
ITS66404 Software Engineering

ASSIGNMENT 1

Project Based Learning (PBL) with Purpose Learning

HAND OUT DATE: 9th September 2021

HAND IN DATE: 03rd October 2021 (Sunday by 11:59pm Malaysia time)

WEIGHTAGE: 20%

Instructions to students:

- The assignment should be attempted in groups of 2-6 students.
- Complete this cover sheet and attach it to your assignment – this should be your first page.

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Introduction

In this modern era, the technology industry is evolving faster than we can comprehend. It is without a doubt that e-commerce and online shopping platforms are one of the most prevalent and sought-after sectors in the industry, with around 54 million clicks on Shopee alone, in the second quarter of 2021. However, these platforms put emphasis on the customer's experience and not much on the sellers. A well developed Seller Centre offers a wide range of benefits to a seller. Our project is a software for a Seller Centre where sellers can oversee all the activities related to their stores or business such as analytics and transactions. We believe that our Seller Centre software can become an efficient and convenient platform for the sellers to keep track of their business. We figured that if any e-commerce website would want to incorporate our software into their project, it would be a focal point for future sellers and small businesses to utilise and sell anything they want.

MISSION

Our mission is to provide software for individual sellers who want to enhance their profile and Seller Centre on e-commerce websites. We have prioritised teamwork, respect, innovation and quality as our core values. We want to continually strive to improve and simplify our products, processes, and services through both incremental and revolutionary ideas. We tend to work as a team in order to further improve online shopping for sellers with innovative and quality technologies to achieve maximum user satisfaction. Even if the team has any disagreements, we learn how to respect each other and find a compromise and a solution that hopefully helps us to avoid these situations in the future. We decide to always act ethically and with integrity in each division of our operations and always be thoughtful in the direction and efforts of coworkers, clients and providers to construct enduring partnerships.

VISION

Our vision is to be regarded as the most trustworthy and reliable developers for a Seller Centre software on e-commerce and online shopping websites, due to our relationships with all the relevant communities such as our clients and investors. Furthermore, we see our

company expanding into different sections in the e-commerce industry, then further into the technological industry. We also aim to set up a good relationship with our customers, users, investors and shareholders so that everyone receives benefits from interacting with the company which can bring the company's status in the industry to greater heights.

Problem

In this day and age, the growth of online shopping has grown tremendously in recent years and as time goes by, more businesses are hopping into this trend. Major e-commerce sites such as Amazon, Lazada and Shopee have reinvented online shopping making online purchases seamless and simple. However many smaller businesses and sellers suffer from a competent interface and experience several challenges that could possibly jeopardise their sales.

Being an online seller is not as easy as it seems. Most of them have reported problems when keeping tabs on their products and customers. This in turn will leave a bad reputation for the sellers as the customers do not feel they get a satisfactory interaction with sellers, all because there are no such tools or software for the sellers to utilise and help their business.

The main problems for sellers include an absence of a software that can display analytics and statistics of products for the sellers, an overload of messages from customers where sellers may not have time to do, the inability for sellers to choose or modify their product campaigns and discounts and the static interface where the sellers are not allowed to customize their profile and workspace. However, these problems can be solved with simple and practical methods.

We feel that this project adheres to our vision and mission as all of us want something that we can rely on. Long are the days where shoppers will be annoyed with the basic functions of online shopping. With the features on our website, it can compete with any other website in the market. It may not be the best e-commerce website but it creates competition which is good for consumers. Anytime someone would think of online shopping, they will be reminded of our app.

Solution

Throughout our team's research in finding the main problems and issues for Seller Centres in online shopping websites, we felt we have created the most efficient and convenient solutions to all the problems listed above. Most of these solutions rely on existing technologies.

In order to help sellers keep up and track their products and business analytics, we decided to integrate a chart and graph system. This system allows the sellers to get an overview of their products in an organized and easy-to-understand method. The sellers can choose how they want the data to be presented in either pie charts, bar or line graphs with many other options to choose from. The system will also provide the necessary data and information such as percentages of products sold and viewed by customers. Furthermore, this solution allows filters to be used so sellers can choose what type of product they want to track.

