SCHOOL OF COMPUTER SCIENCES

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CMT 222 : SYSTEM ANALYSIS AND DESIGN

REPORT 2

MALAYSIA COSMETIC REGULATORY SYSTEM

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GROUP 11

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We declare that all this submitted work is entirely our own except for those sources which we have referenced, and that it has not been previously submitted for assessment in any course.

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ABSTRACT

Most companies including Malaysia Cosmetic Regulatory (MCR) had the experience of processing data using the conventional way. Every business process has to be done manually thus it consumes a long period of time to finish a particular task. Administrative works such as data entry, customer service, answering phone calls are among the tasks that were highly affected. If this continues to happen, companies' efficiencies will decline as only a small portion of jobs are completed within a long period of time. Without proper organization and flows, data loss and information leaking would probably happen. Apart from that, product registration from cosmetic companies would be really difficult and it would cause a big hustle to go back and forth to the headquarter of MCR. Therefore, this paper would like to propose an information system called Malaysia Cosmetic Regulatory System to comprehend the aforementioned problems. This system will be a web based system where people all around Malaysia can access the system as long as they have the accessibility. This system intends to benefit targeted people who are using this system which are staff, cosmetic companies and also public (consumers). Our first objective is to enable the public to check whether a cosmetic product is verified, safe to be applied and has zero dangerous substances. Secondly, to ease product registration by companies so that they do not have to waste their time going back and forth to the headquarter. Our last objective is to assist the staff in spreading information by putting up contents online. Basically how the system will work is that the administrative staff in charge have to login to the system first and they can use their privilege as admins to update and add any important information. Every information will be stored in a database to ease retrieval, deletion and information insertion..As information has been uploaded by the staff, the information will be made public so that it would be delivered to product consumers. The consumers will be able to search for products they want and read information available. In the consumers' section, there will be a section where customers could provide feedback for system improvements or complaints regarding products. As for the cosmetic companies, they have to become a member first and there will be a sign up section, it will then direct the companies to log in session. Staff login and companies login will be different. Companies will be able to register their products and withdraw cosmetic products that have been registered. There will be a price for registration and laboratory testing, so there will be a section

for online transacting. In conclusion, all the plannings have to be done systematically and as organized as possible to achieve all the functionalities aforementioned. All the requirements that are needed by the stakeholders have been identified as well as the use cases. Works will be divided among the team members and activities accomplishments will be depicted using the GANTT chart.

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1. Introduction

1.1 Organization background

The Malaysia Cosmetic Regulatory also known as MCR was set up in October 2000 under the quality control of the Cosmetic Supply Programme. MCR is established to implement quality control on cosmetic products. The infrastructure and facilities were designed to meet the requirements for testing and quality control activities. Since 2002, MCR has accounted for the task of ensuring the qualities of products and the safety of consumers through company registration and licensing schemes. All the registered products have to undergo several processes before getting verified and approved to be safely used. This can be achieved through evaluation of scientific data and laboratory tests before they are sold. The mission of MCR is to safeguard the nation's health through scientific excellence in the regulatory control of cosmetics. It aims to ensure that cosmetic substances approved are safe and of quality.

1.2 System background

A system to monitor products in the market was set-up. Information on cosmetics products for cosmetics professionals and consumers was made available through the cosmetic information service. The Sustainable Development Goal this system is trying to propose is **Good Health and Wellbeing**. We believe by sustaining the Cosmetic Regulatory System, every product that includes harmful substances and ingredients can be put under containments, thus all of the problems that are caused by the detrimental ingredients can be preventable. The stakeholders in this system include the consumers (public), the staff (Malaysia Cosmetic Regulatory) and Product Companies. This system will be owned by the staff administrators (Malaysia Cosmetic Regulatory) who are tasked with putting up contents in the system.

Malaysia Cosmetic Regulatory System will be improved and built as a web-based system where it can be run on a web browser and accessed by computers with internet connection. This system will be available to everybody as long as they have the accessibility to the browser. This system will be used to filter out every detrimental cosmetic product for a better and healthy society.

1.3 Problem description

In addition, maintaining this system will boost the organization's efficiency as it reduces the cost and administrative workload. In the previous time, MCR had to do everything manually. Firstly, regarding administrative workload such as data entry, answering phone calls, entertaining customers and cosmetic product consumers, coordinating and organizing tasks and many more which takes a huge amount of time to be completed. If an organization continues down this conventional way, the results will be lethal and the company's efficiency will decline. By sustaining this system, data entry will be much easier and every previous record can be maintained, traced and tracked easily without much effort. Thus, the risk of loss, theft and forgery can be mitigated.

Secondly, in the previous time, customers, cosmetic product companies and consumers had to take the hustle to come to the company for registering their products or to raise any issues regarding products. The existence of this system will take down all the aforementioned hustles without lessening the efficiency of the company. Doing everything manually will involve cost and all the procedural works will consume time. In fact, it will affect behavioral changes in organization where communication happens in a more effective way for instance, sharing information in a means of file, folders or graphic will make information delivery more successful rather than talking normally.

We are impassioned and determined to outspread any false, illegal and harmful cosmetic products to raise awareness to keep the society and the citizens of Malaysia away from any serious health and skin conditions. The use of dangerous and poorly regulated substances in cosmetic products might cause harm to one's health as long-term exposure of toxins can even cause cancer, dermatitis, hormone disturbance and birth defects in pregnant women.

1.4 System objectives

1. **To check whether a cosmetic product is verified, legal to be used in Malaysia**

   Consumers will be able to make confirmation whether therapeutic substances approved for the local market are safe or not by providing information about cancellation of notified cosmetic

products which contain banned substances including scheduled poisons that are not allowed in cosmetic products. This system will list out every banned product the consumers need to know and they can check whether a product is registered or not. All cosmetic products registered under MCR will undergo a screening test and Cosmetic products found to contain substances that are prohibited or used beyond the limit and conditions allowed as well as products claimed or purported to be used beyond the cosmetic scope will be denied for notification. The status of the product will be displayed as well whether it is pending in registration, unregistered, safe to use or dangerous to use. To ease navigation of products, this system will include a navigation bar in case the consumers want to look for a specific product. A list of products according to the topics also will be displayed. All in all, every information that a consumer has to acknowledge and consider important will be imported by staff to the system so that it will reach the society and help in evoking awareness among Malaysians.

2. **To ease products registration by companies**

The company or person responsible for placing cosmetic products in the local market must notify the Malaysia Cosmetic Regulatory prior to market, manufacture or import cosmetic products. This will allow MCR to gather adequate information on the cosmetic products that are placed in the market. This will also allow MCR to regulate and monitor any unwanted and harmful products in the local market. By sustaining this system, every procedural work in obtaining legal certification of MCR to market the products will be done online. Companies do not have to do everything manually such as filling in the form, instead every step in registering products will appear in the system and all the required information and forms can be found in the system as well. Submission will also be done online. MCR administration department will receive the registration request and process everything. Once the process has completed, the company will get notified whether their registrations are successful or not.

3. **To assist MCR in out spreading information by putting up contents online**

This system also offers a solution and huge benefit in achieving the vision of MCR itself which is to inform people about any dangerous products in the local market. By putting up contents

online, people can easily go through every product that may harm their health and will take precautions whenever they want to buy any products in the local market. In the previous time, people might get notified of the harm of a particular product by reading newspapers or magazines, which are effective but not as efficient as this system. In fact, with the growing number of cosmetic products, it might be difficult to inform people which one is harmful and which one is not. By putting everything online, people will instantly know and be aware of the harmful products and hence it increases awareness among the society.

1.5 System scope and limitations

The scope of MCR system will cover three stakeholders which are the staff, users/consumers as well as the cosmetic companies. These three stakeholders will have their own roles in the system and as compared to before, this system will help in alleviating the stakeholders' jobs. Staff have to ensure the company messages and visions are delivered to the targeted audience by frequently updating the system (add information, delete irrelevant contents, update or edit information). Besides, it allows the staff to generate reports automatically. Users/consumers will have a really good user experience through this website by having all the information needed in the system. They will only have to look for keywords or use the navigation system and every related information will be displayed and can be viewed.Other than that, the cosmetic companies will have their registration processes easy and smooth. By making every of the documents available on the website, it reduces the cost of the entire registration process.

Limitations of the system

1. Cost: MCR will have to labour quite a cost to ensure that this system is capable of managing a lot of visitors at the same time. Maintenance cost is really crucial to keep this system updated and stay relevant.
2. Offline: This system is a web based application and web based runs inside a web browser. It means that this system is not available offline. The stakeholders of the system will have to access the system with internet connection.

1.6 Proposed system description and capabilities

Function	Description
Searching for cosmetic products	Consumers and users will be able to search for any particular cosmetic products using the navigation bar. All of the details about the products will be included as well
Reading information, status and details about system and products	Consumers and users will be able to read information that is posted on the system. For example, the list of harmful products or unregistered products. If users would want to know more about the organization, there will be a section of the organization's introductory available on the system.
Reporting side effects of cosmetic products	Consumers of cosmetic products are allowed to report any side effects experienced. This is to allow MCR in monitoring and take further actions for the cosmetic products in case they are harmful to the society. Reporting side effects might as well cause the cancellation of product certification for the respective company.
Give or report feedback on the system for improvements and enhancements	Consumers and users are allowed to give feedbacks on the system and are given the room to express ideas in enhancing and improving the system
Update or alter information and contents	MCR staff are able to update or alter information that is posted before.
Add information and contents	MCR staff are able to add any relevant information and put up informative contents on the system.
Remove information or contents	MCR staff are able to remove information or contents that are outdated from the system.
Generate report on how many people access to the system	MCR staff will be able to generate reports on the amount of people accessing the system monthly, the amount of newly registered companies monthly, the list of products cancellation and so on.

Login to the system	MCR staff and company will have to login to the system before adding, updating or removing anything from their section.
Registering as MCR member	Companies have to register as MCR members before registering cosmetic products and becoming a cosmetic notification holder.
Register cosmetic products	Companies can register their products to be processed and tested by MCR laboratory.
Submit required documents for registration	In registration processes, companies must submit valid documents to get their products notified and processed.
Pay for laboratory testing and registration fee	Companies have to pay for laboratory testing and registration fees before getting their products processed and tested by MCR.
Withdraw cosmetic products notification	Any companies that want to withdraw their cosmetic product section will be able to do so in the specialized section on the system

Table 1: System description

Table 2: System capabilities

Features	Description
This system is a web based system.	Users, companies and staff do not have to install this system in their phones or personal computers because it can be accessed with internet connectivity.
Product notification note can be generated immediately	The companies can generate notification notes immediately from the system after confirmation of payments as solid payment and registration proof and own references.
Reports stored in a database	To avoid data loss and leak, reports will be automatically saved in databases.

1.7 Expected results and business benefits

The system is expected to check whether the cosmetic products are verified and safe to be applied by consumers. The system is capable of allowing the company to login to the system and register as a member as well as their products with the MCR. Besides, the system also is able to allow the registered products to be tested by MCR laboratory. The user/cosmetics consumers to search the cosmetic products and get the information, status details about the system and also the products. System admin are able to add,delete,update or alter all the information related to the products. Reports also are able to be generated by the system in a short time. The reports include how many people access the system. The deployment of the system will provide the business benefits which are personalized customer service. Providing personalized customer service is the key advantage of the system by providing the information and helping customers choose the best one for them and build their loyalty. MCR functions to ensure the qualities of products and the safety of consumers through company registration and licensing schemes so that it can be a platform for the cosmetics company to establish their products to the consumers.

2. Project Management Plan

2.1 Project overview

2.1.1 Software development methodology

Malaysia Cosmetic Regulatory System incorporates agile methodology throughout the development progress. Agile project management is an iterative approach to delivering a project throughout its life cycle. There are several reasons why we decided to implement agile methodology in our software development.

The first reason is agile life cycles are composed of several iterations or incremental steps towards the completion of the project. The project will break into smaller pieces, which are then prioritised by teams in terms of importance. Agile methodology is really flexible where it allows the developer to revise back the system they built for enhancement purposes according to how the customers shape it. This allows for timely course correction which will virtually eliminate the

chances of absolute project failures. Iterative cycle allows the product to be built incrementally so that it will not fail completely.

The second reason is because the end product will be more predictable. Testing in agile happens regularly through the whole process, so the customers can check periodically on the working project. By this, the project can be finished on time and on budget as well. Apart from that, this will make the project less prone to errors. Having customers checking the project regularly will avoid misunderstandings around the detail of what customers wanted as requirements are checked and confirmed throughout the project. The far less re-work on projects is avoidable as issues and changes are identified in the early stage itself.

According to the aforementioned reasons, it proves that agile is much more open to changes and additions. This methodology is geared to take into account a customer's evolving needs as it adapts to business processes change throughout the development of the project. Not only does it adapt to changes, it also expects them and plans for them. It means that agile methodology really encourages customers and stakeholders involvement in the project development processes. As it involves frequent demonstrations and check ins, it will allow the stakeholders to decide any changes they want to make at a faster pace. Hence, it makes this method customer-centric.

2.2 Problem identification and project approval

2.2.1 System vision document

System Vision Document
Malaysia Cosmetic Regulatory System

Problem description

In the previous time, MCR had to do everything manually. Firstly, regarding administrative workload such as data entry, answering phone calls, entertaining customers and cosmetic product consumers, coordinating and organizing tasks and many more which takes a huge amount of time to be completed. If an organization continues down this conventional

way, the results will be lethal and the company's efficiency will decline. By sustaining this system, data entry will be much easier and every previous record can be maintained, traced and tracked easily without much effort. Thus, the risk of loss, theft and forgery can be mitigated. Secondly, in the previous time, customers, cosmetic product companies and consumers had to take the hustle to come to the company for registering their products or to raise any issues regarding products. The existence of this system will take down all the aforementioned hustles without lessening the efficiency of the company. Doing everything manually will involve cost and all the procedural works will consume time. In fact, it will affect behavioral changes in organization where communication happens in a more effective way for instance, sharing information in a means of file, folders or graphic will make information delivery more successful rather than talking normally.

System capabilities

The system is capable of:

- Login to the system using email
- Generate weekly or monthly reports
- Storing reports in database for security
- Generate product notification note in a short amount of time
- Providing information, status and details about system and products
- Pay for laboratory testing and registration fee via online transaction
- Updating or altering information and contents
- Handling online submissions from users/companies
- Navigating cosmetic products

Business benefits

This system intends to bring the following business benefits to the stakeholders:

- Consumers will be able to differentiate between legal and illegal cosmetic products in the market so that they will get protected from the use of harmful substances.
- To ease cosmetic companies' product registration by turning everything into online processes.

• Awareness can be spread efficiently by putting up the contents online and making it accessible to the public.

Table 3: System Vision Document

2.2.2 The estimated time, cost and annual benefits

The estimated time to finish this project is 8 weeks where both iteration 1 and 3 will take 3 weeks and iteration 2 will only take 2 weeks. The estimated time is decided based on the process and use cases difficulties.

The organization has to labour some amount of money for the development of this system. System Costs means all costs related to the System, including but not limited to Capital Costs, Finance Costs, Operation and Maintenance Costs, and Repair and Replacement Costs. After creating this system, the organization will have to maintain and sustain it which obviously will involve some costs. Annual benefit is not identified in this system development.

2.3 Project risk and feasibility

2.3.1 Organisational risk and feasibility

Management expertise
1. Does the organization have the management expertise? 2. Does the organization have the technical expertise? 3. Are they committed to changes in workflow, technology, personnel? 4. Over ambitious management 5. Distributed project management 6. Changing priorities in project management
Strategy and policy
1. How to achieve the objective of the system? 2. How to increase the system traffic?

3. Planning of operational risk management 4. Reporting procedures for any loss data

Table 4: Organisational risk and feasibility

2.3.2 Technological risk and feasibility

New technology
1. New system might lead to implementation of new technology 2. Initiate implementation and new configurations 3. Does the organization have the necessary technology?
Technology dysfunction
1. Utilizing outdated technology that affects the performance of the system development 2. Software malfunctioning that disrupts works of developments 3. Technological obsolescence of product or product assembly
Security and recovery
1. Fraudulent transaction during online transitioning for payment fee 2. System failure 3. Protection from malwares, hackers and fraudulent activities

Table 5: Technological risk and feasibility

2.3.3 Resource risk and feasibility

Resources availability
1. Does the organisation have the tools or resources to maintain the system? 2. Resources conflicts with other projects
Financial and funds

1. Inadequate or interruptions in funding 2. Inconsistent objectives of time, cost and scope 3. Trial or product development risk that could impact budget

Table 6: Resource risk and feasibility

2.3.4 Schedule risk and feasibility

Estimation risks
1. Underestimates of time necessary to complete the project 2. Will the cost increase if the project is delayed?
Timeline
1. Will all the work be done accordingly to the GANTT chart and project iteration schedule? 2. Decisions take too long to be made 3. Overly optimistic schedule 4. Will the schedule rigidly dictated or constrained by available budget

Table 7: Organisational risk and feasibility

2.4 Project management plan

2.4.1 Project Iteration Schedule

Iteration	Time estimation	Use case assigned to each iteration
1	3 weeks	• Add information • Update list of cancellation of cosmetic products • Generate summary/executive report • Remove notified cosmetic product

2	2 weeks	• Search product • Give feedback • Submit report/complaint • View cancellation of notified cosmetic products
3	3 weeks	• Register membership • Make online payment • Register product • Remove notified cosmetic product
Total	8 weeks	

Table 8: Organisational risk and feasibility

2.4.2 Work breakdown structure (WBS)

The development of the entire system will involve **3 iterations.** This WBS will be for the whole iteration.

