Destination	New Order Window
Action	When The customer comes to the user with some store items he wants to buy, the user will take these items and scan them using a barcode reader or searching for them by their names, categories or even prices then the user will enter the quantity of each item then the total price will appear. He will tell the customer that total price then he will ask the customer whether it's cash or credit card then after completing the transaction he will click on complete order. If the transaction is not complete then the user can click on cancel and all the items will be returned back to the store and the order will be deleted
Requirements	The store items must be recorded in the database by the admin

## 2. Creating a new user and activating his account

Function	Registering a new user and activating his account
Description	The store owner has hired a new employee. This new user needs an account to be recorded when creating new orders. So, the admin must help him create his account
Inputs	<ol style="list-style-type: none"><li>1. User's Username</li><li>2. User's Password</li><li>3. User's Birthday</li><li>4. User's Gender</li><li>5. Admin's Login account</li></ol>
Source	From the new employee
Destination	Add a new user from edit users from main menu
Action	The admin will sign in to his admin account. Then, he will go to edit users. Then, he will click on insert. Then he will give his computer to the employee to sign up. The employee will have to write his unique username, password, birthdate, and his gender. Then, he will have to click on register. After that, if the admin wants to activate his/she account, he/she will have to search for his username, select it and click on activate.
Requirements	A main admin account is required

## 3. Add the new stock

Function	Record the new stock in the system
Description	The admin has some new items coming into his store, he wants to record that new stock and put it in the system.
Inputs	<ol style="list-style-type: none"><li>1. Stock amount</li><li>2. Items' names for the search</li></ol>
Source	From The store
Destination	In Edit Items window
Action	The admin will have to sign in to his/her account, edit items then, select each item he wants to increase or decrease its stock then he will write the new stock then click on update selected.
Requirements	Admin Account

#### 4. Edit Order, Add some items to it that wasn't recorded by a mistake

Function	Add Items to previously recorded orders
Description	The user did a mistake that he ended an order without calculating all the items and he wants to add that missing item, then he has to call the admin and the admin will edit that and add these missing items
Inputs	<ol style="list-style-type: none"><li>1. Items from the customer</li><li>2. Quantity</li><li>3. New Stock</li><li>4. Admins account</li></ol>
Source	From the customer
Destination	In edit orders window
Action	the admin will sign into this account, then he will go to edit orders then then select that specific order then click on order details then add items to order then he will choose the items he wants to add then add their quantity and that's it. He has to edit the stock too.
Requirements	Admin's Account

#### 9. Tabular computation

Condition	Action
Item Stock =0	Error item is out of stock
Quantity > Stock	Error the entered quantity is more than the available
User Activated = 0	Error can't sign in activate your account through an admin
User access control = 0	Sign in as user
User access control = 1	Sign in as admin

## 10. Detailed Scenarios

### 1. Scenario 1: Customer Buying

**Initial Assumption:** The Customer comes with some items that he wants to buy

**Normal:** The user will take each item and record it in the system then tells the customer the total price and after that he will choose the payment method and clicks on complete order and that's it the order has been recorded.

**What can Go Wrong:**

The user's account can be deactivated

The user can forget his password

The user can find the item out of stock

The user can't find the item that the customer wants because it's hidden or hasn't been record in the system.

No connection to database

**Other Activities:** The user can go to the admin for his account activation or resetting his password and the admin can fix the out-of-stock problem or he can add the missing item to the database or fix the database connection problem by starting the system computer or checking the server connection string and fixing it in the main menu

**System State on Completion:** The user will be kept logged in and he is back to the main menu and he can see the order that he recorded in the main menu with it's details for any confirmation.

### 2. Scenario 2: Order has been completed with missing items.

**Initial Assumption:** The user on the cashier recorded an order with missing items that has not been recorded

**Normal:** He will go the admin and tell him to sign in with his account and go to that order details and add that missing item to the system then remove it from the stock.

**What Can Go Wrong:**

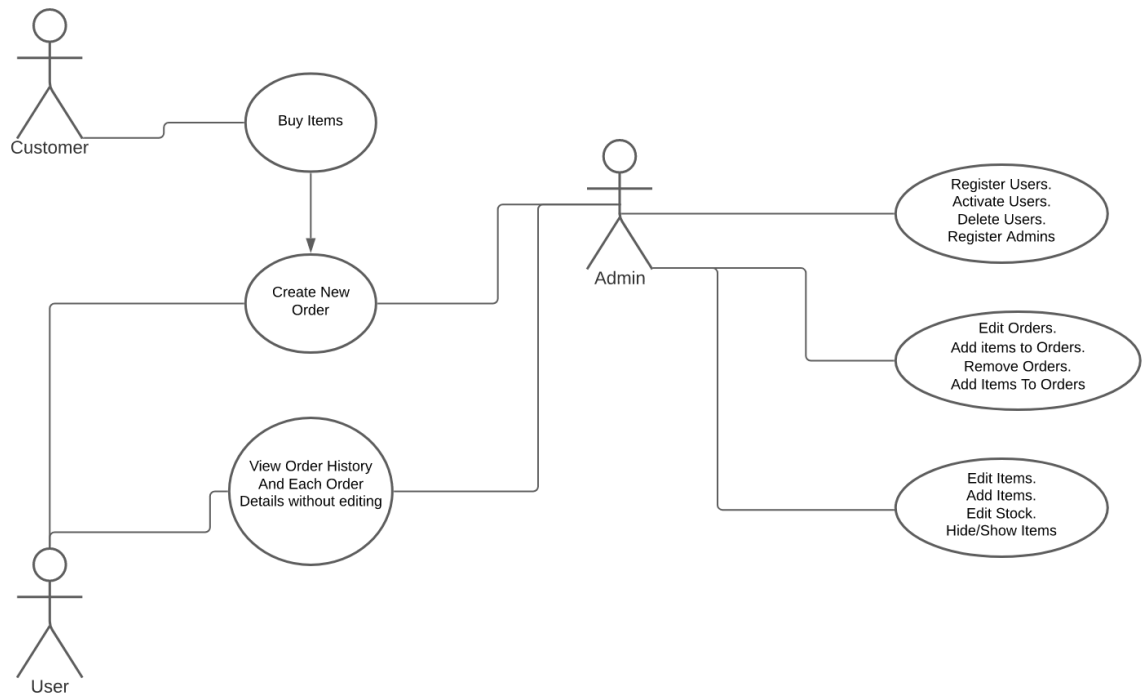
The Admin can delete the whole order by a mistake.