For the second problem, which is an overload of messages from customers, we solved it by developing a bot that automatically responds to the messages. The bot will use machine learning so that it can familiarise itself with the types of messages received. The bot will initially be programmed with different cases so it has a general idea of how to respond to specific types of messages. For example, the bot will automatically respond to messages asking for refunds, availability of products, change of shipping information and many more. If the bot faces a question that it is unable to answer, it will send a message with FAQs for the customer to read from.

The issue of not having flexible discounts and campaigns for the seller's products can literally be solved by implementing an option for seller's to modify what product they want to be campaigned or discounted by the online shopping website itself. Our software will notify the sellers at the right time to offer these promotions according to market activity for the specific product and types of products. However, it is completely up to the seller on whether they are willing to sell their products at discounted prices or start campaigns to promote their products to the public.

A lack of profile customization for the sellers may not look major but it could go a long way for the sellers productivity when handling their Seller Centre. Sellers can allow how they want their interface to look based on their preferences and aesthetics. These customizations include where they want the analytics and statistics of their products to be placed in the interface, what sort of personal details they want to display to the public and what templates or themes they want to apply to their Seller Centre.

Impact of Solution

A topic that is rising today is that e-commerce websites focus more on buyers than sellers. Sellers are regarded as just a means to gather money for the host website, through commission or taxation of their products. Many sellers, with or without experience, require a sort of assurance that their needs will also be met when selling their products. If a small-time company were to sell products without looking into their user data, just how could they improve their product to keep up with the competition? Therefore, we believe that the user analysis center would be something crucial for big or small companies to utilize in order to maintain or improve their sales. For example, a company wants to visualize their economy for a desired time frame, they want to see if their business model is working, how well their products are selling, etc. Through the usage of data for performance mapping such as quarter results, consumer trends, etc. Sellers can acquire desired data not only to forecast their sales, but to also understand the users, market and competition.

Other than that, the requirement to always be there for customers' FAQ can be a hassle. A good response time is earned by answering a customer's questions as soon as possible, and by having a fast response time, the better reputation a store can get. Sometimes the reputation of a shop can be the deciding factor between two shops, and every customer counts, especially for small shop owners. We believe that the social impact of automated answer generation can ease the time consumed by sellers as time is very important especially when running a business because of commitments and errands. Through automated messaging and replying to customer's questions, sellers can take a break from replying to frequently asked questions such as package estimated time of arrival, ongoing discounts, shop's working hours, etc. Besides that, automated replies provide reassurance to a shop's customers. Customers feel noticed and cared for when replied by sellers; if a seller were to take too long to respond, oftentimes customers lose trust in the seller and move on to their competitors. Thus, the seller loses their business.

Other than that, automated generation provides further direction to offer additional resources that customers require. This helps keep the customers engaged with the business until someone can assist them personally. For example, automated replies can provide contact information of someone to talk to, requesting a customer's review of the service or product, directing to online information, etc. As such, businesses will not lose their business by having

automated replies that are customized to the situation and are ready to assist customers. Therefore, customers and sellers are both satisfied with the fast response time and answers.

Next, discounts are eye-catching to buyers who plan to save money or have a tight pocket especially during these trying times of the pandemic plus attracting new and repeat customers increases sales and improves reputation. Because consumers prefer buying things on sale, discounts are a great ploy to draw more people to a store. Furthermore, discounts that only run for certain periods cause buyers to rush and buy products due to their fear of missing out. If a store has not met its sales goals, their store is at risk of losing profit. Discounts increase sales due to the increased traffic in the store. Whether buyers purchase an item or not, it still entices them to buy something else for a different time. However, discounts have a negative impact as buyers would purposely hold out or wait for certain products to be on discounts to proceed with their purchase. Discounts also affect a customer's perceived quality of the product depending on the perceived savings, thus affecting the perceived value of the product and ultimately their purchasing intentions after that thought process. Therefore, discounts have both good and negative impacts that are a risk that sellers must take into consideration.