2.4.2.1 Iteration 1 of MCR Staff Management Subsystem

Note: This subsystem will be done by Nor Athirah Binti Abdul Rahim

Note: Admin can access all the database of information to produce analysis. Use case involve in this subsystem: M1: Add information

M2: Update list of cancellation of cosmetic products

M3: Generate summary/executive report

M4: Login Staff Account

Table 9: WBS Iteration 1

First stage: Project planning	
1. Develop WBS, build schedule and plan the work	1/2 day
2. Make organization chart	1/2 day
3. Estimate time and cost	1 day

Second stage: Analysis task	
1. Make observations based on another administrative system but with the same concept	1 day
2. Define required information and data elements	2 days
3. Determine the use cases for subsystem and model user activities.	2 days
Third stage: Design task	
1. Design database scheme	1 day
2. Design software interface	2 days
Fourth stage: Build task	
1. Programming code.	5 days
2. Perform unit and integration task	2 days
3. Build use case by use case	3 days
4. Build database staff and list of cancellation products	1 day
Fifth stage: Testing and deploy	
1. Perform system functional testing	1 day
2. Perform user acceptance testing	2 days
3. Deploy part of system	1 day

2.4.2.2 Iteration 2 of MCR Customer Management Subsystem

Note: This subsystem will be done by Ainil Hawa binti Abdul Rozak

Note: Use case involve in this subsystem:

M1: Search product

M2: Give feedback

M3: Submit report/complaint

M4: View cancellation of notified cosmetic products

Table 10: WBS Iteration 2

First stage: Project planning	
1. Develop WBS, build schedule and plan the work	1 day
2. Make organization chart	1 day
3. Estimate time and cost	1 day
Second stage: Analysis task	
1. Make observations based on another administrative system but with the same concept	1 day
2. Define required information and data elements	2 days
3. Determine the use cases for subsystem and model user activities.	2 days
Third stage: Design task	
1. Design database scheme	1 day
2. Design software interface	2 days
Fourth stage: Build task	
1. Programming code.	3 days
2. Perform unit and integration task	2 days
3. Build use case by use case	3 days
4. Build customer database	1 day
Fifth stage: Testing and deploy	
1. Perform system functional testing	1 day
2. Perform user acceptance testing	2 days
3. Deploy part of system	1 day

2.4.2.3 Iteration 3 of MCR Cosmetic Companies Management Subsystem

Note: This subsystem will be done by Farah Mursyidah Binti Fuahaidi

Note: Use case involve in this subsystem:

M1: Register Membership

M2: Make Online Payment

M3: Register Product

M4: Remove notified cosmetic product

M5: Login or Sign Up Company Account

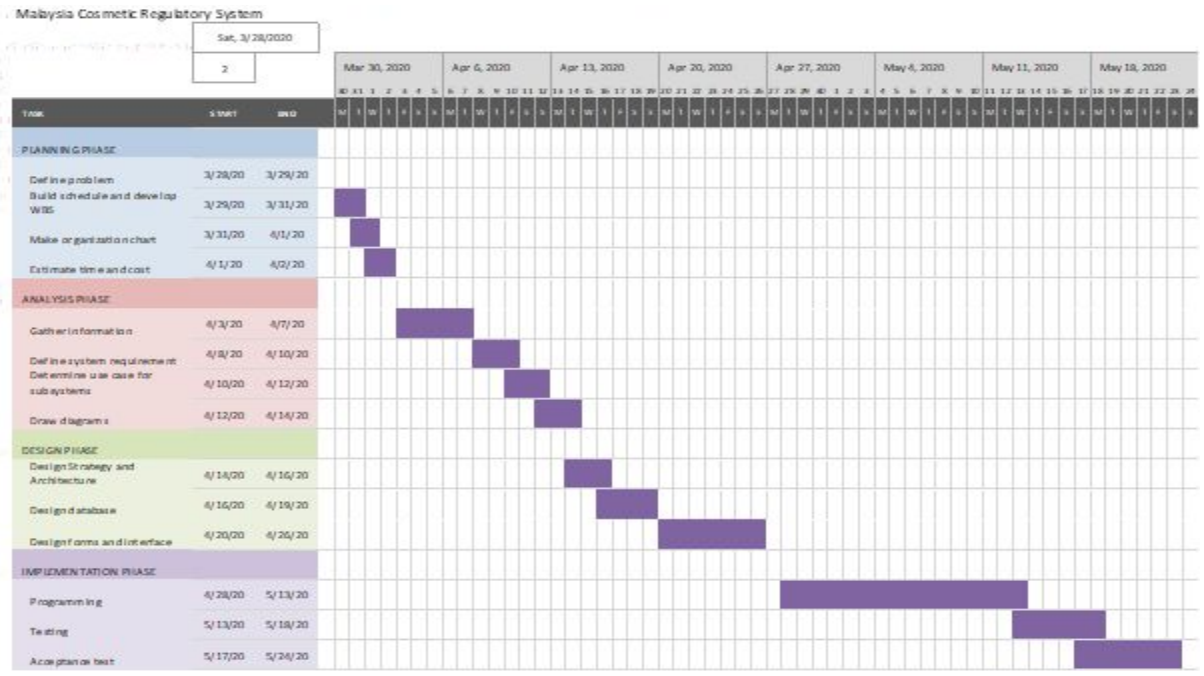
Table 11: WBS Iteration 3

First stage: Project planning	
1. Develop WBS, build schedule and plan the work	1 day
2. Make organization chart	1 day
3. Estimate time and cost	1 day
Second stage: Analysis task	
1. Make observations based on another administrative system but with the same concept	1 day
2. Define required information and data elements	2 days
3. Determine the use cases for subsystem and model user activities.	2 days
Third stage: Design task	
1. Design database scheme	1 day
2. Design software interface	2 days
Fourth stage: Build task	
1. Programming code.	5 days
2. Perform unit and integration task	2 days

3. Build use case by use case	3 days
4. Build companies' databases	1 day
Fifth stage: Testing and deploy	
1. Perform system functional testing	1 day
2. Perform user acceptance testing	2 days
3. Deploy part of system	1 day

2.4.3 Work schedule - GANTT chart and milestone timeline

Figure 1: GANTT Chart



3. System Analysis

3.1 Existing system review

As stated above, this system focuses on cosmetic products only. As we know, there is an existing system that has the same functionality but its scope is much bigger than this system because it focuses on cosmetic products, medicines and vaccines which can cause confusion among users. Some companies have a difficult time registering their company and product since there are so many options. Hence, MCR system is specifically designed for cosmetic product companies and cosmetic lovers to reduce confusion by providing related options regarding cosmetic products.

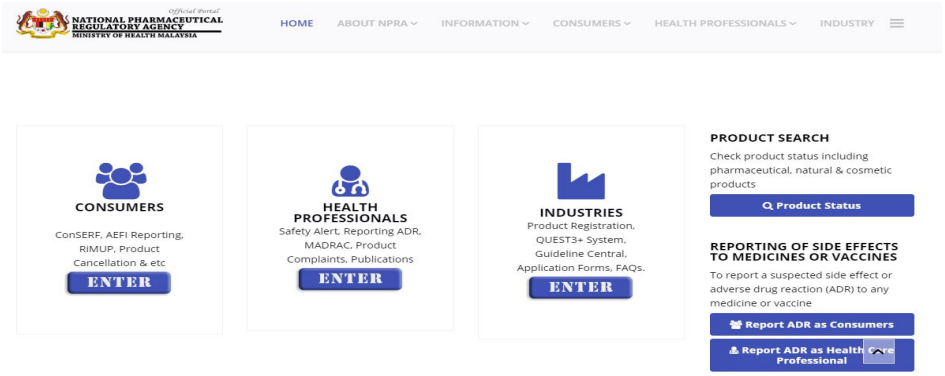
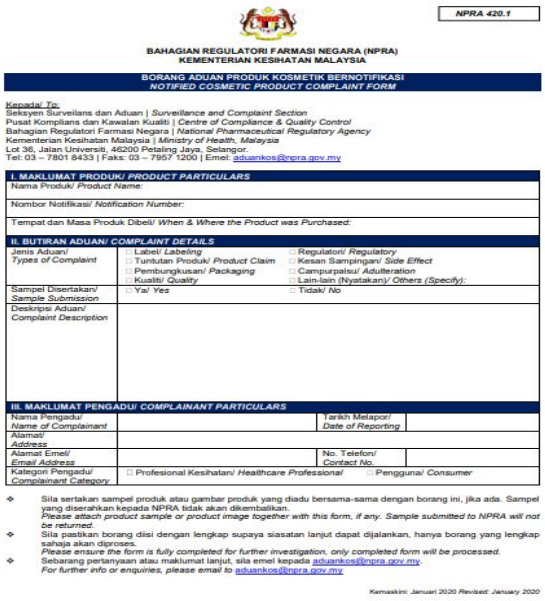


Figure 2: Existing system

We found that consumers are able to report on notified cosmetic products in the existing system but they need to submit it manually. Consumers can download the cosmetic product complaint form to be printed out and fill the form. We found that this procedure is inconvenient which consumes time and money. Therefore, the MCR system has provided the solution to the consumer by providing online reporting on notified cosmetic products. Consumers will no longer need to print out the complaint form and submit it manually. In fact, they can submit and fill the complaint form online with the network access but if the sample of the product was included, the consumer needs to send the sample manually with the complaint form.



NPRA 420.1

BAHAGIAN REGULATORI FARMASI NEGARA (NPRA)
KEMENTERIAN KESIHATAN MALAYSIA

BORANG ADUAN PRODUK KOSMETIK BERNOTIFIKASI
NOTIFIED COSMETIC PRODUCT COMPLAINT FORM

Kepada/ *To:*
Seksyen Surveilans dan Aduan | *Surveillance and Complaint Section*
Pusat Komplians dan Kawalan Kualiti | *Centre of Compliance & Quality Control*
Bahagian Regulatori Farmasi Negara | *National Pharmaceutical Regulatory Agency*
Kementerian Kesihatan Malaysia | *Ministry of Health, Malaysia*
Lot 36, Jalan Universiti, 46200 Petaling Jaya, Selangor.
Tel: 03 – 7801 8433 | Faks: 03 – 7957 1200 | Emel: aduankos@npra.gov.my

I. MAKLUMAT PRODUK/ *PRODUCT PARTICULARS*

Nama Produk/ *Product Name:*	
Nombor Notifikasi/ *Notification Number:*	
Tempat dan Masa Produk Dibeli/ *When & Where the Product was Purchased:*	

II. BUTIRAN ADUAN/ *COMPLAINT DETAILS*

Jenis Aduan/ *Types of Complaint*	☐ Label/ *Labeling* ☐ Tuntutan Produk/ *Product Claim* ☐ Pembungkusan/ *Packaging* ☐ Kualiti/ *Quality*	☐ Regulatori/ *Regulatory* ☐ Kesan Sampingan/ *Side Effect* ☐ Campurpalsu/ *Adulteration* ☐ Lain-lain (Nyatakan)/ *Others (Specify):*
Sampel Disertakan/ *Sample Submission*	☐ Ya/ *Yes*	☐ Tidak/ *No*
Deskripsi Aduan/ *Complaint Description*		

III. MAKLUMAT PENGADU/ *COMPLAINANT PARTICULARS*

Nama Pengadu/ *Name of Complainant*		Tarikh Melapor/ *Date of Reporting*	
Alamat/ *Address*			
Alamat Emel/ *Email Address*		No. Telefon/ *Contact No.*	
Kategori Pengadu/ *Complainant Category*	☐ Profesional Kesihatan/ *Healthcare Professional*	☐ Pengguna/ *Consumer*	

- Sila sertakan sampel produk atau gambar produk yang diadu bersama-sama dengan borang ini, jika ada. Sampel yang diserahkan kepada NPRA tidak akan dikembalikan.
  Please attach product sample or product image together with this form, if any. Sample submitted to NPRA will not be returned.
- Sila pastikan borang diisi dengan lengkap supaya siasatan lanjut dapat dijalankan, hanya borang yang lengkap sahaja akan diproses.
  Please ensure the form is fully completed for further investigation, only completed form will be processed.
- Sebarang pertanyaan atau maklumat lanjut, sila emel kepada aduankos@npra.gov.my.
  For further info or enquiries, please email to aduankos@npra.gov.my

Kemaskini: Januari 2020 *Revised: January 2020*

Figure 3: Example of manual form

3.2 Summary of relevant system

Malaysian Cosmetic Regulatory System (MCR system) is proposed as an alternative to abolish all organization processes that had been done manually. All the staff, consumers and the cosmetic product companies had gone through difficulties in completing their tasks due to limited accessibility. The complexity of their tasks bounded them from achieving the maximum efficiency and productivity of an organization. With MCR system, it helps in lessening every party workload as well as levitating organization's efficiency. MCR system is built to help the staff in putting up contents to spread information to the public. Any correction or awareness can easily be delivered. MCR system allows the staff to edit, update, insert or delete the content and will be directly stored in the databases for company references and information retrievals, thus the data can be secured from any loss or broken. MCR system also assists cosmetic companies in registering their cosmetic products to the system for laboratory testing and being notified to be sold legally in the market. All processes will be done online and the data can be processed faster and protected from broken and fraudility. In fact, it facilitates the consumers or public to look for information regarding the notified products in Malaysia to avoid misuses and harms. Previously

it was really hard to acquire information about a particular product, but with the existence of this system, every search can be easily completed with full description of the product.

3.3 Information gathering technique

- **Observation**

  We gather information through observing the existing system. The existing system sustains the same concept as the MCR system except that the scope is much bigger. It covers not only cosmetic products but also medicines and vaccines which can cause confusion among the stakeholders. MCR system focuses on giving the optimum solution by minimizing the functionalities of the system by reducing the scope. MCR system intends to only focus on cosmetic regulation.The existing system enables the users to give their feedback or reports regarding the used cosmetic products but it has to be submitted manually where the users are required to print out the documents. This method is inconvenient for the staff as well as the users/consumers.

3.4 System requirement

3.4.1 Functional requirement

Table 12: System functional requirement

ID	Requirement	Importance (Low, Medium, High)
R-001	Consumers can search any cosmetic products they want. Only if the products are notified, the description of the products will be available	High
R-002	Consumers can view cancellation of notified cosmetic products to take precautions.	Medium
R-003	Consumer can give a feedback or experience review for system improvement	High

R-004	Consumers can make either good or bad reports on the effects of products.	Medium
R-005	Cosmetic product companies have to register membership to get their products verified.	High
R-006	Cosmetic product companies have to register products to get their products certified.	High
R-007	Cosmetic product companies can remove notified cosmetic products	High
R-008	Do online payment for registration fee	High
R-009	Log in account	High
R-010	Generate report	Medium
R-011	Update list of cancellation of notified cosmetic products	High
R-012	Add information and contents	High

3.4.2 Non functional requirement

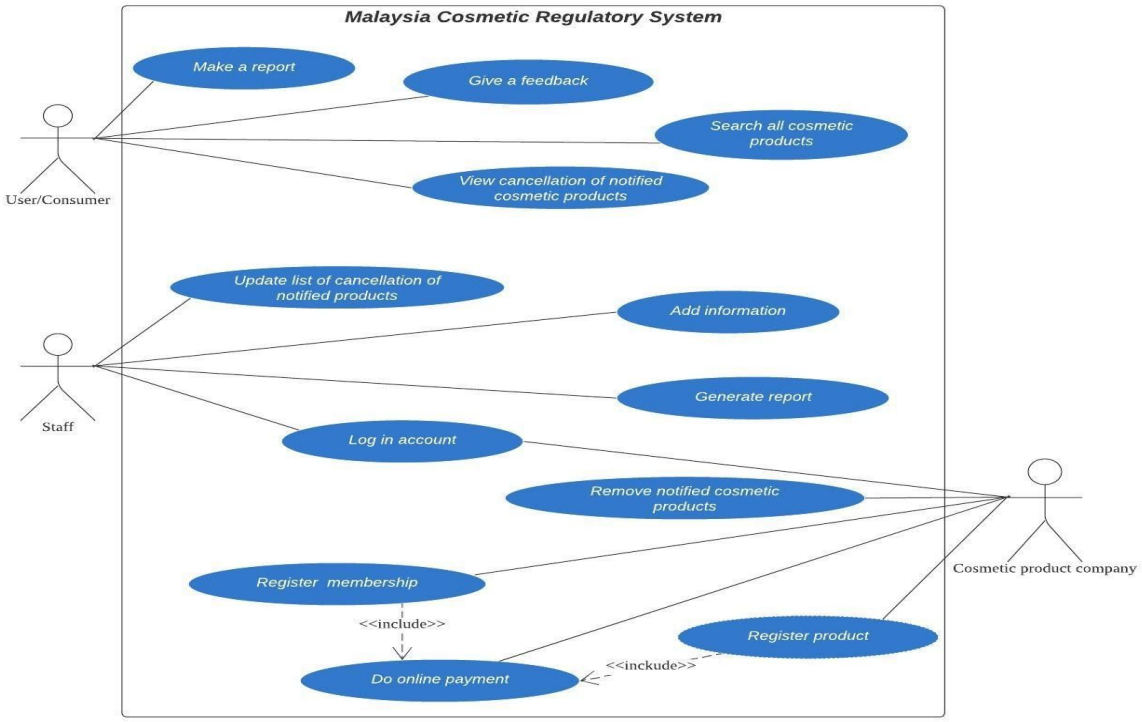
Table 13: Non functional requirement

ID	Requirement	Importance (Low, Medium,High)
R-013	The system must be provided in web based	High
R-014	Reports will be saved in the database.	Medium
R-015	Product notification note can be generated immediately	Low

3.5 Analysis of the new system

3.5.1 Use-Case Diagram

Figure 4: Use case diagram



3.5.2 Use-Case Description and System Sequence diagram

Table 14: Use cases description

Use Case name	Search cosmetic products	View cancellation of notified cosmetic products
Scenario	Search cosmetic products available in the database.	View cancellation of notified cosmetic products that has been uploaded on the system by the admins
Triggering event	Consumers wants to view some information about a cosmetic product	Consumers want to view the notified cosmetic products that have been cancelled and view their information.
Brief	Consumers want to view whether a	This system will provide a list of notified

description	product is legally notified and safe to use by searching in the system. Consumers have to type the name of the product.	cosmetic products that have been cancelled because they contain banned substances. Consumers can know which cosmetic product is not safe to use.
Actors	Users/Consumers	Users/Consumers
Related use case	Make a good or bad report on a product	Update list of cancellation products
Stakeholders	Admin/Staff, Cosmetic product company	Admin/Staff, Cosmetic product company
Preconditions	none	List of cancellation of cosmetic products exist
Postconditions	The searched cosmetic product exists.	none
Exception conditions	If consumers type the name of products wrongly	none

Table 15: Use cases description

Use Case name	Give feedback	Make a report
Scenario	Give feedback for system improvements	Consumers make a report about a product
Triggering event	Consumers want to provide feedback about the system and express ideas in enhancing and improving the system	When consumers want to make a report about a side effect of a product either it is good or bad.
Brief description	Consumers can give their feedback about this system which can help to improve the system. The system will provide an online form that needs to be filled by consumers. This function is optional for consumers. Consumer also will be given the room to express ideas in enhancing and improving the system	Consumers able to make a report about a product. They can write about the positive or negative side effects of a product.
Actors	Users/Consumers	Users/Consumers
Related use case	none	none

Stakeholders	Staff/Admin	Staff/Admin, Cosmetic product company
Preconditions	The online form for users to fill in should be available.	-The online form for consumers to fill should be available. -The product must exist.
Postconditions	The feedback from users should be saved.	-The report should be saved -The information about the consumers should be saved -The sample of product should be sent by consumers if they report about negative side effects of a product.
Exception conditions	The feedback will not be saved if the users does not click the submit button.	-The reported product does not exist. -Users do not click the submit button. -Users do not complete the online form. -Users do not agree with the terms and condition agreements.