The admin can add the item and then forget about changing the stock that will lead to fake stock number

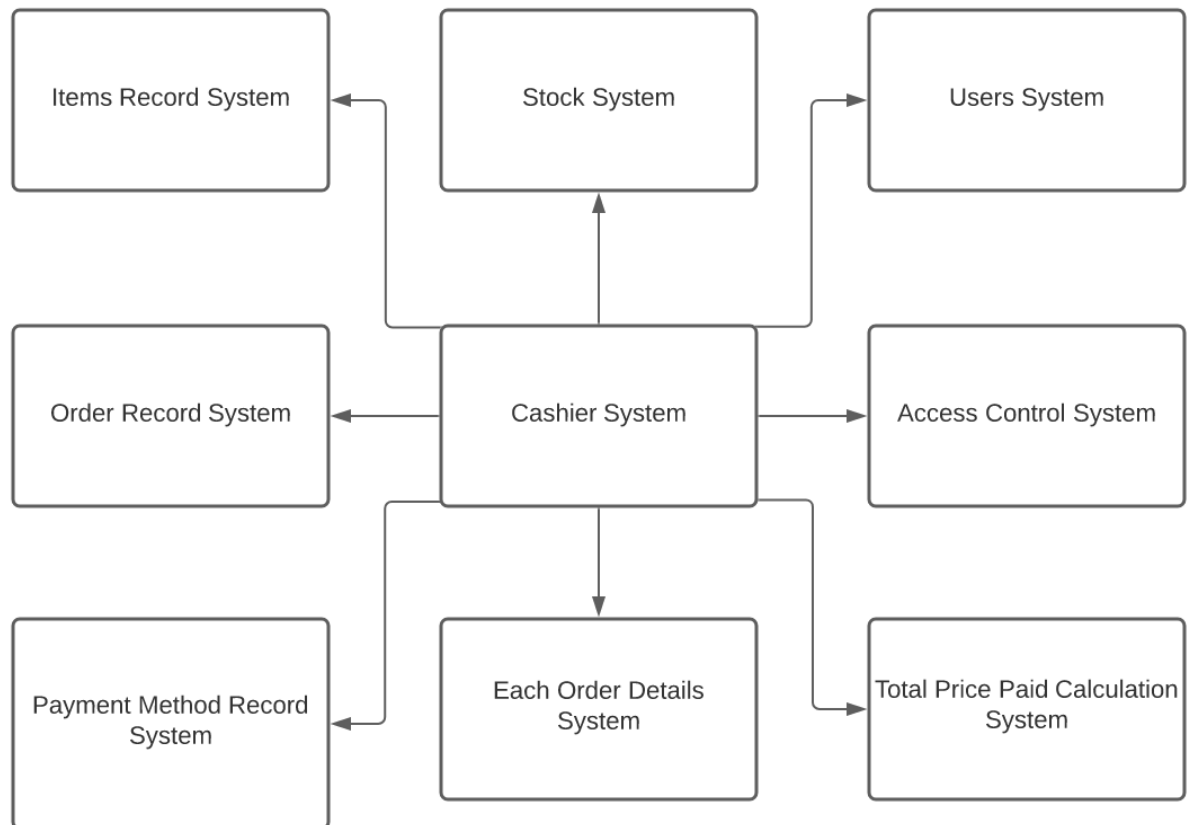
**Other Activities:** The user can have an admin account and do that himself if trusted enough, the admin can delete the whole order and rerecord it again.

