DENTAL CLINIC APPOINTMENT SYSTEM (DCAS)

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This report is submitted in partial fulfillment of the requirements for the Bachelor of [Computer Science (Software Development)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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DECLARATION

I hereby declare that this project report entitled

[DENTAL CLINIC APPOINTMENT SYSTEM]

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : *Nurul Aishah* Date : 10/9/2021
(NURUL AISHAH BINTI ROSLI)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of [Computer Science (Software Development)] with Honours.

SUPERVISOR : _____ Date : 12/9/21
([TS DR LIZAWATI SALAHUDIN])

DEDICATION

I respectfully dedicate my effort to my loving parents, who have been a source of inspiration and strength when I was on the verge of giving up, and who continue to support me morally, spiritually, emotionally, and financially. Also, to my dear friends and classmates who have offered me words of support and guidance in order to complete the development of this system and reporting documentation. Finally, I dedicate my project to Almighty God, thanking him for his direction, strength, mental power, protection, and talents, as well as for providing me with a healthy life that enabled me to complete this final year project.

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First and foremost, I'd want to use this occasion to convey my heartfelt gratitude to my supervisor, Ts. Dr.Lizawati Salahudin, for assisting me in successfully completing this research. Her invaluable advice and recommendations were beneficial to me at various stages of the project's completion. In this sense, I shall always be grateful to her. In addition, I'd want to express my gratitude to my devoted parents, who have provided me with encouragement and inspiration during the execution of this project. I am also wanting to express my gratitude to my friends and responders that assisted me with the user approval questionnaire survey. As a result, I would not have been able to finish my job without their help. Thanks to all of their encouragement and support, I've been able to stay strong and positive while completing this Dental Clinic Appointment System (DCAS).

ABSTRACT

This system is developed for the purpose of to make it easier for patient to book an online dental appointment. People are usually rushed and preoccupied with their daily activities, resulting in them having no time to attend to the dentist clinic for a dental visit and missing the appointment date. In addition, the system will make it easier for the staff to manage all the patient's appointment and information. The searching process for the patient's appointment record and invoice to the staff in the dental clinic office can be accelerate. Meanwhile, the data for the patient details, appointment, treatment for the clinic management can be more manageable. All of the study and analysis is being done to ensure that the system's goal can be met. Next, the project designs are being make in illustration form before proceeding to system development. Next, for system development, the language and database that are used is Hypertext Makrup Language (HTML), Hypertext Preprocessor (PHP), JavaScript, Cascading Style Sheets (CSS), Jquery, and PHP MyAdmin. The expected outcome is a web-based system named Dental Clinic Appointment System (DCAS) that enable the patient to book an online dental appointment by allowing them freely choosing the availabe time slot that shown in the system.

ABSTRAK

Sistem ini dibangunkan untuk memudahkan pesakit membuat janji temu doktor dalam talian. Orang biasanya terburu-buru dan sibuk dengan aktiviti harian mereka, menyebabkan mereka tidak mempunyai masa untuk pergi ke klinik pergigian untuk lawatan ke pergigian dan tidak mempunyai tarikh temu janji. Di samping itu, sistem ini akan memudahkan kakitangan menguruskan semua janji temu dan maklumat pesakit. Proses mencari rekod temu janji pesakit dan invois kepada kakitangan di pejabat klinik pergigian dapat dipercepat. Sementara itu, data untuk maklumat pesakit, janji temu, rawatan untuk pengurusan klinik dapat diuruskan dengan lebih baik. Semua kajian dan analisis sedang dilakukan untuk memastikan bahawa matlamat sistem dapat dicapai. Seterusnya, reka bentuk projek dibuat dalam bentuk ilustrasi sebelum meneruskan pengembangan sistem. Seterusnya, untuk pengembangan sistem, bahasa dan pangkalan data yang digunakan adalah Hypertext Makrup Language (HTML), Hypertext Preprocessor (PHP), JavaScript, Cascading Style Sheets (CSS), Jquery, dan PHP MyAdmin. Hasil yang diharapkan adalah sistem berasaskan web bernama Dental Clinic Appointment System (DCAS) yang membolehkan pesakit membuat janji temu dengan doktor gigi dalam talian dengan membiarkan mereka bebas memilih slot waktu yang ada yang ditunjukkan dalam sistem.

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LIST OF ABBREVIATIONS

FYP	**-**	**Final Year Project**
DCAS	**-**	**Dental Clinic Appointment System**
HLWE	**-**	**Hospital Lam Wah Ee**
UI	**-**	**User Interface**
ERD	**-**	**Entity Relationship Diagram**
TC	**-**	**Test Case**

LIST OF ATTACHMENTS

Chapter 1: INTRODUCTION

1.1 Project Background

A routine dental examination is recommended every six months for a healthy individual. A dental checkup can identify problems of which patients may be unaware. While the dental checkup is very important for patients of all ages, the importance of dental checkup is increased for anyone who has gum disease, braces, filings, or other dental restorations. These patients may have need to have a dental check up every three months. So, the patient must book an appointment with the dentist beforehand. According to the dentistry IQ website, a recent survey found that almost 66 percent of health systems in the United States would use a self-scheduling system by the end of 2019, and about 64 percent of consumers will choose online booking using digital tools. That's a significant number of people who would rather not speak to anyone and instead make their dentist appointments online at their leisure.

Dental Clinic Appointment System (DCAS) could help the patient to book an online dental appointment easily hence, they will not be bothered to rush to the clinic for appointment. The patient can just simply choose the date and the available time slot then submit the appointment to the system. Upon the approval from the clinic staff, the patient gets their appointment reminder after login into the system. Besides, the patient also receives an email for the appointment confirmation status in case they forgot to login to the system for appointment status checking.

1.2 Problem Statement

The DCAS was created in response to several issues that have been found with the old system, in which all dental appointment booking, and administration is done manually. People are usually rushed and preoccupied with their daily activities, resulting in them having no time to attend to the dentist clinic for a dental visit and missing the appointment date. The staff also has difficulty in searching the patient's appointment detail and invoice in the office that is time consuming because they must go through the office's shelf. Other than that, the staff also having problem in recording many patient's data manually in book which may lead to data missing, unmanageable file and unproductive work because the load of patient book record.

1.3 Objective

i) To design a solution to accelerate the searching process for the patient's appointment record and invoice to the staff in the dental clinic office.

ii) To develop a web-based online system to facilitate the patient to book the online dental appointment and get the appointment reminder by using the website notifier.

iii) To test the system to manage the data for the patient details, appointment, and treatment so the clinic management are more convenience.

1.4 Scope

1.4.1 User Scope

The public patient, staff, and administrator are the system's intended users. The users are grouped referring to their user role. So, there are three versions of page view based on the user hierarchy and its boundaries.

1) Patient
2) Staff
3) Administrator

1.4.2 Modules

1) User registration

- Register module enables the user to register their account as patient before they can get into the appointment booking on the system.

2) Login module

- Login module enables the registered user to enter their username and password into the required field in the provided form to login into system.

3) Appointment management

- The system allows the user to create, edit, and remove dental appointments.

4) Appointment reminder

- The registered patient from the system gets the appointment reminder after getting the confirmation approval from the staff. The event calendar that shown in the system at the patient page helps the patient to keep a track of their upcoming appointment.

5) Treatment management

- The system allows the administrator to create, edit, and remove treatment from the system.

6) Dentist management

- The system allows the administrator to create, edit, and remove dentist from the system.

7) Invoice generated

- The system generate invoice after the patient complete their appointment.

8) Appointment reporting

- The system generates automated reporting by retrieving the appointment data from the database. The system displays the generated report at administrator page which are the total of registered patient, the total of new, upcoming and the completion of appointment booking. The system also displays the yearly dental treatment billing graph at the staff page.

1.4.3 Functionality

The patient has to login for book an appointment, they must register first if they do not have an account. The patient must choose their preferred appointment date and choose the available time slot for that day. The staff is in charge for checking the patient's appointment request. After the patient making an appointment booking, the staff will update the appointment confirmation status. Then, the system notifies the user by showing them the upcoming appointment that had been confirmed by the staff at the system patient's dashboard. Another staff task is to create a bill after the patient's appointment complete. The invoice is generated automatically, so they can view the invoice for future references. Meanwhile the treatment and dentist data are managed by the administrator. They have the authorize to make changes by edit and delete the data for the treatment and dentist.

1.5 Project Significant

This DCAS system is a replacement for the inefficient and ineffective old approach procedure. This technology will replace the manual appointment booking and patient data recording processes. With this method, patients will no longer be concerned about not having enough time to schedule a dentist appointment since they will be forced to visit a dental clinic. This system makes it easier for patients to book an online appointment while considering their free time for the scheduling. Meanwhile, staff who have difficulty in manually searching the patient's appointment detail and invoice in the office can ease up. This is because, the system helps the staff in the process of patient's appointment and invoice searching. Other than that, unforeseen issue such as data missing, unmanageable file and unproductive work can be avoid with this system build. This system also helps to facilitate the staff to manage patient's information, and dental health record efficiently.