Table 16: Use cases description

Use Case name	Generate report	Add information or contents on the system
Scenario	MCR staff want to generate a report from the system's analytics.	Staff want to add random content to the system.
Triggering event	When MCR staff want to analyse the system traffic, cosmetic product companies and their products.	When staff want to add random content online to the system to spread information
Brief description	MCR staff will be able to generate reports on the amount of people accessing the system monthly, the amount of newly registered companies monthly, the list of products cancellation and so on.	MCR admin will be able to add content to the system by logging in to the system first
Actors	Staff/Admin	Staff/Admin
Related use case	Log in account	Login account
Stakeholders	Staff/Admin	Staff/Admin. Consumers

Preconditions	-MCR staff should log in as staff/admin before generating a report. -The MCR staff position is high enough or has permission to generate a report.	-Must have a user account
Postconditions	-Date of generating a report should be displayed and saved. -The profile of MCR staff should be recorded.	-Must save the information or contents that have been added
Exception conditions	-The MCR staff position is not allowed to generate a report. -The MCR staff does not have permission to generate a report.	-Staff does not have user account -Staff does not save the contents.

Table 17: Use cases description

Use Case name	Update list of cancellation of notified cosmetic products	Remove notified cosmetic products
Scenario	Staff can update lists by inserting new items, delete items, edit items information or removing the whole list.	Cosmetic product companies can remove their own cosmetic products that have been notified by MCR.
Triggering event	When there is any correction to be done, or new product to be inserted or delete the name of the product from the list.	This happens when the company decides to withdraw the notification of any cosmetic product based on their respective reasons.
Brief description	The staff can update the list that has been uploaded. If there are any mistakes in the list, correction can be made. New products that have been cancelled will also be updated, and deletion of the name of the product will happen in case the product runs the second test and is legally verified by MCR.	Companies can withdraw the notification of any cosmetic product before the end of its validity stating the reason for the decision.
Actors	Staff	Cosmetic product companies
Related use case	View cancellation of notified cosmetic products	Log in account
Stakeholders	Consumers, Cosmetic product company	Consumers, Staff/Admin

Preconditions	-The list must exist. -Staff must have an admin account	-The product must exist and legally notified by MCR
Postconditions	-The changes made in the list must be saved. -The changes made in the list must be free from errors.	-Confirm withdrawal and save the changes
Exception conditions	-The information of the product is wrongly updated. -The staff does not save the changes that have been made in the list.	-Product does not exist -User does not commit changes

Table 18: Use cases description

Use Case name	Register products	Register membership
Scenario	Online product registration.	Online membership registration.
Triggering event	Cosmetic product companies want to register their cosmetic products to MCR online.	Cosmetic product companies want to register as members online.
Brief description	The companies must upload essential documents to MCR to be processed and must fill in forms of products registration.	The companies must upload essential documents to MCR to be processed and must fill in forms of membership registration.
Actors	Cosmetic product companies.	Cosmetic product companies
Related use case	Account log in, Do online payment	Account log in, Do online payment
Stakeholders	Staff/Admin	Staff/Admin
Preconditions	-Companies must be a member and have MCR user account -Pay membership fees -Pay product registration fees	-Have to pay for membership fees -Legal company
Postconditions	-Save all the essential documents.	-Save all the essential documents.
Exception	-Companies who do not have user	-If companies do not pay membership fees,

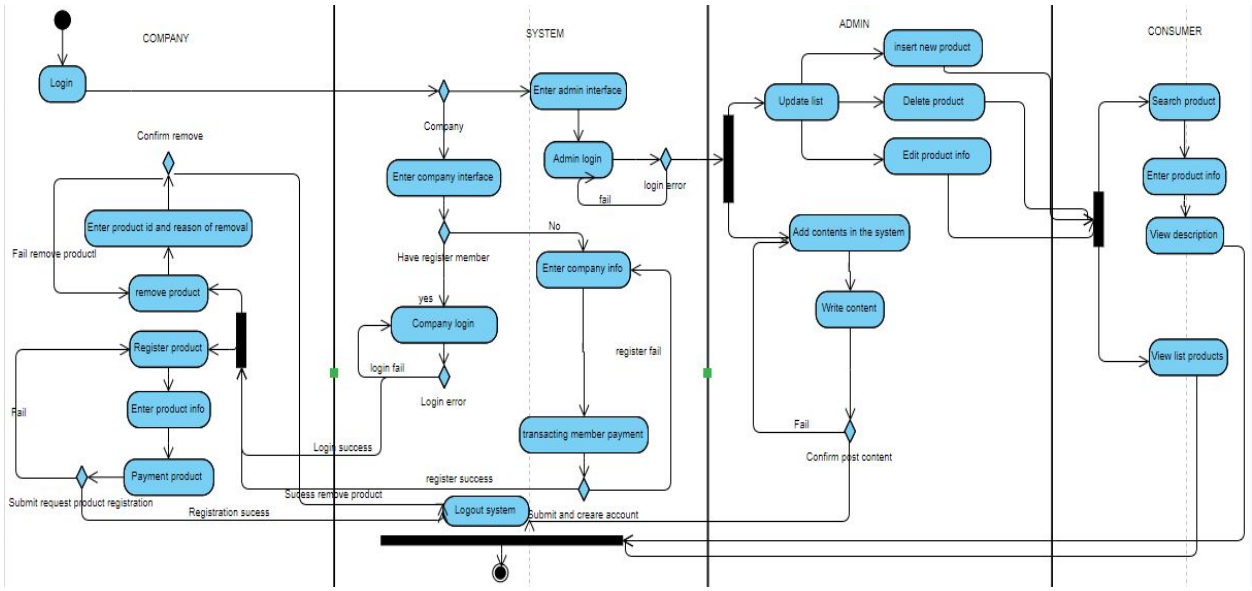
conditions	accounts cannot register.. -If companies do not pay product registration fees, registration will be invalid.	registration will be invalid. -If companies do not save the essential documents, registration will be invalid. -Illegal organization or company request as members will not be approved

Table 19: Use cases description

Use Case name	Log in to account	Do online payment
Scenario	Companies or staff want to log in to their respective accounts.	Transacting payment online via system
Triggering event	When companies or staff want to log in to their respective accounts to do their own tasks like registration and updating information.	When cosmetic product companies want to pay their registration fee during member registration and to pay their product registration.
Brief description	The company must register first as a member and it will automatically direct to system login. Staff must register an account for staff administrators.	Payment for membership and product registration will be imposed on the companies and they are required to transfer it online
Actors	Cosmetic product companies, Staff	Cosmetic product companies
Related use case	Register membership	Register membership, Log in account, Register product
Stakeholders	Staff/Admin	Staff/Admin
Preconditions	Cosmetic product company must already become a member	-Company has already become a member
Postconditions	none	Generate online payment receipt.
Exception conditions	Companies who have not become a member must register first	-The transaction of companies who do not transfer the exact amount of fees will not be accepted-Companies who have not become a member must register first

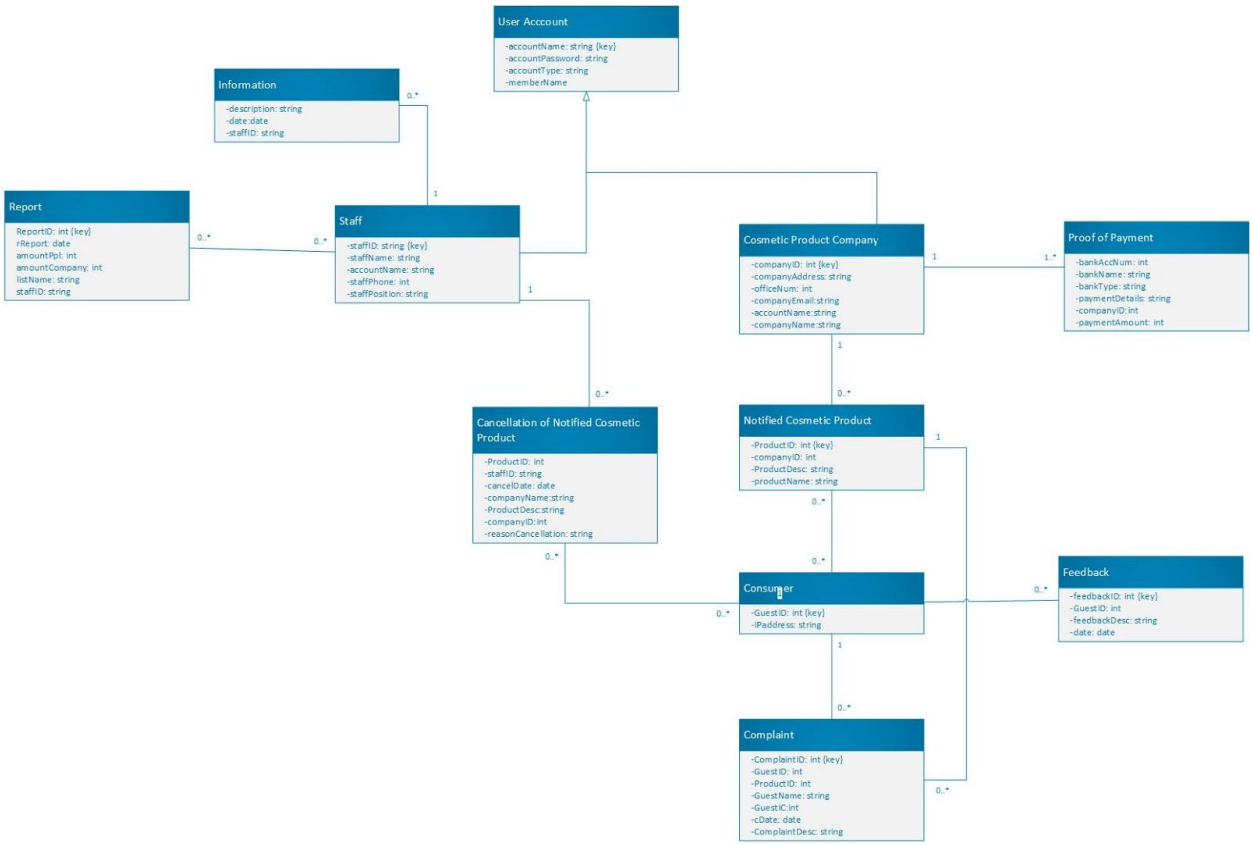
3.5.3 Activity diagram

Figure 5: Activity Diagram



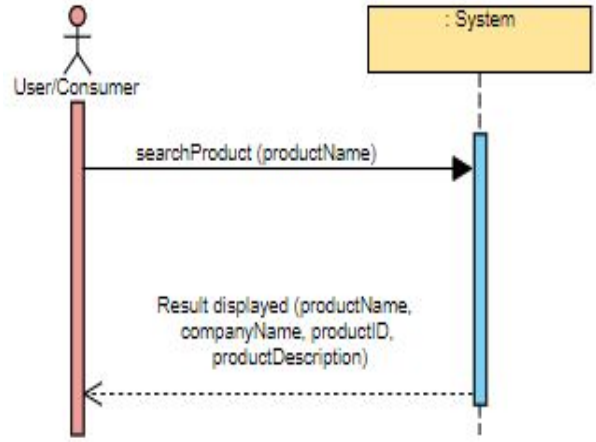
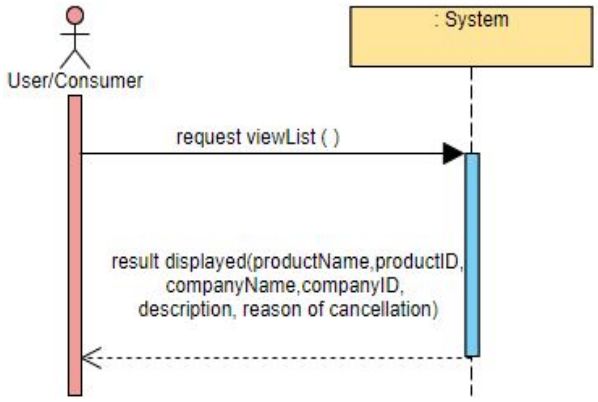
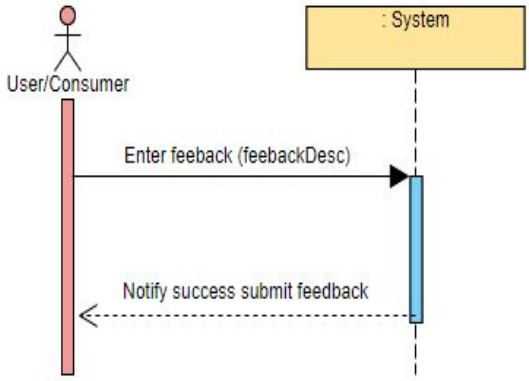
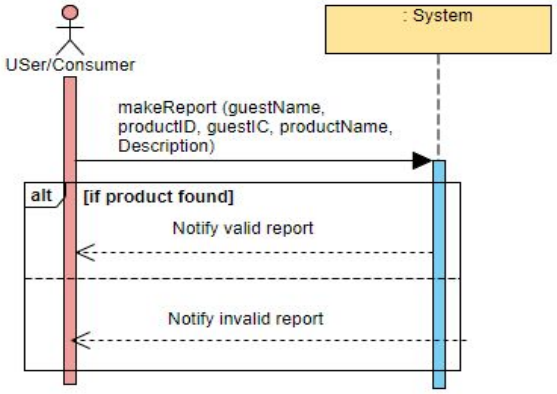
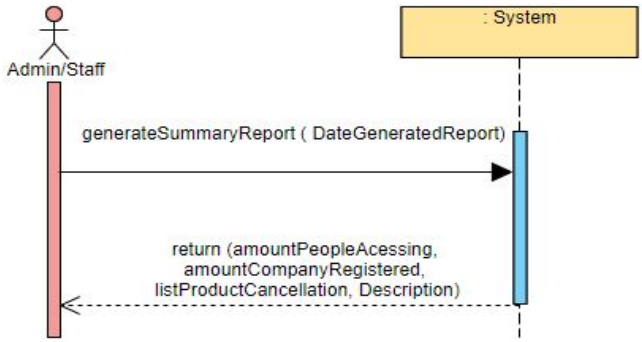
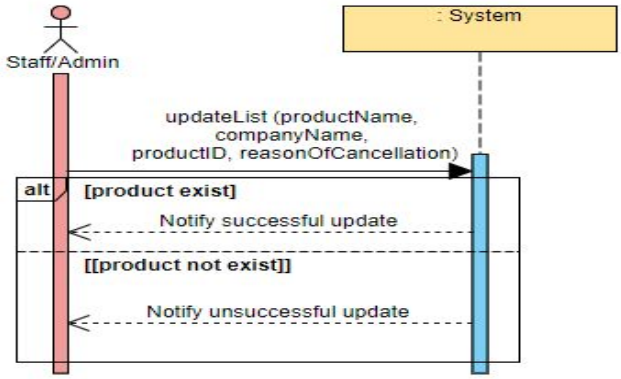
3.5.4 Domain class diagram

Figure 6: Domain Class Diagram



3.5.5 System sequence diagram

Table 20: System Sequence Diagram

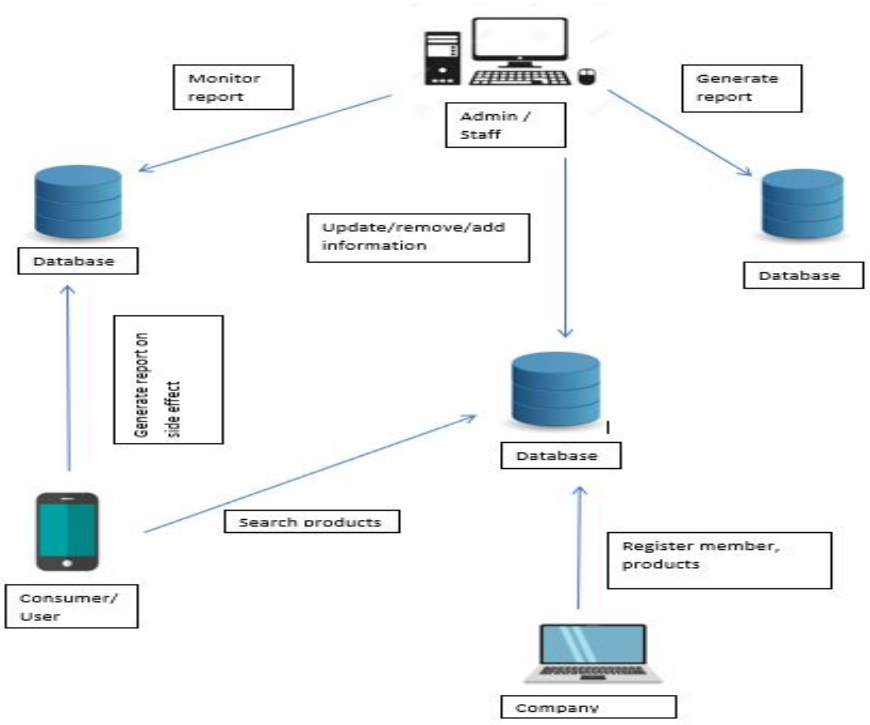
<table>
<tr>
<td>Search cosmetic product
 