Finally, the impact of an interface is the strongest on sellers who are well organized and businesses that have multiple sellers. Customizability is often expected in this day and age in every aspect of our lives. Personalization is what makes users happy and satisfied with how they use our product. Rather than trying to create a broad and general interface, it is important to create a software that allows detailed personalization as everyone is different. As the saying goes – If you try to appeal to everyone, you will appeal to no one. According to Deloitte, studies found that 1 out of every 5 customers is willing to pay 20% more for a personalized or exclusive product. Thus, by giving unique options to customize from, users will build loyalty towards that certain brand and even recommend it to other buyers.

SWOT	Shopee	Lazada	Carousell
Strengths	Competent ads	Clean interface	Better customer support
Weakness	Not well-known	Not enough marketing	Doesn't do buyer to buyer
Opportunities	Improve on advertising	Improve on marketing	Do buyer to buyer

Threats	Take away our sellers	Faster and more efficient messaging system	New and improved analytics
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Discuss business viability application

Every day, there are many products that are sold online on multiple platforms such as Shopee, Amazon and Lazada. All of these websites share a common goal to have people or companies sell their products and items to the general public and earn a commission whenever an item is sold. To achieve this goal, the website must be suitable and comfortable for the users that sell and buy things, there are many factors that could affect how users find the website. A factor that could change the user's experience is the seller centres that mostly affects the number of sellers on a website. If the sellers find the seller centres on a certain website more appealing and easier to use, they may choose that website over others to see their products.

The application is economically viable as with each e-commerce website, it is almost compulsory to have a seller centre, these can be custom or an external one. To build this application for the website may be a bit expensive but it is usually part of the whole package when hiring a developer for an e-commerce website. The price of our application will increase if the developers outsource this application but it may be better than if the original developers try to develop it and it would save a lot of time for the developers. Maintenance of the seller centre is also an expense and may get more expensive over a long period of time.

Technically this application is practical because the use of a seller centre uses online websites as a platform to utilise the application. Whenever a new seller or item is registered, the seller centre will keep track of its viewers, to-do lists, business insights and many more. With this data, the seller would be able to analyse and make informed decisions at the right time. Many people would take advantage of this application and follow the trend that is going on at that moment. The application makes the use of a seller centre more convenient and flexible to suit the seller preferences better.

Websites could take advantage of our application and advertise it as one of the benefits of using their website. Our application is mainly targeted to online e-commerce websites such as Shopee, Lazada and many more.

Architectural overview

5.1 What platform does the proposed system run on?

Our web application can run on all platforms through web browsers such as Google Chrome, Microsoft Edge, Mozilla Firefox, Opera, Internet Explorer, TOR Browser, Naenara and Safari. We believe this is the best and the most efficient method in terms of software development as they are cross-platform compatible and would be much more convenient for the users. Administrators would need to host this web application to make it accessible to their customers by using a web hosting service.

5.2 Is the system architecture broken down into logical chunks and modules?

Yes, the software is functionally decomposed as in the overall function of the software and its processes are broken down into smaller chunks. In an object-oriented context, functions are usually methods. Function partitioning is based on a distinct paradigm, which results in a different grouping of functions and related data. For example, functions such as user login, user registration, user profile customization, automatic messaging bot are separate functions.

5.3 Is the project technically open to some evolution?

Yes, our proposed system is meant to evolve as new trends and technologies emerge every day. The software is built to be able to be modified according to the customer needs, market requirements and new technological advancements. Besides that, the web application can also be scaled vertically or horizontally based on the workloads and the customer's needs.

5.4 Is it only made with a monolithic bloc or does it present interfaces enabling extensions?

The software is built with a monolithic bloc as the proposed software is built as a single code base, but our proposed system also enables the extension to enable payment gateways for online payments possible. We used a monolithic architecture because of its simplicity in development and deployment. Not only that, but software development is also more efficient as it takes less time to develop.