**System State:** the user can check again the order in the main menu

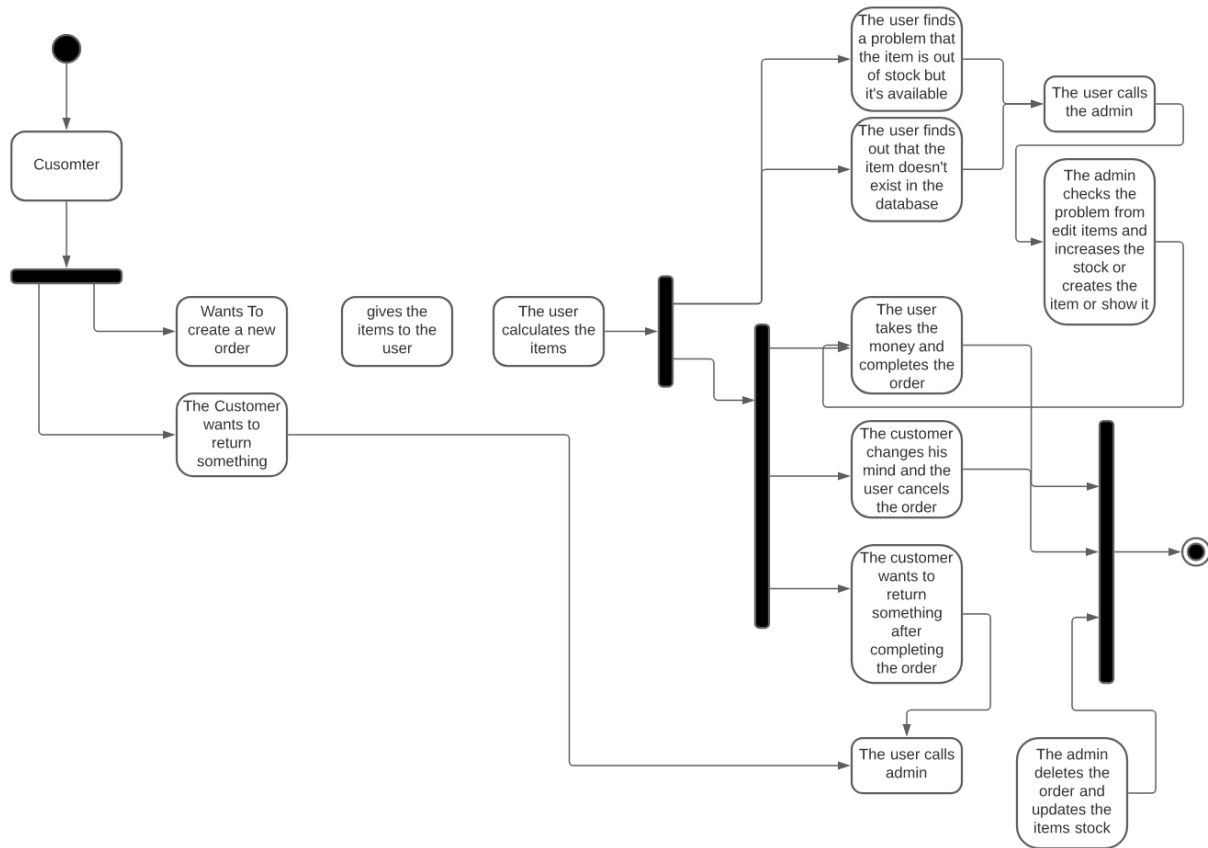
## 11. Use Cases Diagram



12. Full details context diagram

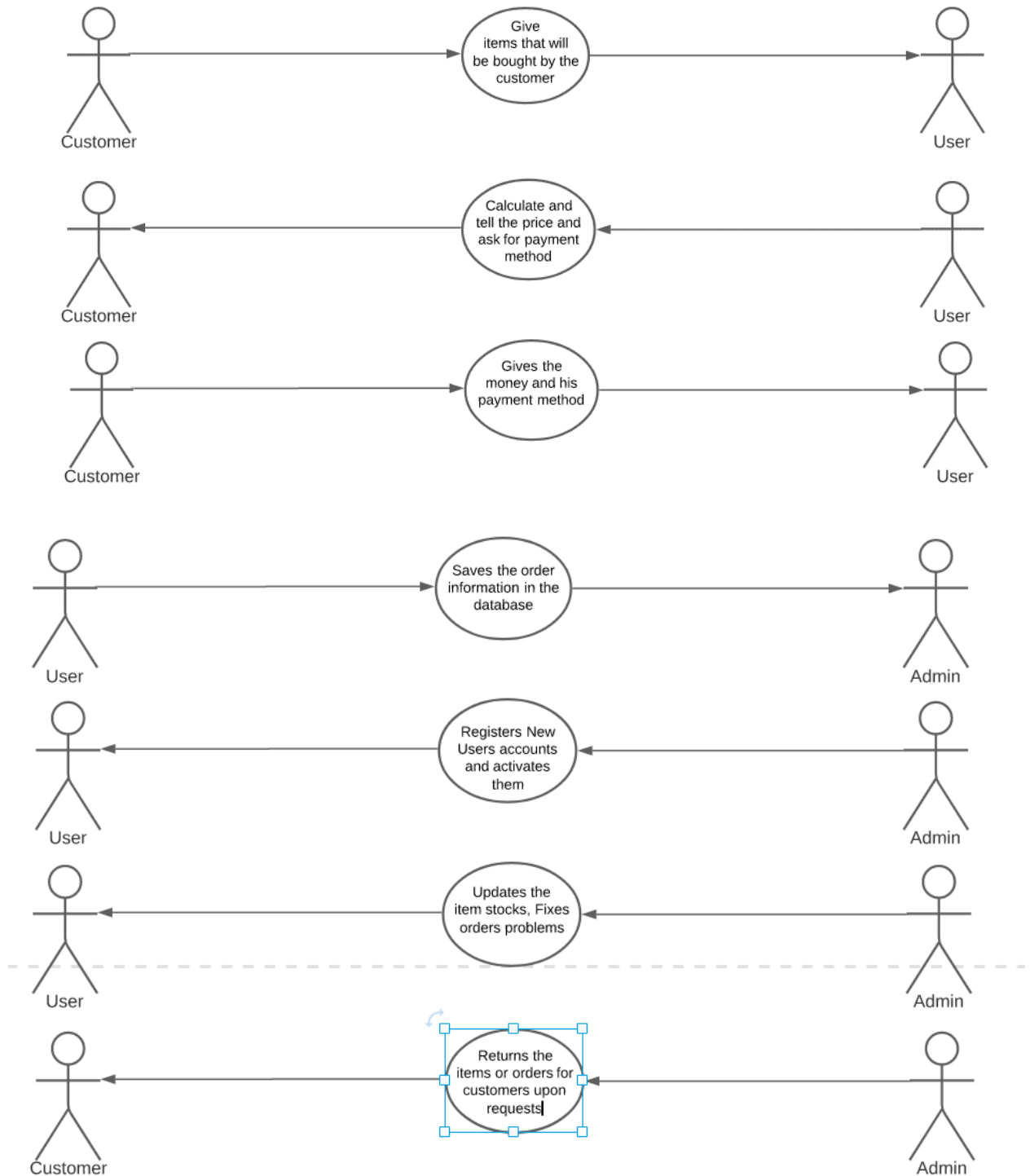


### 13. fully detailed process model UML diagram





## 14. every use cases UML diagram



## 15. tabular description

User saving order	
Description	The user will take the items from the user and scan them and add them to the order then he will tell the total price to the customer then he will ask the customer about his/her payment method and receive the payment the flag the order as complete
Data	Store Items
Stimulus	Order complete command issued by the user
Response	The program will go back to the main menu
Comments	The user must focus while adding items that he must add the correct amount

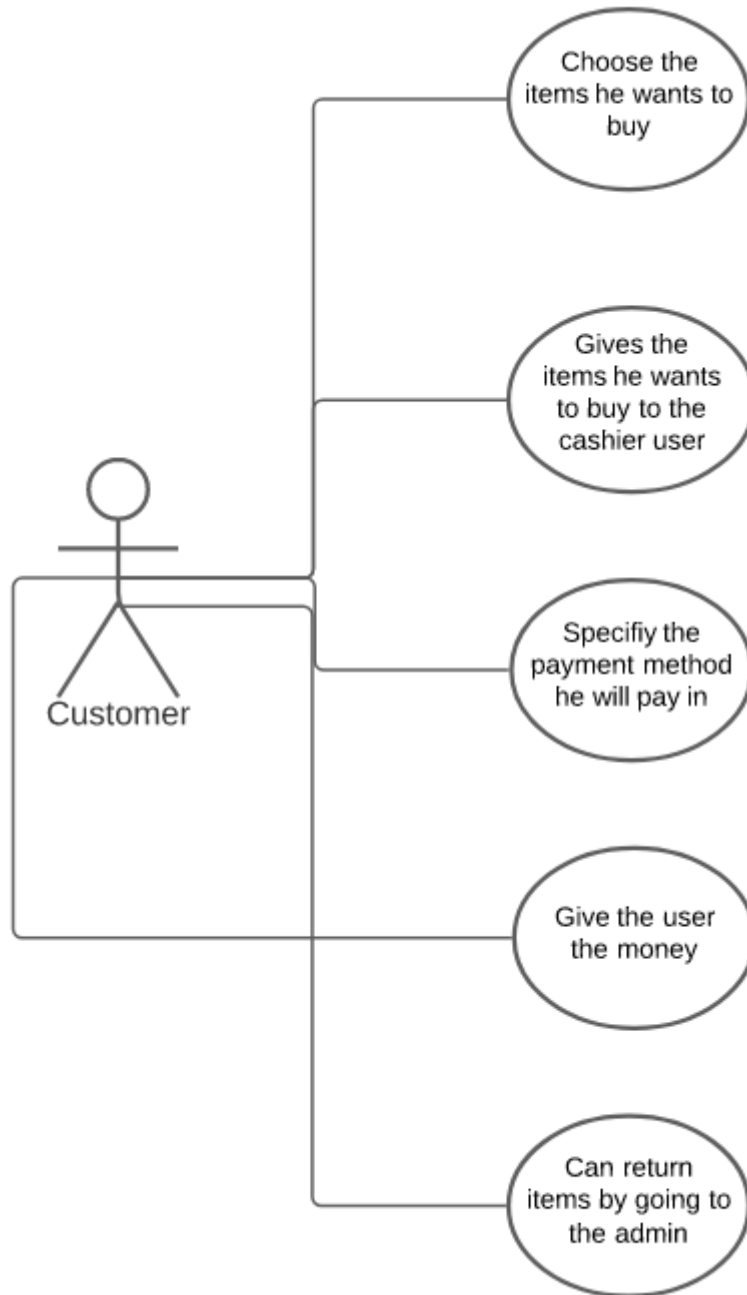
User creating a new account	
Description	The user have to talk to the admin to make him register his new account, then after registering through the admin's account the admin must activate the user's account in order to work and the user be able to sign in
Data	Users Data
Stimulus	Activation Command is made by the Admin
Response	The user will be able to sign in
Comments	The Admin must tell the user that his password is visible to admins so, he has to make something ununique

Customer wants to return an order	
Description	If a customer bought something by mistake or wants to return his order. The customer will have to tell the user to call his admin or go to the admin office, there the admin will sign in to his account and edit his order by removing the item or removing the whole order
Data	Orders and Orders Details
Stimulus	The remove Command is clicked by the admin
Response	Confirmation message showing it has been deleted and the new total price will be calculated
Comments	The admin has to go back to the stock and fill it again.