</td>
<td>View list of products cancellation
 
</td>
</tr>
<tr>
<td>Give feedback for system improvement
 
</td>
<td>Make a report on effects of products
 
</td>
</tr>
<tr>
<td>Generate summary/executive report
 
</td>
<td>Update list of cancellation products
 
</td>
</tr>
</table>

**Note : Other System Sequences Diagram are placed in the appendices

4. System Design

4.1 Architectural Design

Figure 7: Architectural Design



4.2 Hardware and Software specifications

Hardware requirements:

- Processor: Intel Core 2 Duo Processor
- 40GB Hard disk
- 2GB RAM

Software requirements:

Table 21: Software requirement

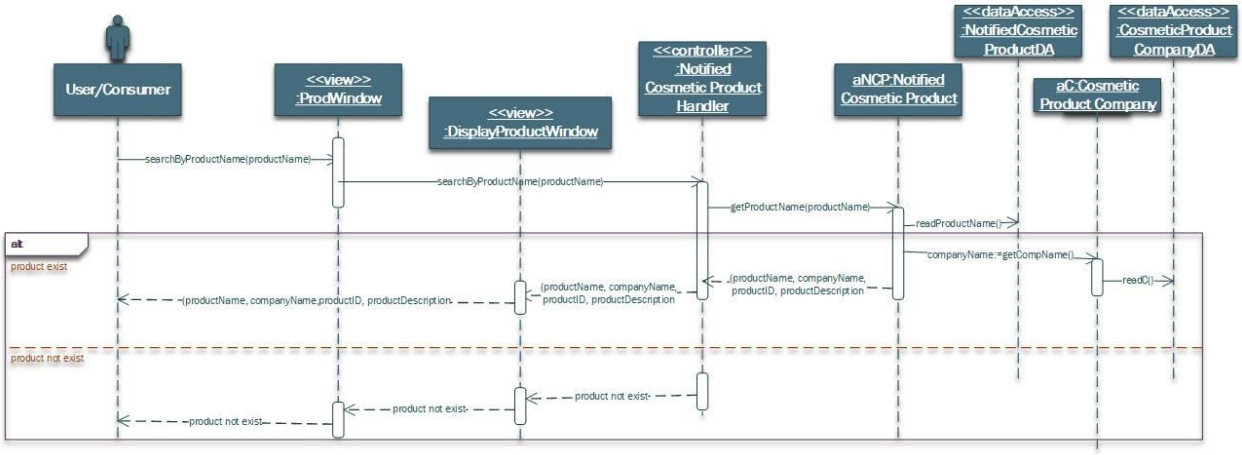
Operating system: Windows 10	Development tool: IntelliJ, Eclipse
Database: MySQL	Web server: Apache tomcat 9
Language: Core Java, Advanced java	Development kit: JDK 1.8

4.3 Detailed Design using UML

4.3.1 Detailed Sequence Diagram

Search Product

Figure 8: Detailed Sequence Diagram

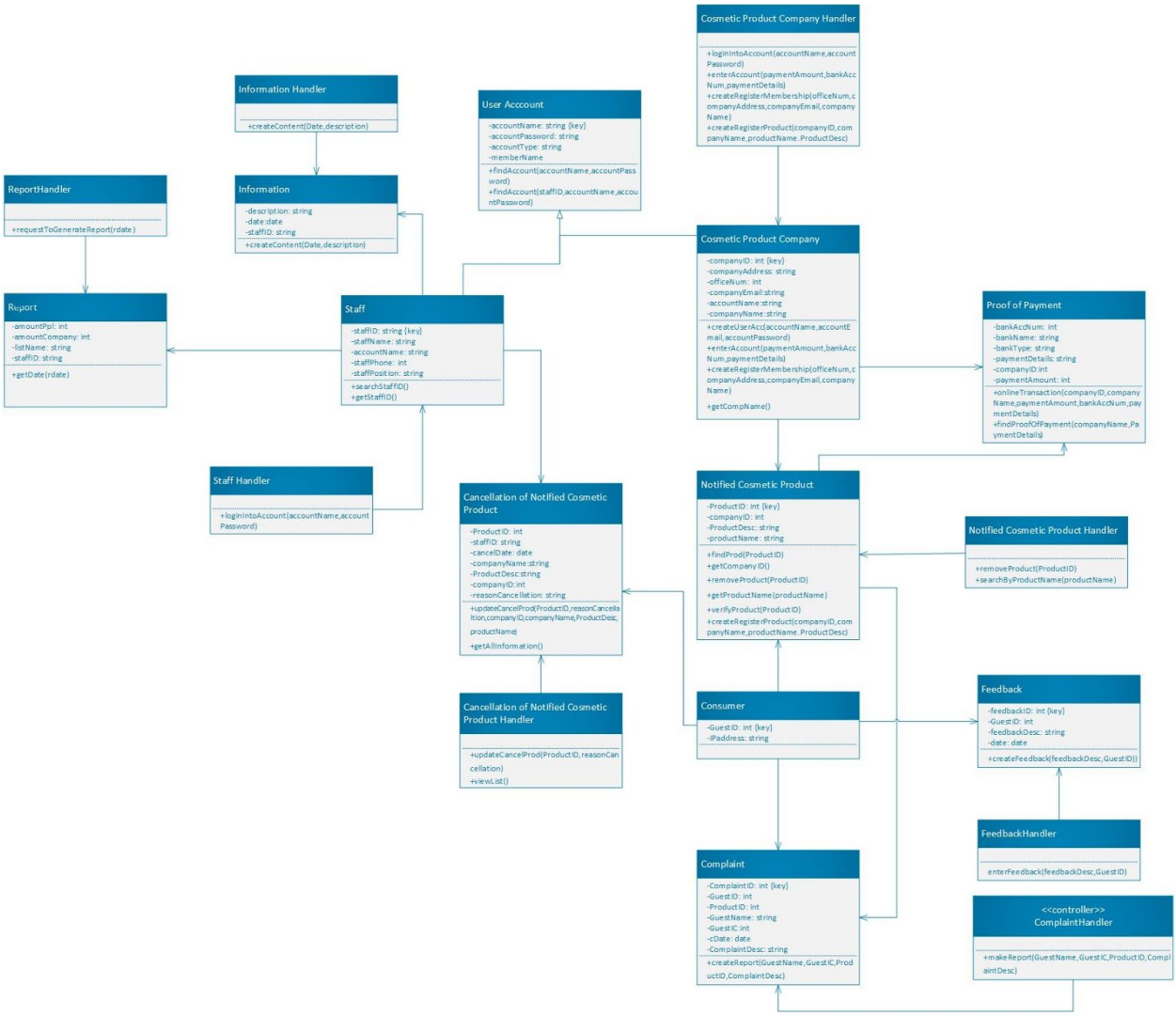


Note : Please refer to the "Diagram" Folder for a more clear image.

Note : Other detailed sequences diagrams are placed in the appendices

4.3.2 Design Class Diagram

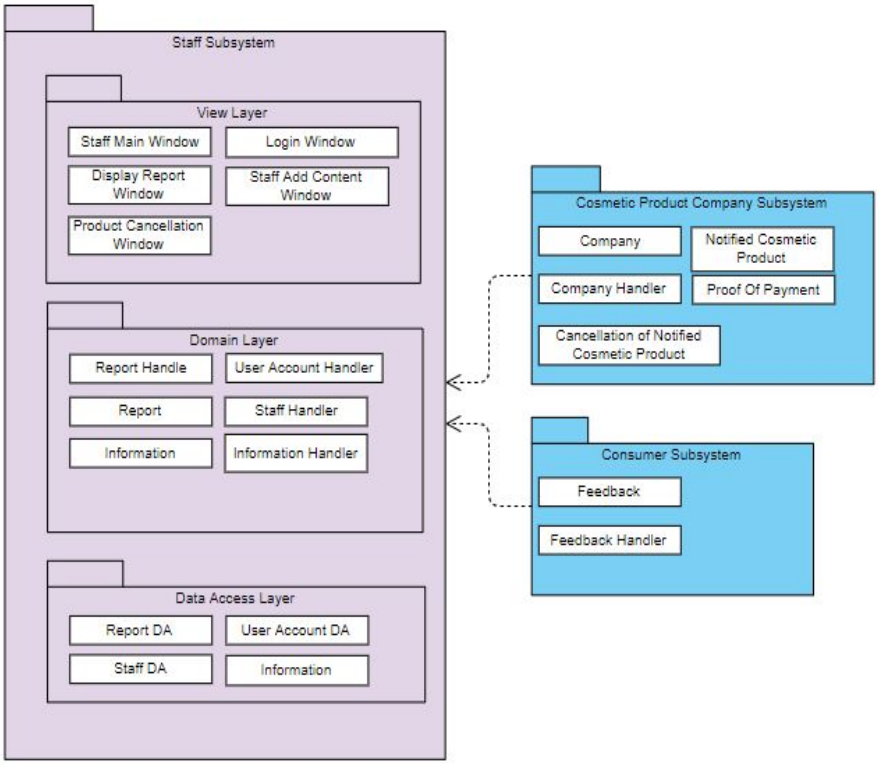
Figure 9: Design Class Diagram



4.3.3 Package Diagram

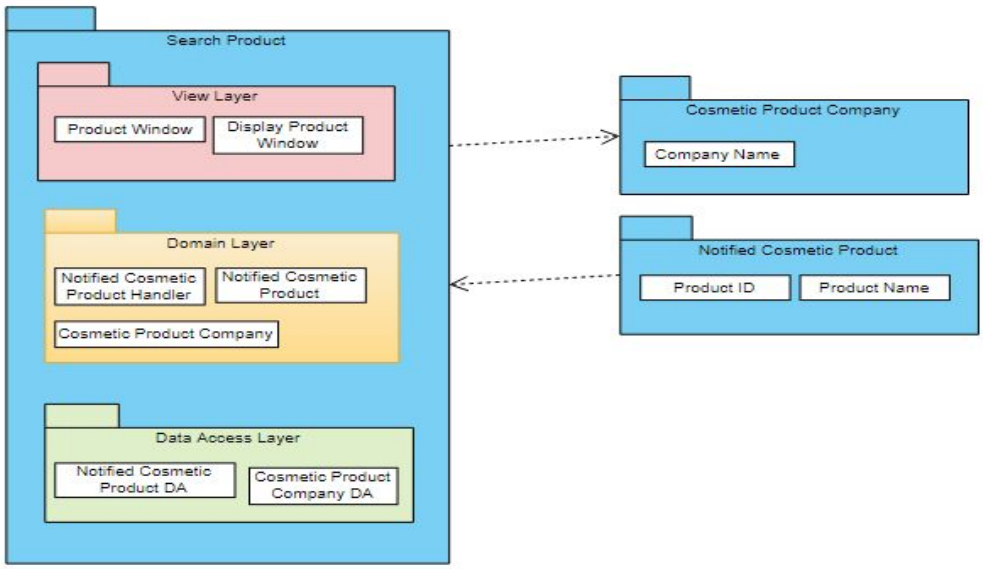
By subsystem:

Figure 10: Package Diagram By Subsystem



By use cases:

Figure 6: Package Diagram by Use Case



Note: Package Diagrams for other subsystems and use cases are placed in the appendices

4.4 User Interface Design

4.4.1 Overall Menu Hierarchy

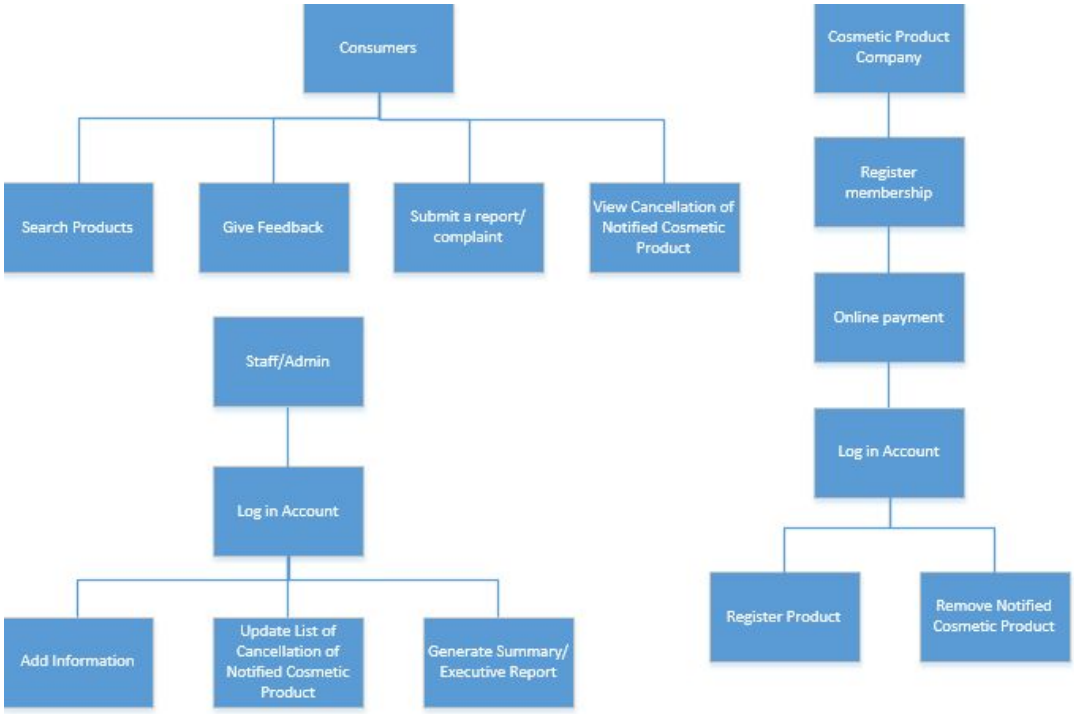
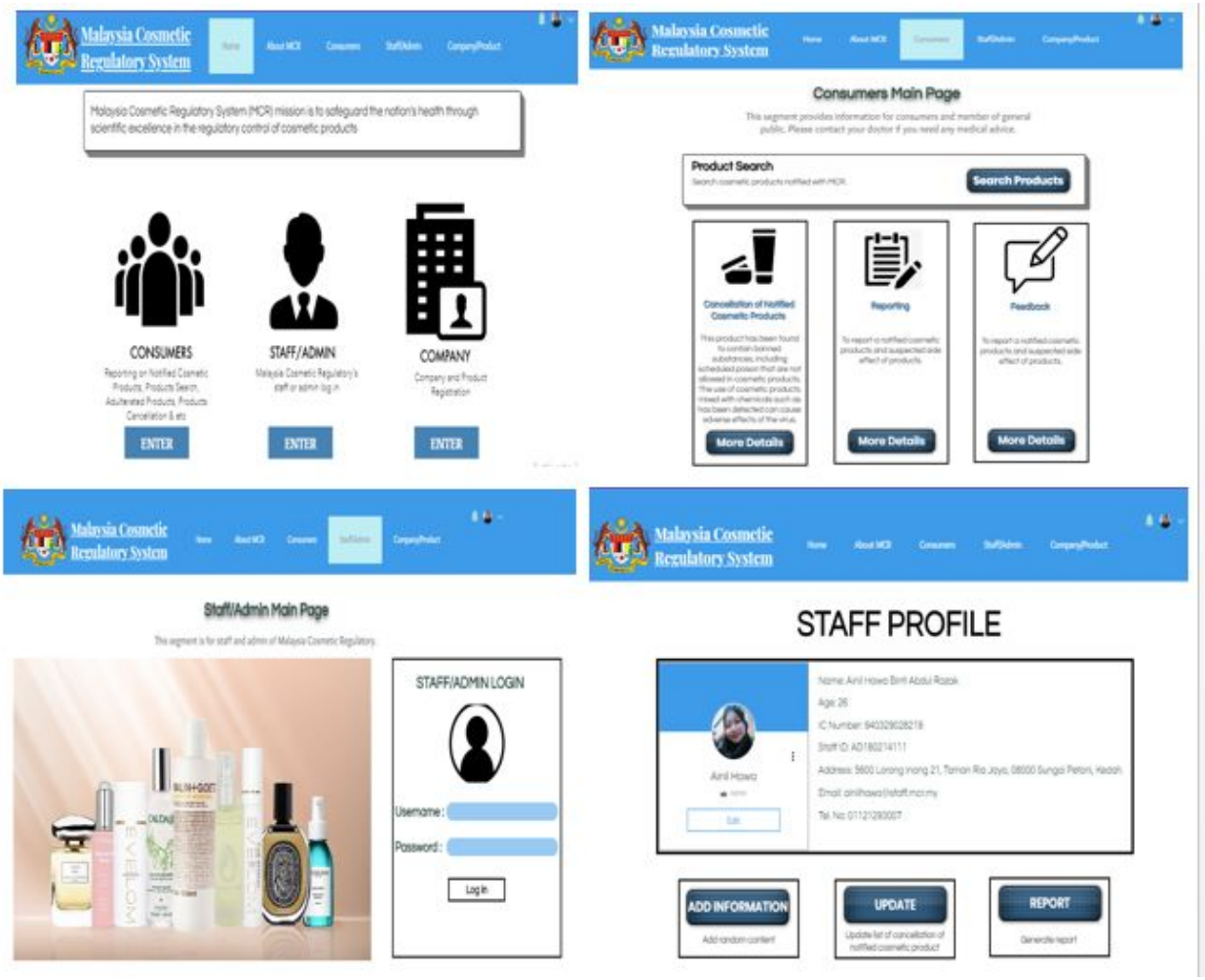


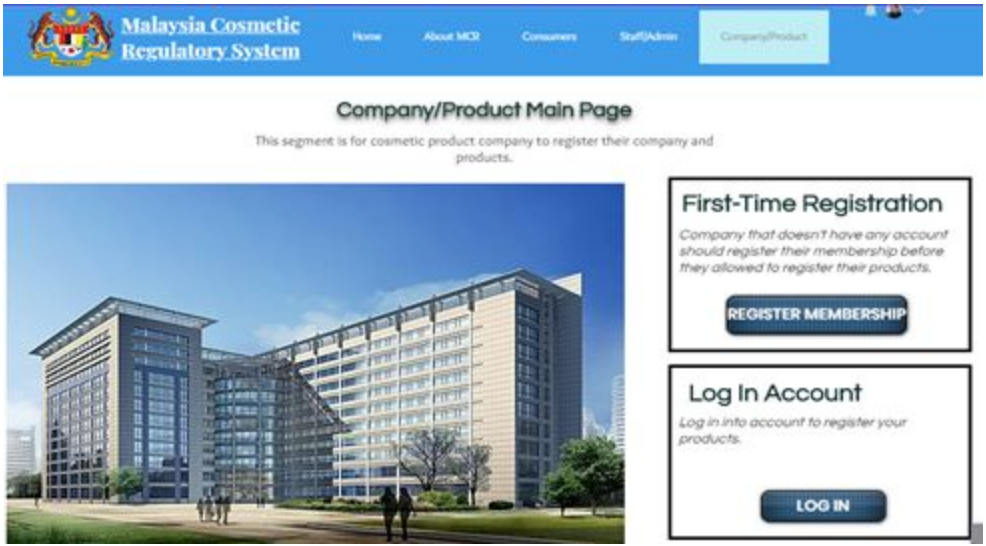
Figure 11: Overall Menu Hierarchy

4.4.2 Windows and Browser design

4.4.2.1 Forms and reports design

Figure 12: Interfaces Design





4.5 Design System Interface

4.5.1 Integrity Control

Integrity control is a system that excludes inputs of data,prevents unauthorized outputs of data and protects data and programs from unintended or malicious abuse. It is important to design system integrity controls to ensure correct system operation, so that the information system is free from corrupted errors. In the MCR system ,we implement several layers of input control:

i) Access Control

For Access Control, the staff are allowed to access the system to modify, add and update the information of the product and system while the companies are allowed to register the product. Users are only allowed to view the information of the system and give feedback.

ii) Output Control

The device must ensure that the input control goes well before continuing at the output. For example,staff/ admin must ensure that the field requested in generated report forms is filled in. Then the report will be generated and displayed. Beside that ,MCR often implements mirror backup to prevent hardware failure or degradation of the device. Mirror backup is 1:1. Therefore, if the main server fails, the data is protected.

iii) Data Validation Control

Input to login the system, to validate the input ,the system will check the account password for the account password that is key in by the staff or company. If the account password is invalid system will ask them to re-enter the account password and it will go for another variable.

