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**FACULTY OF SCIENCE**

**DEPARTMENT OF COMPUTER SCIENCE**

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**PROJECT TITLE: SKINCARE MANAGEMENT SYSTEM**

**A project concept submitted to the Department of Computer Science in  
partial fulfillment of the requirements for the Bachelor Degree of Computer  
Science**

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**JUNE 2022**

## **Declaration**

I have submitted this project on my own behalf. I declare that the project submitted is original except for the source material acknowledged. The piece of work has not been submitted for more than one purpose without declaration.

This project work is submitted in the partial fulfilment of the requirements for the award of the degree of Bachelor of Science in Computer Science. The results embodied in this report have not been submitted to any other University or Institute for the award of any degree or diploma.

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## **Declaration by the supervisor**

This project has been submitted for defense with my approval as the supervisor.

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## **Acknowledgement**

I acknowledge that I am aware of the University policy and regulations on the honesty in academic work and the disciplinary guidelines and procedure that come with breach of these policies and regulations as contained in the universities student's handbook.

## **Dedication**

I dedicate this project to my dear parents, relatives, supervisor and friends who have been a source of encouragement and insight throughout its development and who have in different ways supported and inspired me from the start of the project to its completion.

## **Abstract**

*Project development is a crucial and fundamental unit in Computer Science. This is because the project is what is used to gauge the practical understanding of the student in most of the units taught during the curriculum. It tests the student's skills in system analysis and design during the project development, Entrepreneurship in terms of what solution is the student trying to provide in the current market and system skills development in the language of the student's choice together with tools used. The proposed system targets management of the skin by educating the users through a web application and recommending the best products for their skin. The users will take a skin type test through a skin type test quiz and the system will run through the answers given, calculate and give out an answer letting the user know the type of skin they have. They will see a link below the result and that will take them to a page that educates them on the type of skin they have then see the product they can use for their skin type and purchase from the website directly. The other feature is that the system allows the user to book appointments with a dermatologist so as to get professional help. The administrator will be able to see the activity of dermatologist deleting an availability, generate reports on daily, monthly and yearly appointments, customers who have signed up and the orders that have been made. The dermatologist on the other hand will be able to make his availability visible to his clients, delete the availability and see his appointments. The system is client-based for the users and dermatologist and expected time to completion is six months.*

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## Definition of key terms

HTML - hypertext mark-up language

CSS - cascading style sheets

PHP - hypertext preprocessor

Skincare - Skincare is the range of practices that care for the skin, enhance its appearance and relieve skin conditions.

Dermatologist – is a medical practitioner qualified to diagnose and treat skin disorders.

Skin – is the thin layer of tissue forming the natural outer covering of the body of a person

# **CHAPTER 1: INTRODUCTION**

## **1.1. Motivation and background**

In the past years, people have developed interest (both women and men) in skincare and have depended on the best seller for products or recommendations from the stores over the counter. However, each person has a different skin type and skin conditions, thus the old methods are not effective to judge compatibility of a product and a user.

Skincare is the range of practices that care for the skin, enhance its appearance and relieve skin conditions. They can include nutrition, avoidance of excessive sun exposure and appropriate use of emollients. Practices that enhance appearance include the use of cosmetics, exfoliation and ultrasonic skin treatment.

Taking care of your face and skin is a lot like taking care of your teeth. It takes a routine of proper cleansing(flossing) and moisturizing (brushing) every day, with the right tools and products to keep your pores clean and face glowing

The art of skincare goes way back to the 1500 BC when sandpaper was used to exfoliate the skin and smoothen the scars. From then the art of skincare continued to evolve and continue to evolve till now. Some of the first humans used paint to draw images onto cave walls and used the same paint on their facial features sometimes to make them look better and other times to make them look more threatening.

The first recorded case was from the Ancient Egypt who took skincare seriously then the Greek and the romans borrowed from the Egyptians who also took the skincare and makeup seriously from using Honey as a moisturizer, while oils and sand were used as a natural sunscreen.

The next recorded skincare was in China around 1760 BC during the Shang dynasty who valued the natural pale look and used face powders from lead and skin lighteners made from songyi mushrooms to get the desired look which later spread and became popular across Europe.

The modern skincare started with formation of FDA in 1906 to regulate the industry. This time companies like Maybelline, Max Factor launched all range of skin care products and the world of cosmetics began. Today skincare has advanced and companies work towards developing new products whose objective is to improve the look and the feel of the skin.

The customer visits a store to purchase products that can work with their skin. The skin specialists give advice on which products to purchase whether its dealing with acne or enhancing the skin depending on the skin type (normal, oily, dry, combination or sensitive) and the number of times the consumer should use the products in a week or day. For example, the max number of times you can use a facemask is 3days in a week while serum you can use it daily.

In case the customer who visits the cosmetic store cannot be attended to a store the skin specialist will recommend to go to a hospital or visit a dermatologist.

The customers can also visit dermatologist to get their skin tested and get professional help to treat their skin. The hospital will then keep records of the customers condition so that when the customer gets to come back, they can be able to trace the documents without having to repeat the process of testing the skin type.

There are five different types of skin which include:

- Normal skin – its neither too dry nor too oily. Has no or few imperfections. Has no severe sensitivity. Barely visible pores
- Dry skin – have almost invisible pores. Dull, rough complexion. Skin is less elastic
- Oily skin – have enlarged pores. Dull or shiny, thick complexion. Prone to pimples or acne. Have blemishes
- Combination skin – the skin can be dry or normal and, in some areas, oily such as the T-zone (forehead, nose and chin). Pores look larger than the normal skin. Have blackheads and a shiny skin
- Sensitive skin – the skin is prone to inflammation and it has burning feeling

The process of caring for the skin is an important task which ensures the skin is in a good condition. For one to care for his/her skin one needs to understand and know their skin type which includes: normal, dry, oily, sensitive skin, acne prone, mature, dull skin and rough skin.

There are also concerns in which one may one to treat the skin which includes: acne or breakouts, blackhead, dark spots, large pores, skin firming, sunburn, uneven skin tone, wrinkles etc.

The various ways in which one can care for the skin includes:

- use of sunscreen – protection from the sun is an important aspect because it prevents the skin from skin cancer and faster aging and the appearances of sunburns
- cleansing – this involves cleaning of the face using a cleanser to remove all the dirt from your skin that you had gotten during the day
- use of serums – a serum is skincare product that mostly contains vitamin C and it aids in clearing wrinkles, blackspots, enlarged pores, and uneven skin tone
- use of moisturizer – moisturizing your skins aids in fighting wrinkles, reduces the appearance of blemishes, reduces the chance of having skin problems, helps in your skin staying young

Ways of treating the skin include:

Acne: acne treatment depends on how serious your acne is but the following are some the treatments for a mild acne include: adapalene, tee tree oil, salicylic acid, benzoyl peroxide, alpha hydroxy acids

Sebaceous filaments: these are tiny cylinder-like tubes in your pores that are whitish yellow.

The treatment include: seeing a dermatologist to have them removed or applying benzol peroxide after washing before extraction

Blemishes, scars and hyperpigmentation: treatment for this include use of sunscreen, use of honey, vitamin C, niacinamide retinoic acid. etc.

## **1.2. Background of research**

Usage of skincare products for example body moisturizer, facial cream and hand cream is common among women. The aim of the system will be to guarantee that the clients are able to identify their skin types by taking a skin type test quiz where they will respond to questions involving how they feel the texture of their skin when touched, whether it seems oily or dry, whether when exposed in the sun they get a consuming inclination or not. Through these inquiries, it will set off the client to see things about themselves and get to learn and comprehend their skin and how they can take care of it. This will also help the client to identify the products that will be compatible with their skin and the products that are not harsh on their

skin. The customers will also find a detailed information about their skin type and the how to take care of it.

The alternate way the clients can be able to benefit from the system is through the online booking of appointments to the dermatologist. They will be able to see the dermatologist who is available and book with them. The customer can likewise purchase products directly from the system without having the difficulty of the going physically to the shop.

The administrator will be able to add products and to edit the products in the system. The administrator will also be able to view reports on the sales and appointments made daily, monthly and yearly, customers who have signed up and the gender on a daily monthly and yearly period.

The dermatologist will be posting on the days and time they are available. They will be able to view all the appointments they have and delete them to avoid two bookings.

The front-end will be implemented using the following technologies: HTML (hypertext markup language), CSS (cascading style sheets) and JAVASCRIPT.

In the backend I will implement using PHP and mysql for database.

### **1.3. Problem Statement**

From the research carried out, various problems were identified. These problems were seen when the system was manual. The records of the data of the customer are manual and incase the documents are lost there's a risk that the management will not be able to trace the data. Although there are all sorts of products of skincare the challenge comes when the products don't work on your skin and ends up making it worse or causing skin problems that were initially not there. Statistics shows that only 37% of consumers claim they will only purchase products from brands they can trust and this shows that not all products offered by different companies are safe for your skin and the question arises, how do you know which product to purchase? And how will your skin react to it? Is it safe for your skin? The customers need to visit the store or a dermatologist directly and the appointments or reservations have to be carried out physically.

The customers don't understand or know their skin types hence ends up using products that are not friendly to their skin, or not knowing which products to get. There is no progress of the customer skin improvements being recorded. The store a customer visits may overprice them on the product. The store that the customer visits may have products that aren't authentic and end up using products that can affect them.

#### **1.4. Aim of research**

The aim of this project is to:

- ensure the customers/users get the best organic products that are safe and friendly to their skin.
- enable the customers to get a professional advice from a dermatologist if the condition doesn't improve or if the user has a sensitive skin.
- allow the customers to book an appointment with a dermatologist without having to be there physically and get professional advice and treatment.
- educate the user about their skin type after the results of the skin test.
- enable the customer to get to use products that are authentic and are recommended by dermatologist.
- record the number of new customers to visit the system and generate reports based on that.
- record the number of appointments made daily, weekly and monthly.
- generate system logs of deletion of availability by the dermatologist.
- record the products that are mostly being purchased and generate reports on the products preferred according to the trends.

#### **1.5 Objectives of research**

At the end of this project, I will be able to come up with a system that will:

- ensure the customers/users get the best organic products that are safe and friendly to their skin.



- enable the customers to get a professional advice from a dermatologist if the condition doesn't improve or if the user has a sensitive skin.
- allow the customers to book an appointment with a dermatologist without having to be there physically and get professional advice and treatment.
- educate the user about their skin type after the results of the skin test.
- enable the customer to get to use products that are authentic and are recommended by dermatologist.
- record the number of new customers to visit the system and generate reports based on that.
- record the number of appointments made daily, weekly and monthly.
- generate system logs of deletion of availability by the dermatologist.
- record the products that are mostly being purchased and generate reports on the products preferred according to the trends.

## **1.6. Justification of research**

Users need a transparent way of knowing about their skin types and getting products suitable for their skin types. The proposed system delivers exactly this plus allows users to book appointment with a doctor remotely. The proposed system also negates any previous inconveniences to the user such as having to visit the cosmetic stores or having to visit the dermatologist physically to book an appointment. Finally, the system has functionality of being able to generate reports in order to help in improving the system.

## **1.7. Scope of research**

From the previous problems that were identified in the previous manual system, my proposed system will be able:

- To ensure the customers/users get the best organic products that are safe and friendly to their skin and provide a skincare routine to follow daily or weekly at the comfort of their home

- To enable the customers to get a professional advice from a dermatologist if the condition doesn't improve.
- To allow the customers to book an appointment with a dermatologist without having to be there physically and get professional advice and treatment.
- To educate the user about their skin type through taking a skin type test quiz.
- To enable the customer to get to use products that are authentic.
- To record the number of new customers to sign up in the system and generate reports.
- To record the number of appointments made daily, weekly and monthly.
- generate system logs of deletion of availability by the dermatologist
- To record the products that are mostly being purchased and generate reports on the products preferred.

## **1.7. Research organisation**

This project is organized into seven chapters. The project will have the following chapters:

**Chapter one (Introduction)** which is about the introduction of the project and consists of motivation and background information, problem statement, aim of the project, objective and the scope of the project

**Chapter two (Methodology)** which is about the information about selected data collection methods, the methods of acquiring system requirements and also method for design, implementation and testing of the system.

**Chapter three (Literature review)** will consist of summary of different findings about topic and emerging trends related to skin care products of the skincare management system

**Chapter four (system analysis)** will look at the breakdown of the current system, the system requirement analysis feasibility study and process logic and design of the proposed system

**Chapter five (system design)** will cover the prototype model or the description of the proposed system and system architecture and the database design

**Chapter six** will give a detailed information about system implementation using screenshots, testing plans and evaluation plan.

**Chapter seven (conclusion)** will cover the conclusions, findings and recommendations. It will cover the conclusion of the research project, challenges encountered, future recommendations

## **CHAPTER 2: RESEARCH METHODOLOGY**

### **2.1. Introduction**

This chapter focuses on the methods that have been used in the collection and analysis of data for the project. It explains the research design and data collection methods used and describes how data collected from the research has been analyzed.

The research method to be used is qualitative research which is usually associated with getting people's views and thoughts. This involves collecting data, data analysis and attempting to uncover the deeper meaning to the collective data. Collection of data will be done through observation and interviews and both descriptive data analysis and inferential data analysis will be used to analyze the data.

### **2.2. Methodology for Literature Review**

Literature review plays an important role as a foundation for research. It serves the basis for knowledge development, create guidelines for policy and practice evidence of an effect and if well conducted, have the capacity to engender new ideas and directions for a field.

Literature review also serve as the grounds for future research and theory. If there's a certainty that the research is built on great accuracy, it will be much easier to identify research gaps instead of conducting the same research repeatedly to develop better and more precise research questions and therefore increasing the quality of research.

The literature review consists of an introduction, middle or the main body and a conclusion. The introduction will define the topic and provide an appropriate context for reviewing the literature, establish the reasons for writing the literature review, reviewing the literature, explain the organisation and state of the review that is what is included and what isn't.