1.6 Expected Output

This system will make the application form submission process easier by eliminating the need for patients to visit the dentist clinic merely to schedule an appointment. Patient can simply add their personal details and fill in booking appointment form and next submit it. Meanwhile, staff also can add patient's appointment in case several patients did not aware about the existence of this system. They can also create a bill much easier; they will just have to search for patient name at the list of appointment, insert doctor name, medicine, and the quantity if the dental prescribes any medicine to the patient.

1.7 Conclusion

As a conclusion to this chapter, DCAS may be utilized as a solution to inefficient manual dental appointments at clinics, as well as a fast-build and efficient approach to handle dental appointment issues. The next activity is to accomplish Chapter 2. Fact finding, project methodology, project requirements, and project timelines and milestones are all covered in Chapter 2. To finish this chapter, extensive research on the suggested title is required, including studies of related publications, research papers, and articles.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Based on a study of the existing dental clinic appointment business procedure, literature studies were conducted. The review focused on the theory and concepts that would be applied to the development of the online Dental Clinic Appointment System (DCAS). The purpose of a literature review is to present the research that has been done on the project issue, and it is significant since it demonstrates the project's goal.

This chapter covers all of the study conducted on the present and existing internet system. It also includes customer feedback on the features and capabilities. All of the current or previous system's flaws are being discovered. The present system's strengths are also being recognized and researched in order to include them into the creation of new system.

As the rules to be followed, the technique is divided into many phases. The project development needs, such as software and hardware, are established. This chapter will also include a summary of the project milestones from the beginning to the end. The milestones and Gantt chart serve as a guide to guarantee that the project is completed on time and according to plan.

2.2 Facts and Finding

The discovery of fact or accurate knowledge is known as fact and finding. This section discusses the timeline, analyses the current system, and determines the system's strengths and shortcomings. After all of the strengths and weaknesses have been identified, they will be applied to the system, and the system's failures and weaknesses will be addressed. This system start been developed by reviewing other past system that have the similarities with DCAS system that focusing on the dental appointment system for clinic.

The first article review on the article was found in BMC Health Service Research site. The title of the article is “Web-Based Medical Appointment Systems: a Systematic Review”. According to the article, medical appointment scheduling has been experiencing substantial improvements to promote active patient engagement from the beginning of most non-urgent health care services. Patients have greater flexibility and increased access by using the internet as a medium to decide on their preferences for appointments. Medical appointments are traditionally made over the phone or in person with schedulers. These techniques are backed up by vocal conversation with actual individuals and allow for maximum flexibility in difficult situations. The flexibility to induce a timely appointment is restricted not only by the availability of appointment times, but also by the availability of schedulers and phone lines, because these conventional techniques need the participation of schedulers. Patients' satisfaction with appointment scheduling is impacted by their ability to schedule appointments at the right time with the right health care providers.

Next, the second article's title is "An Insight into Management Practice." The internet has completely changed the way we communicate and interact. In their contacts, both patients and dentists have used electronic communication and social media. Various digital solutions can help enhance practice efficiency, save administrative expenses, and increase collaboration with other healthcare professionals. There is also a variety of dental practice management software available, such as Dentrix, Practo, and others, which have made practice administration more methodical and organized. Within practice management, the appointment system is critical, and it must be controlled well. In most cases, the system

keeps track of all planned patients as well as events for the dentist and staff. It is the focal point of the office and a critical factor in the practice's success or failure. A classic appointment book or software installed on the office computer can be utilized as the appointment management system. If anything changes during the day, the executive assistant should maintain track of the timetable.

As a conclusion, both articles are focus on the online appointment booking that giving the solution for the ineffectiveness of the traditional method. The first article highlights on freedom of patient to booking their appointment according to their preferences. While the second article is focusing on the appointment system that helps in improving the practice management.

2.2.1 Domain

The DCAS will be used at dental clinic by staff and administrator. Meanwhile, it is also a public system where the patient can access it for booking a dental appointment at dental clinic. Patients have traditionally booked dental appointments with their dentists over the phone or in person. These approaches are based on real-time verbal contact with actual individuals, and they provide the most flexibility in difficult situations. The DCAS is important because the system helping the patient for book dental appointment hence getting appointment reminder, help the staff and administrator to ease their work in data management for patient data, appointment, and billing.

Based on the first article, asynchronous and real-time Web-based appointment systems are the two modes that available. Appointments are sought in the asynchronous manner via emails or electronic forms on providers' websites, which are then manually handled by schedulers. So, this method is using asynchronous mode where all the appointment are being made online by user. Technically, this technique replicates the method of telephone-based appointment and real time scheduling whereby patient must make appointment personally by coming to the dental clinic.

Technically, the DCAS is a web-based system that operates in an extremely application programmed, which means that a single, responsive online application may be utilized on a variety of devices. Although web programmed must be tested on many browsers, they do not need to be tested on various OS systems. This simplifies development and testing. It lowers development expenses and speeds up the process.

2.2.2 Existing System

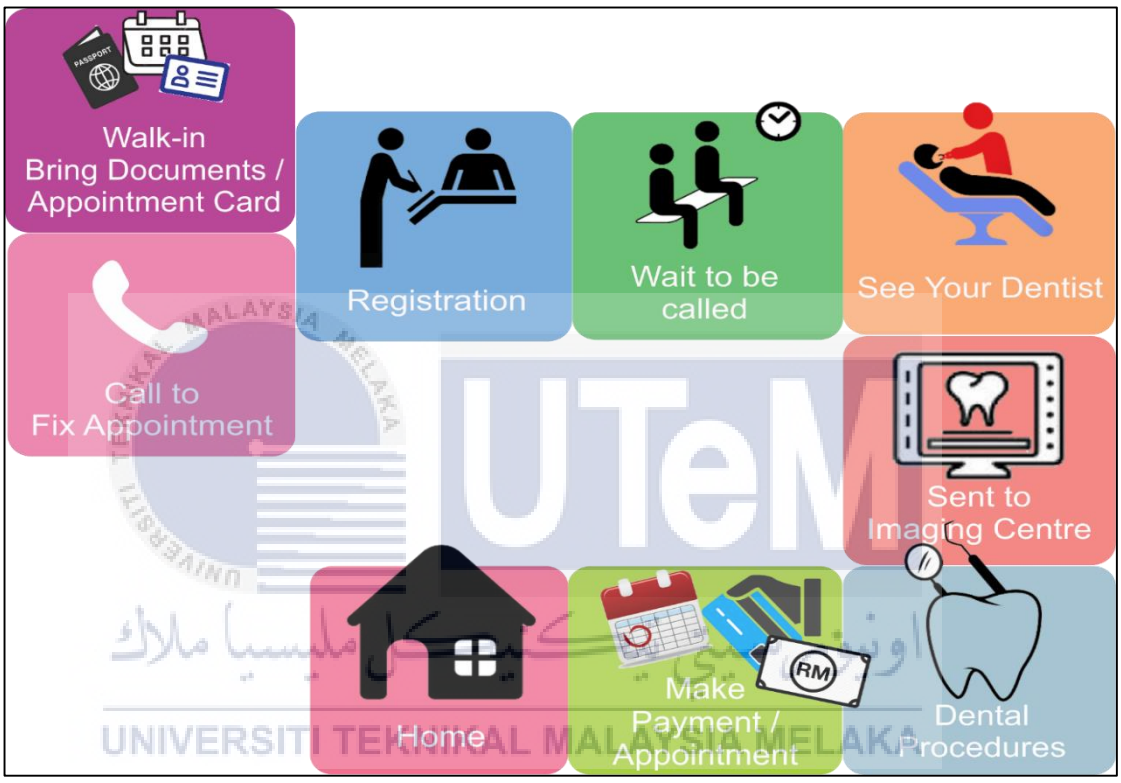

Figure 2.1: Roadmap Illustrator

Hospital Lam Wah Ee (HLWE) have many specialists that offers a variety of service which is also including the dental service. Although HLWE provide online booking appointment, unfortunately it is not included for the dental service. Hence, HLWE still using the traditional method for dental appointment.

Based on the ***Figure 2.1*** that is found in HLWE website, it shows that there is still dental hospital or clinic who use conventional system for dental appointment. The patient still must walk into the dental clinic and bring their documents or appointment card for registration and making an appointment. This is way consuming too much time for the patient where they must go to the dental clinic personally. Then, if there is any appointment to fix, they must make a phone call to the dental clinic office.