The program's components are linked and interdependent. Each component and its connected components must be present for code to be executed or compiled in this architecture. The application consists of several layers and components including a client-side app, which has a user-friendly interface, and several other backend components responsible for managing the customer sales, verifying payments, and so on.

Some benefits of using a monolithic bloc are that our program is capable of handling HTTP requests, executing business logic, accessing a database, and exchanging data with other systems. Not only that but the application can also be scaled vertically or horizontally according to the user requirements.

5.5 Technologies and Resources used in the application

The system consists of a front end where the users will present a graphical user interface to create a system more user-friendly and capable. As a front-end tool, we selected PHP. Because it is an Open-Source Technology, it is more accessible and acquainted with any form of a database. Besides that, we also selected CSS to design the layout and presentation of the website. We also used JavaScript to make our web application dynamic and interactive by using scripts. The back end of a system is essential since it controls all of the system's internal processes. As a back end, we used MySQL. Because it is one of the most capable relational database systems in the world and provides greater security than others.

System Requirements

For our project's website to work correctly, system requirements are required. During the brainstorming session, we came up with a few features that can help the website and the organization overcome problems they may face as they progress along with their business. We were able to gather the needs needed by studying the younger audience because of the increasing rate of them obtaining their own website, as well as the people who are participants in what they seek.

Project Scope

The website that we have decided to build is for the convenience of those who are involved in selling items on websites such as Shopee and Lazada. Not only that, but it also aims to raise awareness of the organization so that more people in the country are aware of their efforts. The user interface will be adapted to the specific needs of the business. From our perspective, the aim of this software will be to provide the assistance that these users require in obtaining the information that will be presented to them.

The major objective of the website and one of the benefits that we highlight when users visit our website is ease. More individuals desire their way of life to be as simple as possible. Sellers can obtain required data not just to estimate sales, but also to have a better understanding of their customers, market, and competitors. Not only that, but the requirement also to be always available to clients Frequently Asked Questions (FAQs) can be inconvenient. A good response time is acquired by quickly responding to a customer's questions, and a store's reputation is enhanced by having a quick response time. We believe that automated response creation can help sellers save time, which is extremely valuable while running a business due to obligations and errands. Other than that, automated generation gives you more options for providing more materials to your consumers. This keeps clients interested in the company until someone can help them personally. By letting vendors customize their shops on the website, sellers will develop devotion to a brand if they are given unique customization possibilities, and they may even promote it to other purchasers.

Functional requirement:

Functional requirements can be understood quite clearly as it is the basics of the system's behaviour. In other words, it can be explained as the features and functions that are required for the system to actually work. These include a signup/login module, calculations and statistics, user input and other programs for the software to run to its full potential.

Functional Requirements	Description
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User Sign Up/Login	The users will input their sign up/login credentials so that they can have access to their profile and Seller Centre. The user sign up and login module will link with the user profile and personal details as the information they input will be stored when they leave the Seller Centre page.
User Profile and Personal Details	This requirement allows us to keep records of sellers which can help when they face any difficulty or issues related to their profile and Seller Centre, especially when they want to modify their existing profile. This requirement will be accessible in the profile section, where they can change their profile or business name, profile pictures and changing passwords.
Profile Customization	This feature allows how the sellers want to customize their interface and workspace, based on their preferences. They can choose where they want to display the business analytics and statistics to their desire so they can prioritize what data they want to be shown. This will be accessible in the profile section of the seller centre where they can choose the themes or aesthetic they want to display.
Search and Filter Module	Sellers can search what type of product they want to analyse. If they are searching for multiple types of products, they can filter the price ranges, popularity, relevance and types of products.
Date and Time Module	Sellers can obtain data for the past week or month so they can analyse any pattern such as high demands and movement in the market for any of their products. This will be included in the analytics section of the system, where they can input the date and time to see