The main body will organize the literature according to common themes, provide insight into the relation between your chosen topic. The conclusion will summarize the important aspects of the existing body of literature.

## 2.3. Methodology for requirement specification, data collection and analysis techniques

Technology and data have become part of how we work. Whether it's in the education field or the cosmetics business field, you need to learn how to collect data and manage data because it helps you in understand your environment better and help you keep up with the trends and everyday life changes as well as knowing the user requirements. This project is no exception and data collection as it is an important factor to consider. There are various techniques of collecting data which include:

- Interviews
- Questionnaires
- Observations
- Documents
- Oral histories

In this project we will focus on interviews, questionnaires and observation data collection techniques in order to find the user requirements.

**Interview** is a method of data collection that involves two or more people exchanging information through a series of questions and answers. The questions are formulated by the researcher to elicit information from interview participants on a specific topic.

**Questionnaire** is a list of questions or items used to gather data from respondents about their attitudes, experiences or opinions. It is used to collect both qualitative and quantitative information. Quantitative data is measurable and involves asking close-ended or multiple-choice questions while qualitative involves interview and open-ended questions where one can answer in depth to the question asked.

**Observation** is a method of data collection which involves seeing people in a certain place at a specific day or time. The researcher usually studies the individuals surrounding in which they are analyzing.

## **2.4. Methodology for system analysis (current system)**

System analysis is the process by which a system is studied so that the information can be analyzed, modeled and a logical alternative can be chosen. It is a problem-solving technique that improves the system and ensure the system works efficiently to achieve its purpose. In this phase the current system will be analyzed and the corrected measures will be taken under what to be implemented and the gap in the current system.

The current system requires the client to visit the dermatologist office to book an appointment and they are required to visit a physical shop in order to purchase the products they need. We also notice that the clients cannot be able to identify the types of skin they have and they end purchasing products that end up being harsh on their skin.

The proposed system will be of benefit to everyone and as everything will be conducted online including booking of appointments with the dermatologist, purchasing products online and taking skin type test to help in identifying the products to purchase.

### **2.4.1. Use case diagram**

A use diagram model the behavior of a system and help capture the requirements of the system. Use-case diagram will be used to capture the process of the current system.

## **2.5. methodology for system design (proposed system)**

System design is the process of planning a system or replacing an existing one by defining its components to satisfy the specific requirements. Before planning one is needed to understand the old system properly and determine how the computers can be used best to solve the problem.

### **2.5.1 database design**

Database design is the organisation of data according to a data model. A designer will determine which data to be stored and data elements interrelate. Having all the data the designer can start to add the data into the database model. In proposed system we will be able to capture the data for customers, dermatologist, administrator, appointments and the sales or the orders.

### **2.5.1 Use-case diagram**

A use diagram model the behavior of a system and help capture the requirements of the system. Use-case diagram will be used to capture the process of the proposed system to show its functionality.

### **2.5.2 Context diagram**

Context diagram shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities. We will show how the processes the customer takes when interacting with the system from login to them taking a skin test, booking an appointment and making a product order. We will also see how the admin is able to make his availability and how the admin is able to see various reports and how the admin gets to post the products that will be visible to the customer for purchase.

## **2.6. Methodology for system implementation**

System implementation is the process of ensuring that the system is operational. This involves constructing a new system from scratch and constructing a new system from an existing one. Implementation allows the users to take over its operation for use and evaluation.

### **2.6.1 front-end**

This is the practice of producing HTML, CSS and JavaScript for a website so that a user can see and interact with the website directly. The project will use these three technologies HTML, CSS and JavaScript for frontend.

HTML (hypertext markup language) is the fundamental building block of the web development. It describes the meaning and the structure of web content. Hypertext refers to links that connect webpages to one another, either inside a single website or between websites. HTML utilizes markup to mark text, images and the content for display in a web browser. It includes special elements such as <head>, <title>, <body> etc.

CSS (cascading style sheets) is used to control the style of a web document in a simple easy way. CSS handles the look and feel part of a web page. Using CSS you can control the color of the text, the style fonts, spacing between paragraphs, etc.

JAVASCRIPT is a programming language it is used for creating network-centric applications. it helps you in developing great front-end, beautiful and fast websites and give users the best graphical user experience.

### **2.6.2. backend**

The backend or the server side is the portion of the website that we don't see. It is responsible for storing and organizing data and ensuring everything on the client side is working. The backend communicates with the front-end by sending and receiving information to be displayed as a webpage. The system will use technologies PHP and Mysql for the backend.

PHP (hypertext preprocessor) is a scripting language used to create dynamic websites and applications. It is mostly used in the server side. PHP can receive data from forms and can work with databases, create sessions etc.

Mysql is a database management system. It stores data in tables. Users can define, manipulate and query data using SQL (structures query language).



## **2.7. Methodology for system testing**

System testing is a level of testing that validates whether the system is functioning properly. The goal of system testing is to detect any irregularity between units that are integrated together. There are various types of testing.

- Usability testing checks the users ease to use the system, flexibility in handling controls and the ability of the system to meet its objectives
- Load testing involves checking whether the system can load in real time environments
- Functional testing tries to look for any possible missing functions
- Regression testing which checks whether the changes made to the system could have affected the performance of the system
- Scalability testing which tests whether the performance of the system is able to scale up or down depending on the number of user request load

## **2.8. Methodology for system deployment**

System deployment involves the steps, processes and activities that are required to make software system available to its intended users. Many development teams choose to host their systems using on-premises IT infrastructure, cloud providers like Amazon Web Services (AWS) because they offer platform-as-a-Service (PaaS) products that help developers deploy applications into live environments without any additional financial burden.

## **2.9. Chapter summary**

This chapter has covered methodology of literature review, requirements specification, data collection system and analysis techniques, system analysis, system design, system implementation, system testing and system deployment.

## **CHAPTER 3: REVIEW OF RELATED WORK**

### **3.1. Chapter introduction**

This chapter will cover the research done on the other similar skincare management system. It will likewise cover history of research topic, review of related prototypes and systems, emerging trends and patterns in the research area the research gap in the study and the chapter summary.

### **3.2. History of research topic**

When it comes to skin care, peoples first thought is about their faces. The skin is the largest part of our body hence it is important to keep it properly nourished. In 1967, a zoologist Desmond Morris stated that “flawless skin is the most universally desired human feature” explaining the ancient human need to advertise health, wellbeing and fertility with an even-toned complexion. In the pursuit to achieve a perfect skin, consumers are willing to search the best skincare products. May it be in department stores or online, the consumers are faced with dilemma on the product to choose. They look to their friends, physicians, favorite influencer or blogger for recommendations, often purchasing expensive products that fail to live up to their supposed benefits.

A market survey was conducted in October 2015 and it showed that most consumers perceived factors like regular facial cleaning, lifestyle and sun exposure was ranked higher and it impacted the skin’s appearance compared to visiting a dermatologist or getting professional skincare treatment.

A stable growth of the cosmetic industry (skin care products) and progressive technology has caused an intense competition in the cosmetics companies. The cosmetic firms are forced to create, innovate and to upgrade their products. There is a need for developing revolutionary technologies and shifting customers’ demands and needs, contribute towards increasing cosmetic companies’ abilities to produce various kinds of cosmetic merchandises (Kumar, Massie, & Dumonceaux, 2006).

### **3.3. Review of related prototypes, systems**

The aim of the literature review is to understand the previous systems and systems similar to the proposed one so as to aid in future research and development. The following are some of the case study systems.

#### **Case study of soko glam**

Soko Glam is an online marketplace that specializes in Korean beauty products. Soko Glam was founded on 1st December 2012 by an esthetician and author Charlotte Cho and David K. Cho. The headquarters are in New York City. Soko Glam operates as an online retailer of Korean beauty products and treatments, specializing in Skin care, hair and makeup. The user can either go ahead to make the purchases of products or get to know of his/her skin by taking a test which is available in the system. The test involves answering nineteen questions about your skin, for example the age, whether you work out, time you spend on the sun etc. and the system lets you know of your skin type and products that you may use to improve on the area of concern on your skin.

The features on Soko Glam include:

- An online method of consultation with an esthetician in the system and book an appointment
- It notifies the user about trending products on the market through email
- A ready online market where the user can shop the product from
- An online consultation method with an esthetician
- Allows user to make reviews on the system on the products they purchased
- Availability of blogs in the system to educate the users more on taking care of skin and understanding their skin better
- Has user friendly navigation where the user can easily navigate through the system with much guidance

### **Case study of skin care by alana**

Skin care by Alana is an android and IOS application than you can freely download, which serves as a skincare management system. The application was founded by Alana family. Notable strongholds offered .by Skin care by Alana include:

- Online method of enquiring about the skin type and recommending the products to use and to purchase from their application.
- The availability of a licensed esthetician who can review your information and respond to you with analysis and recommendations for the products that will get on your way to a good skin.
- Availability of communication through email where the user can email the company in case of any inquiries.
- An online store where you can order the products from the application and have them delivered to your doorstep.
- Blog section where the user can get educated more about skin care.

### **Case study of rynkl**

RYNKL is a wrinkle analysis application free to download that helps the users to track signs of aging on the skin using artificial intelligence to make the skin look younger. The application is free to download and doesn't contain in-app purchases. The application was developed by youth laboratories located in Hong Kong, Hong Kong Island and that was founded on August 15, 2015. The founder is Alex Zhavoronkov.

Youth Laboratories develops algorithms for images analysis and implement them into mobile applications. The algorithm utilizes machine learning and Deep-learning methods, big data analytics, and the latest research in biology to extract facial traits from selfies.

Their first product was RYNKL which allows one to track facial wrinkles and evaluates the effect of anti-aging treatments through making selfies.

## **Case study of TD**

TD is a skincare recommendation system available on IOS and Android. The application that can be downloaded from google play store and apple store. The application identifies and assesses any potentially risky or toxic ingredients in beauty and skincare products. The application was started by founder Lily Tse who wanted to avoid toxic ingredients and find safer alternatives due to a family history of cancer.

The main aim of the company is to educate the users of the industry by allowing them to make an informed decision on what products to purchase.

What the application basically does is scan the user's item (product) barcode and the application will give you an easy-to-follow breakdown of the product's ingredients and where they fall on a potential health hazard scale.

It also gives suggestions for a safer product as an alternative of the product you had chosen to purchase.

The application is free to download but offers a subscription if you need to get unlimited suggestions on the products you purchase in their application.

The weakness in this system is that it doesn't have a specialist who can confirm whether the products they recommend or suggest to the users are actually safe for them to use. It also doesn't have a way for them to get educate the users on their skin types and whether the products they are purchasing could be compatible with their skin.

There's is also no way for the system to be able to recommend the user to visit a specialist if the skin condition requires a specialist(dermatologist) to handle.

## **Case study of sunzapp**

Sunzapp is android application that makes it easier for the users to have fun in the sun without getting burned. The application was developed by Klein Buendel in (2014). It reminds the user to apply sunscreen in case one had forgotten to protect your skin against the sun. The application's

advice is based on the location of the user, environmental conditions, sunscreen SPF(sun protection factor) and UV (ultraviolet radiation) index forecast.

The application also enables each user to add up to 5 profiles which can be customized for your favorite outdoor activities.

Sunzapp features include:

- A personalized real-time data – Sunzapp uses NOAA's (National Oceanic and Atmospheric Administration) hour-by-hour forecast to provide real-time sun protection advice for your profile.
- Timer and alerts – Sunzapp times your UV exposure and sends alerts about when you should sunscreen or when to get out of sun to avoid painful sunburn
- Sun protection tips – Sunzapp gives advice about when to cover-up clothing, sunglasses, hats and shade
- Multiple profiles – Sunzapp lets you add multiple profiles for yourself and family
- Planning function – Sunzapp helps you to plan for an event up to five days in the future.

## **Conclusion**

Having done a review on the above systems and considered all their features. I have sorted the systems from the ones with most features to the least.

- Soko glam which is an online market place that allows its users to shop and also get to learn about their skin through the systems blog and also consult with the system's esthetician.
- Skincare by alana is system that enables its users to get to know about their skin through their blogs and also allow the user to make purchases within the system
- TD is a system that allows user to be aware of the products they are using. That is if the product contains toxins that can harm the skin and get to recommend a better product to the user
- Sunzapp is a system that alerts the user when to be out of the sun and reminds the user to apply sunscreen to protect the user against the harmful sun rays

- Rynkl is a wrinkle detection application/system that uses artificial intelligence to scan the user's skin to detect any signs of aging to the user.

In the view of the above I would recommend on the use of soko glam. The reason behind that being the system can let you know of your skin type and advice you on the products to use and the skin care routine to follow.

### **3.4. Emerging trends and patterns in the research area**

Skincare involves a series of implementation that ensure that one takes good care of their skin. A skincare routine aims to relieve certain skin conditions and make sure the skin's appearance is enhanced. Different skin types require different skincare products. You may also want to consult your dermatologist before using some products especially when you have a sensitive skin. If you know your skin type you can go ahead and purchase skincare product from a brand that you trust. In this topic I will highlight some of the skincare trends that are emerging and that are in the future of the skincare industry.

#### **Use of supplements**

skincare brands are now making oral supplements to be part of your skincare routine. Instead of one focusing on the products only, they are now introducing supplements in powder and capsules. These supplements promote skin elasticity, brightened skin and collagen production

#### **personalized skin care**

various skincare brands are now making personalized products for their customers. All you have to do is to answer an online quiz about what you are struggling with and they will make a skincare product that will specifically cater for your needs. This is a trend that is bound to get better with time.

### **Multi-purpose products**

These are products that ensure you spend less time on the skincare routine. It is convenient for someone who is busy and is in a hurry to go somewhere as it serves multiple purpose in a single product. More skincare brands are now embracing this concept and creating more multi-purpose products.

### **Celebrity skin care**

Through the power of social media, celebrities have big influence on people and what they may decide to use on their skin will be from a celebrity's recommendation. There's a high chance that if a celebrity recommends a specific product everyone will buy it. There has also been a rise in men embracing skincare regimens so there could be more skin products for men in future.