Unfortunately, this is only applied to registered patient because the phone call is only for any inquiries or fix their reserved appointment.

The conventional system does have lack of management in term of quality and standardization. This statement is found from this article that is written by Dr. Ehab Heikal (2008) in his article that is about the Management of the Dental Office. In his article, Lee & Johns (1993) said from the book title "The fundamentals of good medical care, 1993", defined the principles of quality medical care specifying that the aim of medical care is not only to improve the health of patients, but also to meet their expectations and satisfy them

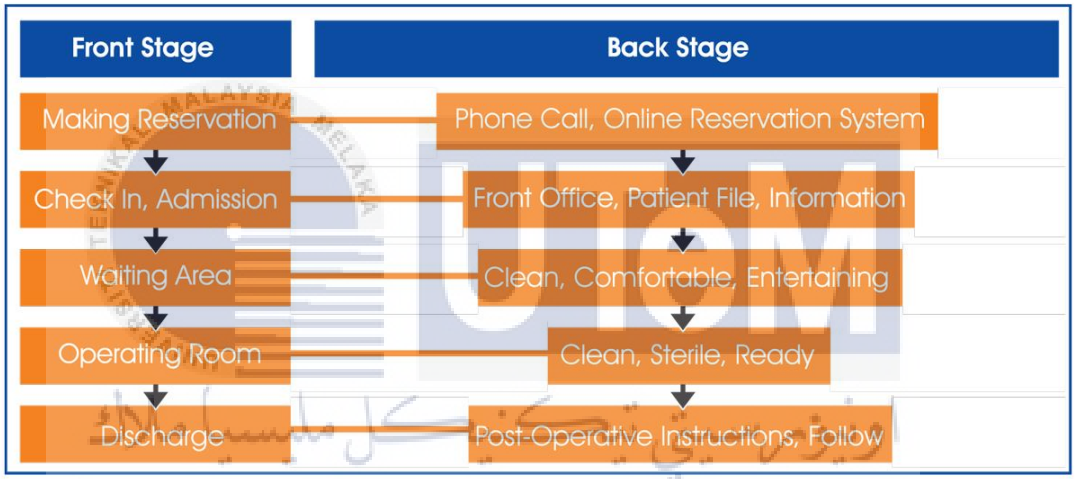

Figure 2.2: Perceived Quality Model

According to Figure 2.2 from the same article, there is a significant gap between each of the flows due to a lack of marketing research, ineffective upward communication (for example, front-line staff failing to report on patient comments, complaints, or information reaching the next level of management), and increased levels of management. There is no direct interaction between front-line employees and middle management because all information and reports must pass via them.

2.2.3 Technique

Fact-finding techniques are a process of collection of data and information based on techniques that contain a sampling of existing documents, research, observation, questionnaires, interviews, prototyping, and joint requirements planning. Collecting required facts are very important to apply tools in System Development Life Cycle because tools cannot be used efficiently and effectively without proper extracting from facts.

The fact-finding technique that used in DCAS is document review that already state on Chapter 2.2. The articles are being reviewed and examine to acquire information on the part enterprise associated with the problem. By examining the documents associated with the current system, some thoughtful concepts out of the system are gain quickly.

2.3 Project Methodology

The Software Development Life Cycle (SDLC) is a technique for producing high-quality software at the lowest feasible cost in the shortest amount of time. SDLC is a well-structured flow of stages that enables a company to swiftly generate high-quality software that has been thoroughly tested and is ready for production.

The Waterfall Model is being utilized in the development of this web based DCAS. There are several reasons for using the waterfall approach to create the DCAS. Waterfall necessitates a great deal of planning and documentation up front. It's broken down into discrete phases or steps. Before anything else, the first stage is critical since it necessitates a complete grasp of the project's demands and scope by both developers and consumers. Determine the project's needs and scope, evaluate those requirements, design, build, test, launch, and lastly maintain the project. It is easy to comprehend and utilize.

Each step of a waterfall model must be finished before the next one can begin. The waterfall model, as shown in Figure 2.3, depicts a linear sequential flow in the software development process. This indicates that any step of the development process may start only after the preceding one has finished. The stages in this waterfall model do not overlap.

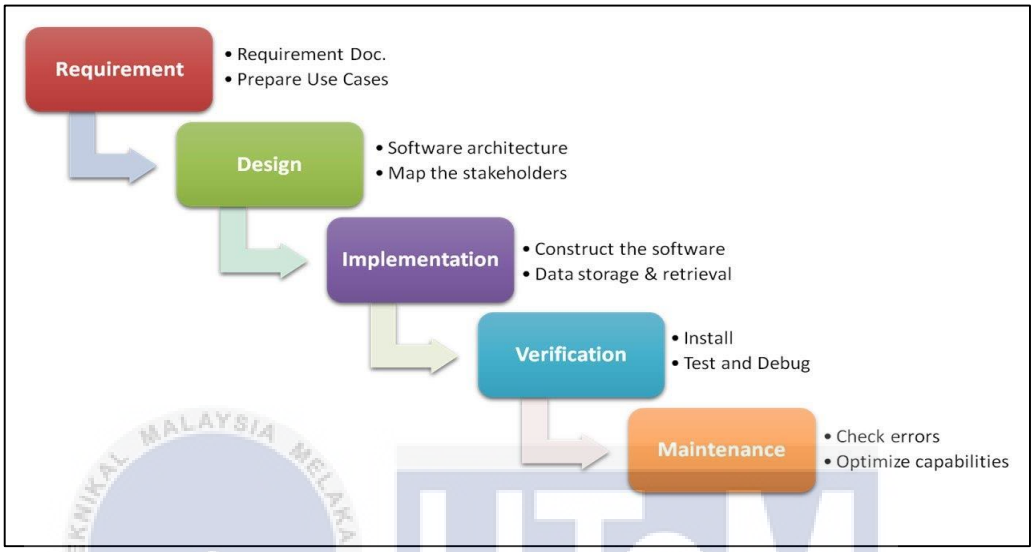

Figure 2.3: Waterfall Model

2.4 Project Requirement

2.4.1 Software Requirement

The software requirements for this web based DCAS are listed in Table 2.1.

Table 2.1 Software Requirement

Software name	Functionality
Sublime Text 3	Code editor for software development.
GitKraken	To push the coding on GitHub to use as backup in order to avoid loss data.
MySQL	Open-source relational database management system
Microsoft Office 2013 (Word, Excel)	Report documentation
Adobe Photoshop	Logo and others design

2.4.2 Hardware Requirement

The hardware requirements for this web based DCAS are listed in Table 2.1.

Table 2.2 Hardware Requirement

Hardware	Specification
Operating System	Windows 10
Processor	Intel Core i5
Installed memory (RAM)	6 GB
System type	64-bit Operating System

2.5 Project Schedule and Milestone

This project's project milestone was completed in around 13 weeks, including the progress report and presentation session. As a result, planning and system architecture, as well as database design and diagram, were completed within the time frame depicted in the Gantt chart.

2.5.1 Gantt Chart

Table 2.3 DCAS Gantt Chart

TASK	WEEK													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Proposal														
Project Introduction														
Literature Review and Project Methodology														
Project Analysis														
Project Design														
Project Implementation														
Project Final Demo														

2.5.2 Milestone

The project starts at 15/3/2021 and there are milestones that need to be completed before the due date.

Table 2.4 DCAS Milestone

No	Milestone	Start date	Due Date
1	Project proposal submission	15/3/2021	22/3/2021
2	Project introduction documentation	29/3/2021	5/4/2021
3	Project development	23/3/2021	22/6/2021
4	Literature review and project methodology documentation	6/4/2021	12/4/2021
5	Project analysis documentation	19/4/2021	3/5/2021
6	Project design documentation	10/5/2021	24/5/2021
7	Project implementation documentation	31/5/2021	7/6/2021
8	Final project demo	23/6/2021	23/6/2021

2.6 Conclusion

As for the conclusion of this chapter, a significant amount of time and effort will be required to do research on the recommended topic, including a review of related publications and research reports. The articles research of dental appointment had been made in literature review and the methodology. All the articles that found are being research in the facts and finding. Those articles have some similarities on the benefit of online scheduling or appointment to the patient that can replicate the traditional manual appointment. The Waterfall Model is then utilized in the development of this web based DCAS since it just requires a lot of structure and documentation up front. This project took around 13 weeks to complete, including the progress report and presentation session, according to the project timeline and milestones. The next activity is to finish Chapter 3. Chapter 3 includes an examination of the problem, data collection, a list of functional and non-functional requirements, and a brief explanation of the remaining requirements.

