VIETNAM GENERAL CONFEDERATION OF LABOUR

TON DUC THANG UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING

FINAL PROJECT

Instructing Lecturer: **Mr. PHAM THAI KY TRUNG**

Student's name: **NGUYEN THI BICH LOAN – 518H0388**

Class: **18H50302**

Course**: 22**

HO CHI MINH CITY, 2022

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ACKNOWLEDGEMENT

After joining the Software Engineering Course, I have learned a lot about patterns which helps me improve my code on development and maintenance. Now, in deeply of my heart, I feel really grateful for many bits of help from my teacher – Mr Pham Thai Ky Trung – that instructed me so enthusiastically. That great help of the teacher that could let me complete the assignment as perfect as possibly. And thanks to those supports, I was able to make this report. I have received great help and support from teachers and friends. And then, I would like to express my gratitude to Ton Duc Thang University for creating the best conditions during this semester.

Sincerely thanks with all my love and respect.

ASSIGNMENT IS COMPLETE AT TON DUC THANG UNIVERSITY

I hereby undertake that this is my own project / our project and under the guidance of lecturer Pham Thai Ky Trung. The research contents and results in this topic are truthful and have not been published in any form before. The data in the tables serving the analysis, comments and evaluation collected by the author from different sources are clearly stated in the references.

In addition, the project also uses a number of comments, assessments as well as data of other authors, other organizations and organizations with citations and origin notes.

If I detect any fraud I take full responsibility for the content of my project. Ton Duc Thang University is not related to any copyright or copyright infringement caused by me during the implementation process (if any).

Ho Chi Minh City, 01 January 2022

Author

(sign and write full name)

Nguyen Thi Bich Loan

LECTURER'S CONFIRMATION AND EVALUATION SECTION

Confirmation of the instructor

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Tp. Ho Chi Minh, 01 January 2022

(Sign and write full name)

The assessment of the teacher marked

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Tp. Ho Chi Minh, 01 January 2022

(Sign and write full name)

TABLE OF CONTENTS

CHAPTER I – INTRODUCTION

1.1 Purpose and Scope

This project presents an overall architectural overview for the whole software functions of the Company selling Computer Components, it contains a variety of disparate architectural sides to depict particular aspects of the functions. Furthermore, it also supports software architects

to make sure that all the modules to be built will meet the needs of the users in term of functionality of platform as well as technology

1.2 Product Overview

A. Scenario for Accountant to Create Received Goods Note:

- When a Company wants to receive more goods, an Accountant will interact with a software in order to create a Received Goods Note.
- This action contains Add product/ Remove product/ Update product quantity
- The result of this action is that the software will return a Receive Goods Note which has full information such as received note id, time, products' details, price, …

B. Scenario for Accountant to Create Delivery Goods Note:

- When a Company wants to deliver goods to agents, an Accountant will interact with a software in order to create a Delivery Goods Note.
- This action contains Add product/ Remove product/ Update product quantity/ Update payment status/ Update delivery status
- The result of this action is that the software will return a Delivery Goods Note which has full information such as delivery note id, time, products' details, price, agent's detail, payment status, delivery status, …

C. Scenario for Accountant to View Incoming/Outgoing Stock Report:

- When an Accountant wants to look for a Stock Report of a randomly selected month, he/ she will interact with a software in order to View Report.
- This action contains View Incoming Stock/ View Outcoming Stock
- The result of this action is that the software will return a list of Incoming Products, or a list of Outcoming Products of that picked month.

D. Scenario for Accountant to View Revenue Report:

- When an Accountant wants to look for a Revenue Report of a randomly selected month, he/ she will interact with a software in order to View Report.
- The result of this action is that the software will return a Revenue Report list of that picked month.

**E. Scenario for Agents to Place An Order:**

- When Agents want to place an order, they will go to the Company website.
- This action allows Agents to add product to cart / update product quantity.
- Then the Agents check out their cart and click Choose Payment Method.
- The Agents will pay for the order and their order will be prepared.

CHAPTER II – PROJECT MANAGEMENT PLAN

2.1 Project Organization

2.2 Lifecycle Model Used

In this project, I decided to use V-Shape Model as Software Development Lifecycle Model. This model is an extension of the "Waterfall model". Instead of moving down in a linear way, the process steps are bent upwards after the implementation and coding phase, to form the typical V shape. The major difference between the V-shaped model and waterfall model is the early test planning in the V-shaped model. This model requires a clearly defined and known Software requirements, as well as an well-know Software development technologies and tools
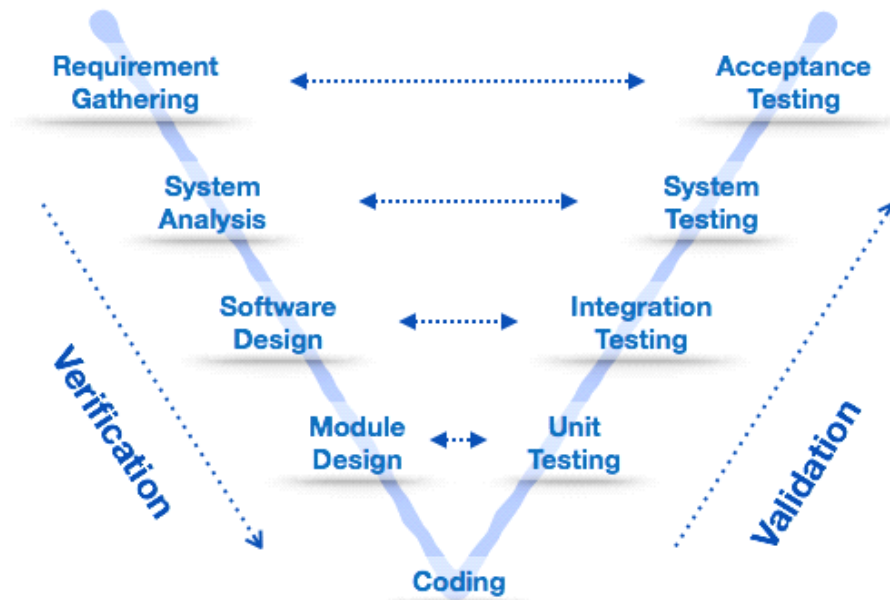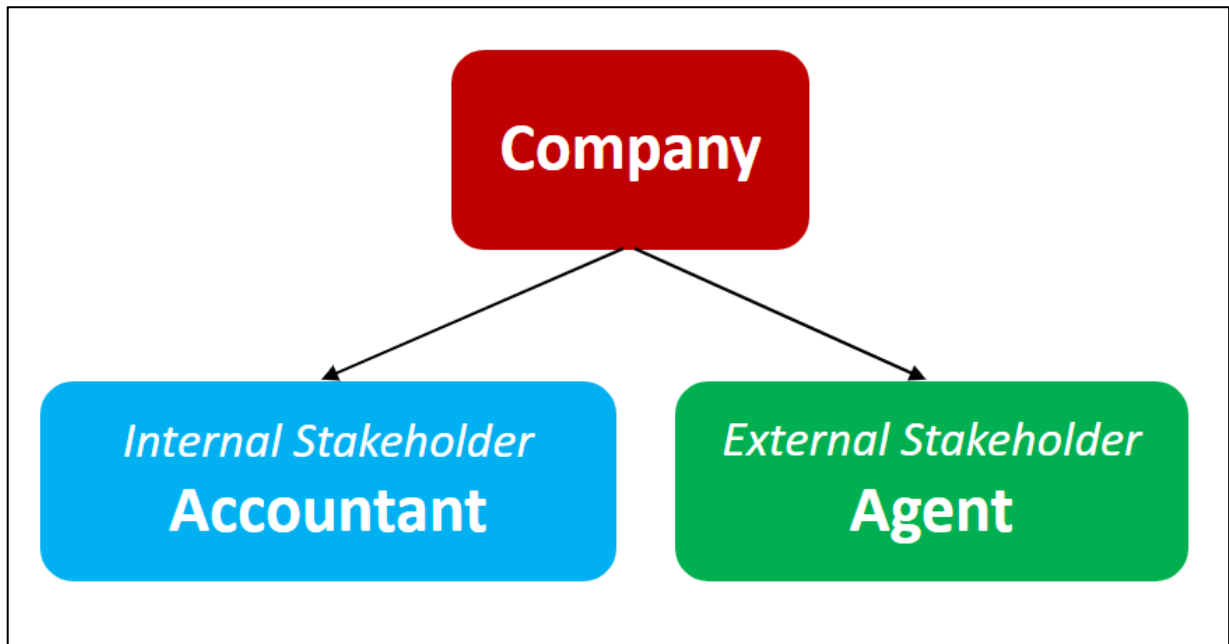

Advantages	Disadvantages
- Simple and easy to use - Each phase has specific deliverables.	- Very inflexible, like the waterfall model.