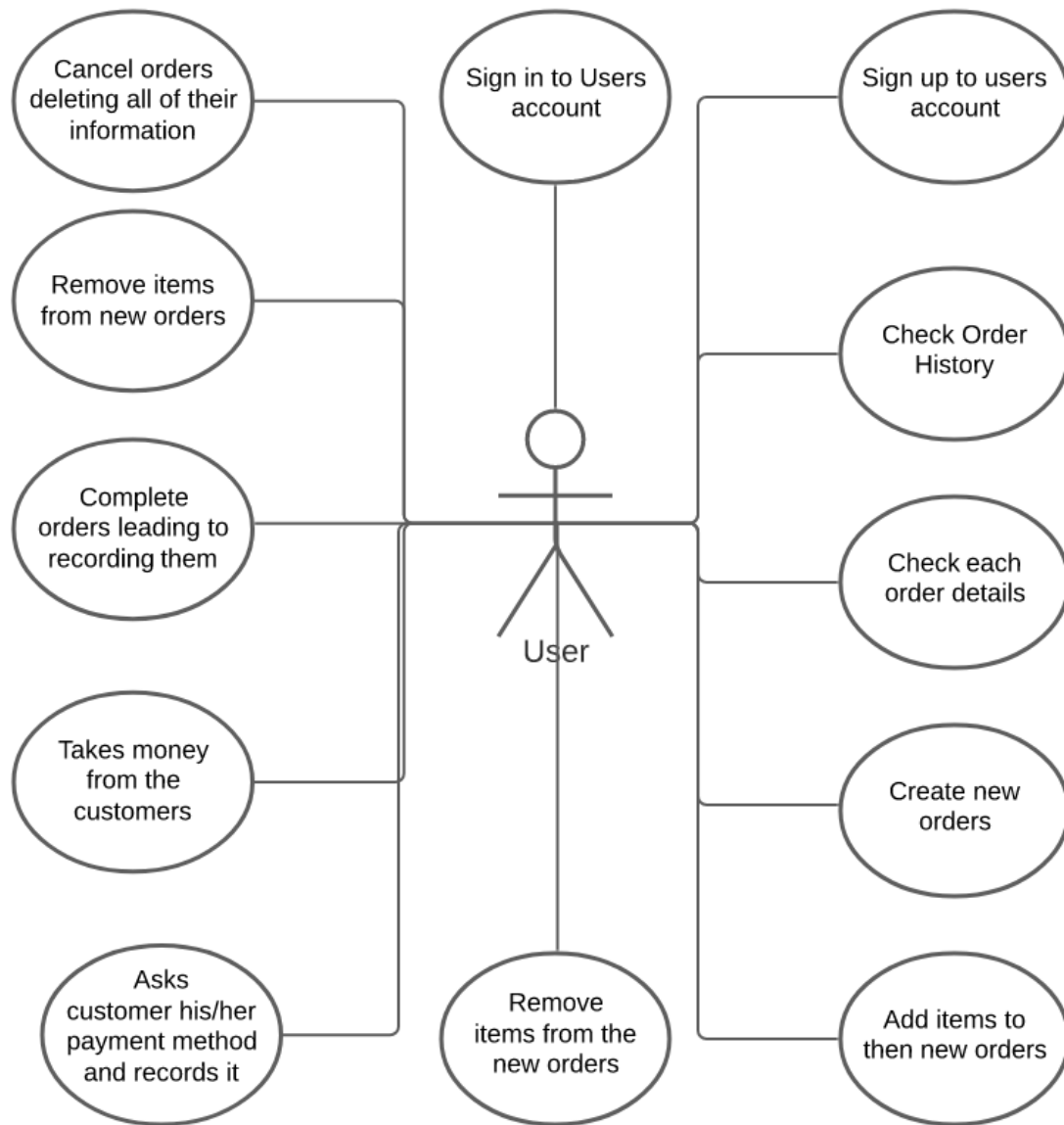
Items out of stock but it exists.	
Description	The user will have to notify the admin about this issue and he will have to tell him the item's ID or barcode, then admin will assist him by signing into his account and increasing the stock
Data	Items
Stimulus	The Stock Update command is issued by the admin
Response	A message will show that he updated the item successfully and the user can add that item back to new orders
Comments	The admin should always revise the stock after editing any tables.