CHAPTER 3: ANALYSIS

3.1 Introduction

The project lifecycle begins with the analysis phase. The high-level Project Charter's deliverables are broken down into more precise market requirements during the Analysis Phase. The Analysis Phase is also when the project's overall trajectory is defined by generating project strategy papers.

In most situations, gathering specifications requires more than merely informing users of their needs and recording their replies. Depending on the complexity of the application, the technique for gathering specifications has its own well-defined procedure. This method consists of a series of repeatable steps for gathering, documenting, communicating, and managing requirements.

3.2 Problem Analysis

The concept for the DCAS came from several issues that were listed in the problem description at Chapter 1.2. Based on the current existed system in Chapter 2.2.2, HLWE still stick to the manual method for dental online appointment. The figure 3.1 that is about the flowchart of the existed system in HLWE below shows the flow of the patient who must go to the HLWE for dental appointment that is refer to figure 1 that is the roadmap illustrated for the existed system.

The first problem that the manual system must encounter is the patient must go through many procedures by coming to the hospital just to make a dental appointment. The patient who are busy especially with their works are tend for having no time to come to the hospital to make a dental appointment. Next, with a growing number of patients, it is indeed giving the difficulty to the staff in searching the patient's

appointment detail and invoice in the office. The staff to go through the office shelf searching for the countless data record. Due to that, it is time consuming for the staff who struggling over patient file searching. Another issue is there is a problem in recording many patient's data manually in the file record. Other than the unproductive file management in the manual system, it is also lead to data loss due to the load of patient book record.

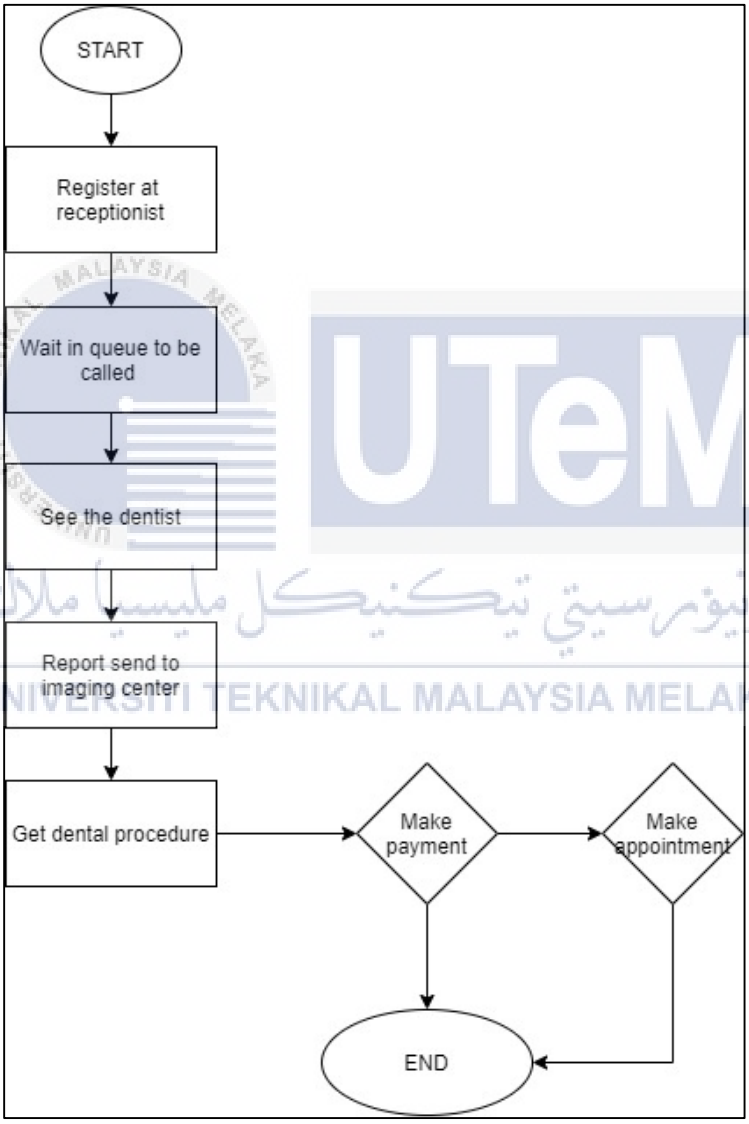

Figure 3.1: Existed System in HLWE Flowchart

3.3 Requirement Analysis

3.3.1 Data Requirement

Table 3.2 Table Admin

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
admin_ID *(Primary)*	int(5)	No				
username	varchar(20)	No				
password	varchar(20)	No				

Table 3.1 shows all the data requirement for the admin. The data that are needed in the admin are ID, username, and password.

Table 3.1 Table Patient

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
patient_ID *(Primary)*	int(3)	No				
username	varchar(20)	No				
password	varchar(60)	No				
fullname	varchar(100)	No				
IC	varchar(20)	No				
gender	varchar(10)	No				
DOB	date	Yes	*NULL*			
phoneNo	varchar(20)	No				
email	varchar(50)	No				
address	varchar(100)	No				

Table 3.2 shows all the data requirement for the patient. The data that are needed in the patient are patient_ID, username, password, fullname, IC, gender, date of birth, phone number, email, and address.

Table 3.3 Table Staff

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
staff_ID *(Primary)*	int(5)	No				
username	varchar(20)	No				
password	varchar(20)	No				

Table 3.3 shows all the data requirement for the staff. The data that are needed in the staff are staff ID, username, and password.

Table 3.4 Table Treatment

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
treatment_ID *(Primary)*	int(11)	No				
treatment_name	varchar(100)	No				
fees	float	No				

Table 3.4 shows all the data requirement for the treatment. The data that are needed in the the treatments are treatment ID, treatment name and fees.

Table 3.5 Table Appointment

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
app_ID *(Primary)*	int(11)	No				
patient_ID	int(3)	No		patient -> patient_ID		
treatment_ID	int(11)	No		treatment -> treatment_ID		
date	date	No				
time	varchar(20)	No				
status	int(11)	No	1			
rating	varchar(10)	No				
feedback	varchar(500)	No				

Table 3.5 shows all the data requirement for the appointment. The data that are needed in the appointment are appointment ID, patient ID which is foreign key from patient table, treatment ID which is foreign key from treatment, date, time and status for the appointment approval by staff.

Table 3.6 Table Dentist

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
dentist_ID *(Primary)*	int(11)	No				
dr_name	varchar(50)	No				
IC	varchar(20)	No				
phoneNo	varchar(20)	No				
email	varchar(50)	No				
address	varchar(100)	No				

Table 3.6 shows all the data requirement for the dentist. The data that are needed in the dentist are dentist ID, dentist name, IC number, phone number, email, and address.

Table 3.7 Table Bill

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
bill_ID *(Primary)*	int(11)	No				
app_ID	int(11)	No		appointment -> app_ID		
dentist_ID	int(11)	No		dentist -> dentist_ID		
medicine	text	No				
price	float	No				
created_at	timestamp	No	current_timestamp()			

Table 3.7 shows all the data requirement for the bill. The data that are needed in the bill are bill ID, appointment ID, which is foreign key from the appointment table, dentist ID which is foreign key from the dentist table, dentist name, medicine, price, and the time that bill is created.

3.3.2 Functional Requirement

A functional requirement provides a system function, where a system function is defined as a specification of behaviors between the actor's outputs and inputs. Figure 5 depicts how the system is recorded, computed, transformed, and transmitted data.

Table 3.8 Functional Requirement

FR ID	Requirement Statement
FR001	The system has three different roles that each of them have different page view, functionality, and permission. The system has limit access to authorized users.
FR002	The system allows the patient and staff to submit new appointment.
FR003	Only the staff has the right to accept appointment request from the patient.
FR004	The system allows the user to view the list of appointment.
FR005	The system validates the correct input data from the form field
FR006	The system provides input mask to ensure the user are entering correct input data.
FR007	The system only allows the administrator to edit and making change to the treatment and dentist data.
FR008	The system only allows the patient to change their information detail at the profile page.
FR009	The system only allows the staff to view and add billing to patient after patient complete their appointment.

The table 3.8 above shows the functional requirement of DCAS. That explains that some functionality which allows only by certain user based on the role.

3.3.2.1 Use Case View

A use case is a sequence of events that identifies the interactions that occur between the actor and the system to achieve a goal. The diagram below depicts a global view of the use case model, which includes all of the use cases utilized in the DCAS.