- Higher chance of success over the waterfall model due to the development of test plans early on during the life cycle. - Works well for where requirements are easily understood. - Verification and validation of the product in the early stages of product development.	- Adjusting scope is difficult and expensive. - The software is developed during the implementation phase, so no early prototypes of the software are produced. - The model doesn't provide a clear path for problems found during testing phases. - Costly and required more time, in addition to a detailed plan

CHAPTER III – REQUIREMENT SPECIFICATIONS

## 3.1 Stakeholders for the system

Stakeholders diagram

On this project, I figure out that there are only 2 Stakeholders for the system, the first one is Accountant – also known as Internal Stakeholder, and the second one is Agent who is known as External Stakeholder.
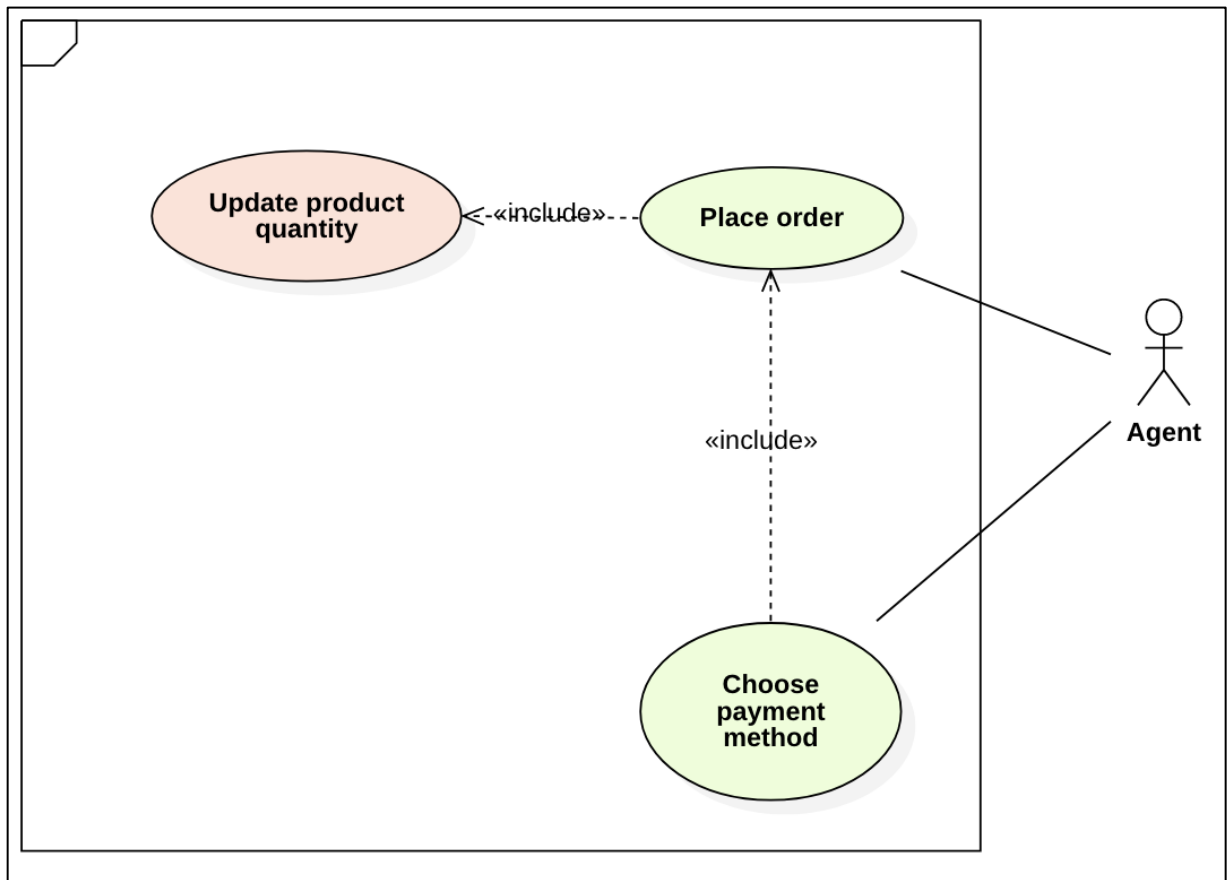
- Accountant: A person who can create Goods Delivery Note, create Goods Receive Note, view Stock Report and view Revenue Report on Winform application

- Agent: A person/ group who wants to buy a product from our Company by using Website

3.2 Use case model

3.2.1 Graphical use case model
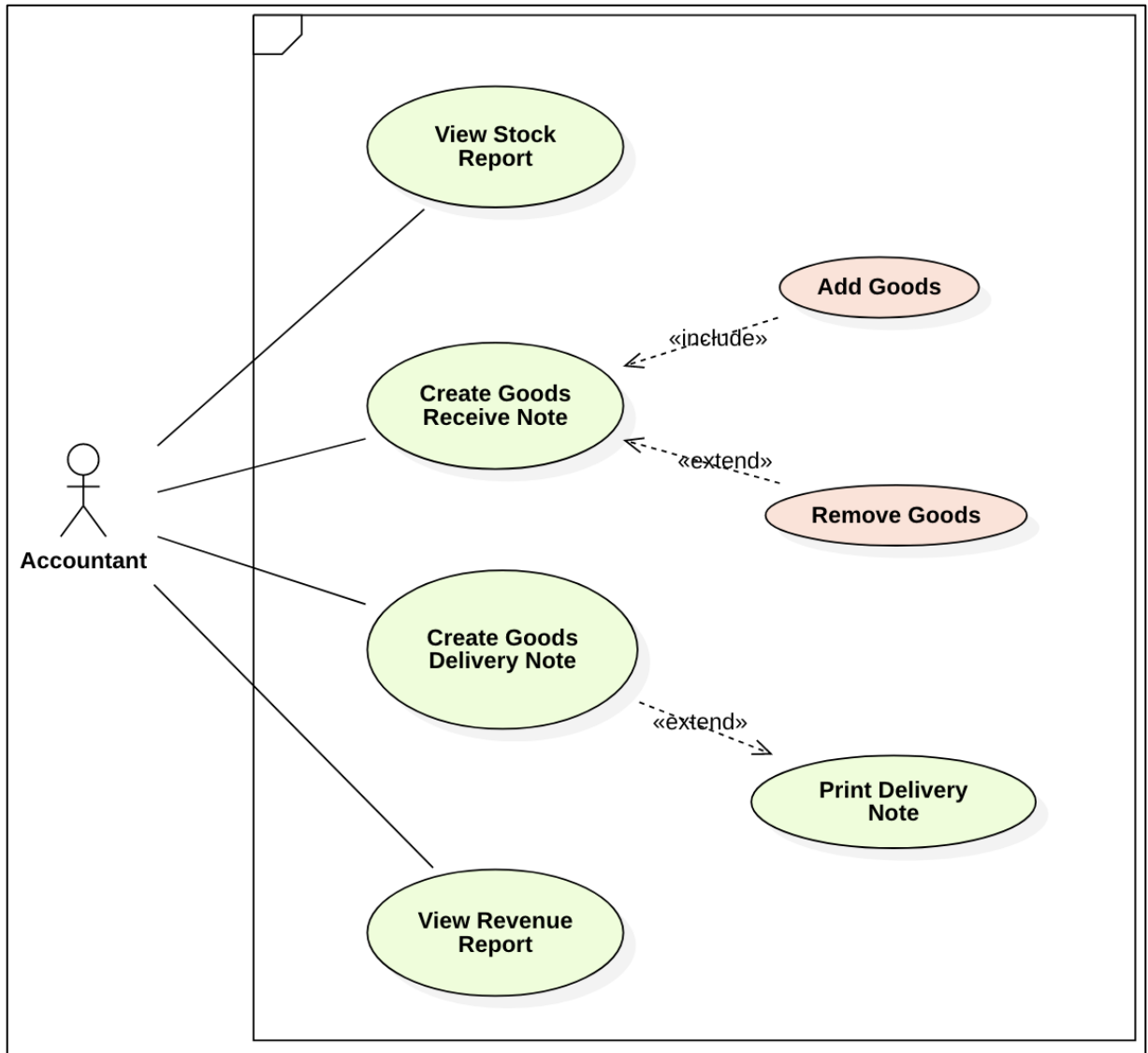
Usecase Diagram for Accountant

Usecase Diagram for Agent

3.2.3 Textual Description for each use case

- **Use case viewStockReport**

ID:	**viewStockReport**
Title:	**View Stock Report**
Description:	- When an Accountant wants to look for a Stock Report of a randomly selected month, he/ she will interact with a software in order to View Report. - This action contains View Incoming Stock/ View Outcoming Stock - The result of this action is that the software will return a list of Incoming Products, or a list of Outcoming Products of that picked month.
Primary Actor:	Accountant
Preconditions:	[Describe the state the system is in before the first event in this use case.]
Postconditions:	[Describe the state the system is in after all the events in this use case have taken place.]
Main Success Scenario:	Accountant clicks on Report tab Select Incoming/ Outcoming Stock Report Then the list of incoming/ outcoming stock will be presented
Extensions:	[Describe all the other scenarios for this use case - including exceptions and error cases.]
Frequency of Use:	Not frequently, just few times every month
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case createGoodsReceiveNote**