4.5.2 Security Control

For employees and businesses to sign into either the website or the mobile application version, version security measures must be in place to allow users to safely access confidential or vital data. Username and password are used to prevent an unauthorized user from signing into another

account. Password encryption is also done using the bcrypt algorithm to prevent readable passwords stored in the database system.

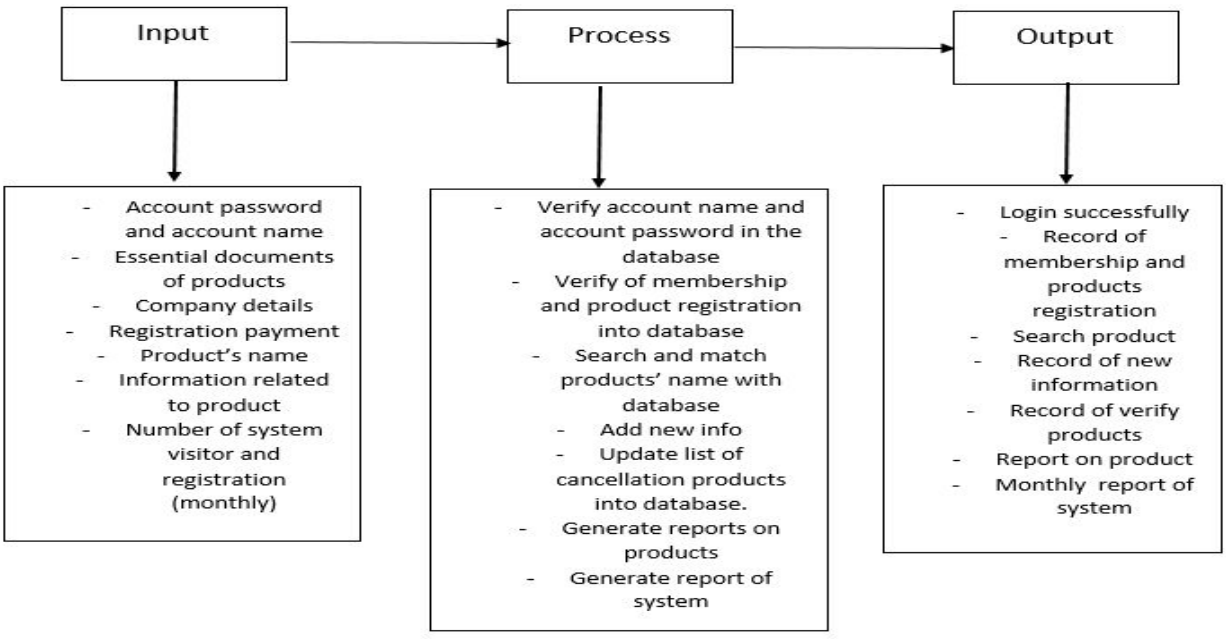
The companies who have registered and staff can access the system, thus the data will be transmitted to the system. Then, the result of all the updates and new data entered by the companies and staff will be displayed in the system for the users to view. The system will only allow the registered user to have the authorization to access the system by checking their username and password. The system has the session expiry which means it doesn't have forever-lasting sessions. If the user closes the websites, their sessions should expire after a while. “A-while” ,may still be a big number but depending on the service provided.

5. System Implementation and Testing

5.1 Implementation Strategy

5.1.1 Input, Process and Output

A graphical representation of all the factors constituting a process. The input-process-output diagram contains all the necessary materials and information for the process itself.



Explanation:

Input: The company and staff are required to input account name and account password to log in into account.The company who wants to register for the membership and their products has to input the details and essential documents required. Company required to input payment for registration. The details can be filled through the form available. The input that gives the data to be processed. The users are required to input the product's name if they want to search the cosmetic product. The input will be processed. The staff are required to input any data related to the products and system such as information about items or products or any content of the system for the users references. The input data will be processed and stored.

Process: System will verify the password and account name to process the login activity. The system will process the details and essential documents related with the membership and products for the registration and verify it into the database. System will process the payment for the registration. The system will search and match the product's name entered by the user with the record in the database and view it to the user. Data input by the staff will be processed and stored in the database.

Output : Login successfully. The output of the system can have the record of the membership and products registration for the references, invoice of the registration payment were included. System will have a record of verified products. System able to have reports on products and annual reports of the system.

5.1.2. Bottom-Up Approach

Bottom-up development schemes are projects which local communities are planning and controlling to assist their local periphery. They are not expensive because they are smaller,more suitable technology to be paid for by local people. Because the project is smaller than a top-down project, the damage to the environment is often much smaller. This approach is to frame the system together to create a more complex system, thus making the emerging system's original sub-system. Bottom-up processing is a type that forms a perception based on incoming data from

the environment. From the perspective of Cognitive Psychology, knowledge reaches the eyes in one direction (sensory input, or “bottom”),and is then turned into an image by the brain that can be interpreted and recognized as a perception (output that is “built up” from processing to final cognition). The system’s individual base elements are first specified in great details in a bottom-up approach. These elements are then connected to form larger subsystems, which are then connected on turn, often at several levels, until a full top-level structure is created.

The techniques also resemble a “seed” pattern,with small beginnings but gradually increasing in complexity and completeness. “Organic strategies” may, however,result in a tangle of elements and subsystems.developed in isolation and subject to local optimisation as opposed to achieving a global objective. This Malaysia Cosmetic Regulatory System is using a bottom-up approach in which all the information that the system collects are from the cosmetic company,users and staff itself. The data then begins processing and storing related information into the database system, and will generate reports by the system administrator. Then the users are able to use the system.

5.2.Testing Strategy

5.2.1. Unit Tests

Unit testing is a process where individual methods,groups or elements are evaluated before being incorporated with other applications. The unit testing aims to identify and fix as many errors as possible before combining modules into larger software units,such as programs,classes and subsystems. Unit testing should focus on one specific feature(e.g., calling a pop method when the stack is empty should throw an InvalidOperationException). Any type of dependency that is slow/ hard to understand/ initialize/manipulate should be stubborn/mocked/whatever the appropriate technique is used to allow you to focus on what the code unit does, not what its dependencies do. In short,unit tests are as basic as possible ,easy to debug, reliable (because external variables are reduced),quick to execute and help to show that a program's smallest building block performs and is implemented before it is installed. The caveat is, although you can verify that they work in isolation perfectly.

5.2.2 Integration Test

Integration tests expand on unit testing by integrating code units and evaluating the resulting combination of different systems to do something useful together. Also ,the atmosphere is another aspect that separates integration tests from unit tests. Integration tests can and will use threads,access the database, or do whatever it takes to ensure that all code and various changes to the environment work correctly. If you have broken some serialization code and checked the inwards of the device without touching the disk,how do you know it will work when you load and transfer it to the disk? You may have neglected to flush and to dispose of streams of data. The only way to find out for sure is to check it 'for real' using a production-proximate environment. The main advantages is that they will find bugs that can't be found on unit tests such as cable bugs (e.g. a Class A instance unexpectedly gets annul instance of B) and environment bugs (it runs great on my single CPU computer,but my colleague's 4 core computer can't pass the tests). The main disadvantages are that integration tests touch more code, are less reliable,failures are harder to diagnose and the tests are harder to maintain. Often , integration checks do not automatically prove a complete function works. The consumer may not care about my program's internal information,but we do

5.2.3 System and Acceptance Test

Acceptance testing is generally divided into two types which is standard acceptances testing includes running a complete framework check (e.g using the web page in a web browser) to see whether the functionality of the program follows the specification. For example,"clicking a zoom icon will increase the view of the document by 25%." There is no real continuum of results,just a pass or fail outcome. The benefit is that tests are presented in plain English and ensure the full functionality of the program as a whole. The downside is that you've gone up the research pyramid . Acceptance test hit mountains of code, so track a difficult one. In agile product development, user acceptance testing often includes designing experiments to replicate user stories created by /for customers of the app during development. When the checks pass, the program will meet the requirements of the customers and the stories can be considered complete.

A test suite is basically an executable specification written in a domain-specific language describing tests in the language used by system users.

5.3. Deployment Strategy

5.3.1. Direct Deployment Approach

Direct operation is where the old system is cut and the new system is overwritten. The direct cutover method allows automatic change from the old system to the new system when the new system is operational. Of all four this is a least costly approach but entails a high risk of data loss. As a backup option, the company can not revert to the old system with the direct cutover method. Direct operation involves more risks of total system failure and if there is a failure in the staff/admin system for example cannot verify the login process for a cosmetic company then it will be difficult for the company to login into the system and register their products. So we will not use a direct deployment strategy.

5.3.2 Parallel Deployment Approach

When two processes run simultaneously, parallel terms are used, while here two operations run simultaneously. The parallel operation change approach allows both the old and the new information system to be completely operational for a defined period of time. Once customers,management and the IT department are confident that the new system is operating properly, the old system will end. Parallel operation has very low risk as if the new system is not working properly. The company can use the old system as backup. But it is the most expensive method to change. Data must be inserted into both systems, contributing to increased workload and delays in production. The Malaysia Cosmetic Regulatory System is not applied in parallel.

5.3.3. Phased Deployment Approach

Phased operation works through various phases or stages. The implementation of the new system is phased operation in modules or stages. This is also a direct cutover combination similar to

pilot operation and parallel. But in this approach certain users are given the whole system as a part of the system instead. The chance of errors or failures in phase operation is restricted to the implemented module only and therefore phase operation is less costly than complete parallel operation. But in some situations, phased operation may cost more than a pilot approach, with a large number of separate phases involved in the system. Malaysia Cosmetic Regulatory System involves various phases such as registration of product,payment, report of the system and product and more. Because of the involvement of so many phases it would be difficult and costly to apply a phased operation approach.

6. Conclusion

In order to establish the Malaysia Cosmetic Regulatory System, a comprehensive strategy should be carried out carefully to ensure that during the implementation of the system, all the specifications or features of the system would not be overlooked. The requirements are met through the implementation of the features and use cases listed above. After thoroughly reviewing the existing system, we are really clear of the users' needs and until now, we are able to define all the specifications that the stakeholders required. We also systematically plan how operations should be carried out using Gantt Chart and organize the job as a team. All use cases have been identified and organized and graphically designed to make it clear to all stakeholders, including developer teams.

The objectives that we envisioned for this system are achieved with maximum success. Our first objective, which is to check whether a cosmetic product is verified and legal to be used in Malaysia is achieved through the implementation of notified product list checking by users. To ease the checking and searching, users can use the navigation bar and every information about the searched product will appear. There are a lot of functionalities that are added for users that have been discussed above. Our second objective which focuses more on the cosmetic company is done by setting up an online submission platform to ease registration. There are some added functionalities that have been discussed in the above section. And the last objective which is to assist the Staff and MCR itself to outspread the information by putting up contents online so that the public can read and get benefit from the contents that the staff posted.

Throughout this project, we observed that the existing system upholds the same concept as the MCR system except the scope is much larger. It covers not only cosmetic products but also medicinal products and vaccines that can cause confusion among stakeholders. Although the scope is smaller, that is where the strength lies where MCR system is much more focused and has its own target audience. MCR system would bring more benefits toward stakeholders and consumers as it can ease the cosmetic companies' ability to register their products online and consumers are able to differentiate between legal and illegal cosmetic products in the market. We believe that the system we developed overcome the limitations and disadvantages that the existing system has

We will begin monitoring the projects for the next plan and build the system according to plan. The system requirement may be added if any other requirements are met or if the requirement of the stakeholder can be taken into account. We hope we can build an incredible program which will support and can help to manage the cosmetic products in Malaysia become easier, more efficient and secured within time and budget provided.

7. References

[1] Cosmetic Guidelines (Annex I - VII)
Posted By jeevank -
https://www.npra.gov.my/index.php/en/cosmetics-guideline-annex-i-vii.html

[2] Systems Analysis and Design in a Changing World, seventh edition 2-1 Chapter 2
-Investigating System Requirements Chapter Overview
Xcfv03 8invnd -
https://www.academia.edu/36644671/Systems_Analysis_and_Design_in_a_Changing_World_seventh_edition_2-1_Chapter_2_-Investigating_System_Requirements_Chapter_Overview

[3] Satzinger, Jackson, Burd, Introduction to Systems Analysis and Design: An Agile, Iterative Applicationroach 6th Ed, Edited by Rosnah Idrus for CMT222/CMM321, Chapter 3:Use Cases