	what happened in their Seller Centre.
Statistics, Analytics and Calculations	A seller can quickly track and know about how their products are being viewed or purchased with the presence of statistical charts and graphs. Calculations for this requirement are such as percentages, losses and profits. A quick glance of these statistics and analytics allows more time for sellers to take action. This feature will mainly allow sellers to click and drag where they want the statistics to be on their page.
Seller's Automatic Messaging Bot	The messaging bot helps save time and effort for the seller as they don't need to reply to all the customers who are asking the same question individually. The bot uses pre-existing programs such as customers asking for discounts or refunds. The bot will also use machine learning so it can respond to a wider range of messages. Sellers can choose whether they want the bot activated or not.
Discount and Campaigns	Sellers can choose when they want to campaign their products or sell it at a discounted price. Shopee or Lazada might sell a product with discounts without telling the sellers and it would feel unfair to them. We will notify sellers when there are any opportunities to discount or campaign their products. A prompt will appear where sellers can choose the percentages of discounts and many more.
Transaction and Payments	The software will keep records of all transactions and payments made between sellers and customers. Sellers can click on the icon and it will list down all the transactions made. The date and time module can also be useful as the sellers can check transactions made

	on a certain date.
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Non-functional requirements:

Non-functional requirements are the how of the website. They form the ultimate user experience of your e-commerce and indicate a different level of expectation. These non-functional requirements can captivate the user but it also can increase the cost of the project. Non-functional requirements include security, speed, usability, performance, maintainability and scalability.

Non-Functional Requirements	Description
Security	Security is extremely important when the site deals with monetary transactions, users' financial and other sensitive data. When the website uses an SSL certificate and enforces a data privacy policy, users will trust the website. They might even be converted to brand advocates and introduce the website to their family and friends. Security also refers to compliance with customer data protection rules, PDPA in Malaysia.
Usability	The website should be easy to use regardless of age and technical skills. Usability is defined by how easily a user can find what he/she is looking for in a single page visit. At the same time, perform the tasks in the store and whether the experience was a memorable one.
Performance	The loading time of the e-commerce store is vital as most users do not have much patience. Special attention has to be given to ensure the website loads as fast as possible regardless of the increasing traffic and

	<p>number of integrations on the website. Hence it would be good to set up the speed benchmark, maximum SKUs to add to the store or any other performance indicator best for the business.</p>
Maintainability	<p>The operational costs for maintenance is something you have to consider. Maintainability is how easy it is for a system to be supported, changed, enhanced, and restructured over time. Lifespan, the frequency to revise the website and resources available are the key factors when structuring maintainability requirements.</p>
Scalability	<p>Scalability describes how the website can grow and have more features and functionality without performance degradation of the website. It should be able to accommodate more users, more transactions, more processes as well as additional nodes and services in the future when the business expands and the system has to change to meet the needs of the business.</p>

Conclusion

In conclusion, sellers no longer have to worry about losing out to competitors within the market with our new software. The features such as automated response, business analysis, customizability and discount management in our software will grant customers a competitive edge when boosting their business performance.

The solutions suggested may seem simple at face value, but it completely solves all the difficulties and issues online sellers and businesses have when handling their store. After all, we are supposed to just develop software that makes the seller's experience smoother and more efficient. You don't always have to come up with innovative solutions when solving problems, as all of our solutions are solved using existing technologies.