ID:	createGoodsReceiveNote
Title:	**Create Goods Receive Note**
Description:	- When a Company wants to receive more goods, an Accountant will interact with a software in order to create a Received Goods Note. - This action contains Add product/ Remove product/ Update product quantity - The result of this action is that the software will return a Receive Goods Note which has full information such as received note id, time, products' details, price, …
Primary Actor:	Accountant
Preconditions:	List of products must be available before
Postconditions:	Incoming products' details will be added in database in order for Accountant to view stock report
Main Success Scenario:	Accountant clicks on Create Goods Receive Note tabs Choose date Choose product Enter product product quantity - Click on Add to add recently choosen product - Click on Remove to remove the product
Extensions:	If Accountant doesn't add any product, he/ she cannot click on Receive Button to Create Goods Received Note.
Frequency of Use:	Frequently
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case createGoodsDeliveryNote**

ID:	**createGoodsDeliveryNote**
Title:	**Create Goods Delivery Note**
Description:	- When a Company wants to deliver goods to agents, an Accountant will interact with a software in order to create a Delivery Goods Note. - The result of this action is that the software will return a Delivery Goods Note which has full information such as delivery note id, time, products' details, price, agent's detail, payment status, delivery status, …
Primary Actor:	Accountant
Preconditions:	List of products must be available before
Postconditions:	Outcoming products' details will be added in database in order for Accountant to view stock report
Main Success Scenario:	Accountant clicks on Create Goods Delivery Note tabs Choose an order to view its detail products - Click on Delivery/Print to create a delivery note
Extensions:	If Accountant doesn't add any product, he/ she cannot click on Receive Button to Create Goods Received Note.
Frequency of Use:	Frequently
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case viewStockReport**

ID:	**viewRevenueReport**
Title:	**View Revenue Report**
Description:	- When an Accountant wants to look for a Revenue Report of a randomly selected month, he/ she will interact with a software in order to View Report. - The result of this action is that the software will return a Revenue Report list of that picked month.
Primary Actor:	Accountant
Preconditions:	None
Postconditions:	The full information of revenue for the picked month will be presented on the screen
Main Success Scenario:	Accountant clicks on Report tabs Choose month Choose year Click Report button
Extensions:	None
Frequency of Use:	Not frequently, just few times every month
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case removeGoods**

ID:	removeGoods
Title:	**Remove Goods**
Description:	- When an Accountant wants to remove a picked
Primary Actor:	Accountant
Preconditions:	List of products must be available before
Postconditions:	None
Main Success Scenario:	Accountant clicks on Create Received/ Delivery Goods Note tab Choose the product and its quantity Click Add
Extensions:	Add: Accountant cannot add product if the product is out of stock Update quantity product: Accountant cannot choose the greater quantity than the one on stock
Frequency of Use:	Frequently
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case addGoods**

ID:	addGoods
Title:	Add Goods
Description:	- When an Accountant wants to create Receive Goods Note, he/she must add a product. Beacause the Note cannot be empty
Primary Actor:	Accountant
Preconditions:	List of products must be available before
Postconditions:	None
Main Success Scenario:	Accountant clicks on Create Received/ Delivery Goods Note tab Choose the product and its quantity Click Add
Extensions:	Add: Accountant cannot add product if the product is out of stock Update quantity product: Accountant cannot choose the greater quantity than the one on stock
Frequency of Use:	Frequently
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case placeOrder**

ID:	**placeOrder**
Title:	**Place Order**
Description:	- When an agent wants to purchase any products, he/she will go to the website of the company, choose the product that the agent is looking for. Then the agent clicks to choose payment method. This process will finish after successful payment.
Primary Actor:	Agent
Preconditions:	List of products must be available before
Postconditions:	The place order information will be sent to the database for the accountant to create a delivery goods note
Main Success Scenario:	Agent goes to the company website Choose the product(s) that he/she is looking for and fill its quantity Choose payment method The process will finish after the payment is confirmed
Extensions:	If the payment is declined, the process cannot be done
Frequency of Use:	Frequently
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

- **Use case choosePaymentMethod**

ID:	**choosePaymentMethod**
Title:	**Choose Payment Method**
Description:	- When an agent wants to purchase any products, he/she will go to the website of the company, choose the product that the agent is looking for. Then the agent clicks to choose payment method. There are several payment methods (cash/ Momo/ bank transfer/ …)
Primary Actor:	Agent
Preconditions:	Must have Momo service/ bank authorization
Postconditions:	The payment status must be update correctly and immediately after the agent finish this step
Main Success Scenario:	Agent goes to the company website Choose the product(s) that he/she is looking for Choose payment method - Cash: the payment status will be "pending" - Momo/ bank transfer: the payment status will be "paid" The process will finish after the payment is confirmed
Extensions:	If the payment is declined, the place order process cannot be done
Frequency of Use:	Frequently
Status:	[Development status]
Owner:	Loan Nguyen
Priority:	[Priority of this use case]

3.3 Functional requirements

Winform app	Web
- ComboBox of Product names contains product name - On create Receive Note tab must have a textBox to fill product quantity - Must have a ListView to display datum of Receive Note product details, Orders, Orders' details, Revenue Report, Stock Report - Must have a final price for both Receive Note/ Delivery Note - On Report tab must contain a comboBox to choose month, a textBox to fill a year and a comboBox to choose to view Delivery/Receive stock report	- Must have a full list of products - Must have a textBox for Agent to fill quantity of product - Must have different payment method selections (MOMO, cash, bank transfer)

3.4 Non-functional requirements

Winform app	Web
- Received Goods Note must be updated immediately after the Accountant clicks create note button - Delivery Goods Note must be updated immediately after the Accountant clicks create note button - Receive/delivery stock report must be presented immediately after the Accountant executes	- Time to execute payment should not be delay more than 3 minutes

- Revenue Report will be presented correctly and right immediately after the Accountant clicks on report button	

CHAPTER IV – ARCHITECTURE

4.1 Architectural style(s) used

4.2 Architectural model

4.3 Technology, software, and hardware used

4.4 Rationale for your architectural style and model

Student should have finished the architecture part. Please refer other attached documents.

CHAPTER V – DESIGN

5.1 Database design

```sql
 81    USE [Store]
 82    GO
 83    /****** Object:  Table [dbo].[DeliveryNote]    Script Date: 1/5/2022 11:54:59 AM ******/
 84    SET ANSI_NULLS ON
 85    GO
 86    SET QUOTED_IDENTIFIER ON
 87    GO
 88   CREATE TABLE [dbo].[DeliveryNote](
 89        [id] [int] IDENTITY(1,1) NOT NULL,
 90        [createTime] [datetime] NULL,
 91        [totalPrice] [decimal](18, 0) NULL,
 92        [orderId] [int] NULL,
 93     CONSTRAINT [PK_DeliveryNote] PRIMARY KEY CLUSTERED
 94   (
 95        [id] ASC
 96   )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
 97   ) ON [PRIMARY]
 98    GO
 99    /****** Object:  Table [dbo].[Order]    Script Date: 1/5/2022 11:54:59 AM ******/
100    SET ANSI_NULLS ON
101    GO
102    SET QUOTED_IDENTIFIER ON
103    GO
104   CREATE TABLE [dbo].[Order](
105        [id] [int] IDENTITY(1,1) NOT NULL,
106        [createTime] [datetime] NULL,
107        [status] [nvarchar](50) NULL,
108        [paymentMethod] [nvarchar](50) NULL,
109        [paymentStatus] [nvarchar](50) NULL,
110     CONSTRAINT [PK_Order] PRIMARY KEY CLUSTERED
111   (
112        [id] ASC
113   )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
114   ) ON [PRIMARY]
115    GO
116    /****** Object:  Table [dbo].[OrderProduct]    Script Date: 1/5/2022 11:54:59 AM ******/
117    SET ANSI_NULLS ON
118    GO
119    SET QUOTED_IDENTIFIER ON
120    GO
121   CREATE TABLE [dbo].[OrderProduct](
122        [orderId] [int] NOT NULL,
123        [productId] [int] NOT NULL,
124        [quantity] [int] NULL,
125        [price] [decimal](18, 0) NULL,
126     CONSTRAINT [PK_OrderProduct] PRIMARY KEY CLUSTERED
127   (
128        [orderId] ASC,
129        [productId] ASC
130   )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
131   ) ON [PRIMARY]
132    GO
133    /****** Object:  Table [dbo].[Product]    Script Date: 1/5/2022 11:54:59 AM ******/
134    SET ANSI_NULLS ON
135    GO
136    SET QUOTED_IDENTIFIER ON
```