## 16. use cases of each agents

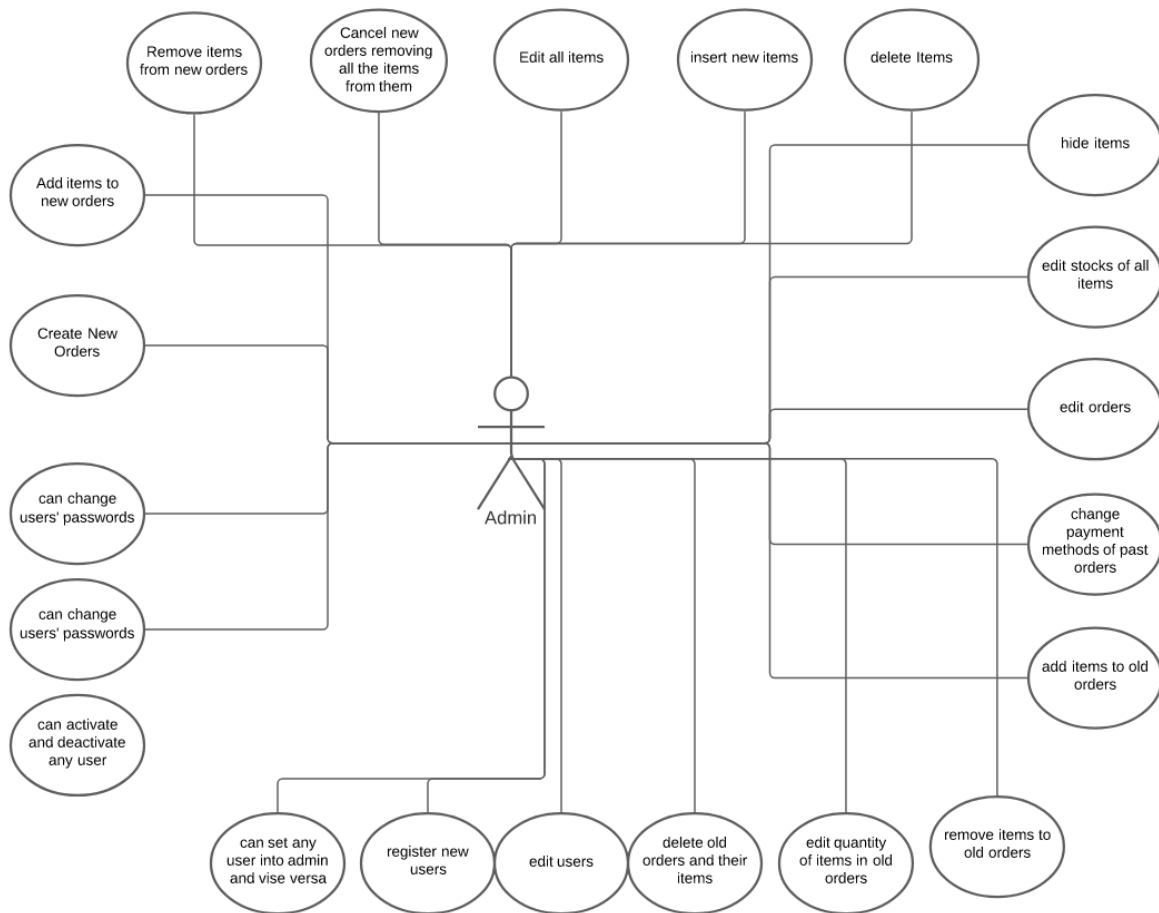
### 1. Customer



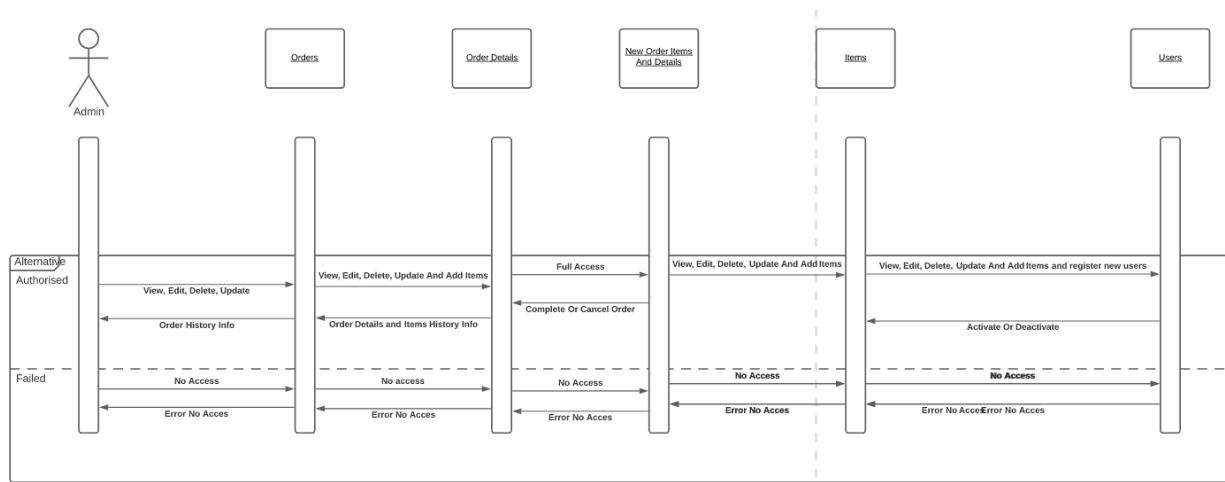
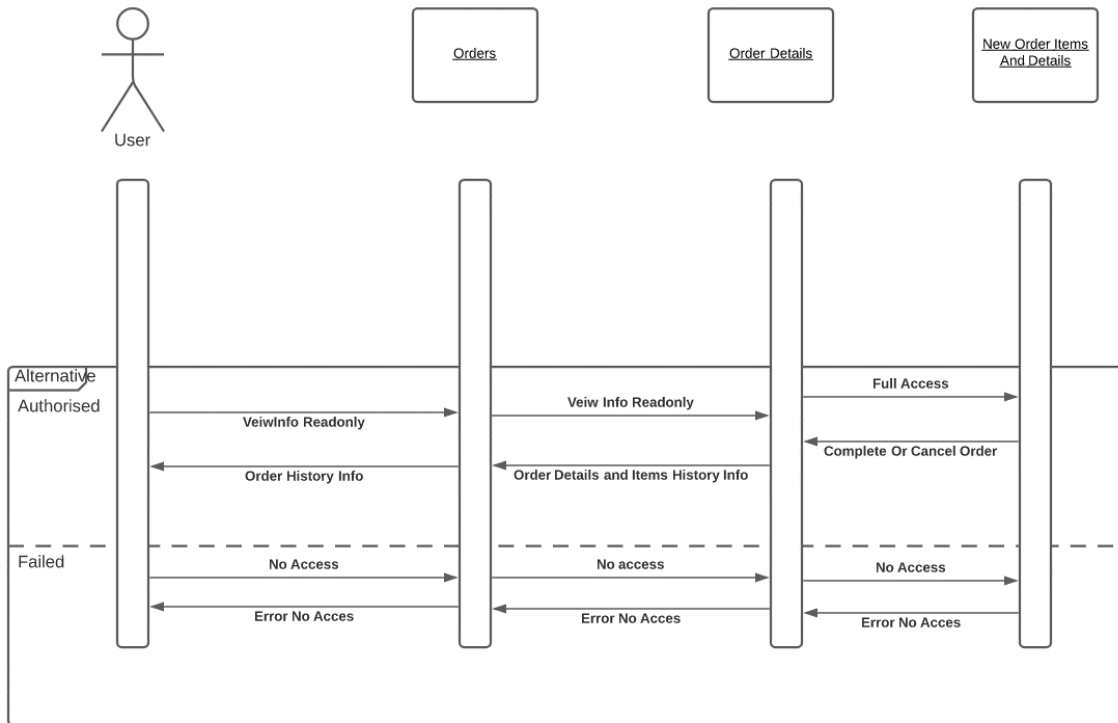
## 2. User