### **3.5. Research gap**

A research gap is basically a topic or area for which missing or insufficient information limits the ability to reach a conclusion for a question.

During the research we have seen various systems with different functionalities. For instance, sunzapp is able to alert the user when they have basked in the sun for a long period of time, soko glam educates their users about their skin through their system blogs and allows the user to consult with their system's aesthetician.

Through that research it is noted that it would be important to have a system where you can be able to know your skin type by the system scanning your face or body using an artificial intelligence technology and the system being able to automatically recommend you to visit a doctor or recommending the products to use instead.



### **3.6. chapter summary**

The chapter has covered the literature review in depth, history of research topic, review of related prototypes and systems, emerging trends and pattern in the research area and research gap.

## **CHAPTER 4: SYSTEM ANALYSIS**

### **4.1. Chapter introduction**

This chapter will provide a breakdown of the processes and functions involved in the current system. The current system will be explained through graphical representation by the use of use case diagram. The importance of taking such measures is to ensure all functionalities of the system are inclined in the design to create a clear guideline for system development.

This likewise helps in answering questions such as: what problem the system solves, who the intended user of the system is, where the system is supposed to be used and how the system is supposed to be used.

### **4.2. description of the current system**

The current system of a skincare management system involves a customer visiting a store to purchase products that can work with their skin. The skin specialists give advice on which products to purchase whether its dealing with acne or enhancing the skin depending on the skin type (normal, oily, dry, combination or sensitive) and the number of times the consumer should use the products in a week or day. For example, the max number of times you can use a facemask is 3days in a week while serum you can use it daily.

In case the customer who visits the cosmetic store cannot be attended to a store the skin specialist will recommend to go to a hospital or dermatologist.

The customers can also visit dermatologist to get their skin tested and get professional help to treat their skin. The hospital will then keep records of the customers condition so that when the customer gets to come back, they can be able to trace the documents without having to repeat the process of testing the skin type.

#### **4.2.1 weakness of the current system**

The current system has the following weaknesses:

- The records of the data of the customer are manual and incase the documents are lost there's a risk that the management will not be able to trace the data.
- Although there are all sorts of products of skincare the challenge comes when the products don't work on your skin and ends up making it worse or causing skin problems that were initially not there. Statistics shows that only 37% of consumers claim they will only purchase products from brands they can trust.
- The customers need to visit the store or a dermatologist directly and the appointments or reservations have to be carried out physically leading to.
- The customers don't understand or know their skin types hence ends up using products that are not friendly to their skin. Or not knowing which products to get
- There is no progress of the customer skin improvements being recorded.
- The store a customer visits may overprice them on the product
- The store that the customer visits may have products that aren't authentic and end up using products that can affect them.

#### **4.2.2 strength of the current system**

The current system also have its strengths and they are follows:

- Sometimes customers may want physically purchase a product because they may not trust products being sold online.
- Customer may want to go to a doctor that they trust will cater for their doctor without having to try a new doctor that don't have any information about their past skin condition
- Customers may know stores where they can get organic and affordable products
- There's is a relationship with the client and the dermatologist because of the physical interaction.

### 4.3. Feasibility study

Feasibility study is an analysis that considers all of a project's relevant factors including economic, technical and scheduling consideration to ascertain the likelihood of completing the project successfully.

#### 4.3.1 Economic feasibility

Economic feasibility study is a kind of cost-benefit analysis of the project to assess whether it will be possible to implement it. It supports in decision making by identifying the strength, weakness and risks associated with the project.

product	Price (ksh)
Laptop (core i7 8gb RAM)	Ksh. 50,000
Android smartphone (Android 10)	Ksh. 20,000
Transport	Ksh. 6,000
<b>Total</b>	<b>Ksh. 77,000</b>

*Table 1 Economic feasibility table*

#### 4.3.2. Technical feasibility

Technical feasibility refers to the process of identifying how you will produce your project and if will be possible.

The software tools to be used include:

- Visual studio IDE
- XAMPP control panel
- PHP programming language
- JavaScript programming language
- Mysql database
- Html & CSS for front-end development
- Github version control for back up

The hardware tools to be used include:

- HP ProBook 430 Intel core i7 8gb RAM
- Android smartphone

#### **4.4. Data input and output analysis**

The system will be able to capture the information about the users, admin, dermatologist, products, orders, skincare management, appointments and doctor available.

##### **4.4.1. Data analysis of system**

My system needs to generate the following reports:

- The number of users that book an appointment with dermatologist on daily,
- The number of users that book an appointment on monthly basis.
- The number of users that book an appointment on yearly basis
- The number of orders on daily basis.
- The number of orders on weekly basis.
- The number of orders on yearly basis
- The products that are on demand
- The gender of customers in the system
- The number of users in the system
- The number of products in the system
- Appointment by status
- Appointment by a doctor name
- Orders by shop name
- Orders by status

In order to generate the above reports the data the system needs to capture:

### **User**

The input that is needed is:

- User identification
- The first name of the user
- The last name of the user
- The phone number of the user
- The email address of the user
- The gender of the user
- The type of the user
- The password of the user

### **Appointment**

The input that is needed is:

- the identification of the appointment
- the user identification
- the date of the appointment
- the time of the appointment
- the status of the appointment

### **Product**

the input that is needed is

- the identification of the product
- the shop names
- the shop owner
- the shop phone number
- shop email address

- the product name
- the type of skin to be used for
- the description of the product
- the price of the product
- product image

## **Orders**

The input needed is:

- the unique identification of the orders
- the date of the orders
- user identification
- product name
- quantity of product
- total amount
- the payment type
- shop name
- product identification
- status of the order

## **Doctor available**

The input needed is:

- identification
- user identification
- date available
- time available
- status

## **Skin type management**

The input needed is:

- identification
- skin type image
- description
- skin type
- skin management description

## **user interface analysis**

The customer will be able to signup/login, take skin type test, make a product order and book appointment with a dermatologist

The dermatologist will be able to signup/login, schedule an availability and view the appointments

The admin will be able to signup/login, view reports on appointments, sales, users, customers, post products, update product and delete the product

## **Process analysis**

The customer will be able to signup/login, take skin type test, make a product order and book appointment with a dermatologist

The dermatologist will be able to signup/login, schedule an availability and view the appointments

The admin will be able to signup/login, view reports on appointments, sales, users, customers, post products, update product and delete the product

## **Data storage analysis**

The data will be stored in mysql database. It will be backed up using the version control Github.



## 4.5. Process logic design of the current system

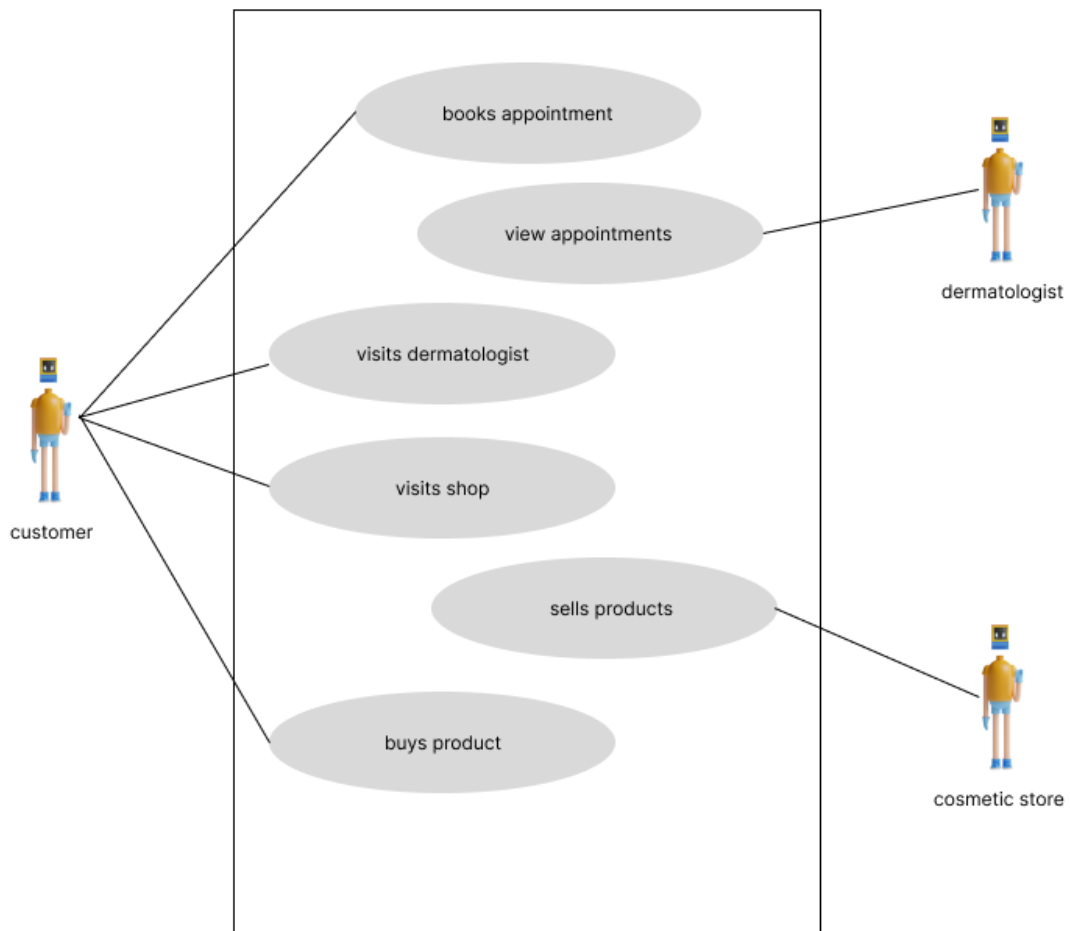


Figure 1 Use case diagram of the current system

## 4.6. Chapter summary

The current system uses manual system where the client visits the shop and dermatologist physically. We have looked at the current system, its strength and weaknesses, feasibility study to determine the cost and the technical budget. We have also covered the process logic of the current system.

## **CHAPTER 5: SYSTEM DESIGN OF THE PROPOSED SYSTEM**

### **5.1 Introduction**

System design involves the development of the system logically. It also establishes the inputs and outputs from the system, the processes involved to give the expected results. The primary point is to develop an architecture and structure of the proposed system. The main models are outlined that captures the key components of the system at different levels. The design of the system consists of the activities which yield system specifications that meet the functional requirements of the user. It involves the following:

- process logic design
- database design
- Input/output of the proposed system

### **5.2. Description of the proposed systems**

The proposed system is a web-based application. The customer can sign up and login into the system. The customer can take a skin type test quiz to know the skin type they have. The customer can book an appointment with the system's doctors. The customer can also be able to view the available products and purchase the products directly.

The administrator can sign up and login into the system. The administrator can be able to add products to be viewed by the customer. The administrator can also be able to generate reports based on sales, appointments, number of users, edit and delete the existing products.

The dermatologist can be able to sign up and login into the system. The dermatologist can post the day and time they are available for booking and delete then the appointment is made to available double booking of appointment. The dermatologist can also be able to see the appointments he/she has.

### **5.3. Requirement analysis**

The purpose of requirements analysis is to determine user expectations for an application to be built or modified. It is subdivided into the following.

#### **5.3.1 Functional requirements**

- users should be able to sign up and login
- users should be able to make appointments
- users should be able to make an order
- users should be able to take a skincare text
- administrator should be able to add and remove products

#### **5.3.2 Non-functional requirements**

- The system should have a friendly user interface
- The system should provide secure authentication of user account
- The system should be scalable

## 5.4. Conceptual architecture of the proposed system

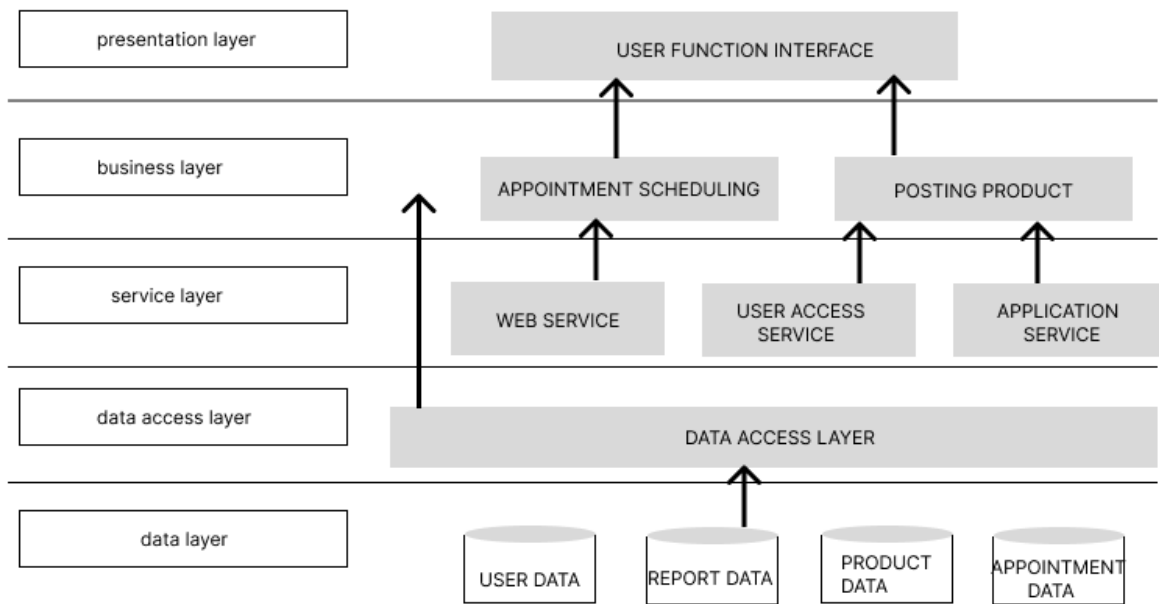


Figure 2 Conceptual architecture of the proposed system

## 5.5. Process logic design of the proposed system

### Use case diagram of the proposed system

The below use case shows the process of the proposed system.