A code to generate database - 1

```
144    CONSTRAINT [PK_OrderProduct] PRIMARY KEY CLUSTERED
145 ⊟(
146        [orderId] ASC,
147        [productId] ASC
148 )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
149 ) ON [PRIMARY]
150    GO
151    /****** Object:  Table [dbo].[Product]    Script Date: 1/5/2022 11:54:59 AM ******/
152    SET ANSI_NULLS ON
153    GO
154    SET QUOTED_IDENTIFIER ON
155    GO
156 ⊟CREATE TABLE [dbo].[Product](
157        [id] [int] IDENTITY(1,1) NOT NULL,
158        [name] [nvarchar](50) NULL,
159        [price] [decimal](18, 0) NULL,
160        [quantity] [int] NULL,
161    CONSTRAINT [PK_Product] PRIMARY KEY CLUSTERED
162 ⊟(
163        [id] ASC
164 )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
165 ) ON [PRIMARY]
166    GO
167    /****** Object:  Table [dbo].[ReceiveNote]    Script Date: 1/5/2022 11:54:59 AM ******/
168    SET ANSI_NULLS ON
169    GO
170    SET QUOTED_IDENTIFIER ON
171    GO
172 ⊟CREATE TABLE [dbo].[ReceiveNote](
173        [id] [int] IDENTITY(1,1) NOT NULL,
174        [createTime] [datetime] NULL,
175    CONSTRAINT [PK_ReceiveNote] PRIMARY KEY CLUSTERED
176 ⊟(
177        [id] ASC
178 )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
179 ) ON [PRIMARY]
180    GO
181    /****** Object:  Table [dbo].[ReceiveProduct]    Script Date: 1/5/2022 11:54:59 AM ******/
182    SET ANSI_NULLS ON
183    GO
184    SET QUOTED_IDENTIFIER ON
185    GO
186 ⊟CREATE TABLE [dbo].[ReceiveProduct](
187        [noteId] [int] NOT NULL,
188        [productId] [int] NOT NULL,
189        [quantity] [int] NULL,
190        [price] [decimal](18, 0) NULL,
191    CONSTRAINT [PK_ReceiveProduct] PRIMARY KEY CLUSTERED
192 ⊟(
193        [noteId] ASC,
194        [productId] ASC
195 )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
196 ) ON [PRIMARY]
197    GO
198    SET IDENTITY_INSERT [dbo].[Accountant] ON
```

A code to generate database - 1
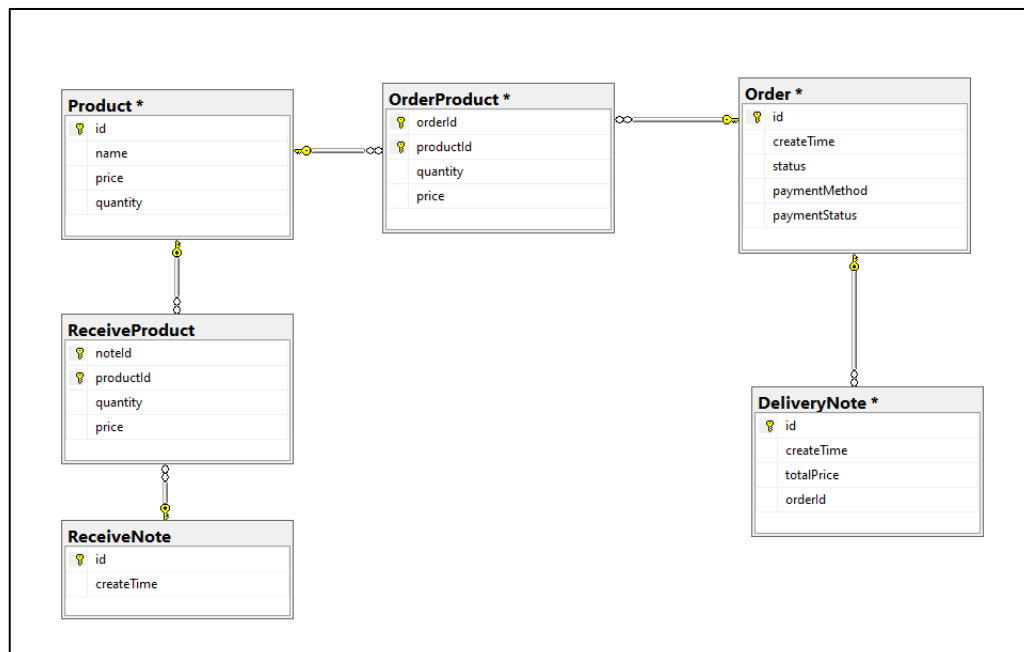
Database Diagram

- Design database of *Product* table

	Field name	Datatype	Null?	Default	Description
1	id	INT			Product ID
2	name	NVARCHAR(50)	X		Product name
3	price	DECIMAL(18, 0)	X		Product price
4	quantity	INT	X		Product available quantity

- Design database of *OrderProduct* table

	Field name	Datatype	Null?	Default	Description
1	orderId	INT			Order ID
2	productId	INT			Product ID
3	quantity	INT	X		Quantity of ordered product
4	price	DECIMAL(18, 0)	X		Total price of ordered product

- Design database of *Order* table

	Field name	Datatype	Null?	Default	Description
1	id	INT			Order ID
2	createTime	DATETIME	X		Order created time
3	status	NVARCHAR(50)	X		Status of Order
4	paymentMethod	NVARCHAR(50)	X		Payment method
5	paymentStatus	NVARCHAR(50)	X		Payment status

- Design database of *DeliveryNote* table

	Field name	Datatype	Null?	Default	Description
1	id	INT			Product ID
2	createTime	DATETIME	X		Delivery note created time
3	totalPrice	DECIMAL(18, 0)	X		Product price

4	orderId	INT			Product available quantity

- Design database of **ReceiveNote** table

	Field name	Datatype	Null?	Default	Description
1	id	INT			Product ID
2	createTime	DATETIME	X		Receive note created time

- Design database of **ReceiveProduct** table

	Field name	Datatype	Null?	Default	Description
1	noteId	INT			Receive note ID
2	productId	INT	X		Product ID
3	quantity	INT	X		Quantity of product
4	price	DECIMAL(18, 0)	X		Total price of product