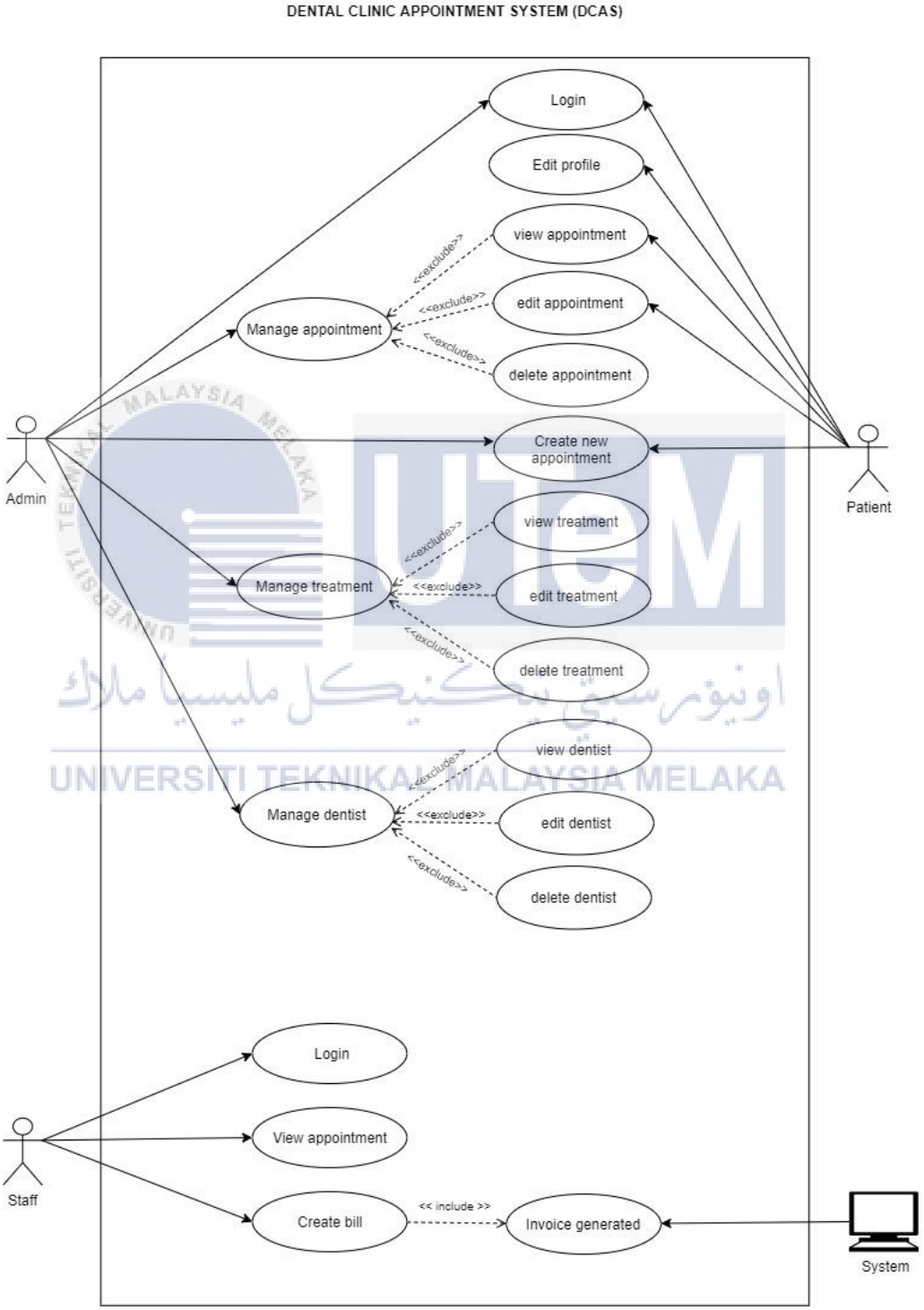

Figure 3.2: Use Case for DCAS

The DCAS use case diagram is shown in Figure 3.2. All the appointment can be managed by admin. When the patients add new appointment, only the staff who have the authority to approve the appointment and make any changes. The staff can create the bill after the completion of dental appointment. They can just simply field the form that provided in the bill page and then the system calculates the bill to generate the invoice automatically. All the bill data also stored in the database and the successful created invoices are displayed at the staff page for future references. The dentist and treatment that been added by admin store into the database and then shown in the appointment and bill page.

3.3.3 Non-functional Requirement

A non-functional requirement is one that defines criteria rather than behaviors that may be used to assess the performance of a system. Functional requirements, on the other hand, specify precise behaviors or functions.

Table 3.9 Non-functional Requirement

NFR ID	Requirement	Description
NFR001	Accessibility	The system is able to adapt to different mobile screen size and horizontal screen.
NFR002	Response Time (Database Update)	Respond time of updating database should be 10 seconds or less.
NFR003	Security	The system ensures the data is protected from unauthorized access.

The table 3.9 shows the non-functional requirement for DCAS. The DCAS is accessible which is convenience to use in any device, the respond time is faster and the security that ensure that DCAS is protected against unauthorized access.

3.3.4 Others Requirement

Sublime Text 3 is one of the software developments tools that was utilized throughout the software development. It's a cross-platform code editor that's recognized for its speed, ease of use, and active community. It's a fantastic editor right out of the box, but the real strength comes from the ability to extend its capabilities with Package Control and custom settings The MySQL database platform was also utilized by the DCAS system since it is more dependable for storing more data, can support huge databases of 50 million rows or more, and is compatible with most operating systems. Furthermore, Adobe Photoshop CS6 is the software utilized to develop and improve the online system's banner, as well as any pictures, graphics, and buttons that will be included in the system.

Hardware plays a vital part in the development of this system in order for it to function smoothly and efficiently. Thus, the computer is required to operate the system and serve as the database storage, as well as an external hard drive for backup and a printer to print all of the documentation required throughout the system's development. The minimum hardware required for this system is Windows 10 in 64-bit mode, which is the most recent version of the Windows operating system. Next, the processor is an Intel Core I5 with 6GB of RAM installed to ensure that the system can be created and operate properly.

3.4 Conclusion

As for the conclusion of this chapter, all the issue regarding the current existing system is being analyze. Doing the analysis for the system is important since the analysis phase is where the project lifecycle starts. The requirement analysis consists of the data requirement that shows the data dictionary from the database. The functional and non-functional requirement also have been listed and explained. Software and hardware that had been listed on the previous chapter is explained briefly on this chapter. Those are the minimum software and hardware requirement as for developing this system. The next activity is to finish Chapter 4. Chapter 4 is about the design that needed for the project before being developed. All the design that involves are shown in the next chapter.

CHAPTER 4: DESIGN

4.1 Introduction

The outcome of the preliminary design analysis and the detailed design result are defined in this chapter. Project design is the first step of a project, during which all aspects of the project are planned out. The goal is to come up with one or more designs that can be used to achieve the project's goals. This chapter consists of the high-level design which are system architecture that consist of static and dynamic view to the system and the user interface design that are show the input, navigation, and output design. Other than that, the conceptual and logical database design also being illustrated in this chapter.

4.2 High Level Design

The architecture that would be utilized to build a software product is described by high-level design (HLD). The architectural diagram depicts the overall system, indicating the major components and their interactions that will be built for the product. The HLD utilizes terminology that are likely nontechnical to moderately technical and should be intelligible to system administrators. Low-level design, on the other hand, exposes programmers to the logical precise design of each of these parts.

4.2.1 System Architecture

The structural design of a system is known as system architecture.

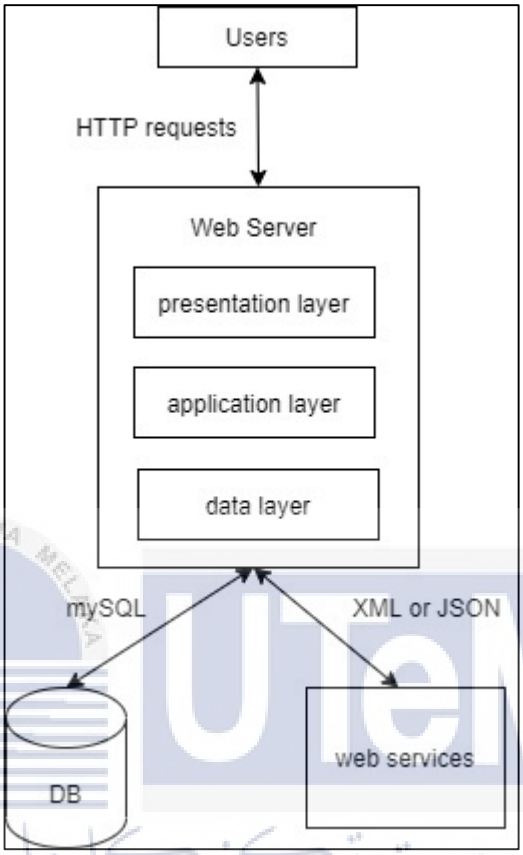

Figure 4.1: Architecture system of DCAS

DCAS's system architecture is represented in Figure 4.1. Using Java Server Pages, users send queries to the web server and receive replies (JSPs). The web server hosts the application's different levels, which are Model-View-Controller compliant (MVC). Users interact with the program via HTTP requests and responses presented in a browser at the presentation layer. The data layer manages the application's flow and business logic implementations in order to process requests from users and their answers in the application layer. The database's data layer manages domain data and offers persistence and retrieval capabilities. The database is where the data is saved and retrieved after that. In the meanwhile, the contact with other applications took place through web services.