Figure 3 Use case of the proposed system

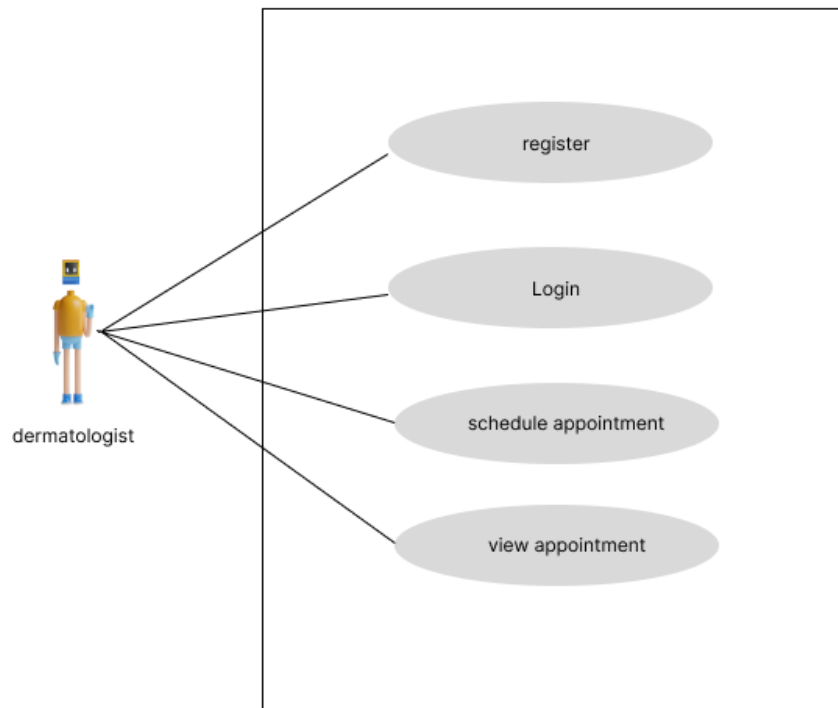


Figure 4 Use case of a dermatologist

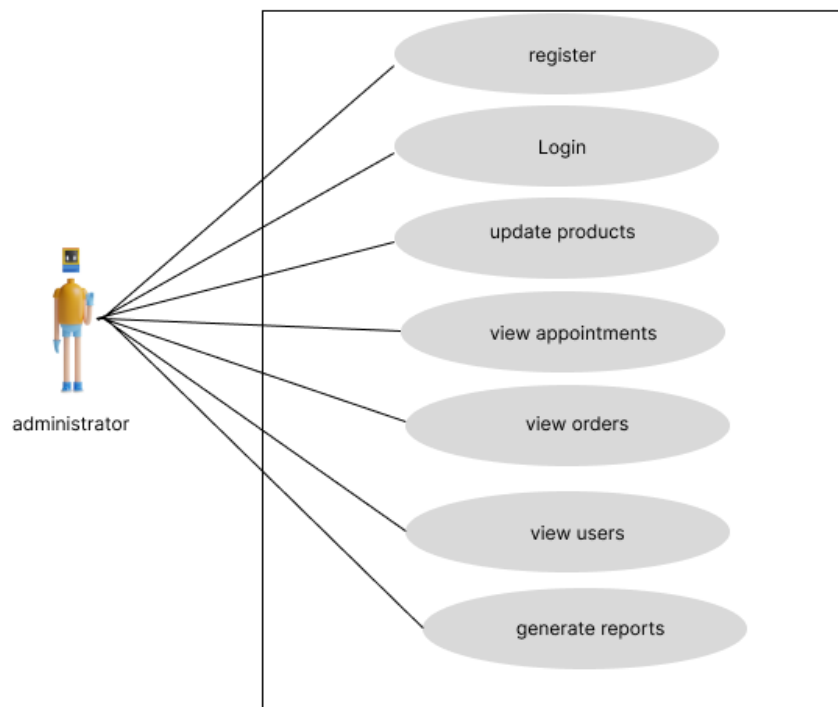
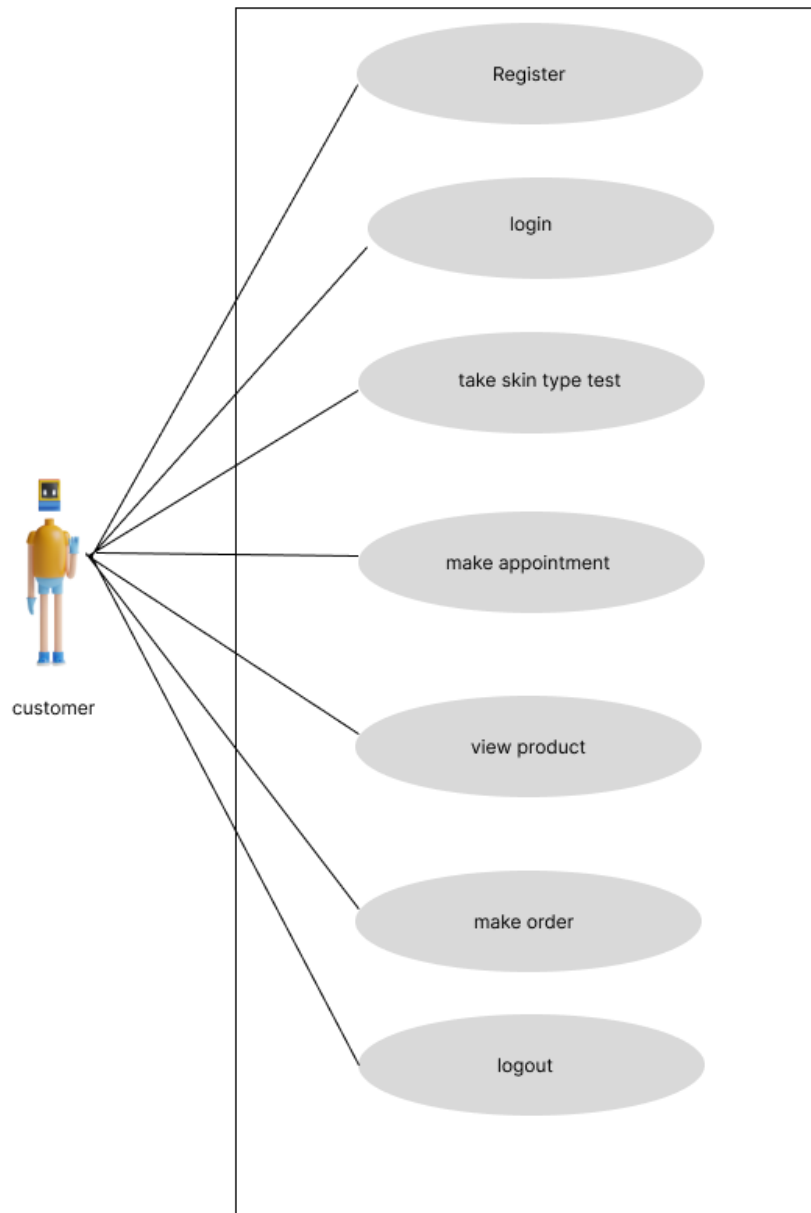