5.2 Static model – class diagrams
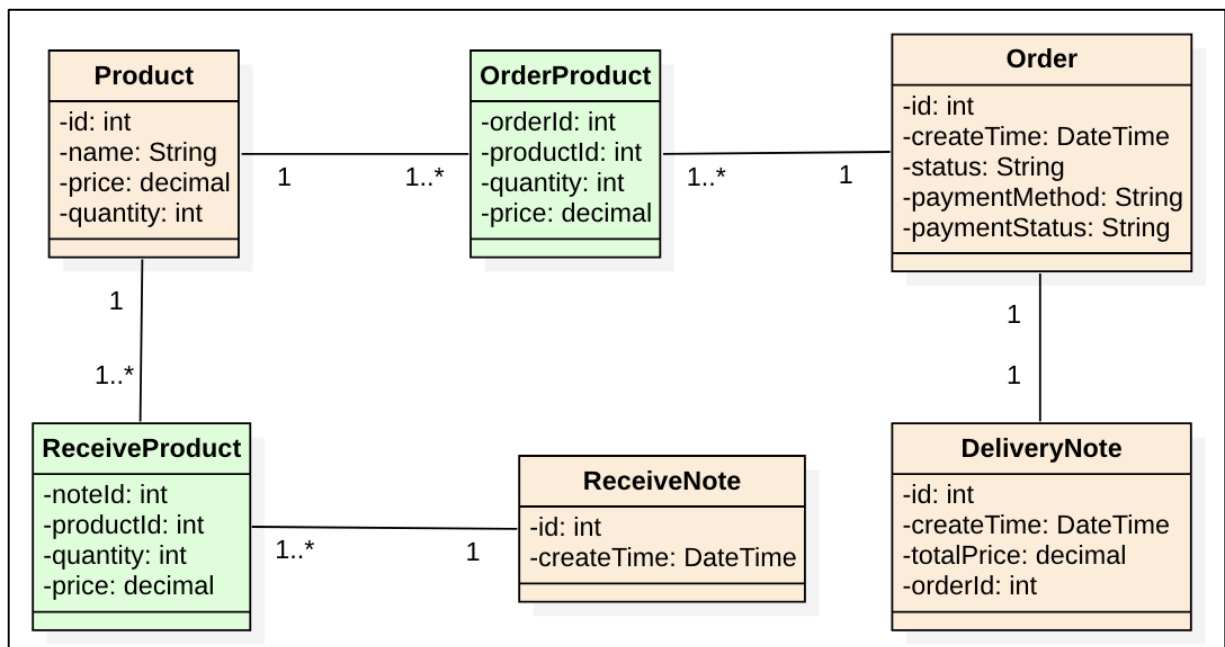
Class Diagram of the project

5.3 Dynamic model – sequence diagrams
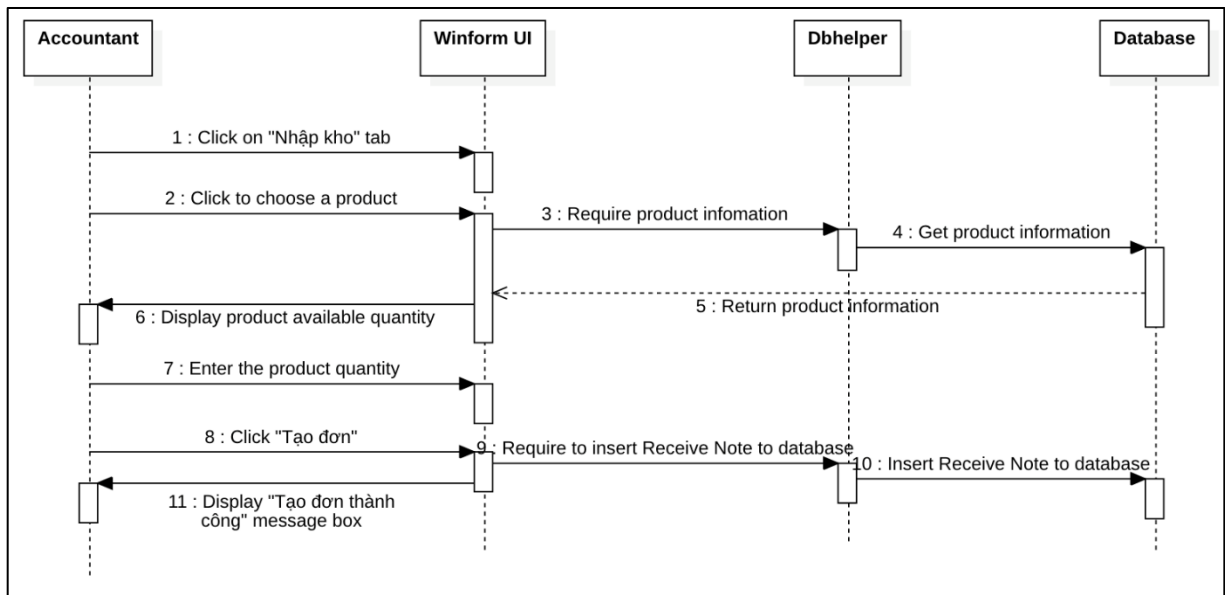
Sequence Diagram – Create Goods Receive Note
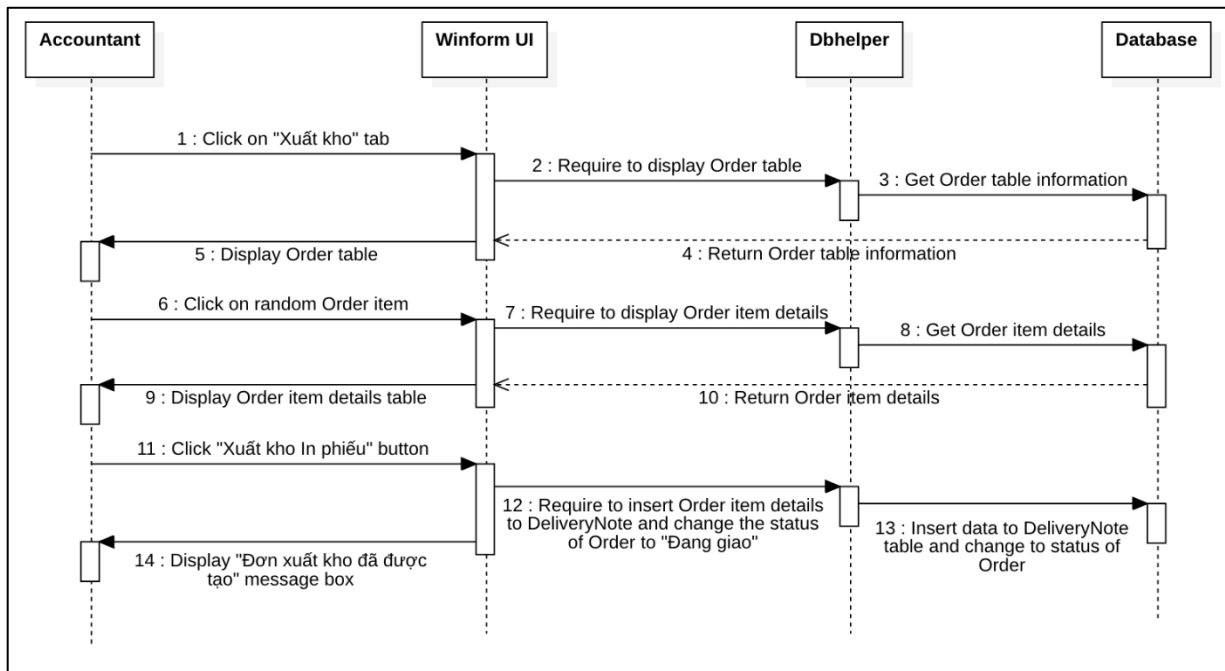
Sequence Diagram – Create Goods Delivery Note
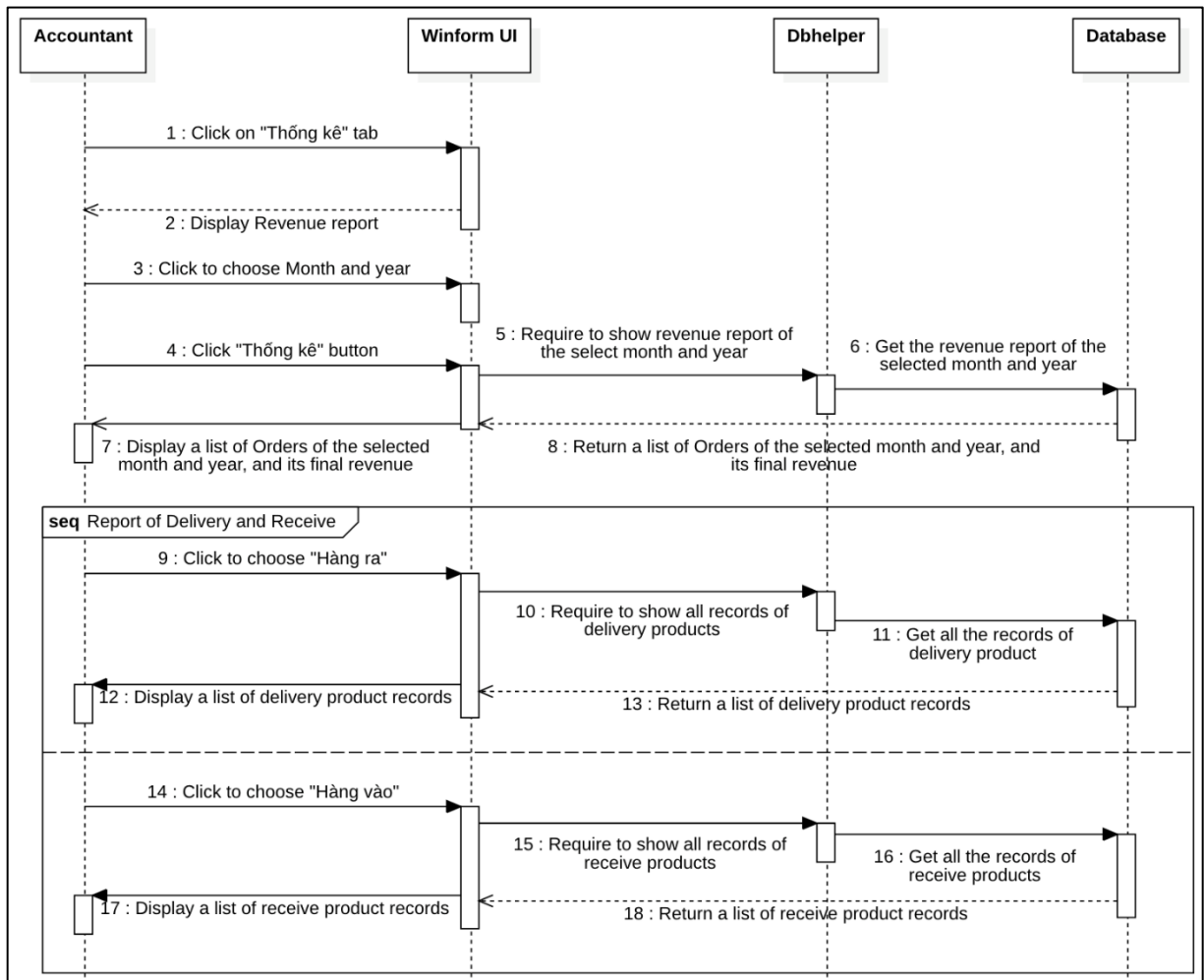
Sequence Diagram – Create Goods Receive Note

CHAPTER VI – TEST PLAN

6.1 Requirements/specifications-based system level test cases

	Testcase description	Testcase procedure	Expected Result	Test Result
1	Test comboBox product name and quantity textBox is empty	1. Product name comboBox and quantity textBox is empty 2. Click "Thêm"	Message displays "Chưa chọn sản phẩm và số lượng"	pass
2	Test comboBox product name is empty	1. Product name comboBox is empty 2. Click "Thêm"	Message displays "Chưa chọn sản phẩm!"	pass
3	Quantity textBox is empty	1. Quantity textBox is empty 2. Click "Thêm"	Message displays "Chưa nhập số lượng"	pass
4	Product list on create receive note is empty	1. Product list is empty 2. Click "Tạo đơn"	Message displays "Chưa chọn sản phẩm để tạo đơn!"	pass
5	Click on order from Order list	1. Click on order from Order list	Order's product detail listView display the correct products of the clicked Order	pass
6	Month comboBox is empty	1. Month comboBox is not selected 2. Click "Thống kê"	Message display "Vui lòng chọn thang!"	pass