4.2.1.1 Static View

Static view is rendered beforehand or the first time when a page is requested and stored somewhere in html file on disk or in Memcached (general-purpose distributed memory-caching system) instance which is each request receives this pre-rendered response. The static view, also known as the structural view, highlights the system's static structure through the use of objects, attributes, operations, and relationships..

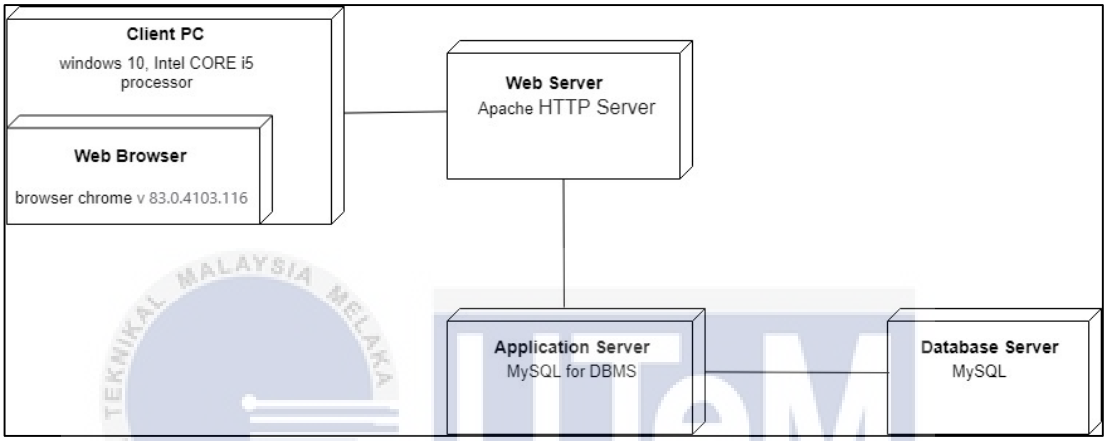

Figure 4.2: DCAS Deployment Diagram

The figure 4.2 shows the deployment diagram for DCAS. From the client pc then user used web browser as platform to run the DCAS. Then for web server it is use the Apache HTTP Server. All the data stored in the database server using MySQL.

4.2.1.2 Dynamic View

Dynamic view is the HTML output that is dynamically build up which is rendered on each request allowing the page to always show up to date information, The dynamic view, also known as the behavioral view, emphasizes the system's dynamic activity by displaying item collaborations and changes in their internal states. The sequence diagram is shown in this view.

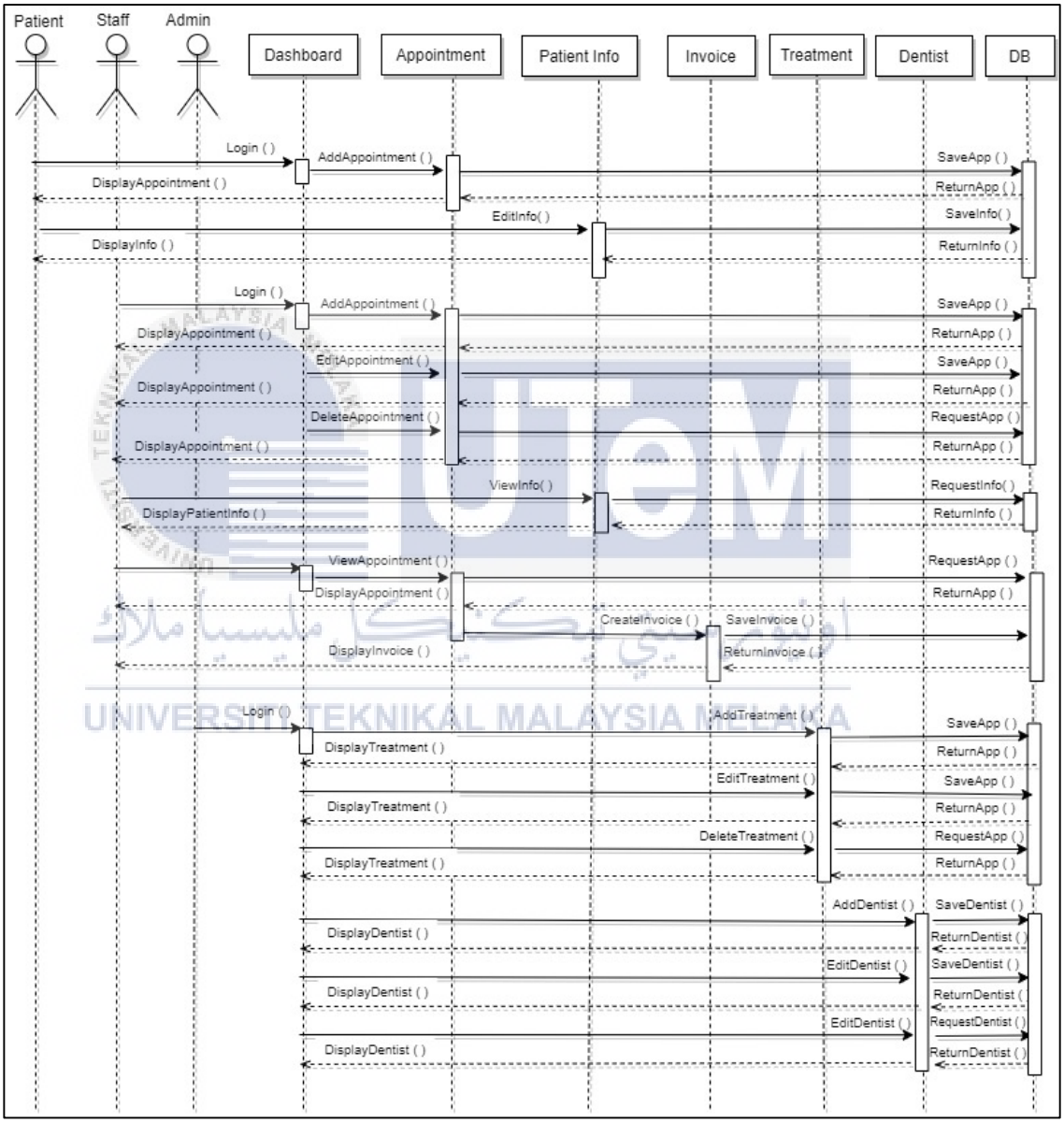

Figure 4.3: Sequence Diagram for DCAS

The sequence diagram for DCAS is shown in Figure 4.3. Basically, there are three actors for DCAS system which are patient, admin, and staff. All users have to login into DCAS before they can navigate to dashboard based on their role. The patient and staff can add new appointment but only the staff can make changes to the appointment. The patient's profile can be viewed by all of the users but can only be modified by the patient only. Admin can add and remove the treatment and dentist information record. Meanwhile, the billing invoice of the DCAS can only be manage by the staff.

4.2.2 User Interface Design

The process of designing user interfaces in software or electronic devices with an emphasis on appearance or style is known as user interface (UI) design. Designers strive to develop user interfaces that are simple to use and enjoyable to use. Graphic user interfaces and various types of user interface design are referred to as UI design.

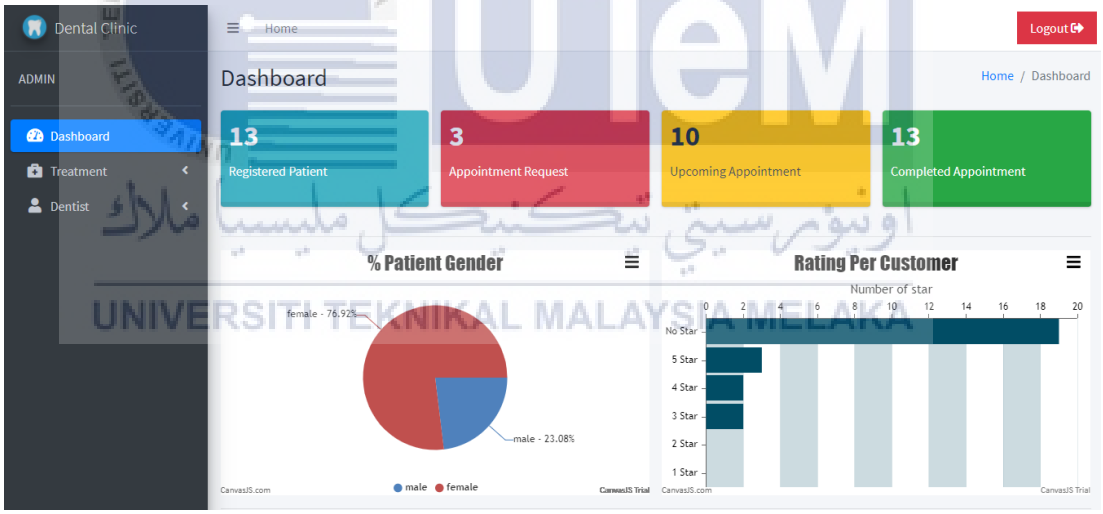

Figure 4.4: Admin Dashboard

The figure 4.4 shows the admin dashboard in DCAS. On the left side are the menu navigation.