Figure 5 Use case of an administrator

## Use case diagram of a customer



*Figure 6 use case diagram of a customer*

### Context diagram of the proposed system (dfd level 0)

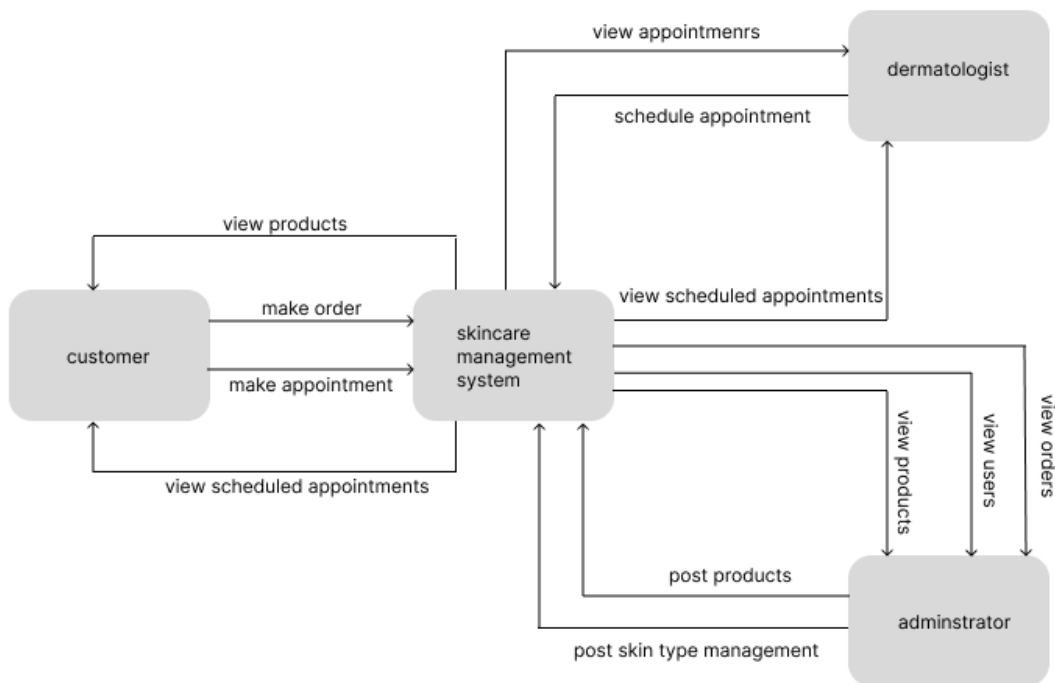


Figure 7 context diagram of skincare management system



## Data flow diagram (DFD) level 1

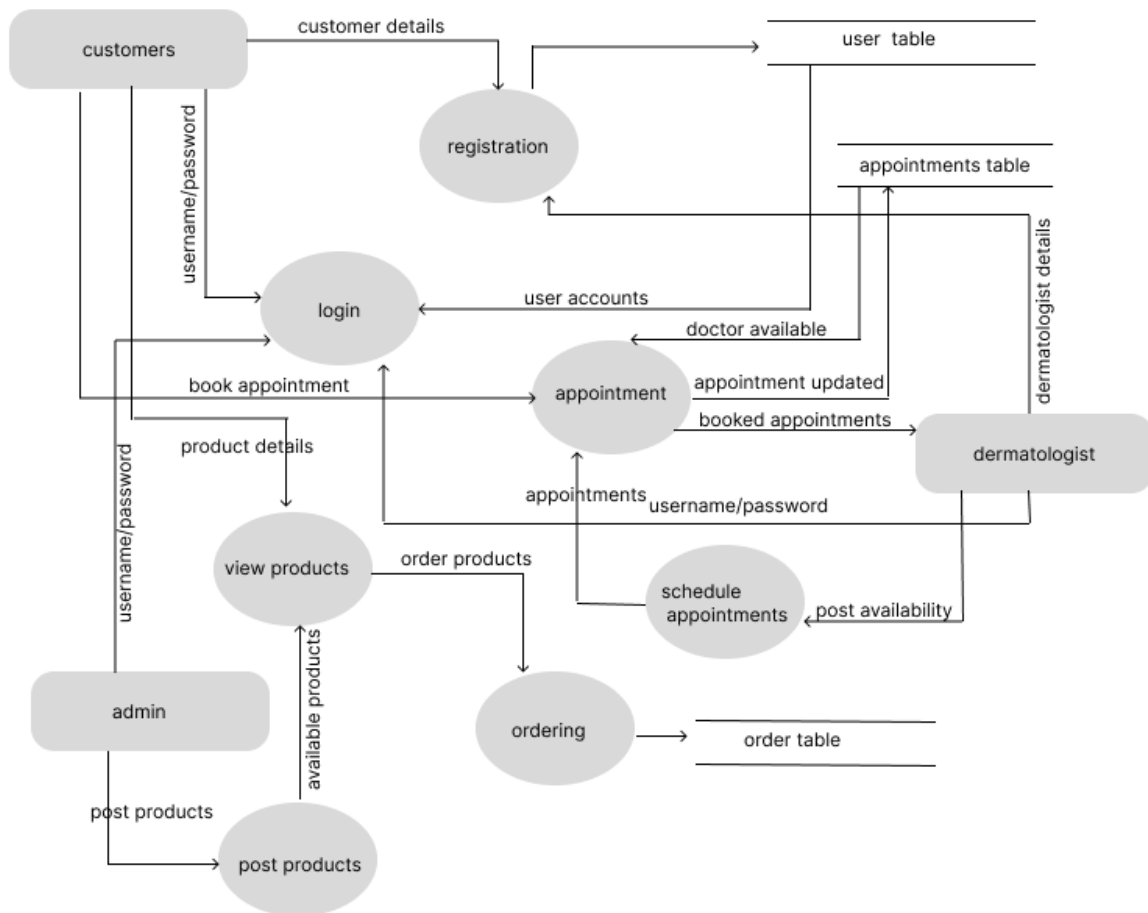


Figure 8 DFD level 1

## Data flow diagram (DFD) level 2

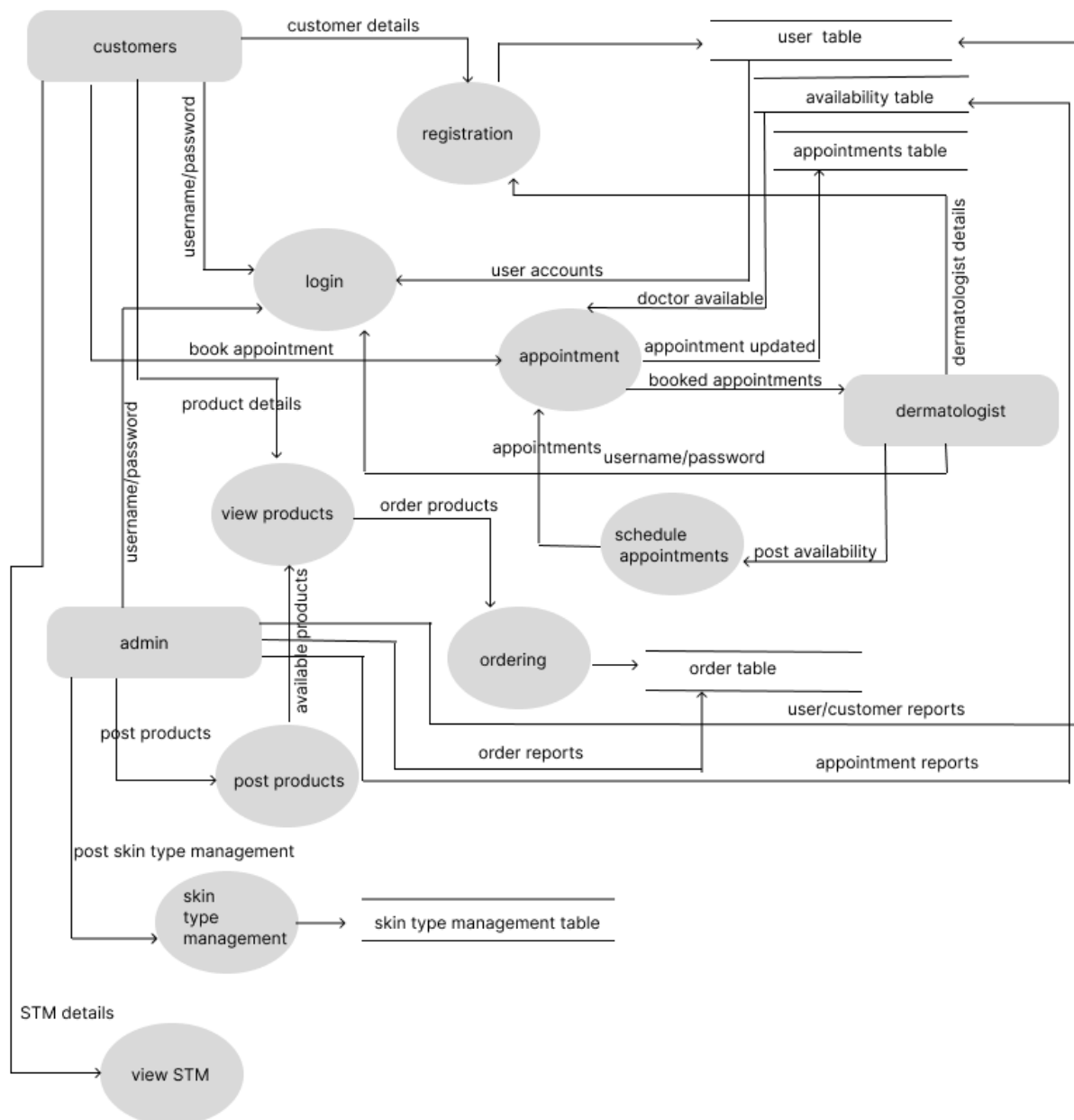


Figure 9 DFD level 2

## ER (entity relationship) diagram

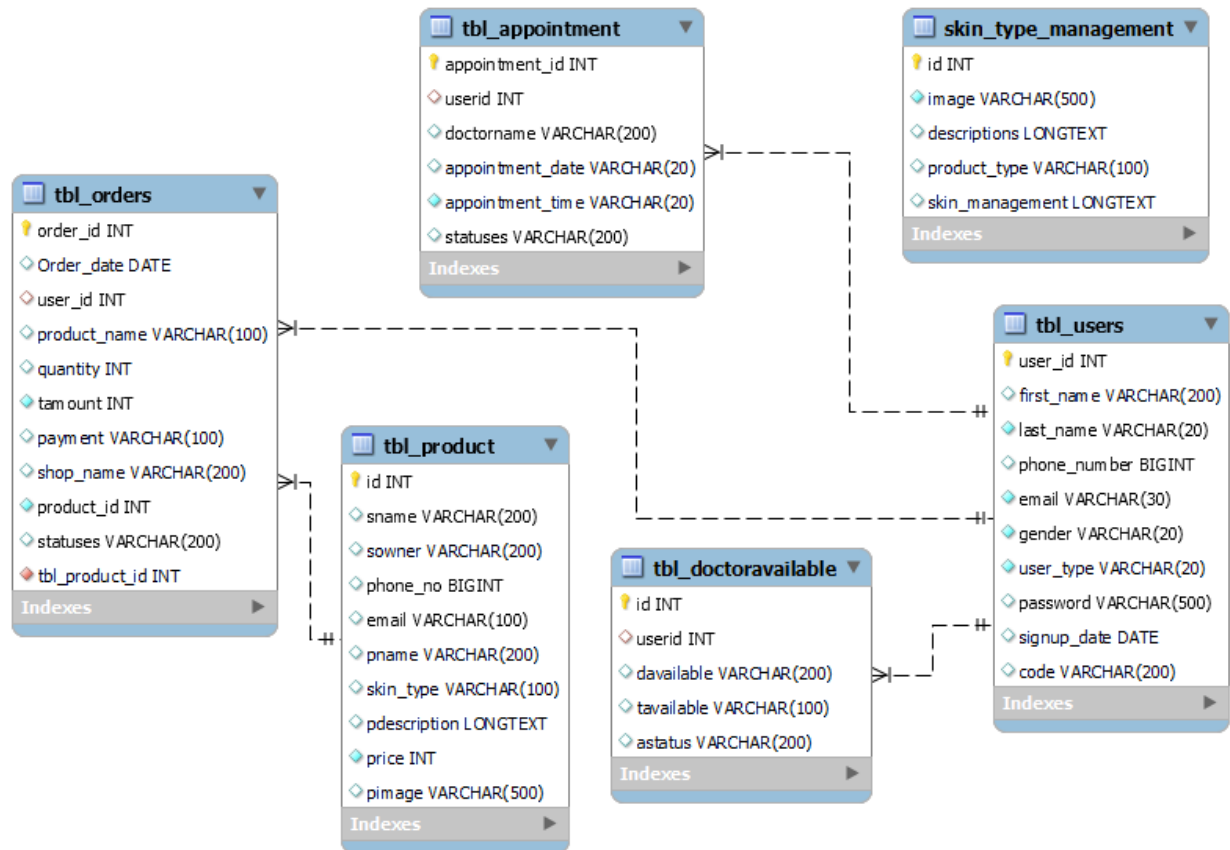


Figure 10 ER (Entity relationship) diagram

## Customer flowchart diagram

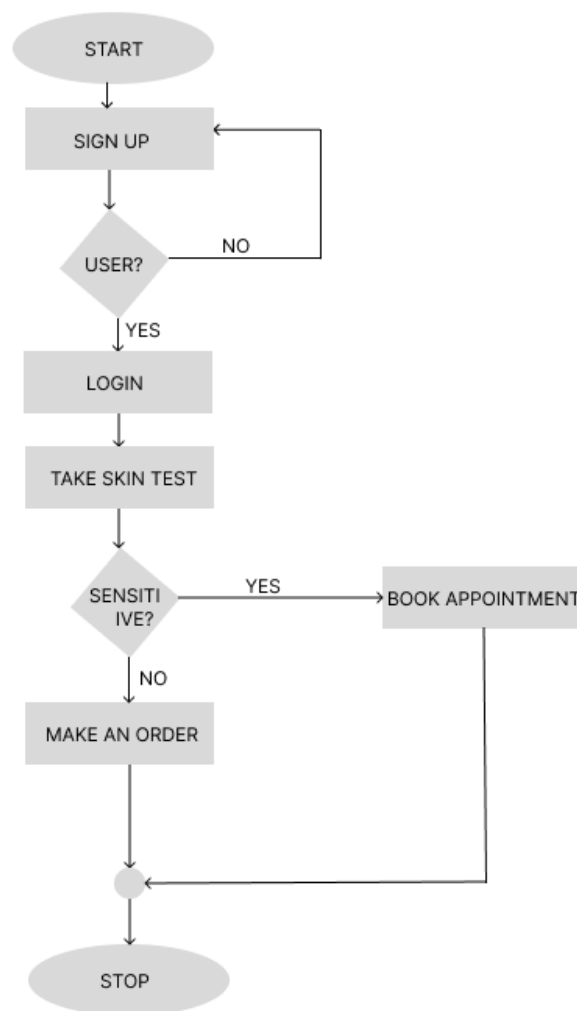


Figure 11 Customer flowchart

## Dermatologist flowchart diagram

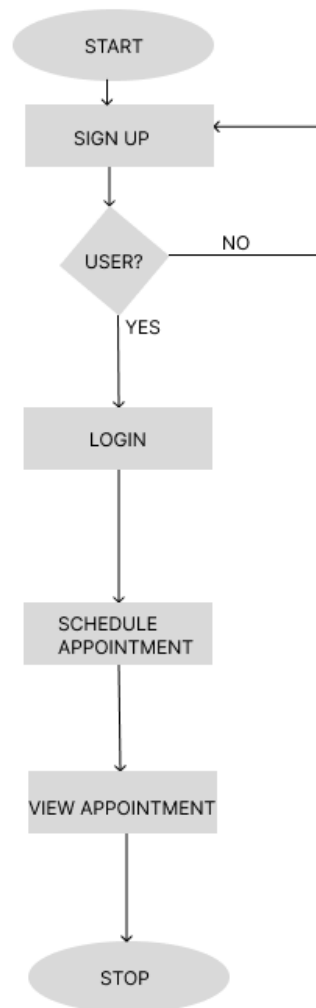


Figure 12 Dermatologist flowchart

## Admin flowchart diagram

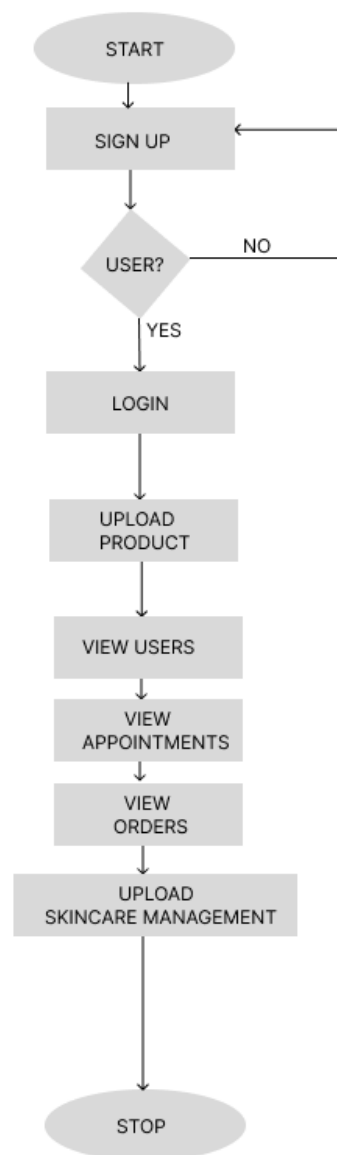


Figure 13 Administrator flowchart

## 5.6. Database design

### tbl\_users

Field Name	Type	Description
User_id	int	Id of user
first_name	varchar	Name of user
last_name	varchar	Last name of user
phone_number	int	Phone number of user
email	varchar	Email of user
gender	varchar	Gender of the user
user_type	varchar	Type of the user
password	varchar	Password of the user
signup_date	date	Date user registered

Table 2 Table users

### tbl\_appointment

Field Name	Type	Description
appointment_id	int	Id of the appointment
userid	int	Id of the user
Doctorname	varchar	Name of the doctor
Appointment_date	varchar	Date of the appointment
Appointment_time	int	Time of the appointment
statuses	varchar	Status of the appointment

Table 3 Table appointment

### tbl\_product

Field Name	Type	Description
id	int	Id of the product
sname	varchar	Name of the shop
sowner	varchar	owner of the shop
phone_no	int	Phone number of the shop
email	varchar	Email of the shop
pname	int	Name of the product
skin_type	int	Used for which skin type
pdescription	varchar	Description of product
price	int	Price of the product
pimage	varchar	Image of the product

Table 4 Table product

### tbl\_orders

Field Name	Type	Description
order_id	Int	Id of orders
Order_date	date	Date ordered
User_id	int	User identification
product_name	varchar	Name of the product
tamount	int	The total amount
payment	varchar	Type of payment
shop_name	varchar	Name of the shop
product_id	int	Id of the product
statuses	varchar	The status of the order

Table 5 Table orders



### skin\_type\_management

Field Name	Type	Description
id	int	Id of the skin type
image	varchar	The image of skin condition
descriptions	varchar	Description of skin
product_type	varchar	Type of the product
skin_management	varchar	Skin management advise