	Month comboBox is empty	1. Month comboBox is not selected 2. Choose delivery/receive comboBox	Message display "Vui lòng chọn tháng!"	pass
7				
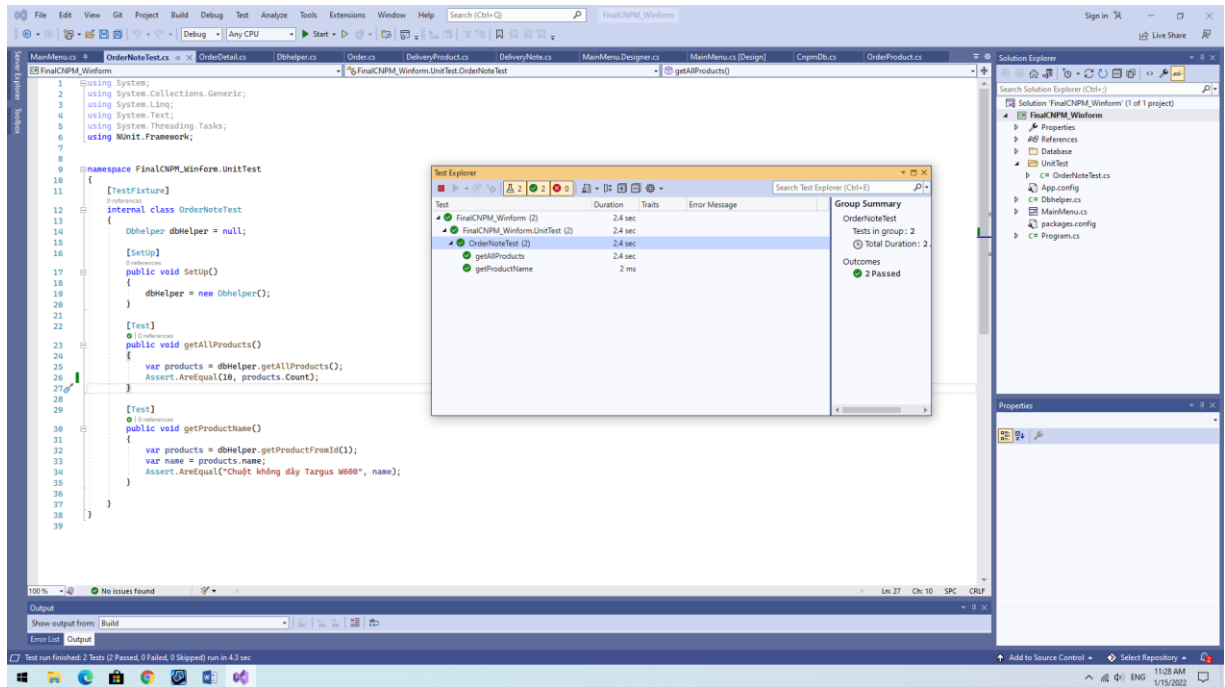
6.2 Unit test

This is a demo for running unit test on the project
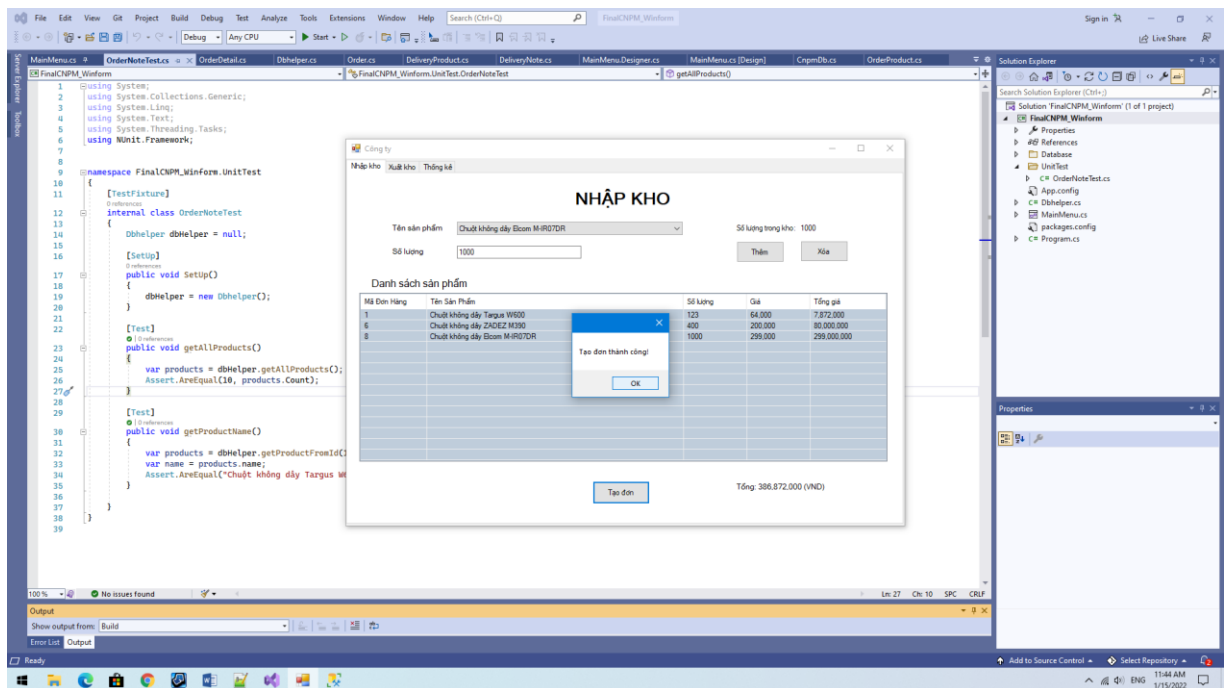
This is a website for agent to make a purchase