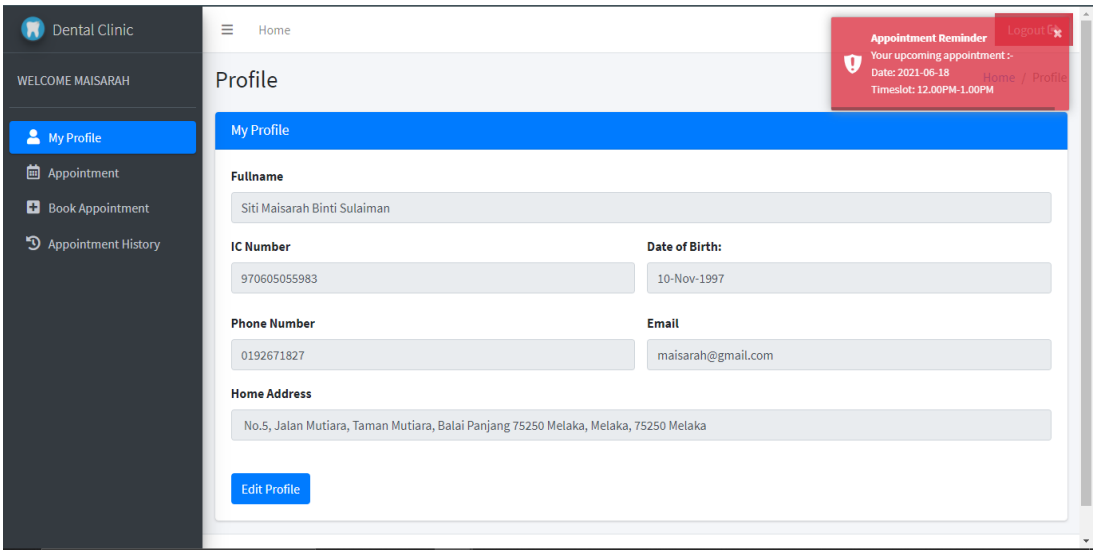

Figure 4.5: Patient Dashboard

The figure 4.5 shows the patient dashboard in DCAS. On the left side are the menu navigation.

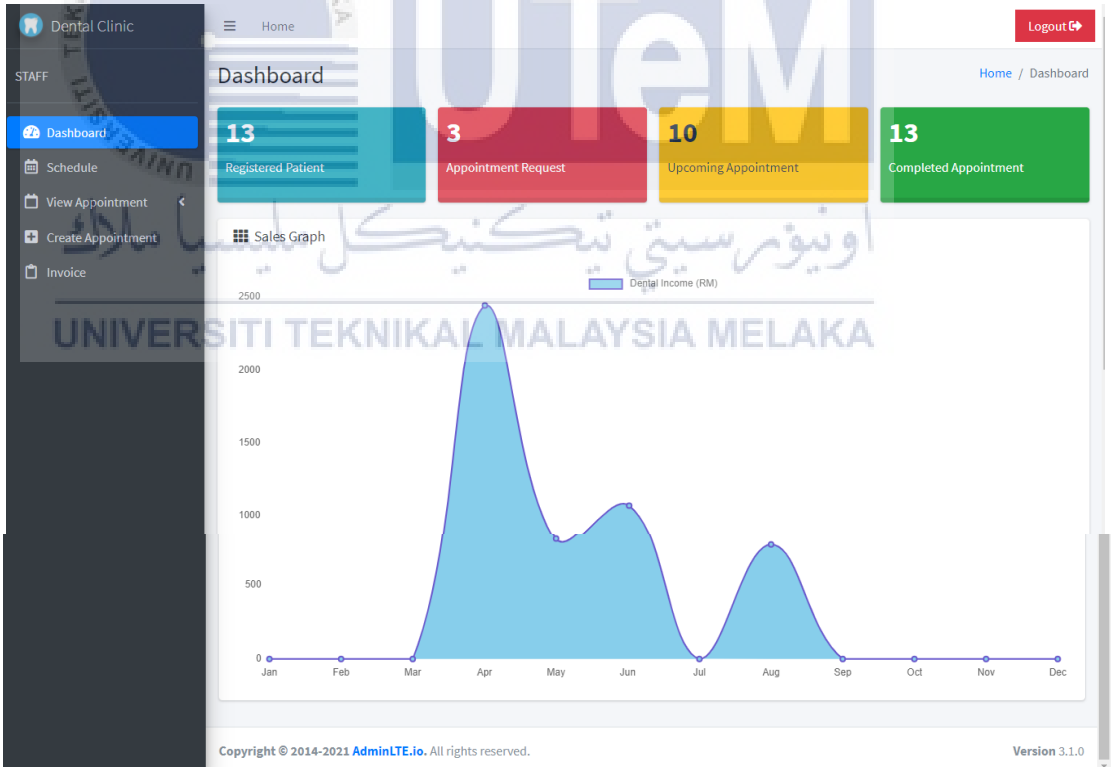

Figure 4.6: Staff Dashboard

The figure 4.6 shows the staff dashboard in DCAS. On the left side are the menu navigation.

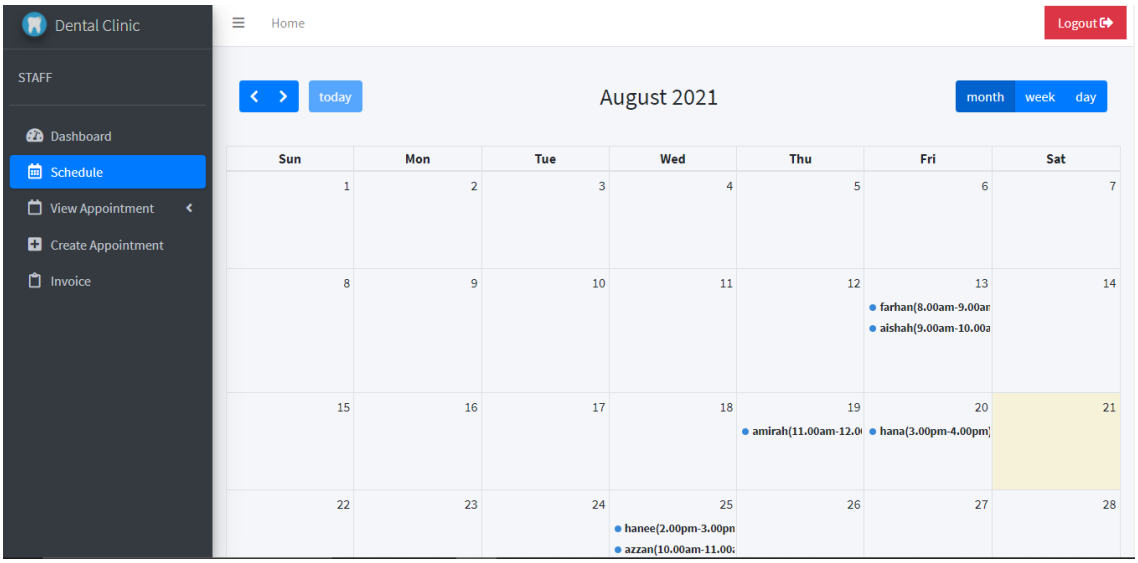

Figure 4.7: Staff Page - Appointment Schedule

Figure 4.7 shows the patient's appointment schedule in the staff page.