8. Appendices

3.5.5 System sequence diagram

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 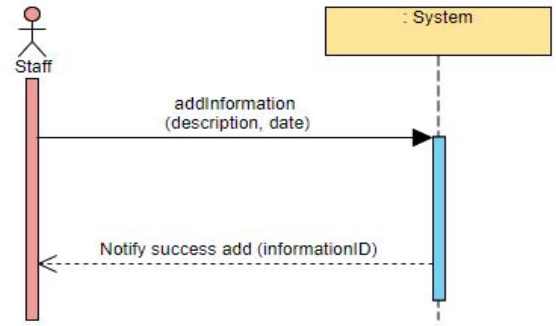
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 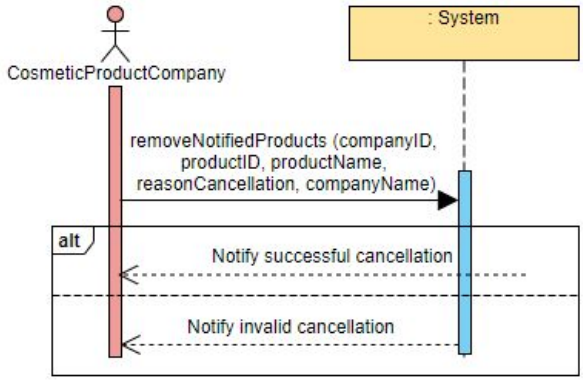
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 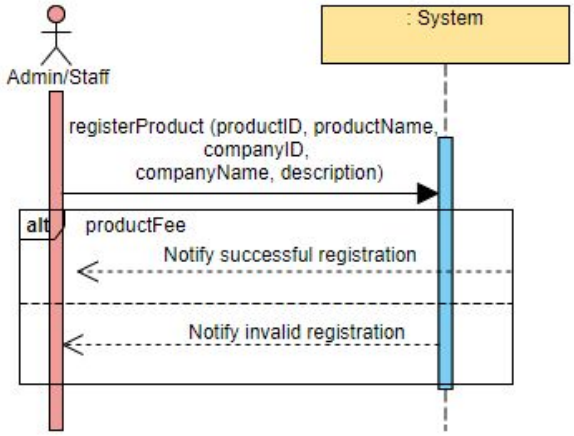
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 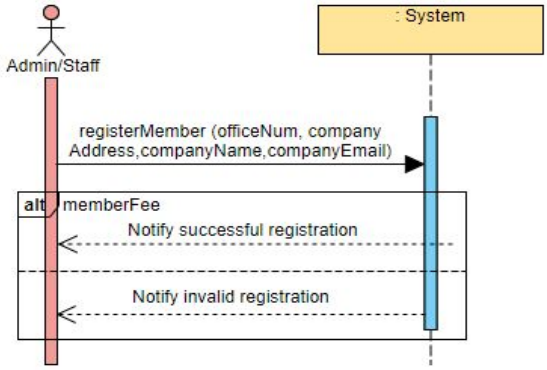
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<tr>
<td>Log in to a account</td>
<td>Do a online payment</td>
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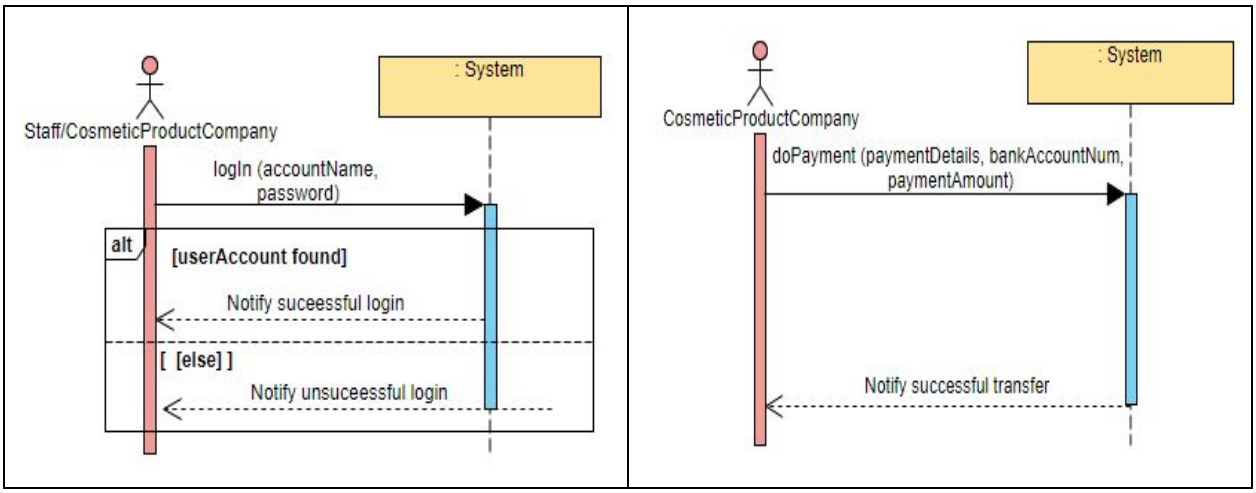
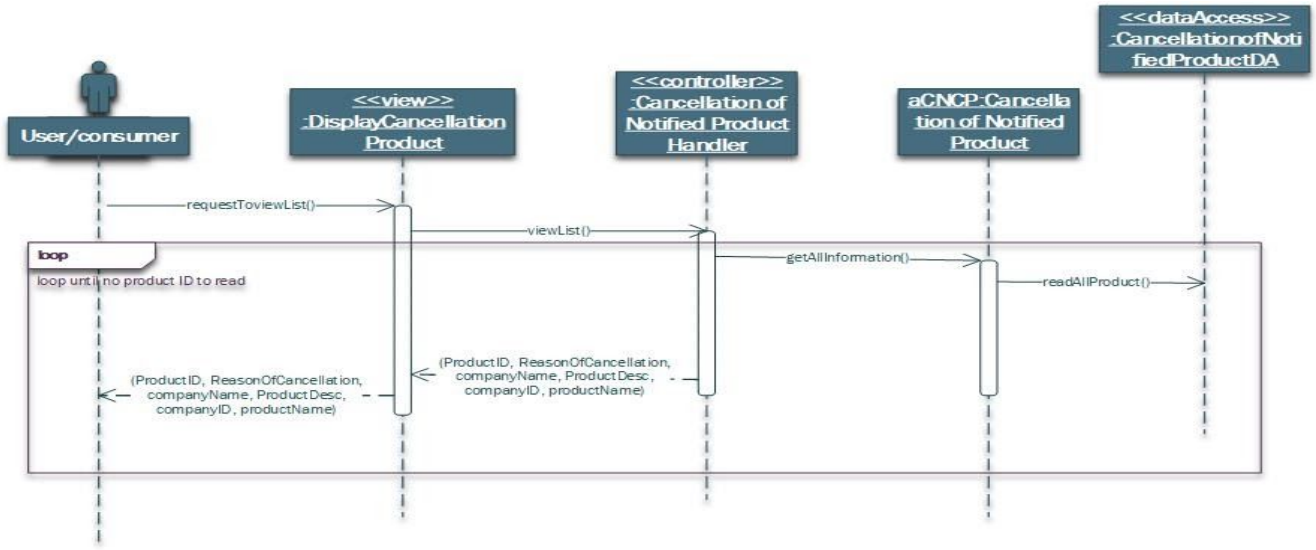
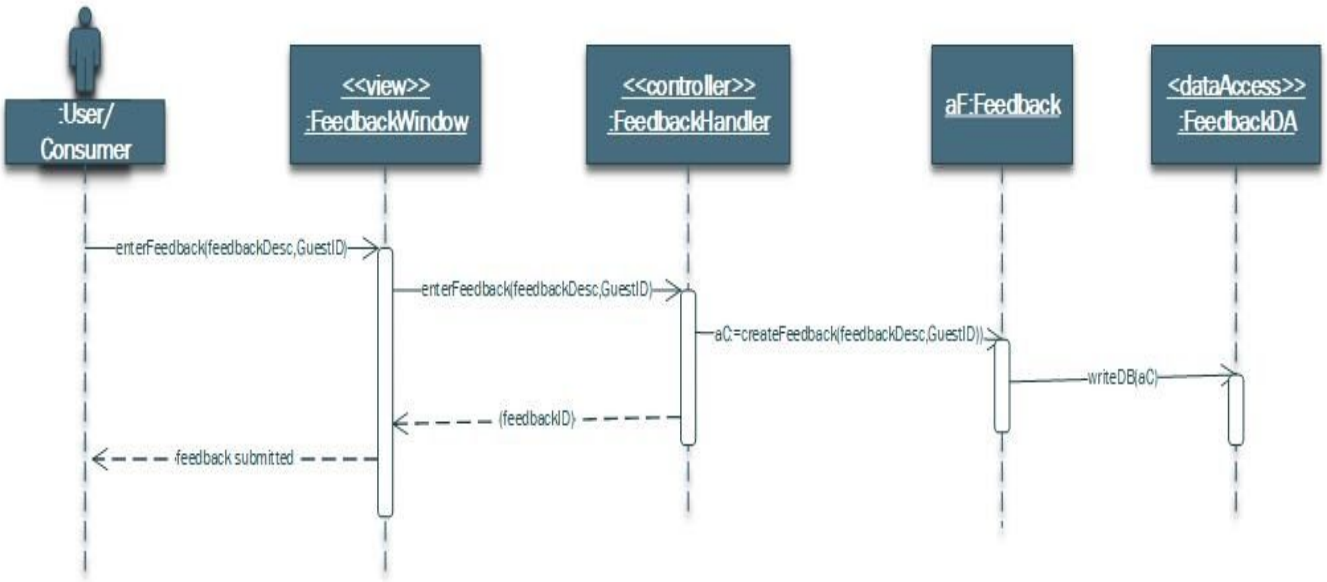


4.3.1 Detailed Sequence Diagram

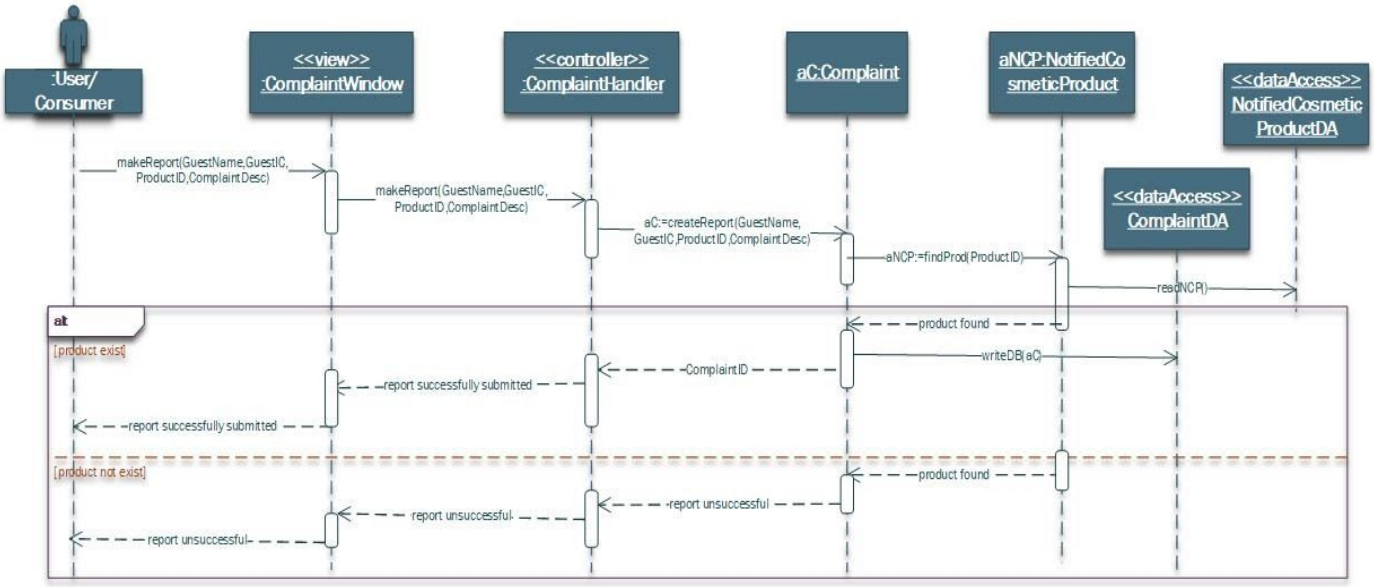
View List of product Cancellation



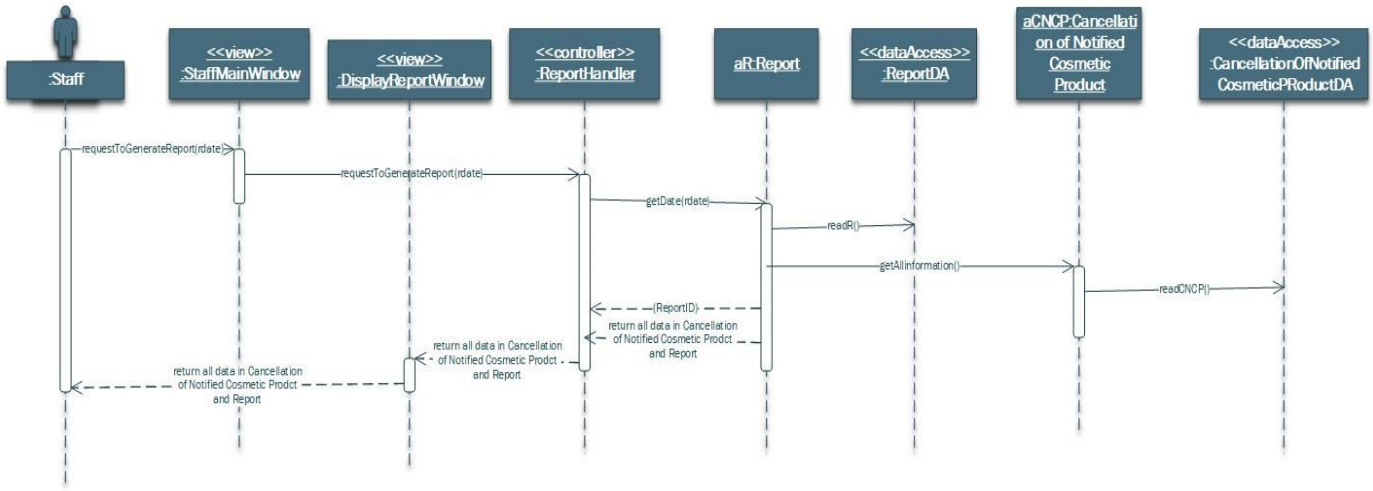
Give Feedback for System Improvement



Make a Report on Effect of Products



Generate summary/executive report



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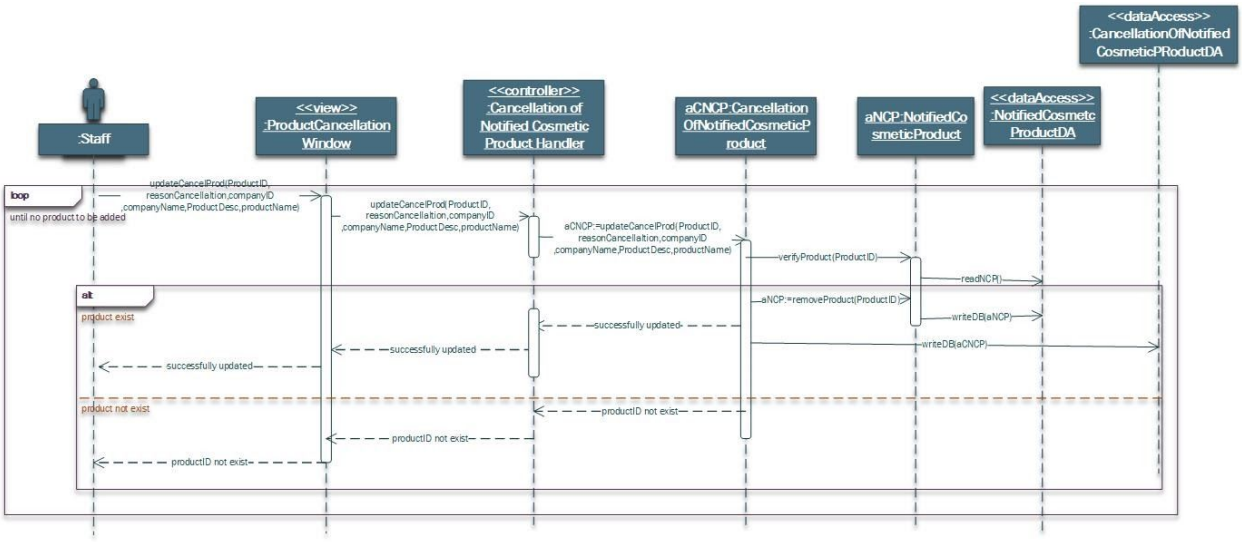
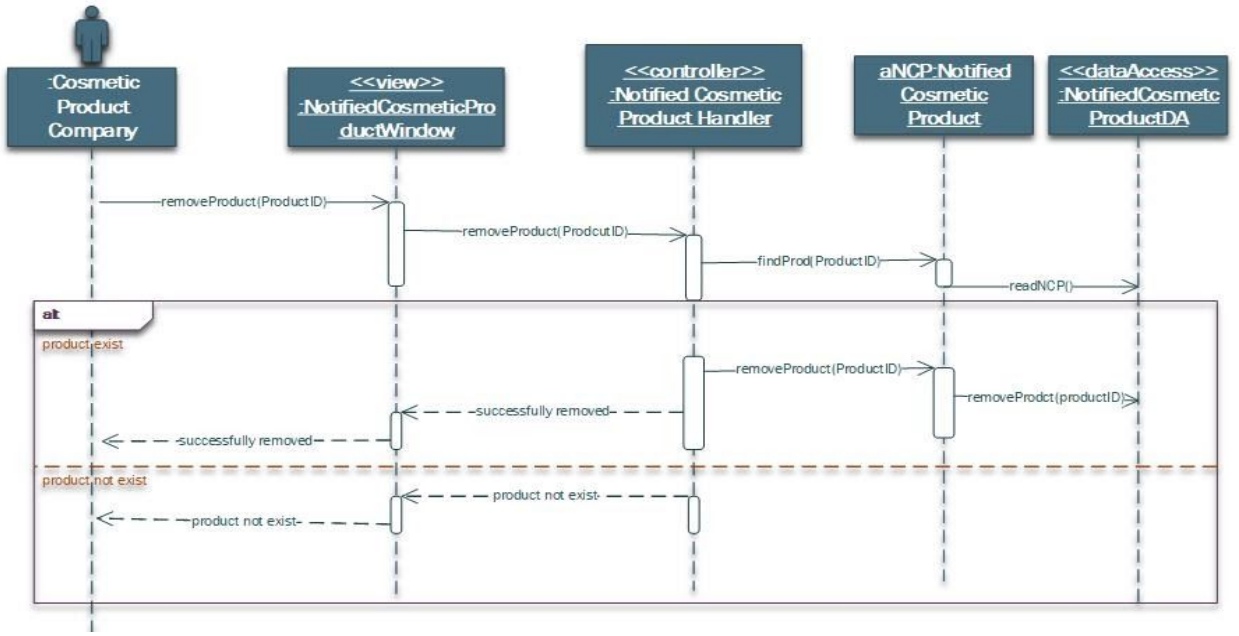


Remove notified cosmetic product



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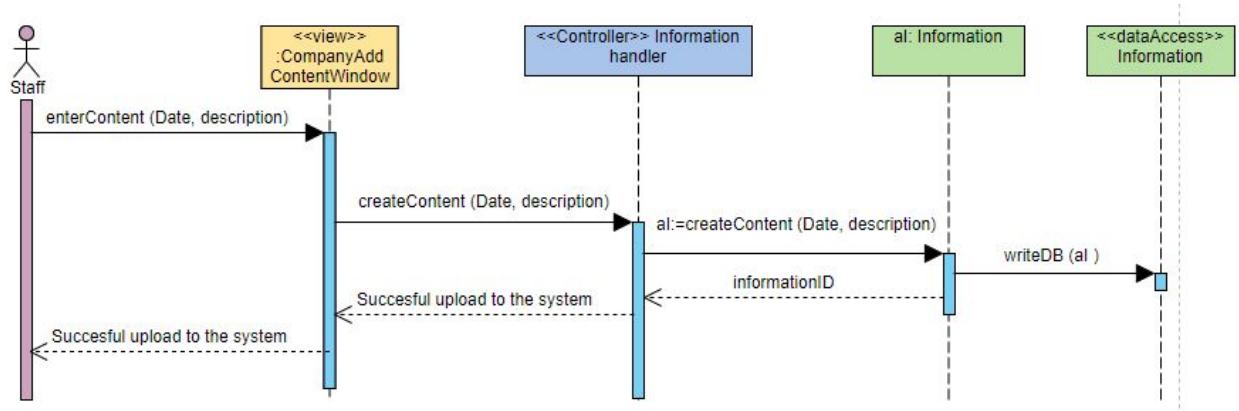
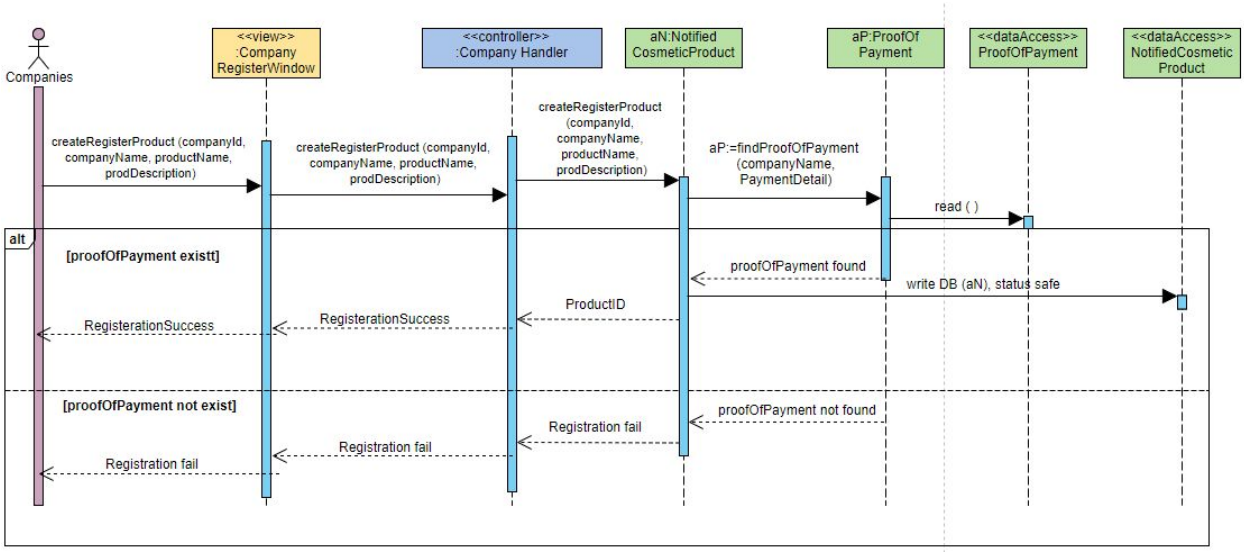