Table 6 table skin type management

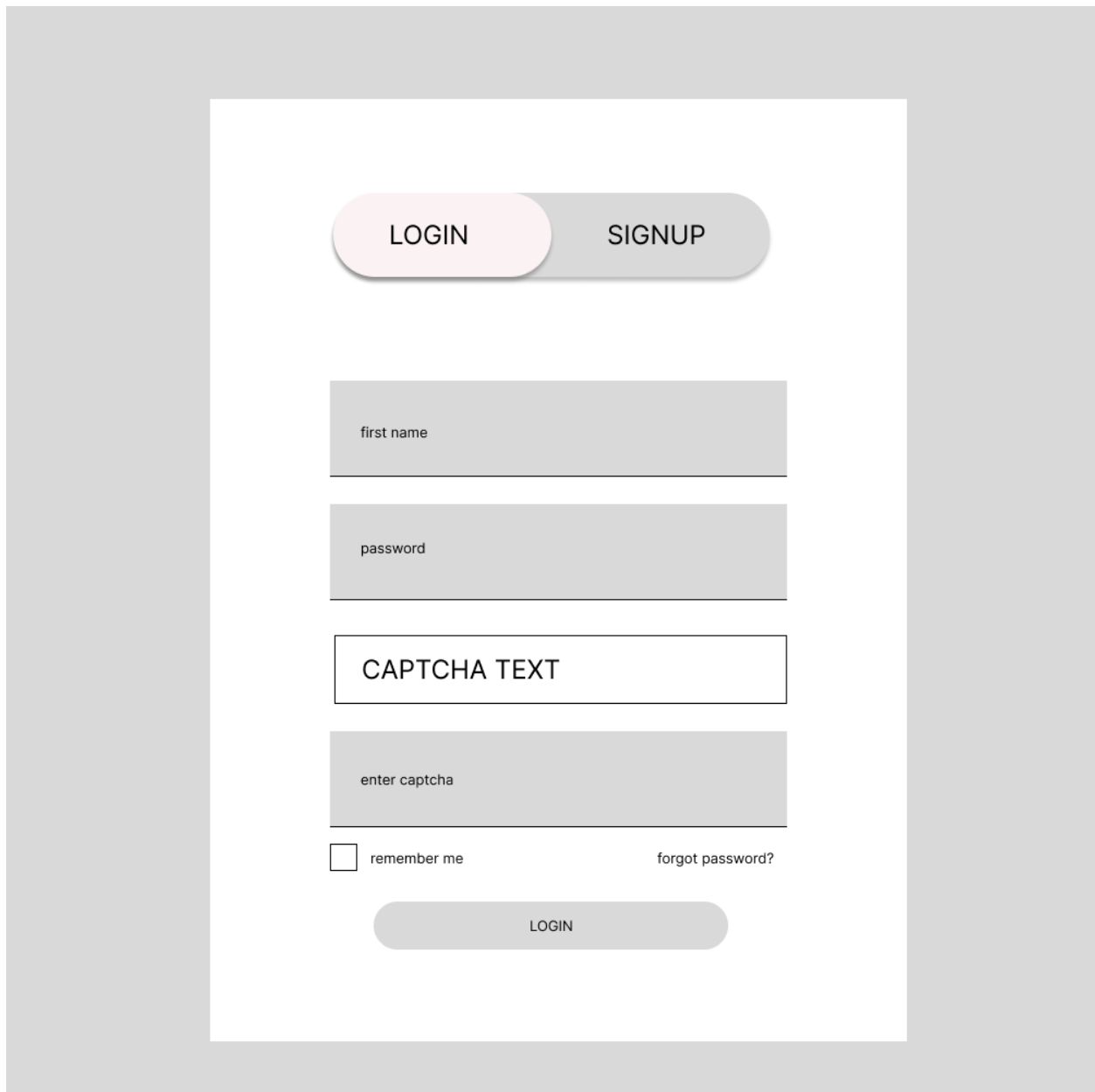
### tbl\_doctoravailable

Field Name	Type	Description
id	int	Id of the table
userid	int	Id of the user
davailable	varchar	Description of skin
tavailable	varchar	Type of the product

Table 7 Table doctor available

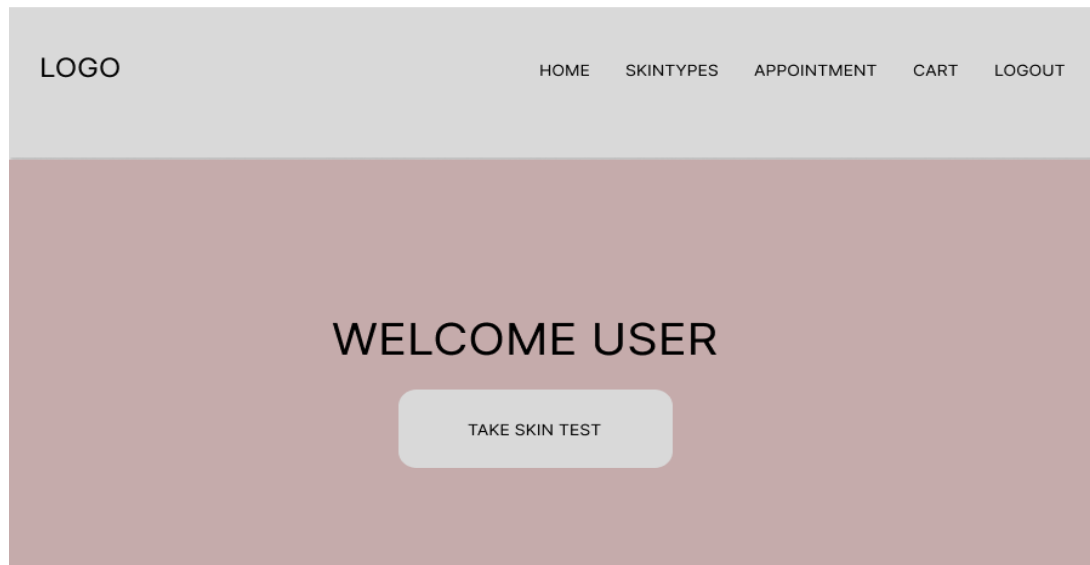
## 5.7. Input and output of the proposed system (mock up screens)

### 5.7.1 Login mockup



A login screen mockup with a light gray background. At the top, there are two rounded buttons: a pink one labeled "LOGIN" and a gray one labeled "SIGNUP". Below these are three input fields: a gray one labeled "first name", a gray one labeled "password", and a white one with a black border labeled "CAPTCHA TEXT". Below the captcha field is another gray input field labeled "enter captcha". At the bottom left, there is a checkbox labeled "remember me". To its right is a link labeled "forgot password?". At the very bottom, there is a gray rounded button labeled "LOGIN".

Figure 14 Login screen mockup



## PRODUCTS

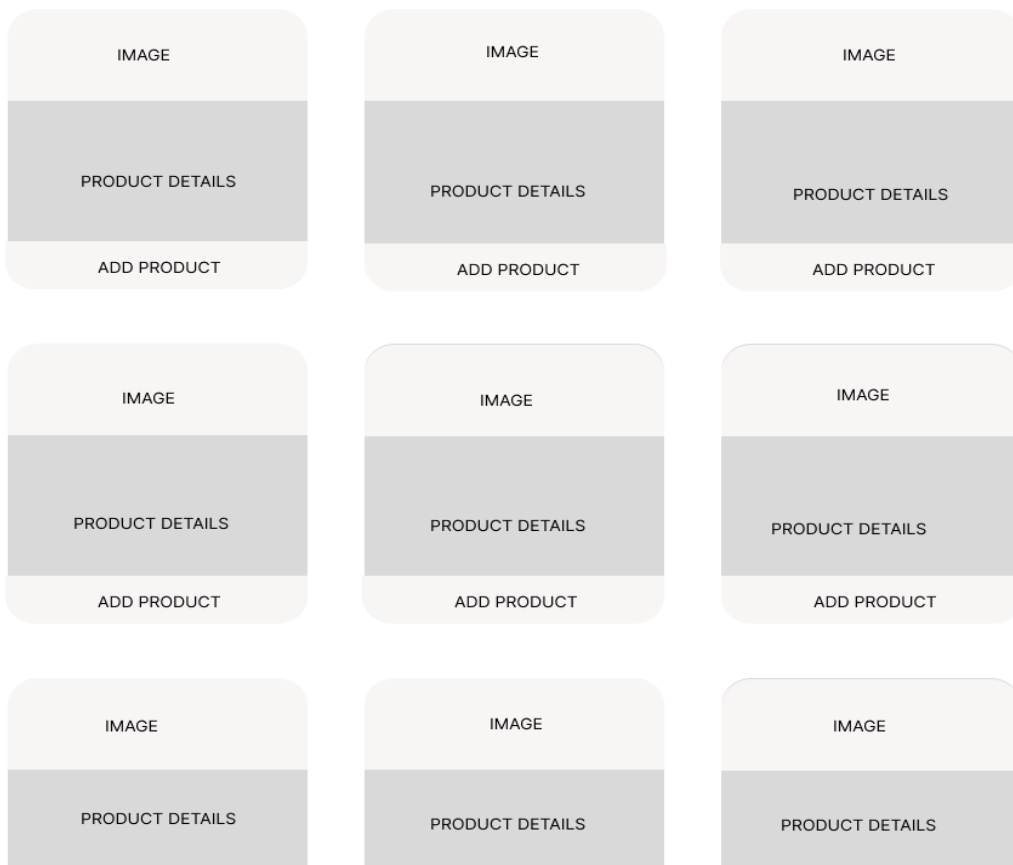


Figure 15 Homepage mockup

## **5.8. Chapter summary**

The proposed system will comprise of three users; customer, dermatologist and administrator. The administrator who will manage the data and the responsible for adding and deletion of product. Customer who will be able to book appointment and purchase products and a dermatologist who will post the days he is available and view his appointments. Functional requirements include users being able to login into the system and non-functional include having a secure system

## CHAPTER 6: IMPLEMENTATION SYSTEM AND TESTING

### 6.1. Chapter Introduction

This chapter will be about how the physical system will be built, ensuring that the information system is operational and used.

### 6.2. System screenshots

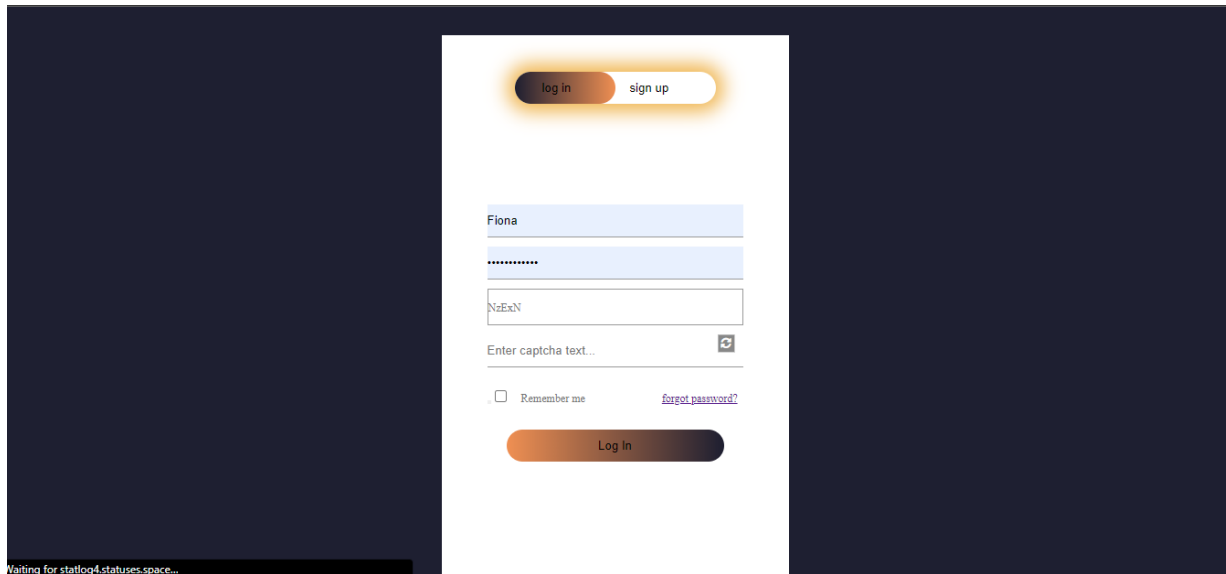


Figure 16 Login page screen

HEAVENLY SKIN				HOME	SKIN TYPES ▾	APPOINTMENT	CART (0)	LOGOUT
Book appointment								
Doctor Name	Date Availabe	Time Available	Book appointment					
Dr. prudence	2022-05-14	11:00 - 12:00	Book appointment					
Dr. prudence	2022-05-14	15:00 - 16:00	Book appointment					
Dr. prudence	2022-05-15	15:00 - 16:00	Book appointment					
Dr. Queen	2022-05-25	12:00 - 14:00	Book appointment					
Dr. Queen	2022-05-25	11:00 - 12:00	Book appointment					
Dr. Queen	2022-05-26	12:00 - 14:00	Book appointment					
Dr. Queen	2022-05-26	15:00 - 16:00	Book appointment					
Dr. joseph	2022-06-07	12:00 - 14:00	Book appointment					

Figure 17 Booking appointment screen

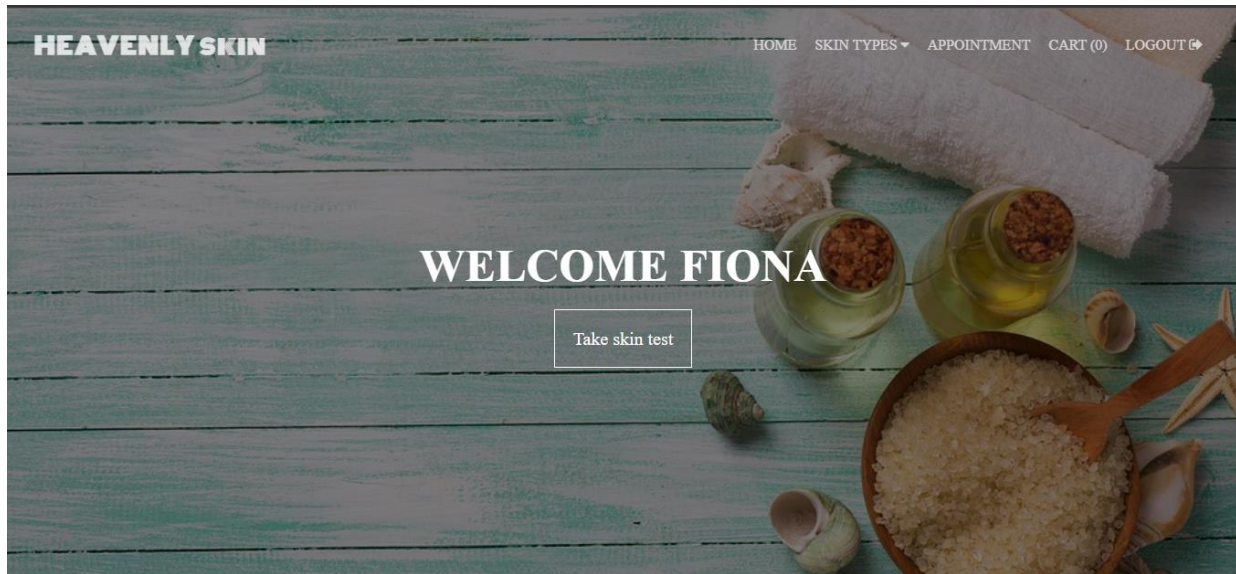


Figure 18 Home page screen

HEAVENLYSKIN

- dashboard
- appointments
- users
- customers
- orders
- Add Products
- Product Report
- skin management
- logout