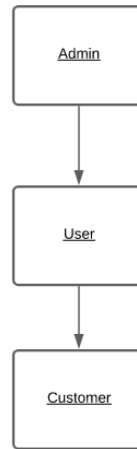
### 3. Admin

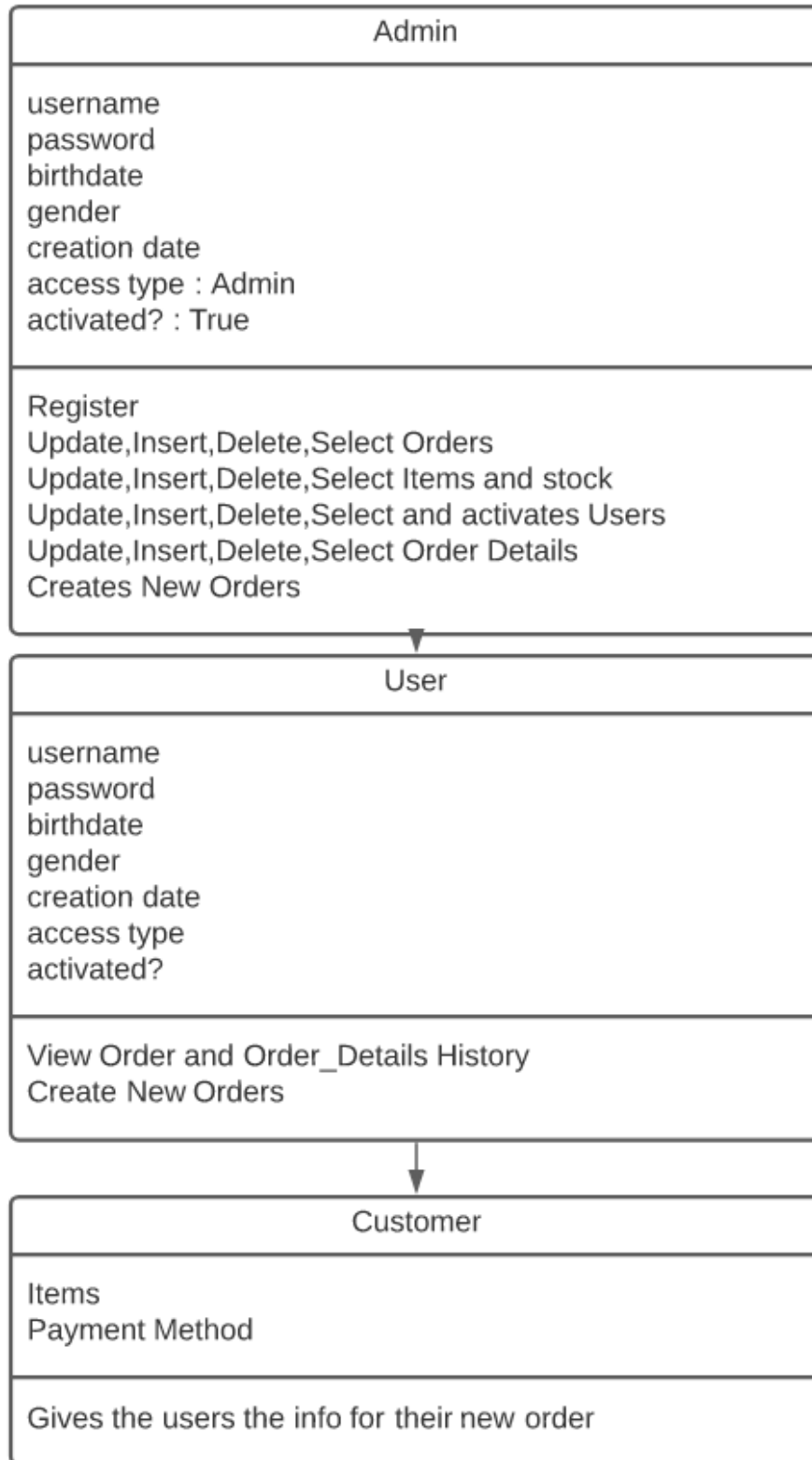


## 17. Draw Sequence diagrams of every action



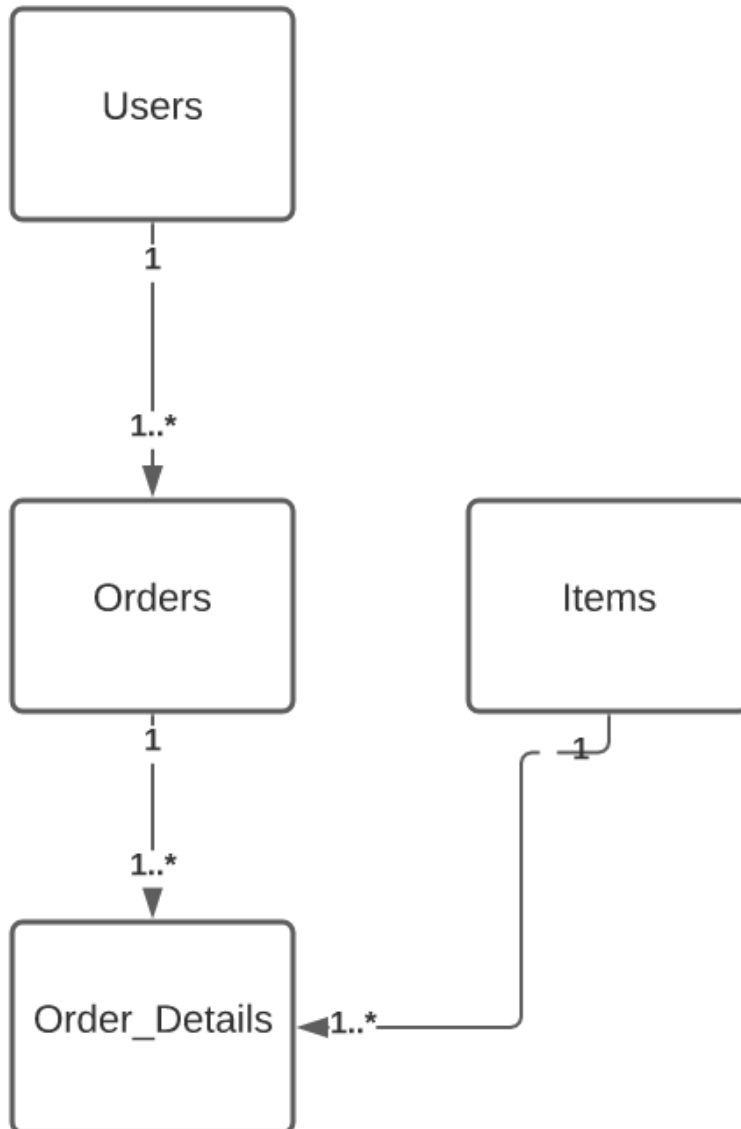
18. generalization hierarchy



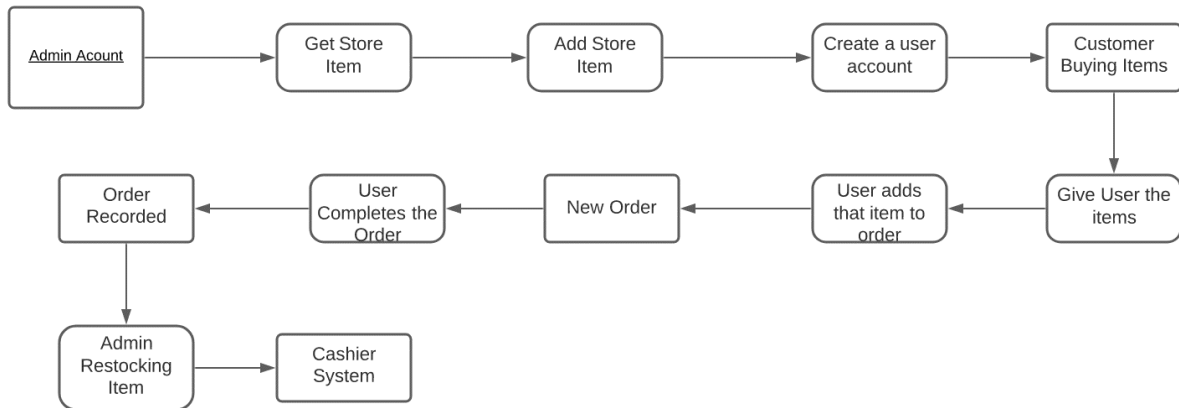




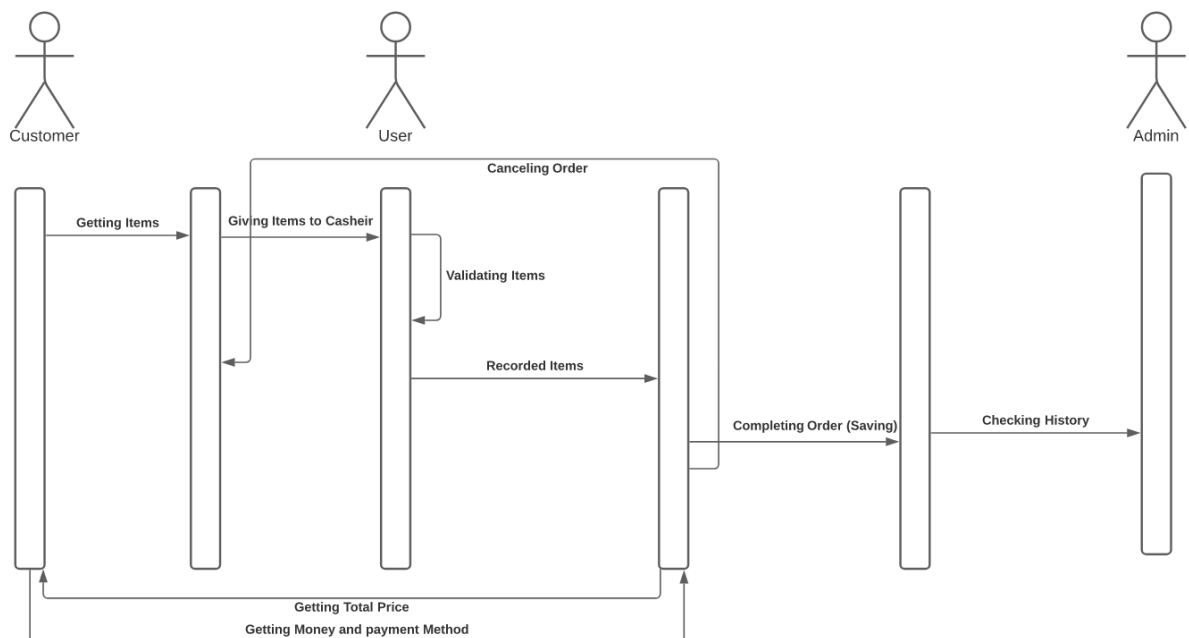
19. aggregation associations



## 20. activity model

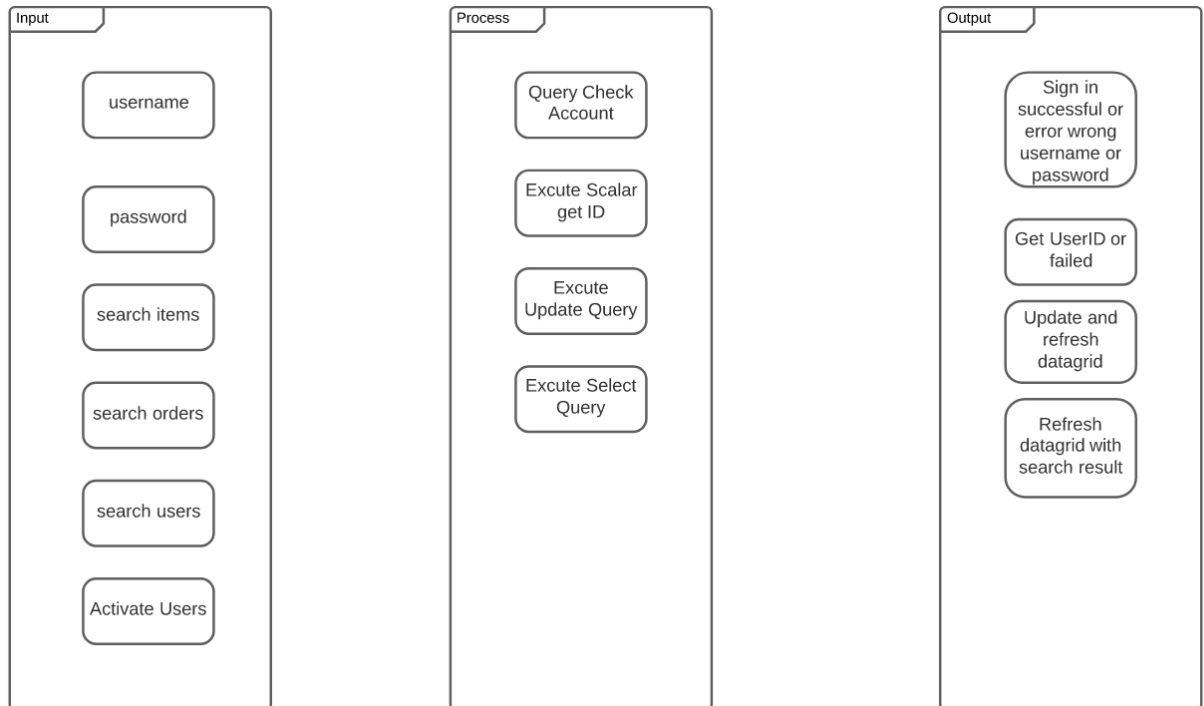


## 21. Order Processing

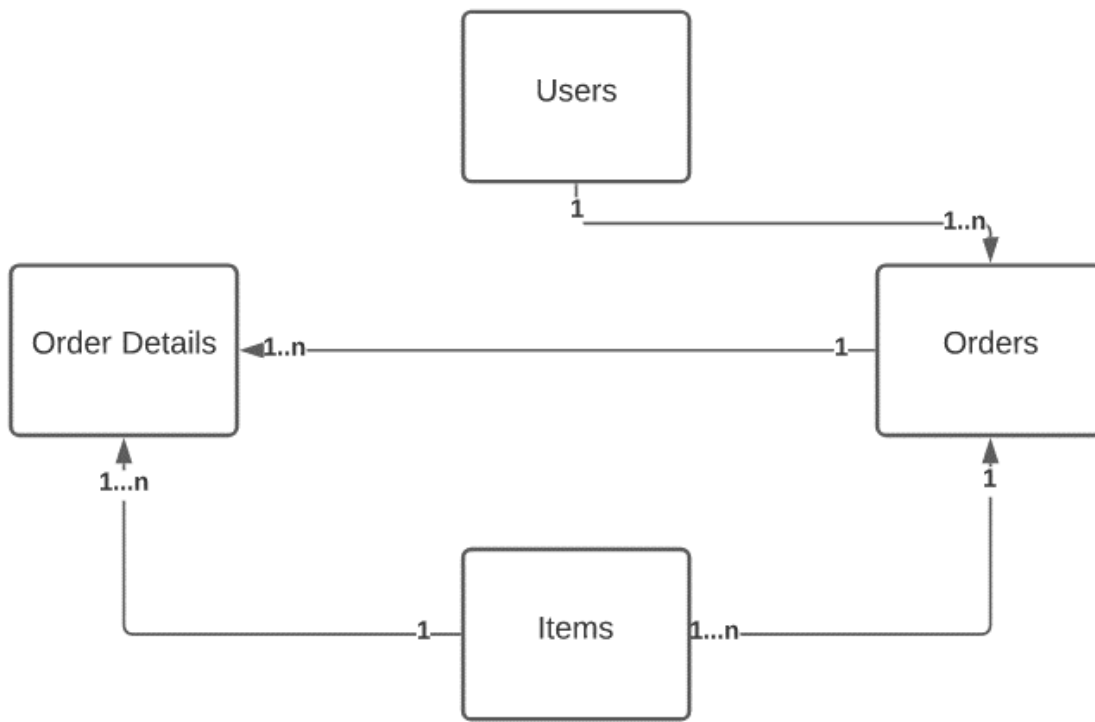


## 22.

## 23. Software Architecture



24. context diagram



## 25. detailed usage scenario

Jim is a new employee working in a small store that is selling some groceries. On his first day, he comes to see his employer. His employer starts teaching him how this store works and shows him where is the cashier then, he shows him the system. After that, the employer calls Jim to his office and tells him to enter his information. Jim looks at the monitor and he can see some textboxes and labels besides them. He must create an account and enter his username, password, gender, and birthdate. After he enters it, he goes outside to sign into the cashier's computer but there is an error that his account is not activated. He goes back again to the employer and the employer apologized because he forgot to activate his account. Then he goes in and activates his account. Jim goes back to his computer and signs in. Now he can see the previous store's orders and their details. He sits and waits, and his first customer enters. He is impatient and getting some items then goes to him and tells him to calculate fast. So, he opens a new order and starts on recording all the items as fast as he can then he tells him his total price then, asks about his payment method. So, he tells him it is cash so, Jim chooses cash and directly completes the order before receiving the money. Then, when he is receiving the money, he notices that the customer has an item that he did not calculate. To solve this, he had to call his employer and let him sign in as his admin account then go to that order then go to its details and add to it this missing item then when he told the customer the new price he told him that I want it to be credit card. So, Jim gives back his cash and the employer changes the payment method of the order to credit card. He took his payment and the customer left. The employer told Jim to be careful next time, and he asked about that missing item again then the employer went to edit items window and decreased that missing items amount from the stock.