Register product



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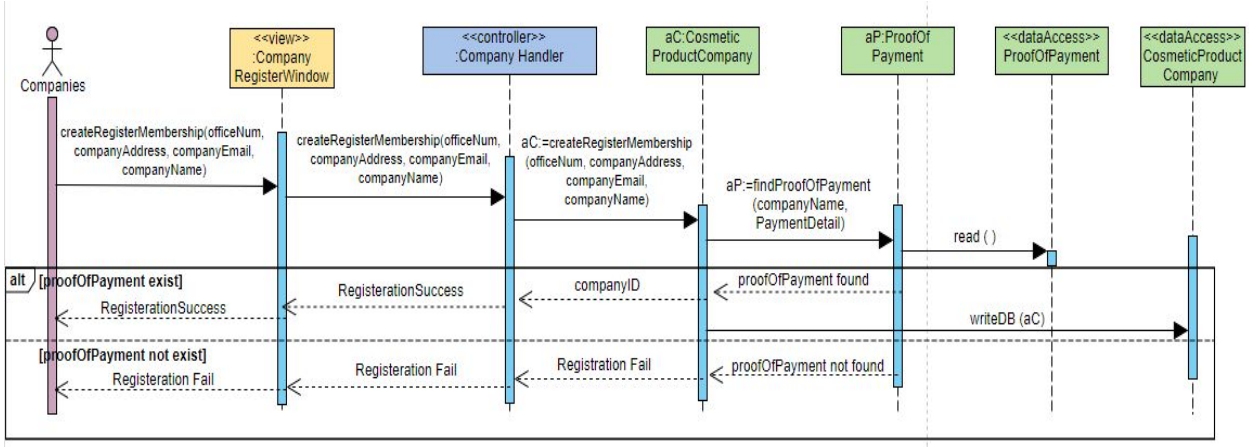
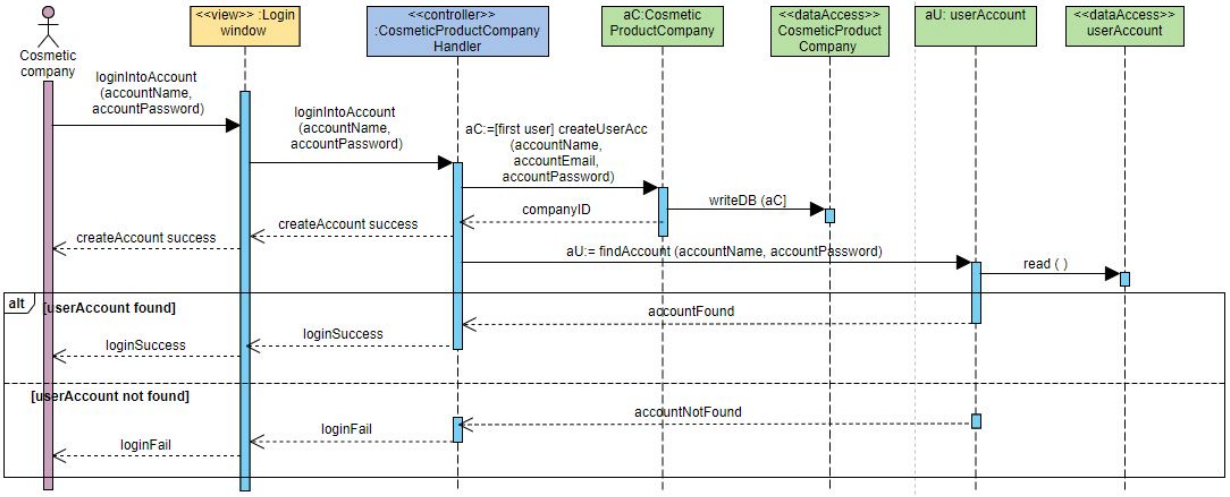
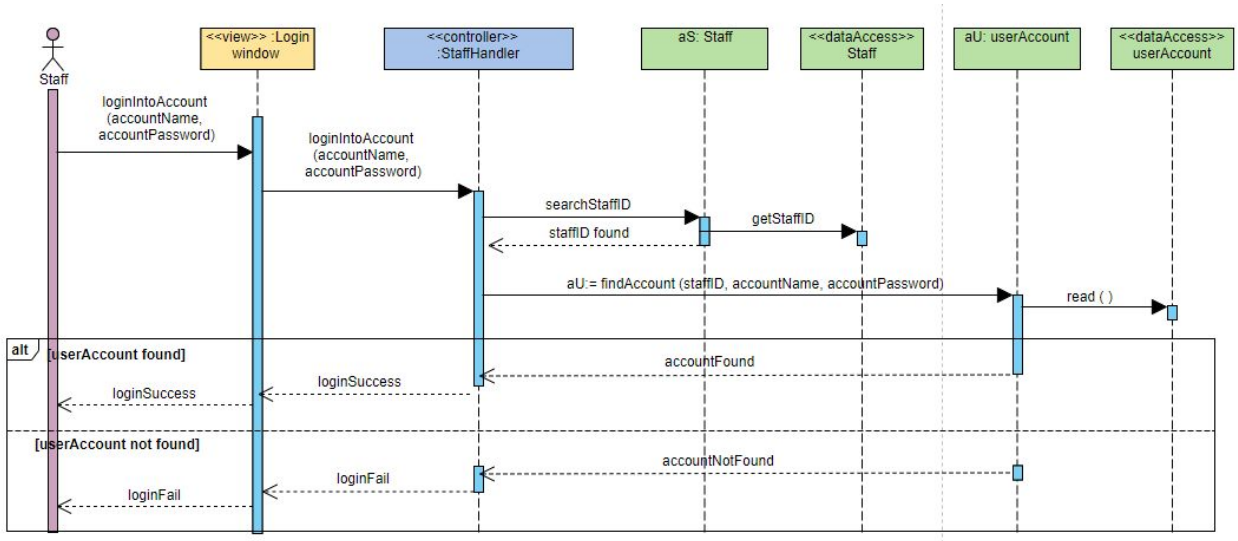


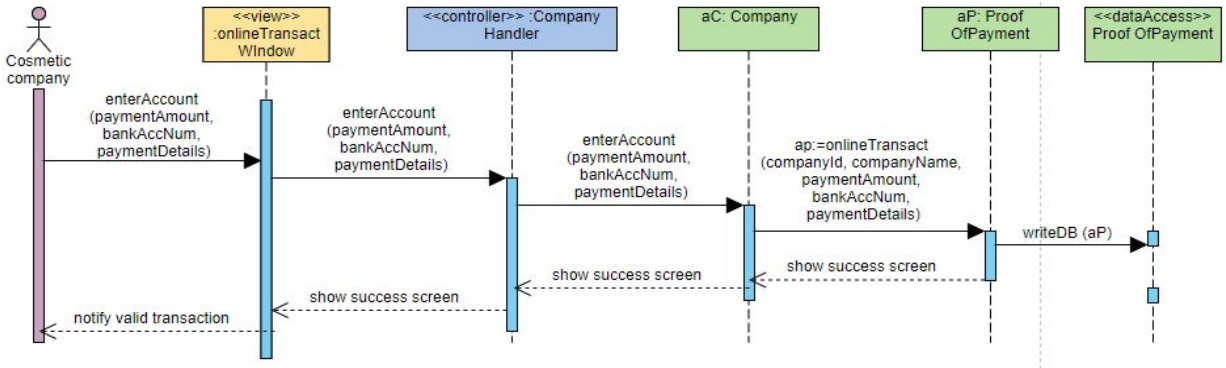
Cosmetic Product Companies Login to account



Staff Login to account

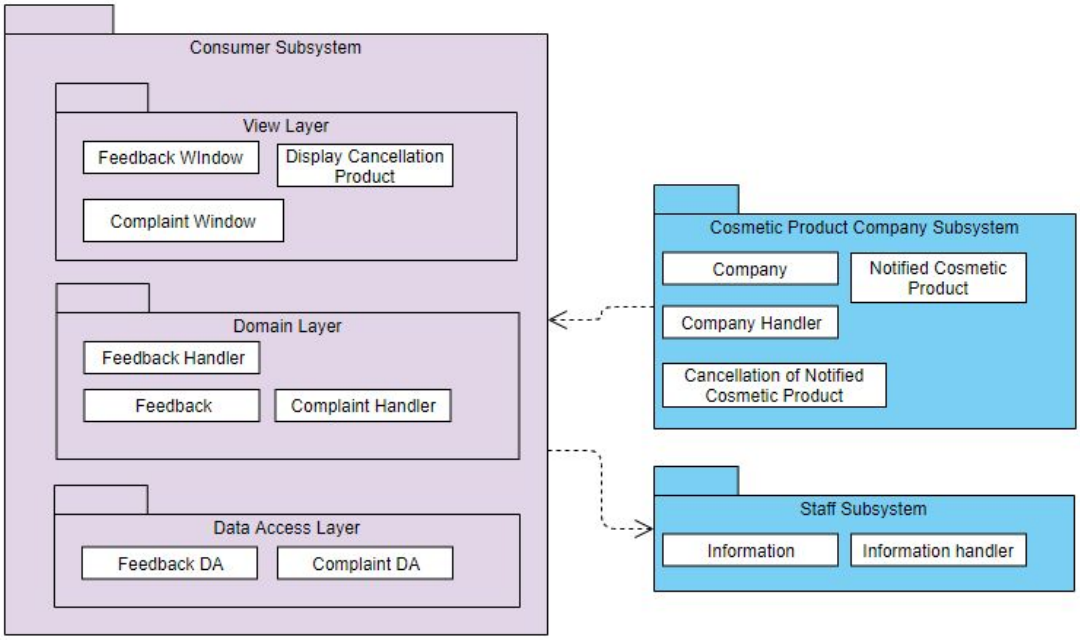


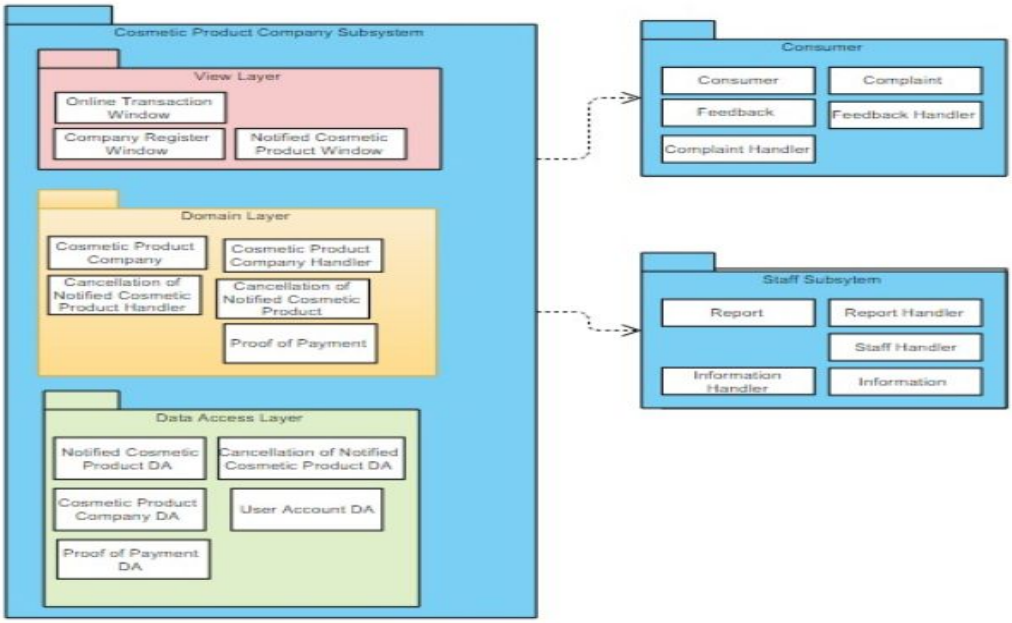
Online transaction



4.3.3 Package Diagram

By subsystem:





By use cases:

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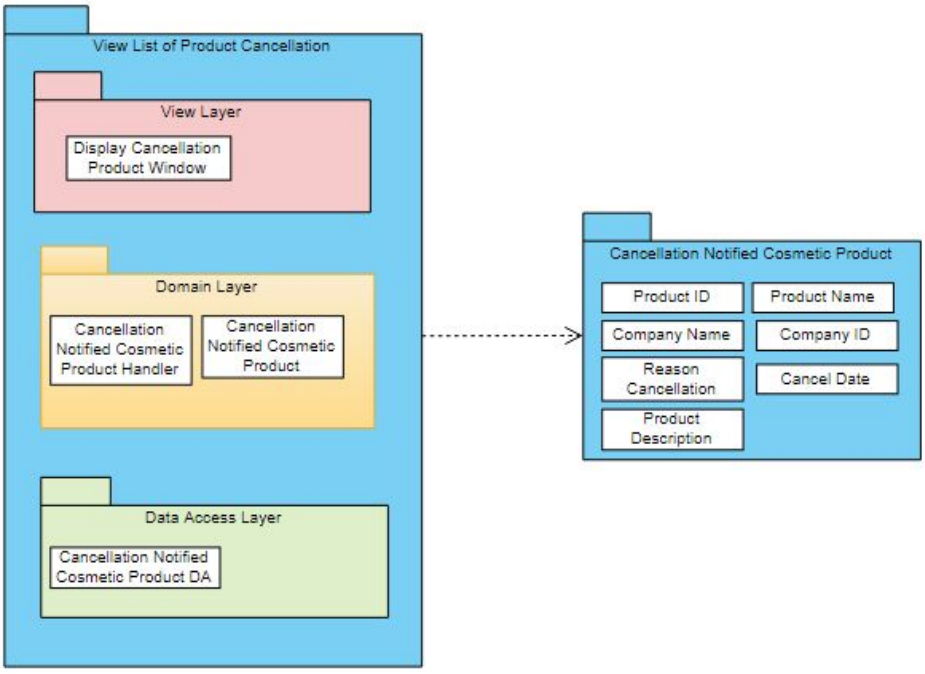

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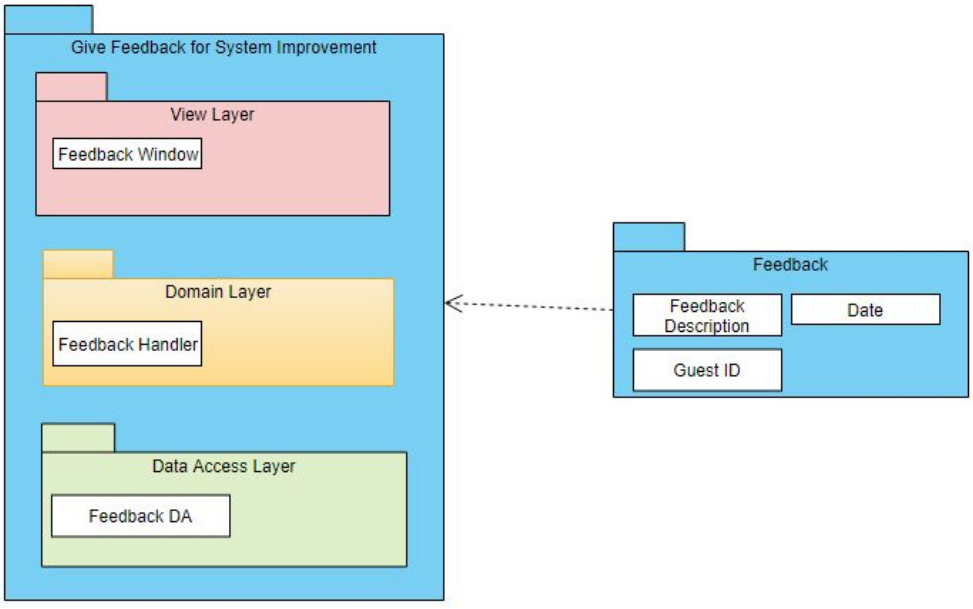