58

appointments

59

users

4

dermatologists

Appointment report

select day

select month

select year

status

select doctor

filter

reset

Annual report

Print

First Name	Last Name	Phone Number	Email	doctor name	date	time	status	Actions
Fiona	Kasyoka	728657560	fiona@gmail.com	joseph	18/12/2018	12.00noon	seen	<a href="#">Edit</a>
jenney	dee	797786549	jenney@gmail.com	joseph	18/12/2018	12:00	seen	<a href="#">Edit</a>
asher	mia	796453627	asher@gmail.com	joseph	19/12/2018	12:00	seen	<a href="#">Edit</a>
wester	lamb	787456783	wester@gmail.com	joseph	20/12/2018	14:00	seen	<a href="#">Edit</a>
sam	oppa	76545351	sam@gmail.com	joseph	21/12/2018	14:00	seen	<a href="#">Edit</a>
Amiee	lamb	707456702	Amiee@gmail.com	joseph	22/12/2018	12:00	seen	<a href="#">Edit</a>

Figure 19 Appointment report page

## 6.3. Testing plan

### 6.3.1 Scope

The things that will be tested will be to:

- Test if the user is able to successfully login
- Test whether all the forms are validated
- Test whether the user can successfully sign up
- Test whether the user can be able to take a skin test
- Test whether the user can be able to book an appointment
- Test whether the user can be able to make a product order

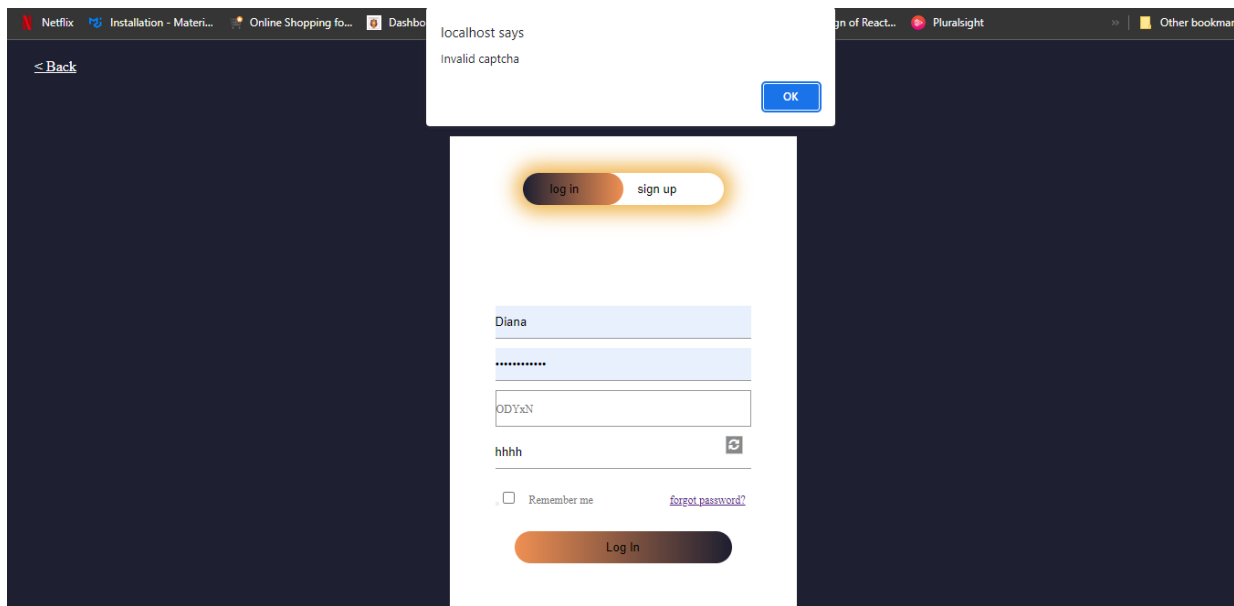


Figure 20 checks whether the captcha is correct and prevents logging in if it is incorrect

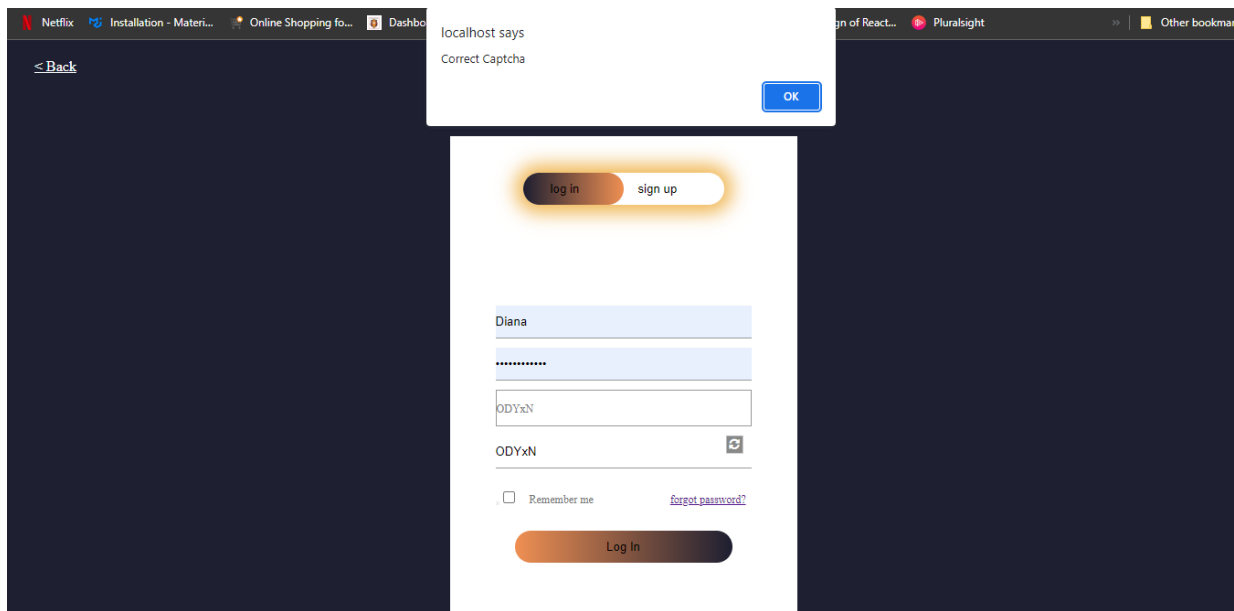


Figure 21 Correct captcha allows user to login

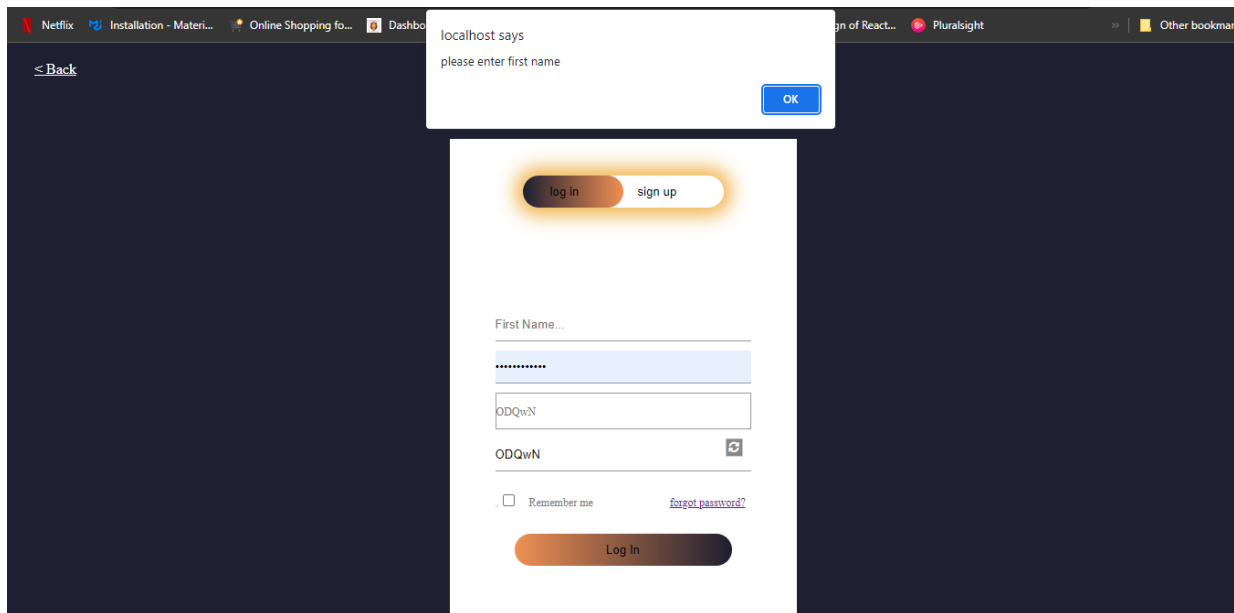


Figure 22 checks for form validation



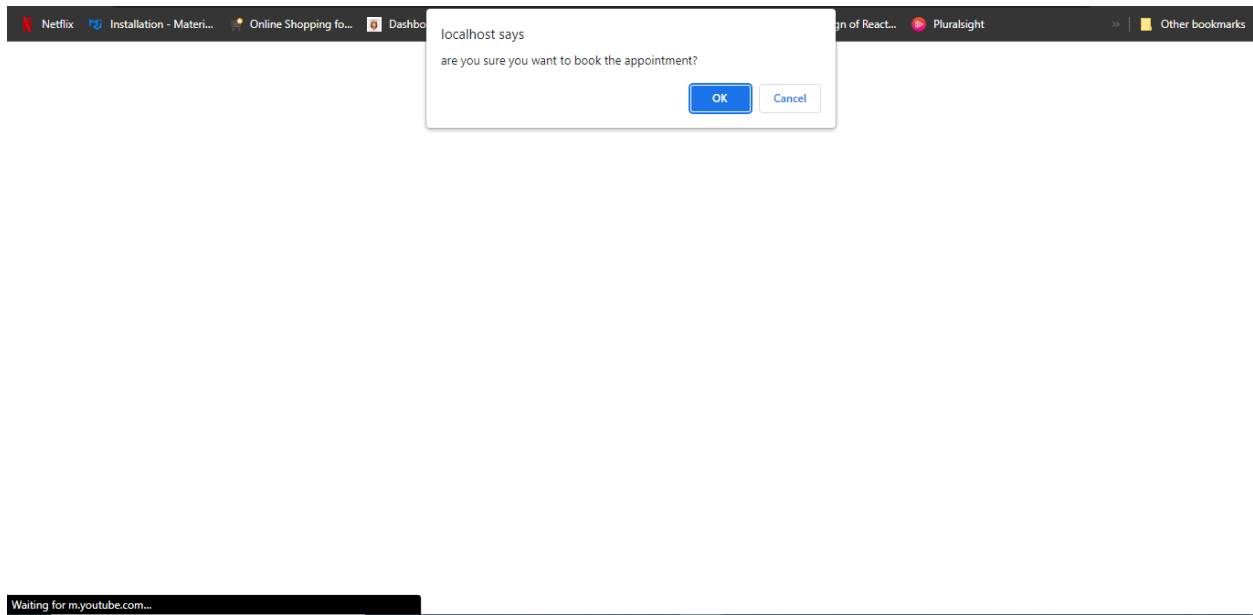


Figure 23 Successful booking of appointment

## 6.4. Evaluation plan

The purpose of evaluation plan is to collect information about program activities and objectives, monitor progress and to report and communicate results to stakeholders and community.

## 6.5. Chapter summary

This chapter has covered how the system was implemented and screenshots of the system functionality were also provided. Some of the functionalities were the user being able to successfully login into the system.

## **CHAPTER 7: CONCLUSIONS, FINDINGS & RECOMMENDATIONS**

### **7.1. Introduction**

This aim of this project was to research and find a way to implement skincare management system through technology and make it easier for the users to purchase products as well as educate them on importance of taking care of the skin.

### **7.2. Challenges Encountered**

The challenges encountered during this project period include:

- Inability to do interviews due to the Covid-19 pandemic
- Debugging errors involved with the system
- Using programming languages that had neglected and re-learning them

### **7.3. Future recommendations**

For the future, I would recommend a system that tracks the users progress on their skin from using the products recommended in the system.

### **7.4. Conclusion**

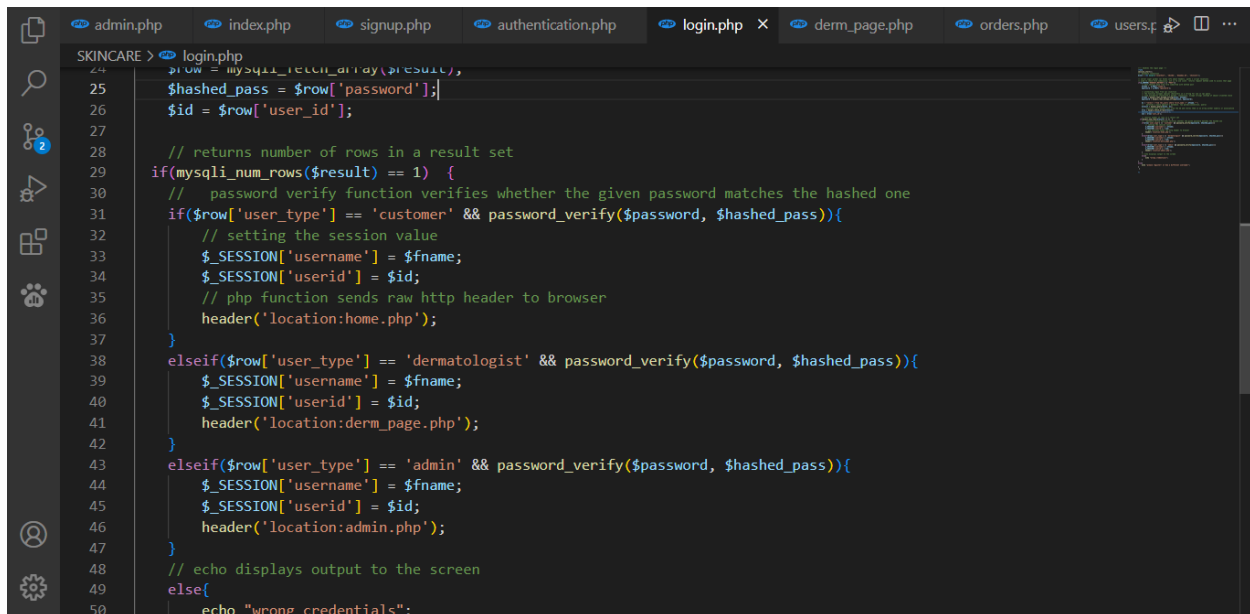
In conclusion, skincare management system is a good solution for the users trying to find the products that will be safe for their skin. The system provides a way to not only recommend the best products but to also help them understand the type of skin they have and the products that will be safe for their skin.