Add a quantity for product(s) that we want to buy and choose payment method to purchase
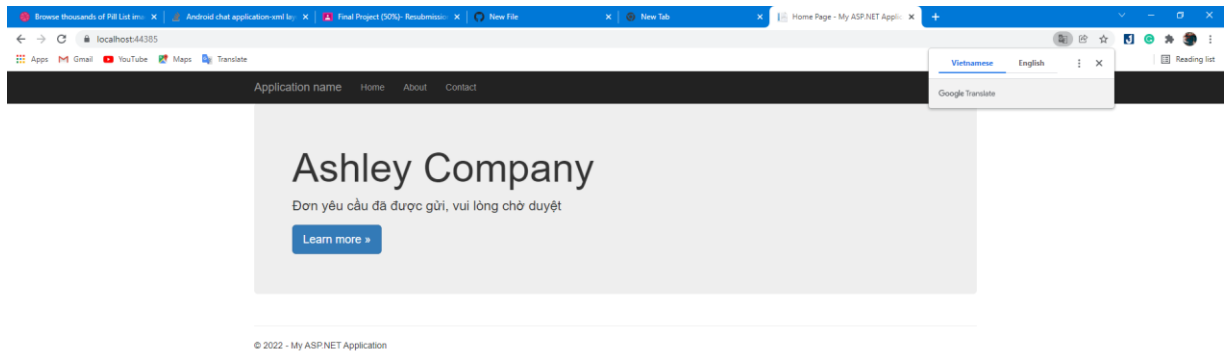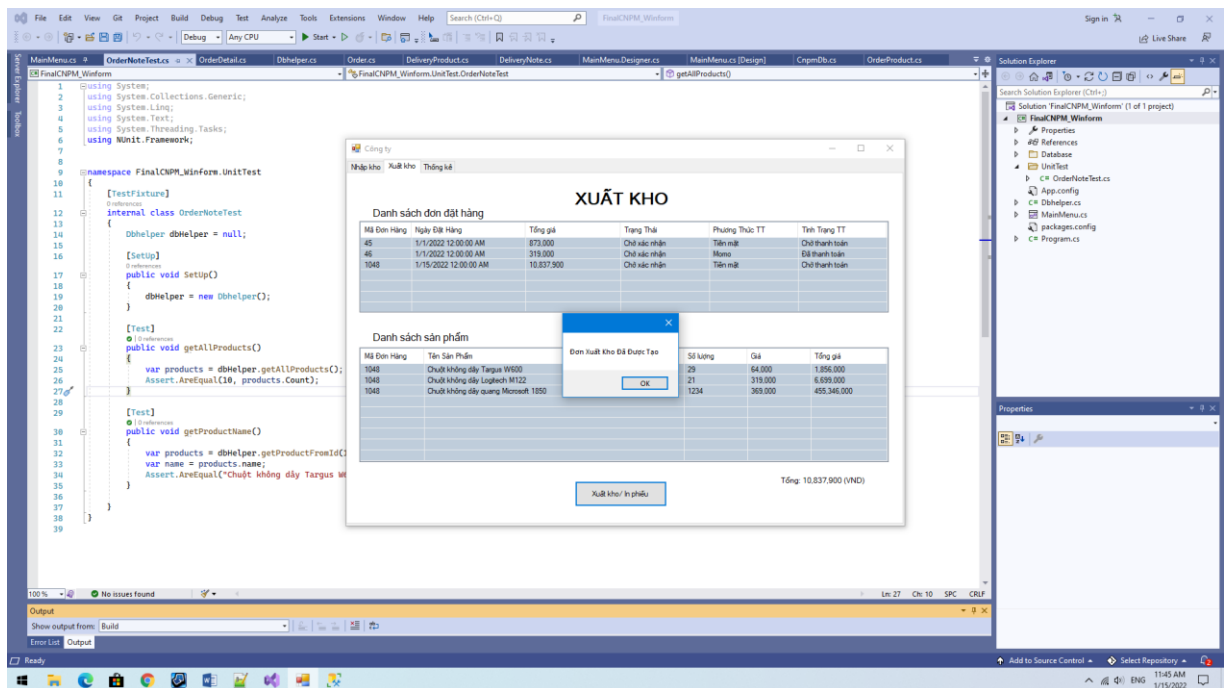
This page will be shown if a purchase is successfully made
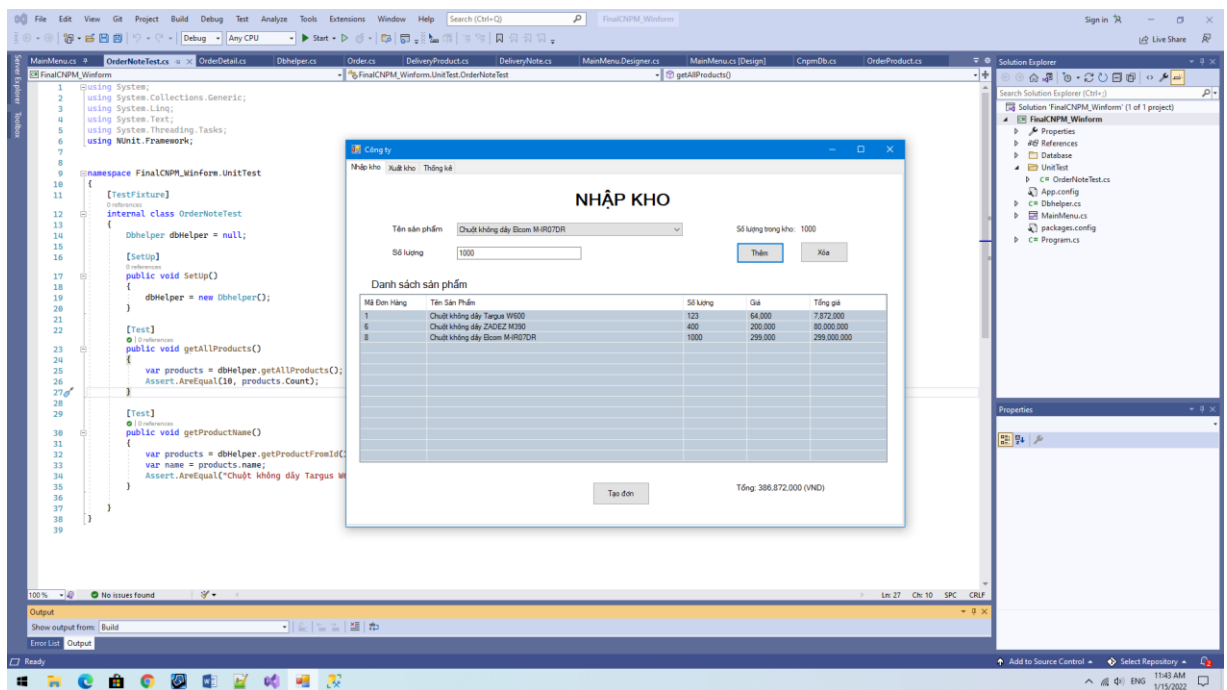
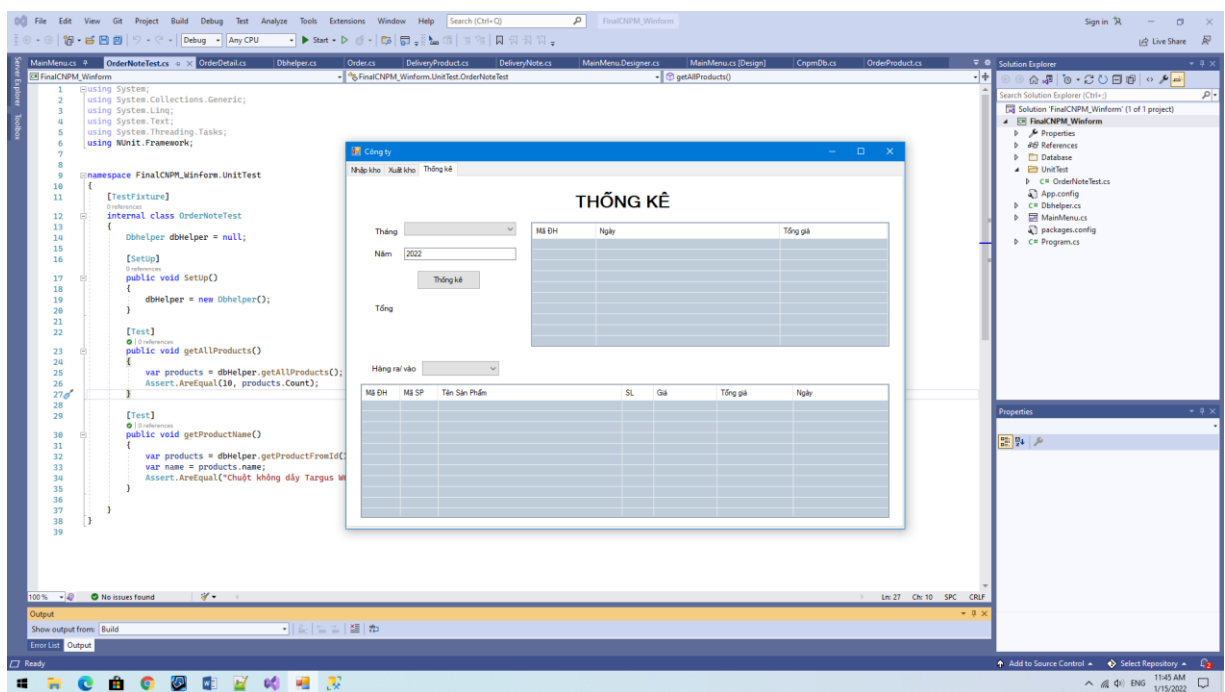