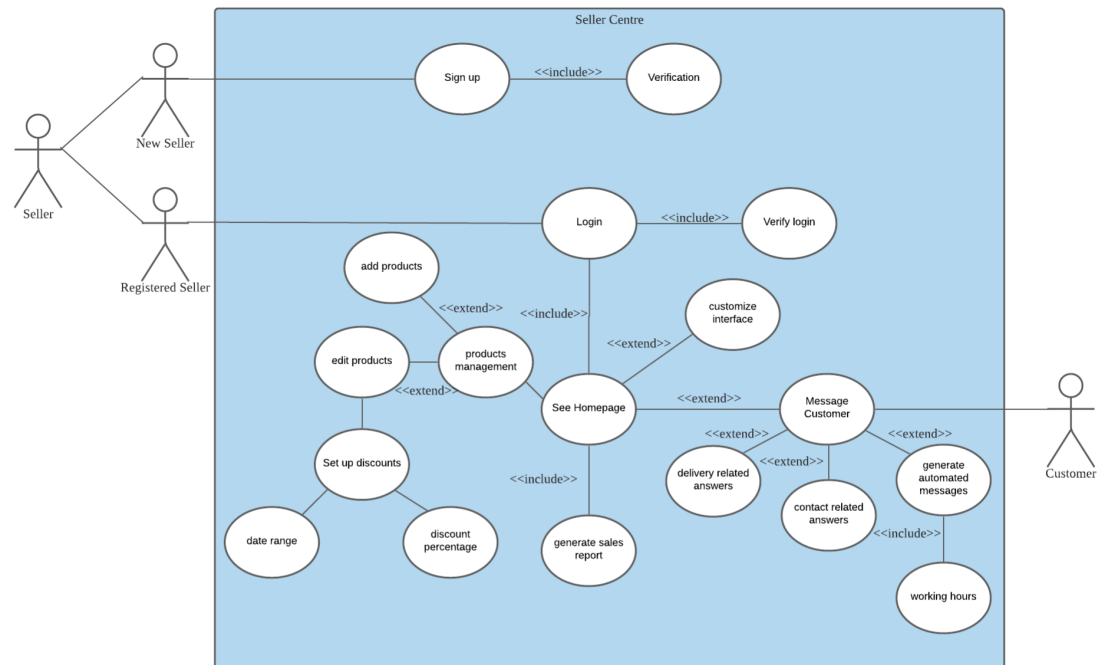
The application is technically and economically viable as there are all the resources that are needed for the program and it could be self-sustainable if we develop ourselves. Not only that, the program is built in a way the program can be modified and evolved as time goes by. Hence, the consumers will save costs over time as they do not need to recreate a new system to keep up with their business needs.

We will also consider these enhancements in the future. The enhancement will include omni-channel support whether through E-store or M-store to achieve the widest coverage possible so that customers can connect with us wherever they are. In phase 2 we will upgrade our data technology to help sellers better understand their customers' behavioural patterns by tracking their spending habits, what they love, what they are willing to spend on and other information. Besides that, sellers can further build a relationship with their customers by analyzing the data and finding what motivates them to keep coming back again and again either through reward points, redemption of personalised gifts or/and maybe keep them updated with targeted promotions.