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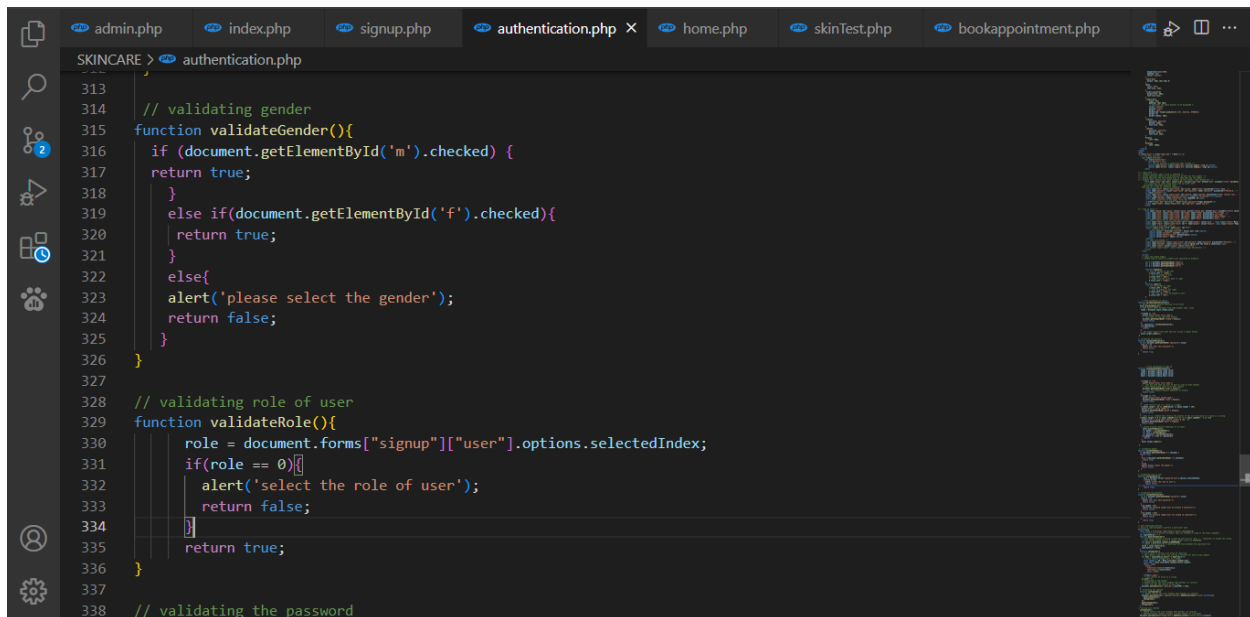
## APPENDIX

### Sample code



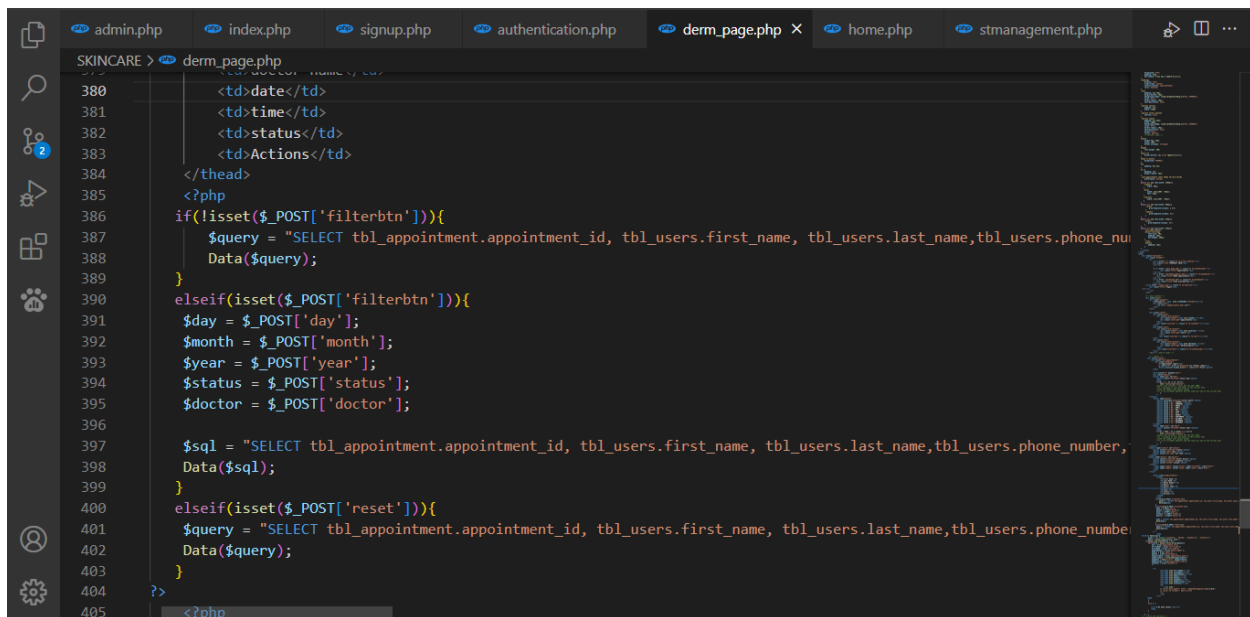
```
SKINCARE > login.php
24 $row = mysqli_fetch_array($result);
25 $hashed_pass = $row['password'];
26 $id = $row['user_id'];
27
28 // returns number of rows in a result set
29 if(mysqli_num_rows($result) == 1) {
30     // password verify function verifies whether the given password matches the hashed one
31     if($row['user_type'] == 'customer' && password_verify($password, $hashed_pass)){
32         // setting the session value
33         $_SESSION['username'] = $fname;
34         $_SESSION['userid'] = $id;
35         // php function sends raw http header to browser
36         header('location:home.php');
37     }
38     elseif($row['user_type'] == 'dermatologist' && password_verify($password, $hashed_pass)){
39         $_SESSION['username'] = $fname;
40         $_SESSION['userid'] = $id;
41         header('location:derm_page.php');
42     }
43     elseif($row['user_type'] == 'admin' && password_verify($password, $hashed_pass)){
44         $_SESSION['username'] = $fname;
45         $_SESSION['userid'] = $id;
46         header('location:admin.php');
47     }
48     // echo displays output to the screen
49     else{
50         echo "wrong credentials";
```

Figure 24 Login sample code



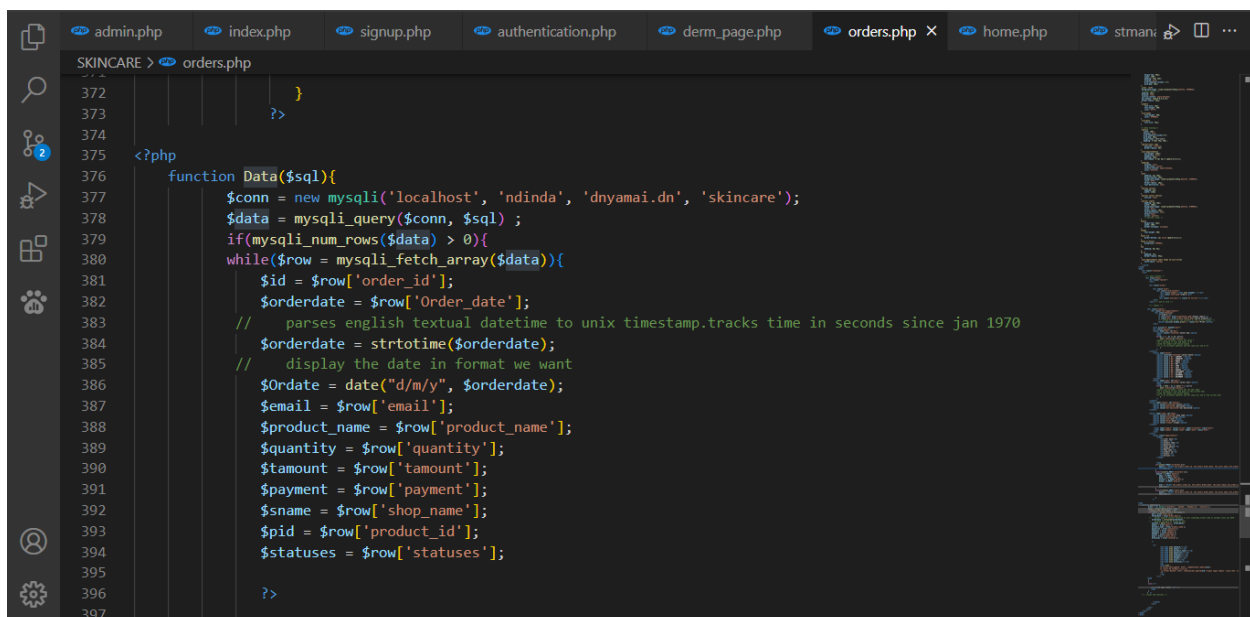
```
SKINCARE > authentication.php
313
314 // validating gender
315 function validateGender(){
316     if (document.getElementById('m').checked) {
317         return true;
318     }
319     else if(document.getElementById('f').checked){
320         return true;
321     }
322     else{
323         alert('please select the gender');
324         return false;
325     }
326 }
327
328 // validating role of user
329 function validateRole(){
330     role = document.forms["signup"]["user"].options.selectedIndex;
331     if(role == 0){
332         alert('select the role of user');
333         return false;
334     }
335     return true;
336 }
337
338 // validating the password
```

Figure 25 signup validation sample code

A screenshot of a code editor with a dark theme. The top tab bar shows several files: admin.php, index.php, signup.php, authentication.php, derm\_page.php (active), home.php, and stmanagement.php. The main editor area displays PHP code for derm\_page.php, with line numbers 380 through 405 visible. The code includes HTML table tags for date, time, status, and actions, followed by PHP logic for filtering and displaying appointment data from a database. The code uses \$\_POST to handle filter and reset buttons, and SQL queries to fetch data from tbl\_appointment and tbl\_users tables.

```
380         <td>date</td>
381         <td>time</td>
382         <td>status</td>
383         <td>Actions</td>
384     </thead>
385     <?php
386     if(isset($_POST['filterbtn'])){
387         $query = "SELECT tbl_appointment.appointment_id, tbl_users.first_name, tbl_users.last_name,tbl_users.phone_nu
388         Data($query);
389     }
390     elseif(isset($_POST['filterbtn'])){
391         $day = $_POST['day'];
392         $month = $_POST['month'];
393         $year = $_POST['year'];
394         $status = $_POST['status'];
395         $doctor = $_POST['doctor'];
396
397         $sql = "SELECT tbl_appointment.appointment_id, tbl_users.first_name, tbl_users.last_name,tbl_users.phone_number,
398         Data($sql);
399     }
400     elseif(isset($_POST['reset'])){
401         $query = "SELECT tbl_appointment.appointment_id, tbl_users.first_name, tbl_users.last_name,tbl_users.phone_nu
402         Data($query);
403     }
404     ?>
405     <?php
```

Figure 26 Appointments report sample code

A screenshot of a code editor with a dark theme. The top tab bar shows several files: admin.php, index.php, signup.php, authentication.php, derm\_page.php, orders.php (active), home.php, and stman. The main editor area displays PHP code for orders.php, with line numbers 372 through 397 visible. The code includes a function Data(\$sql) that connects to a MySQL database, queries for orders, and processes the results, including parsing dates and extracting various order details like product name, quantity, and payment.

```
372     }
373     ?>
374
375     <?php
376     function Data($sql){
377         $conn = new mysqli('localhost', 'ndinda', 'dnyamai.dn', 'skincare');
378         $data = mysqli_query($conn, $sql) ;
379         if(mysqli_num_rows($data) > 0){
380             while($row = mysqli_fetch_array($data)){
381                 $id = $row['order_id'];
382                 $orderdate = $row['Order_date'];
383                 // parses english textual datetime to unix timestamp.tracks time in seconds since jan 1970
384                 $orderdate = strtotime($orderdate);
385                 // display the date in format we want
386                 $Odate = date("d/m/y", $orderdate);
387                 $email = $row['email'];
388                 $product_name = $row['product_name'];
389                 $quantity = $row['quantity'];
390                 $tamount = $row['tamount'];
391                 $payment = $row['payment'];
392                 $sname = $row['shop_name'];
393                 $pid = $row['product_id'];
394                 $statutes = $row['statutes'];
395
396             }
397         }
398     }
```

Figure 27 Orders report sample code

### **Sample Questionnaire**

1. Do you know what type of skin you have?
2. What skincare products do you use for your skin?
3. Do you have sensitive skin or skin condition you may have?
4. If you have had any skin treatment, were you satisfied with the results? If no, why were you dissatisfied?
5. Have you experienced any allergic reaction to skin products? If yes, which product did you use?