This is a GUI for Create Receive Goods Note
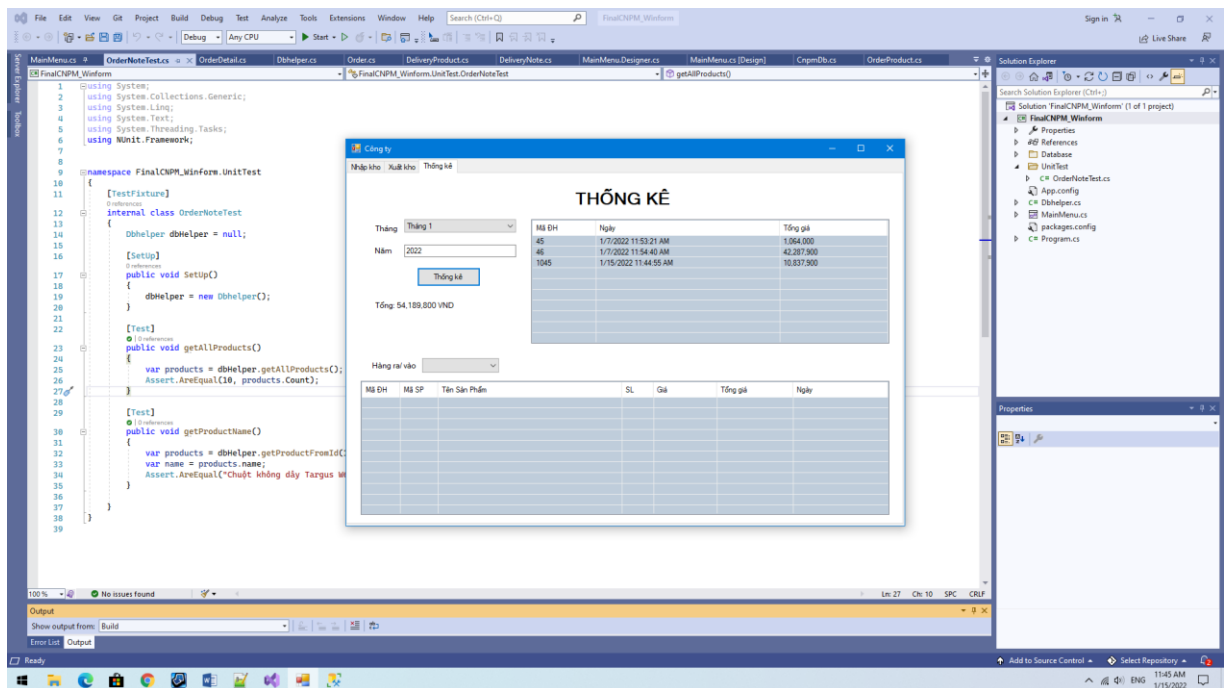
Add product(s) and click Create button
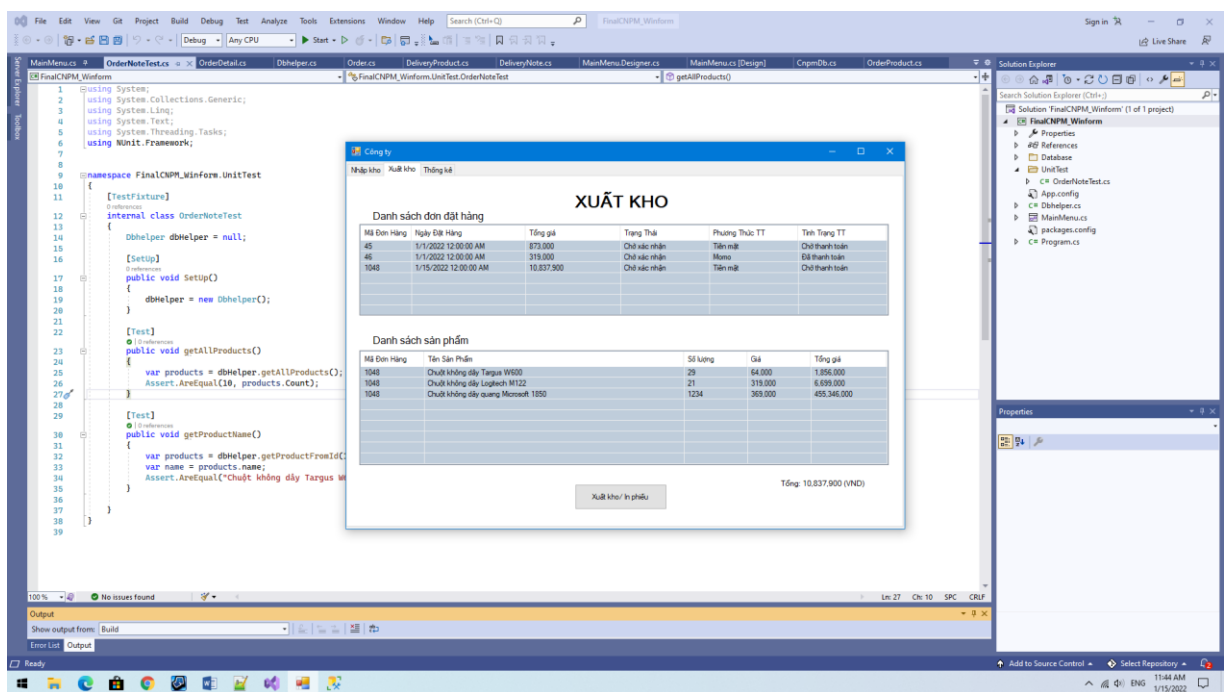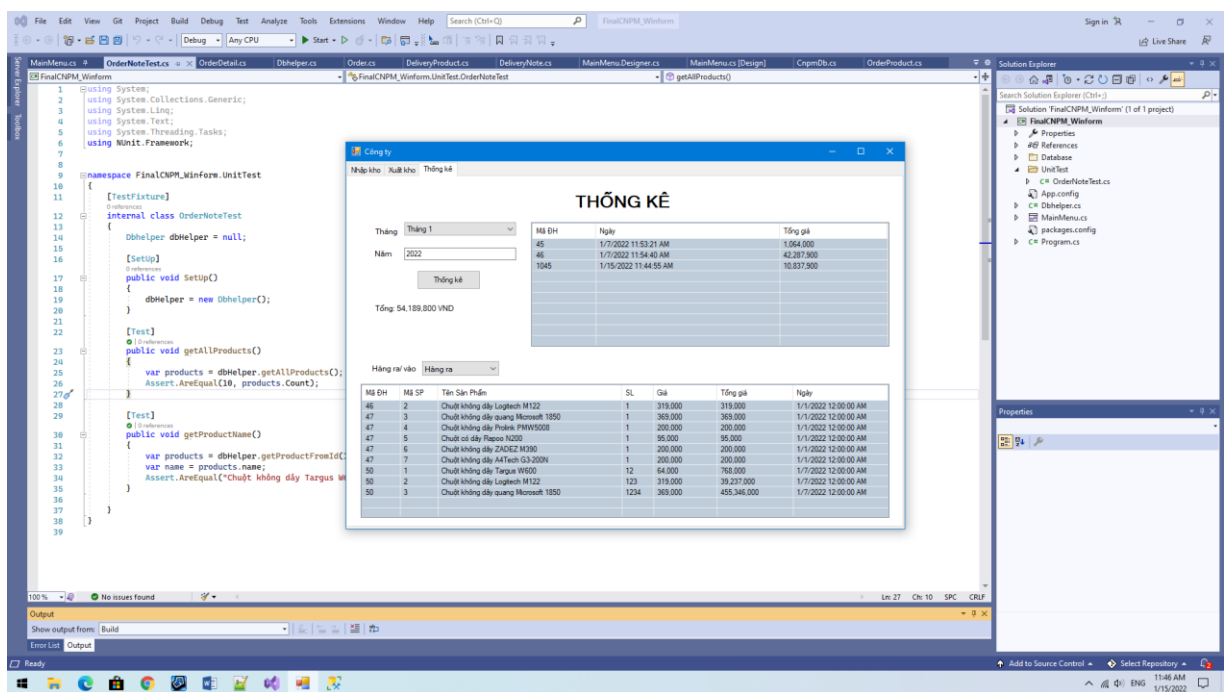

This is a GUI for Create Delivery Goods Note

Choose a purchase request and click Delivery

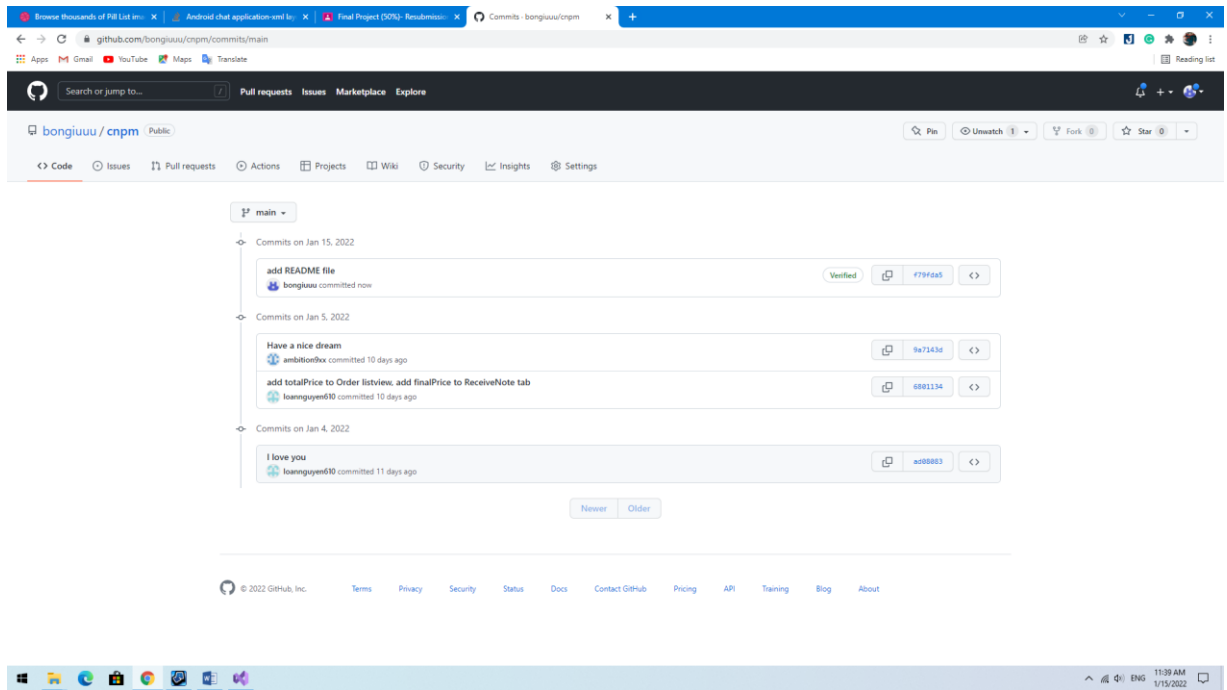*This is a GUI for Report Revenue/ Stock*

Choose month and year -> Click Report to view Revenue Report

Click to choose Incomming/ Outcoming to view Stock Report

6.3 GIT/SVN

This is a git which is used for this project - https://github.com/bongiuuu/cnpm

REFERENCES

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https://www.google.com/search?q=generate+database+diagram+sql+server+management+studio&oq=generate+database+diagram+sql+server+&aqs=chrome.1.69i57j0i19l2j0i19i22i30l7.9215j1j7&sourceid=chrome&ie=UTF-8