## 26. reliability terminology

Term	Description
Human Error or Mistake	Human behavior that results in the introduction of faults into the system. For example in this system firstly the sql connection string, It will change on new systems upon install and needs to be configured first thing. The second error is the stock. If the admin changes items through editing, it doesn't update the stock as the stock is

## 27. Safety Terminology

Term	Definition
Damage	When the stock is misconfigured and someone asks about an item whether it's in the store or not and it's written that it's in stock and it's not this will waste time searching for that item
Risk	If this application is used by a pharmacy and the stock is misconfigured there is a risk that when an important medicine is needed on emergency and the employees and employers think it's in stock but it's out of stock. That's a risk

## 28. Security Terminology

Term	Example
Asset	The Orders that is completed and the item stock
Exposure	If a user has an admin access and isn't trusted he/she can sell items and take the money then edit the orders and their items and stock so they can steal some money into their pockets as the admin has access to everything. But, if user he can't edit or change anything
Vulnerability	A weak admin who trusts the wrong user or his password is weak and is stolen
Attack	An Impersonation of an authorized user
Threat	An unauthorized will gain access to the system by guessing their credentials of an authorized user or faking that they are trusty people
Control	The admin should never give admin access to any user, The admin should deactivate any account that isn't working. The password should be hidden too

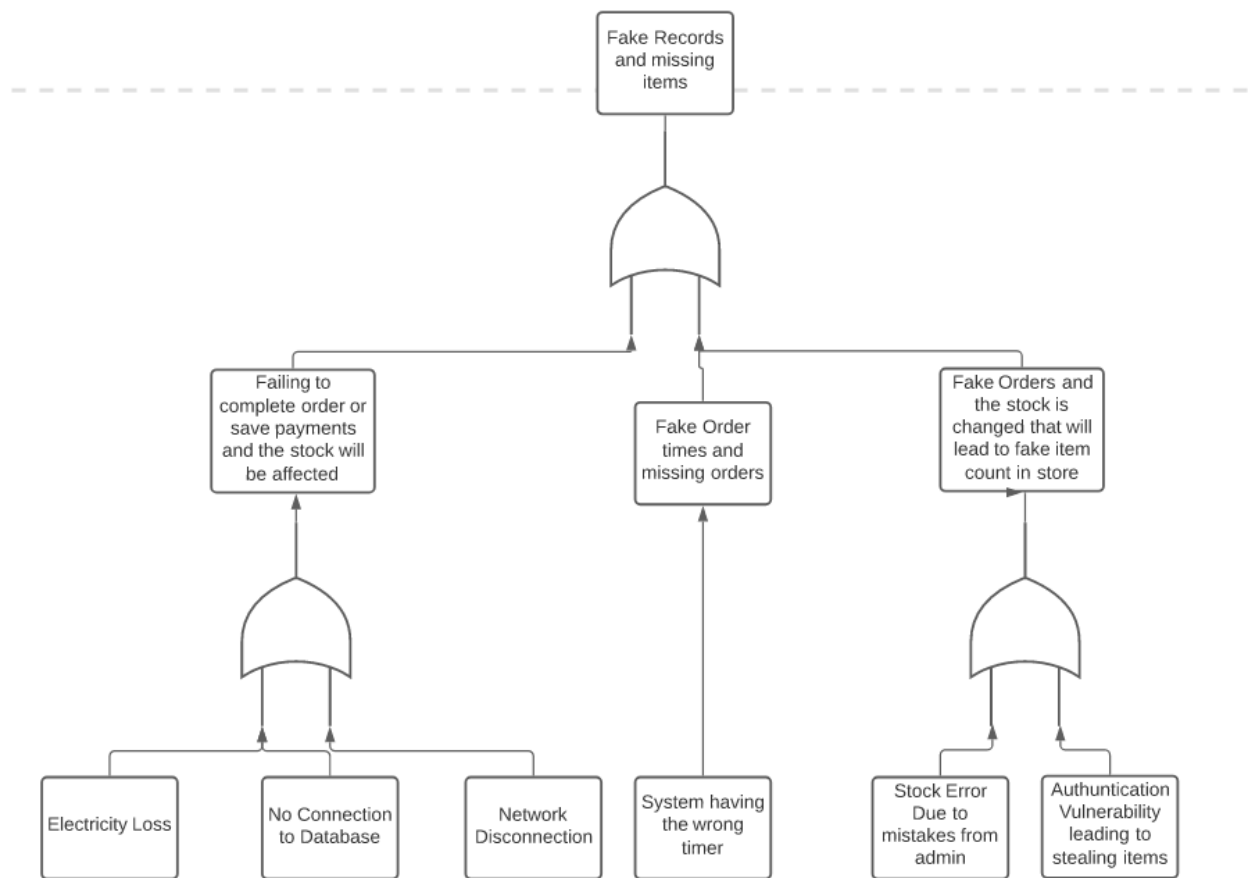
## 29. Vulnerability Avoidance

I added the admin access and user access and account activation and deactivation for vulnerability avoidance. As if everyone is admin. The system will easily have fake records and people can steal from the store very easily. The stock system is made also to track the stock as if items go missing it can be detected easily.

### 30. Risk Classification Tabular view

Identified Hazard	Hazard Probability	Accident Severity	Estimated Risk	Acceptability
No Connection to Sql Server	Low once configured	High	High	Intolerable
Admin Account Stolen or Guessed	Medium	Medium	High	ALARP
Untrustworthy employee with admin record changing record	Medium	High	High	Intolerable
Power Failure	High	Medium	Low	Acceptable
Weak Machine	Low	Medium	Low	Intolerable

### 31. Software Fault Tree



## 32. Safety Requirements

SR1. The System Won't Sell items out of stock or sell items more than stock

SR2. If prices changes old orders won't be affected.

SR3 Old orders prices can be changed by admin

SR4 User Bind to Orders can never be deleted

SR5 Items that have been sold before can never be deleted but can be hidden

SR6 User account without admin access cannot change any data from the tables like Items, Users, Orders or Order Details

SR7 In case of no connection to database on launching. An error will be shown that the program has failed to sign in.

SR8 Authentication Bypassing Control by closing the application if there is no ID, Username or login isn't complete

SR9 In case of SQL connection during the application usage the application shouldn't crash but it will show an error

## 33. reliability requirements

RR1: Each input and textboxes in the system can check if this input is empty and show the specified error

RR2. Any prices or int textbox is controlled to only input numbers even on pasting, if the data entered isn't a number then the paste won't work

RR3. Dates are controlled and on user Register if the date is in a correct format a tick will appear.

RR4. If parsing the date failed it will stop the process showing an error.

RR5. In case of ip change to the server. There is a temporary Connection string change on login that's for access in emergency times.



### 34. threat and control analysis

Threat	Probability	Control	Feasibility
Unauthorized user gaining an admin account and accessing and changing items prices	Low	Only make rules that admin accounts are signed in from the office admins and users should have no access to these rooms	An Admin should be available at all times. I think this is feasible for small to medium stores
Unauthorized user gaining an admin account and changing items stocks and orders for putting money in his pocket instead of the cashier for personal gains	Medium	Only make one admin account for the owner and one main admin account for the manager and no one else should have any admin account and the password of these account must be hard	Feasible but high cost solution if any user steals money. It's hard to confirm
Admin Making mistakes when refunding items and receiving items without recording the stock back	High	This can make tracking store items harder as if store items are stolen nobody will notice and that leads to high losses	Feasible but has the cost of that stolen item

## 35. References

1. Mainly: [https://www.youtube.com/playlist?list=PL\\_pbwdlyffslgxMVyXhnHiSn\\_EWTvx1G-](https://www.youtube.com/playlist?list=PL_pbwdlyffslgxMVyXhnHiSn_EWTvx1G-)
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3. Lucidchart.com