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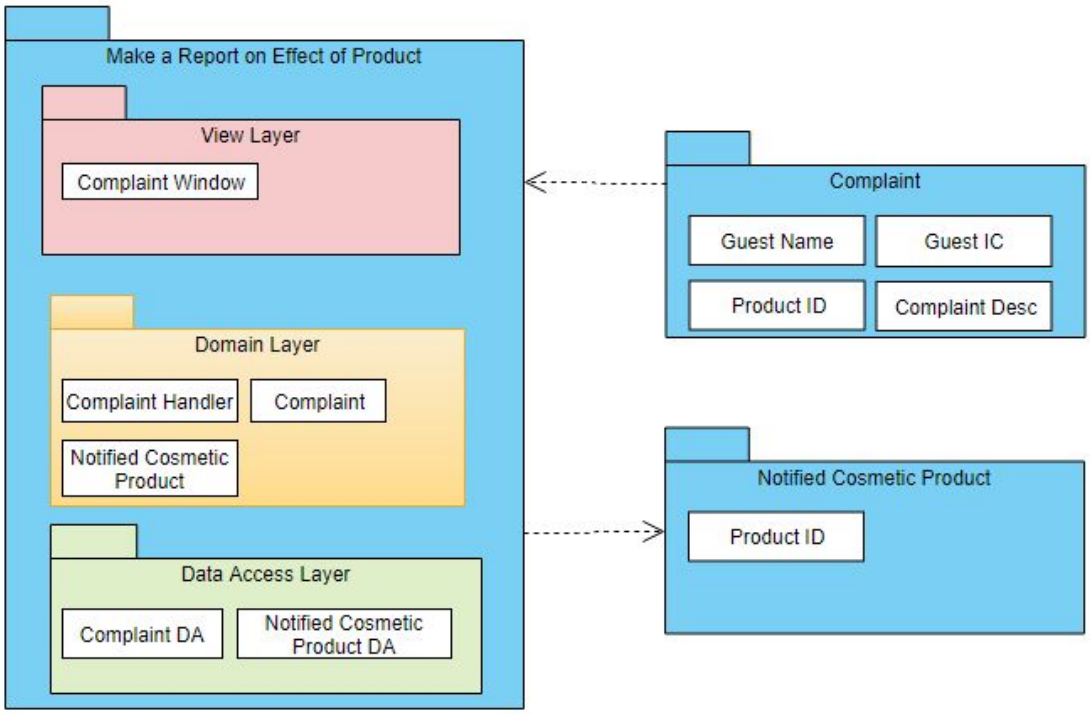

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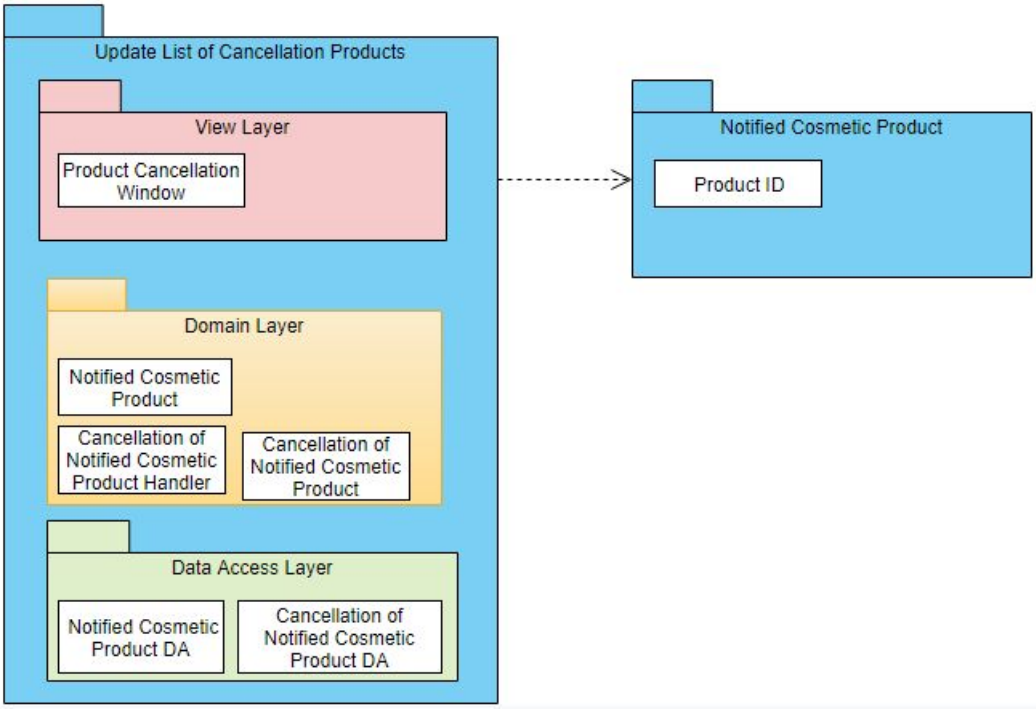
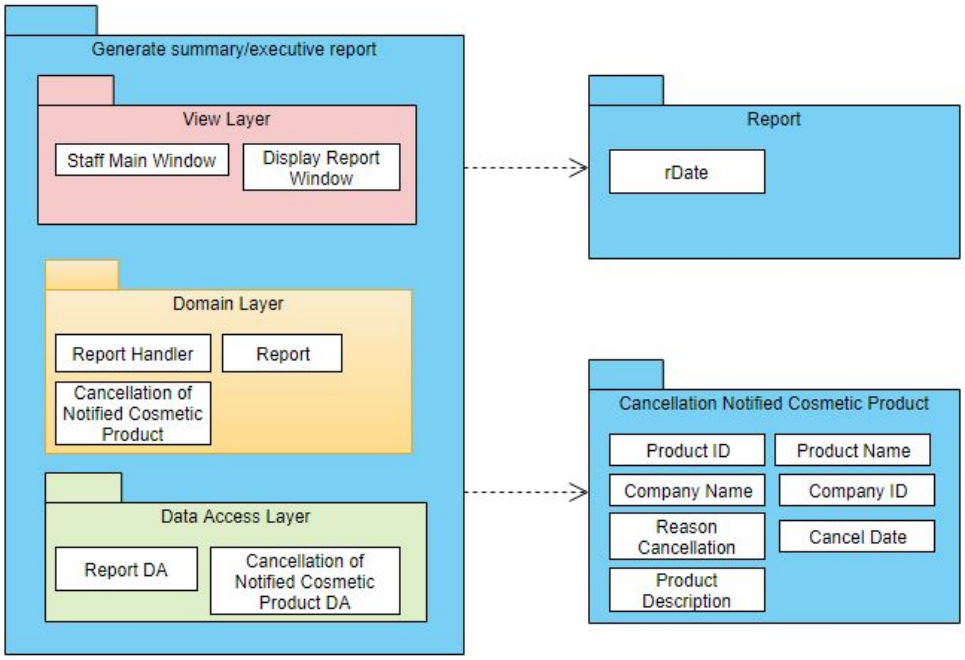


Generate summary/executive report



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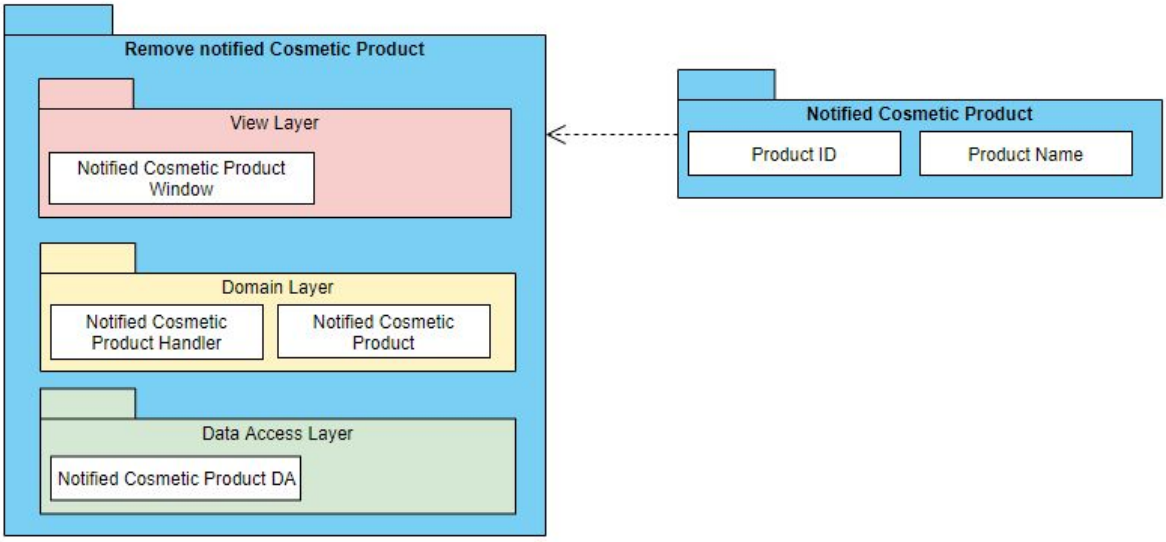

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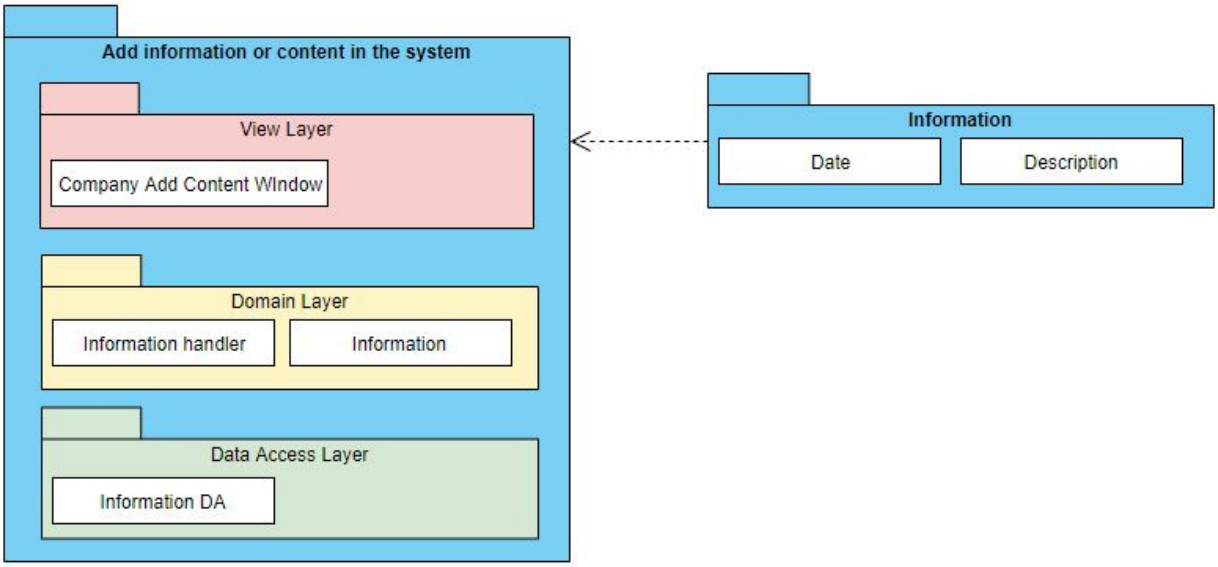
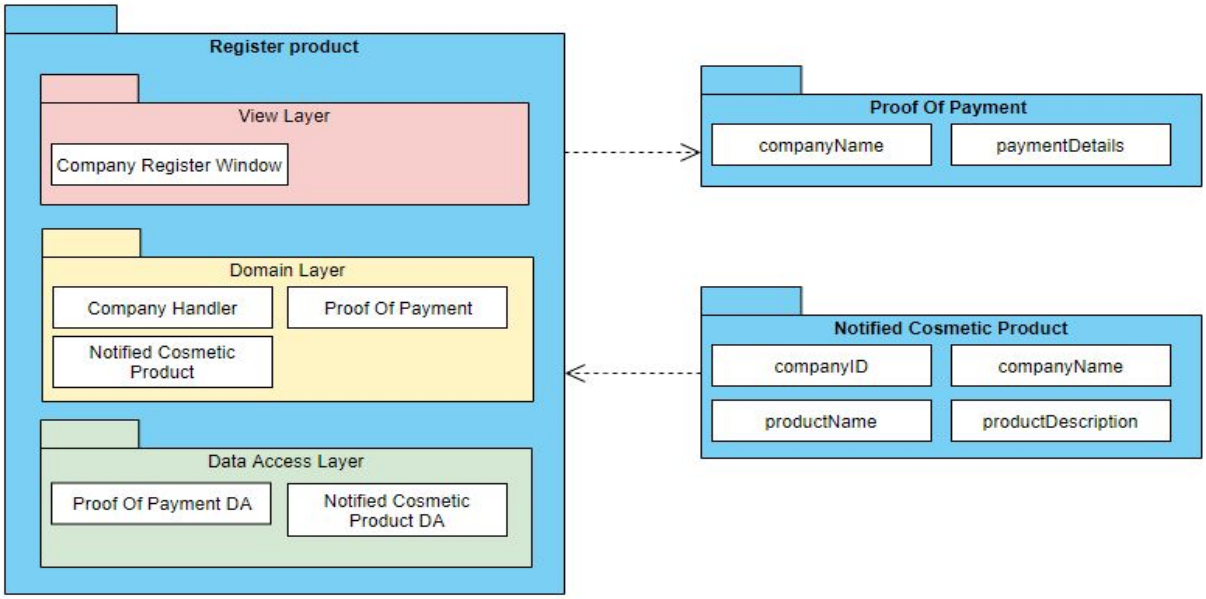


Register Product



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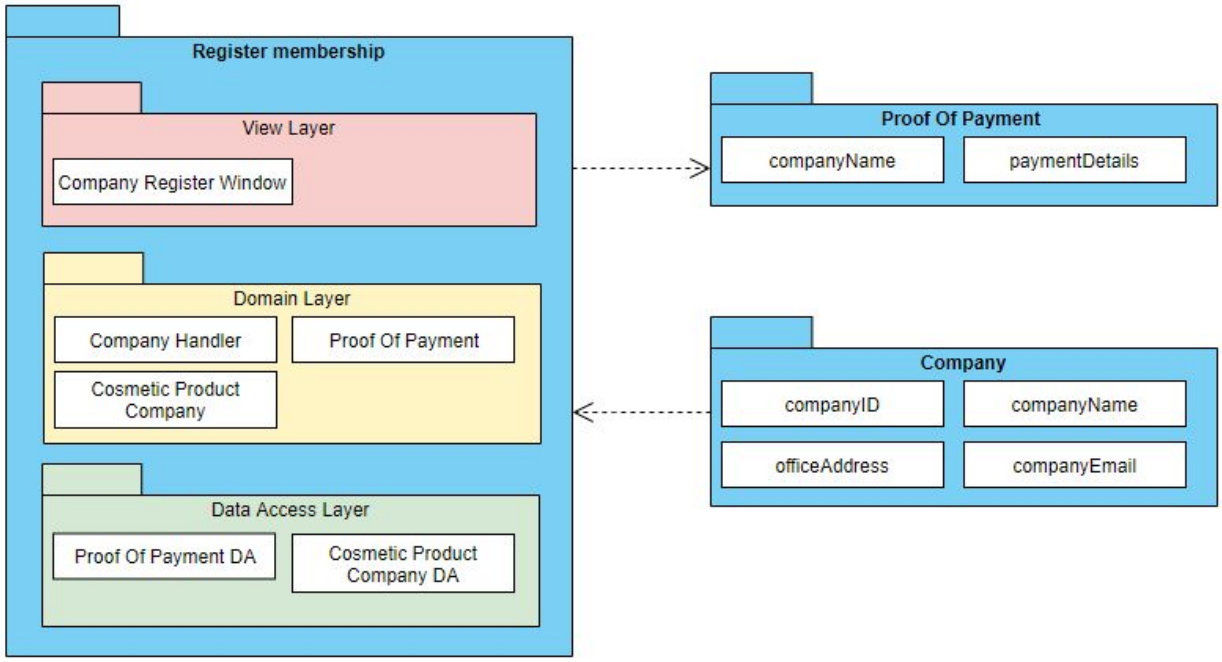
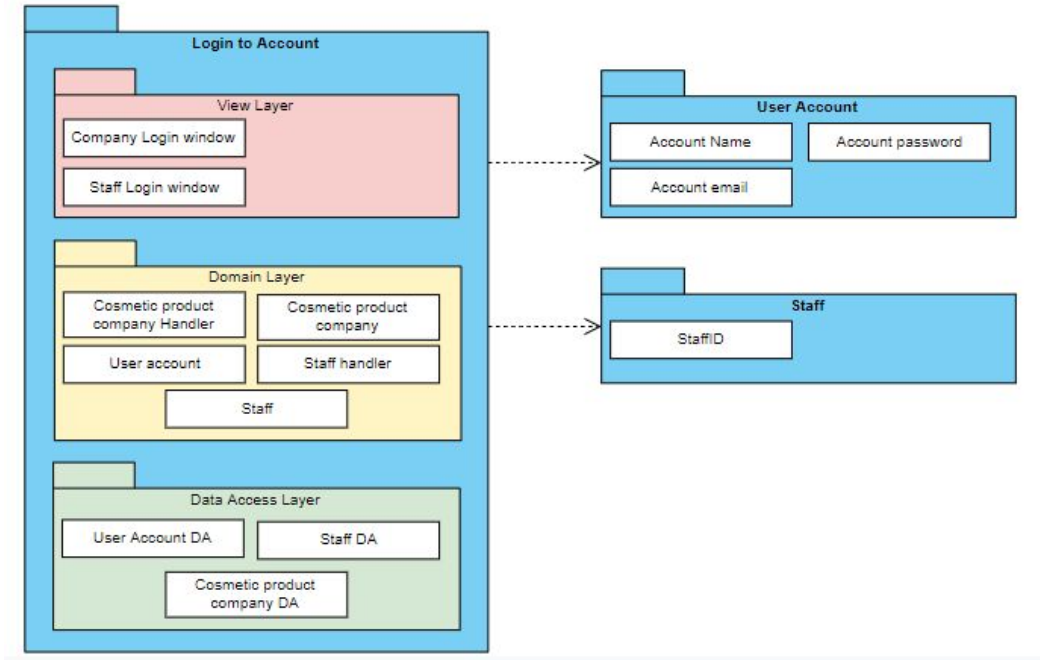


Login Account



Online transaction