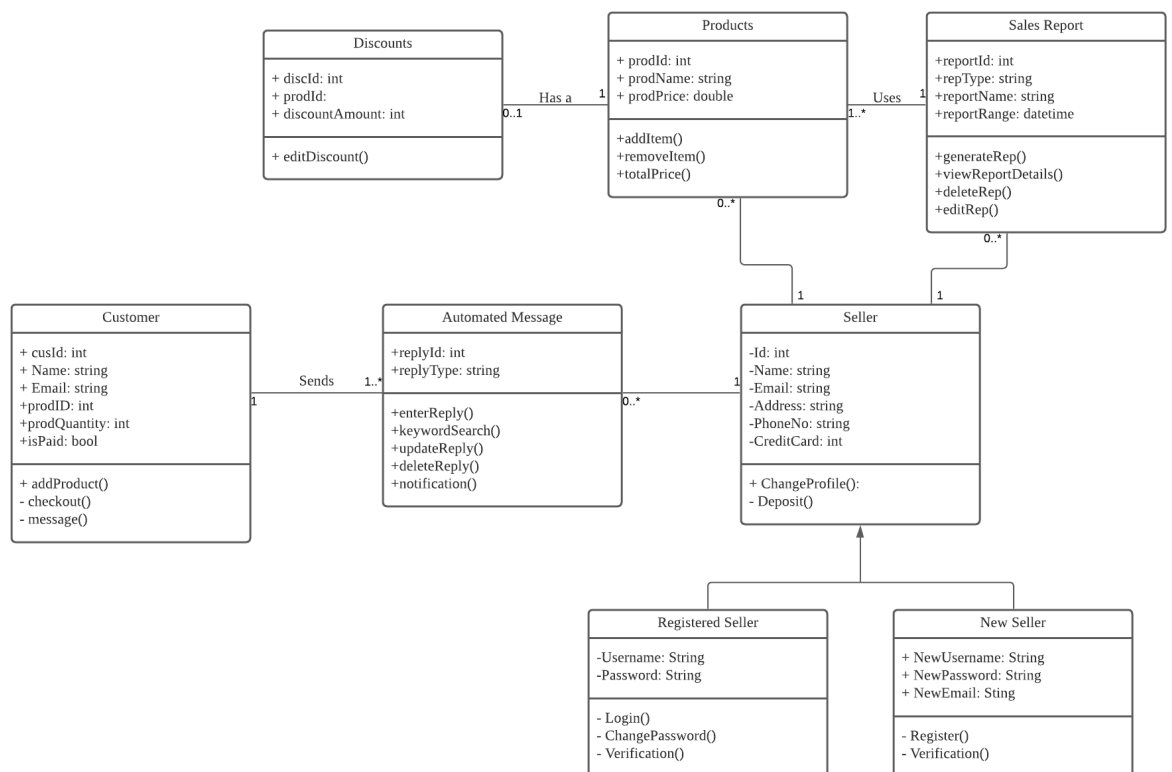
System Analysis and Design

List and draw all the related UML diagrams in this section

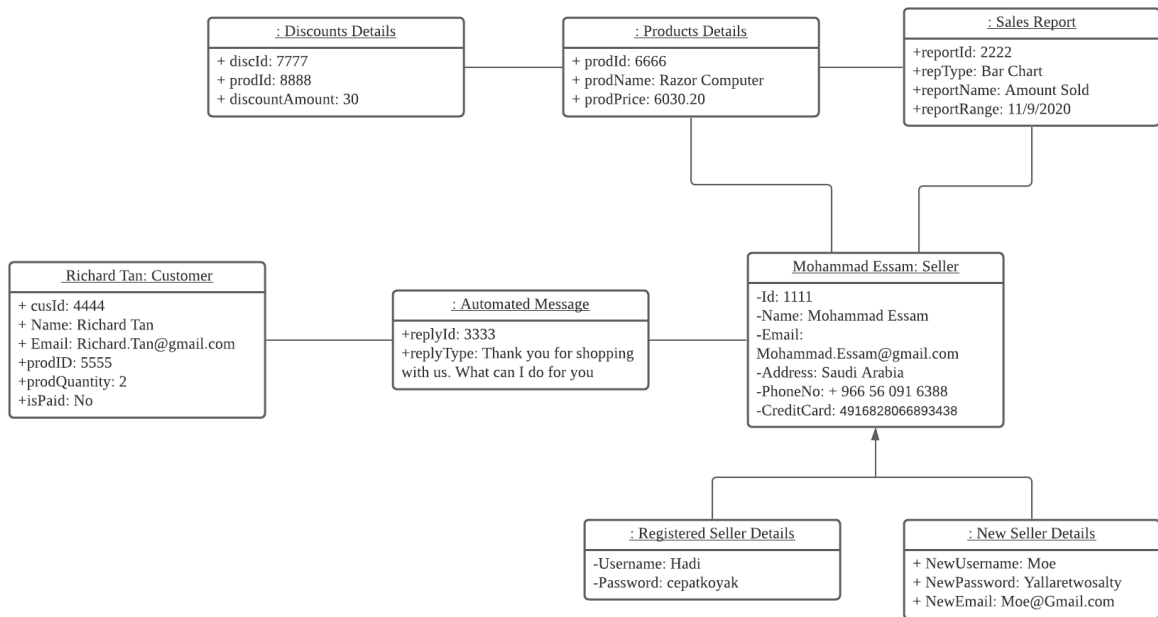
a) UML Use Case diagram



b) UML Class diagram



c) UML Object diagram



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