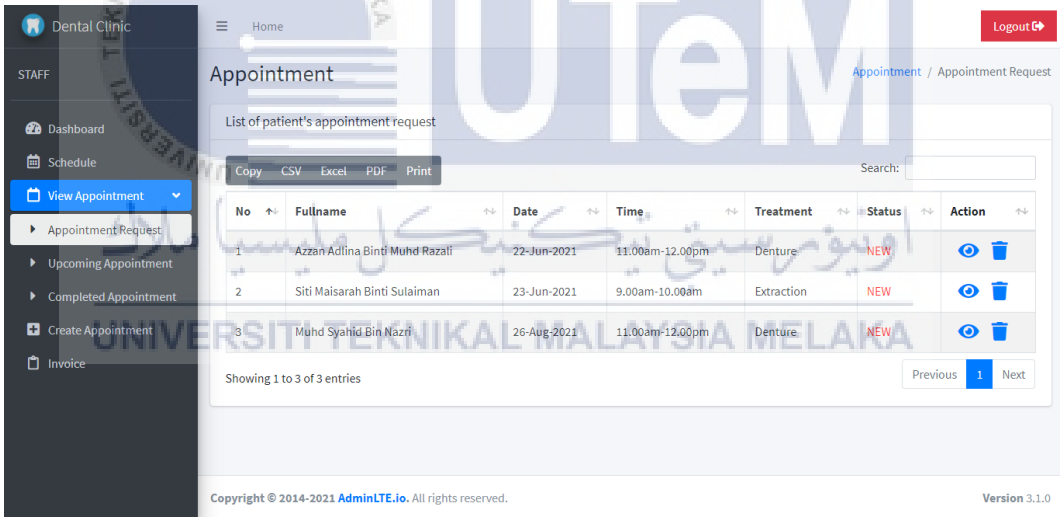

Figure 4.8: Staff Page – Appointment Request

Figure 4.8 shows the patient's appointment request in the staff page.

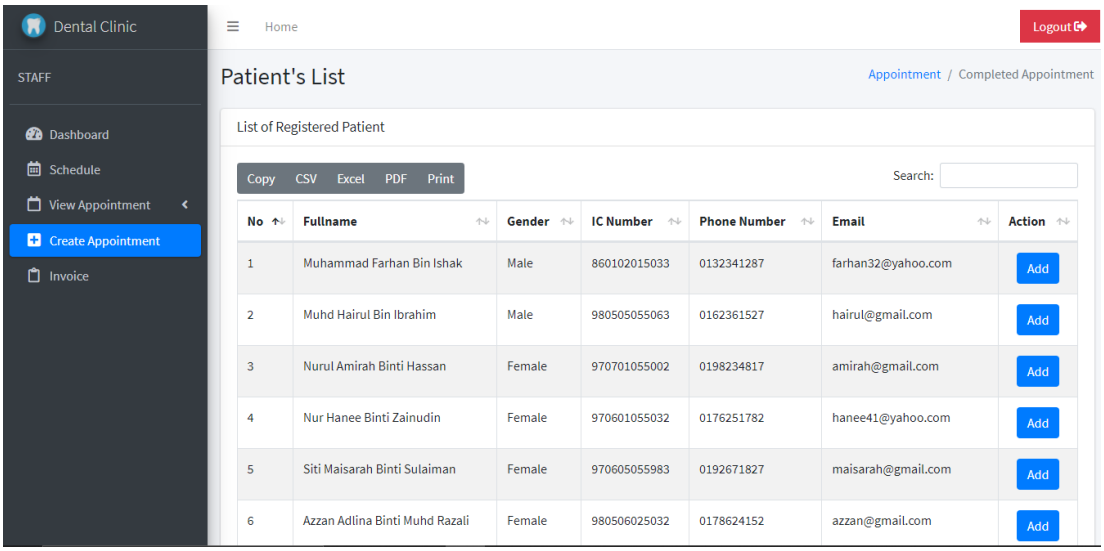

Figure 4.9: Staff Page – Create Appointment

Figure 4.9 shows the create appointment for appointment booking in the staff page.

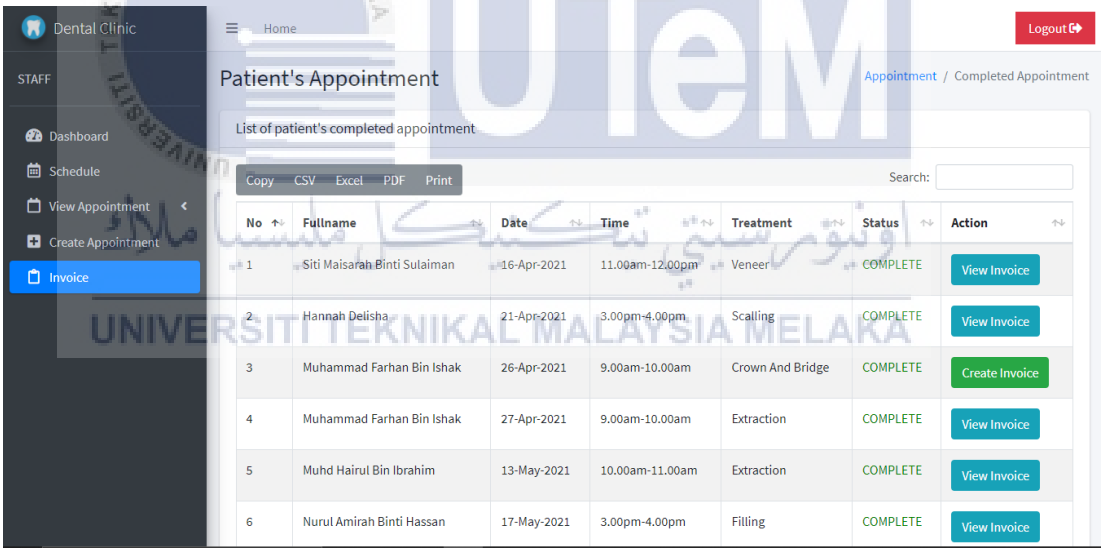

Figure 4.10: Staff Page – List of Completed Appointment

Figure 4.10 shows the completed appointment list in the staff page. shows the treatment list in the admin page. Admin can delete and make changes to the treatment.

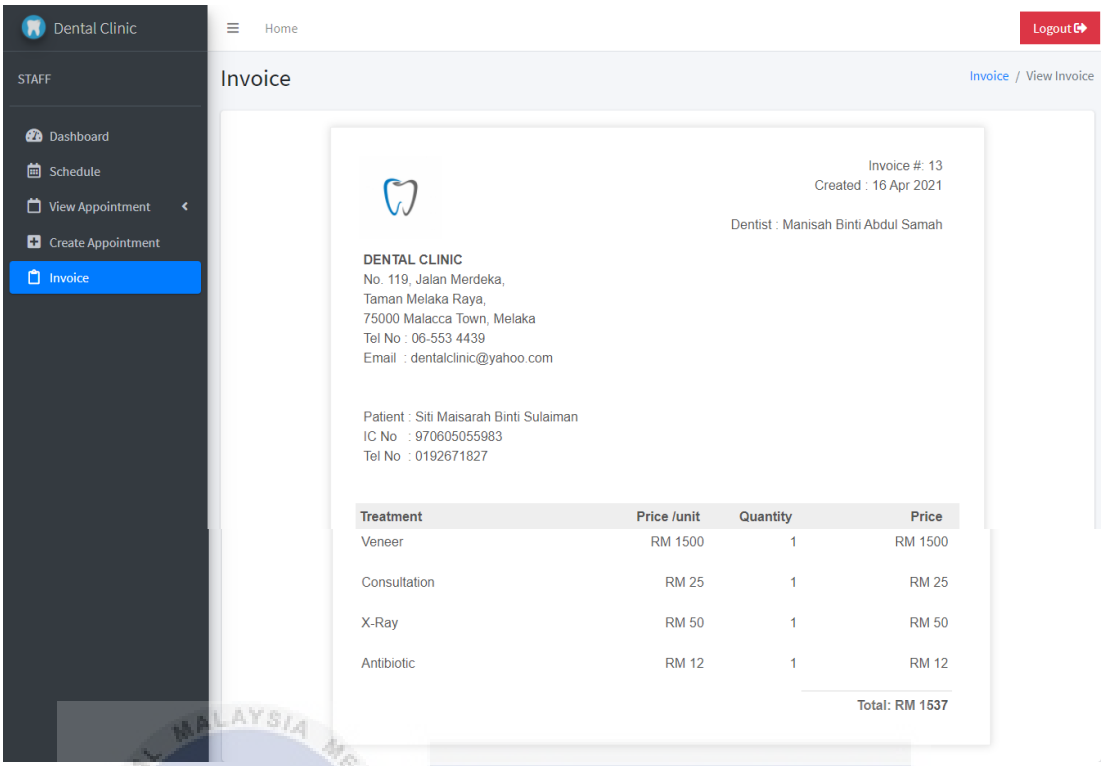

Figure 4.11: Staff Page – Generated Invoice

Figure 4.11 shows the invoice in the staff page.

Figure 4.12: Admin Page – Treatment List

Figure 4.12 shows the treatment list in the admin page. Admin can add new treatment, delete, and make changes to the treatment.

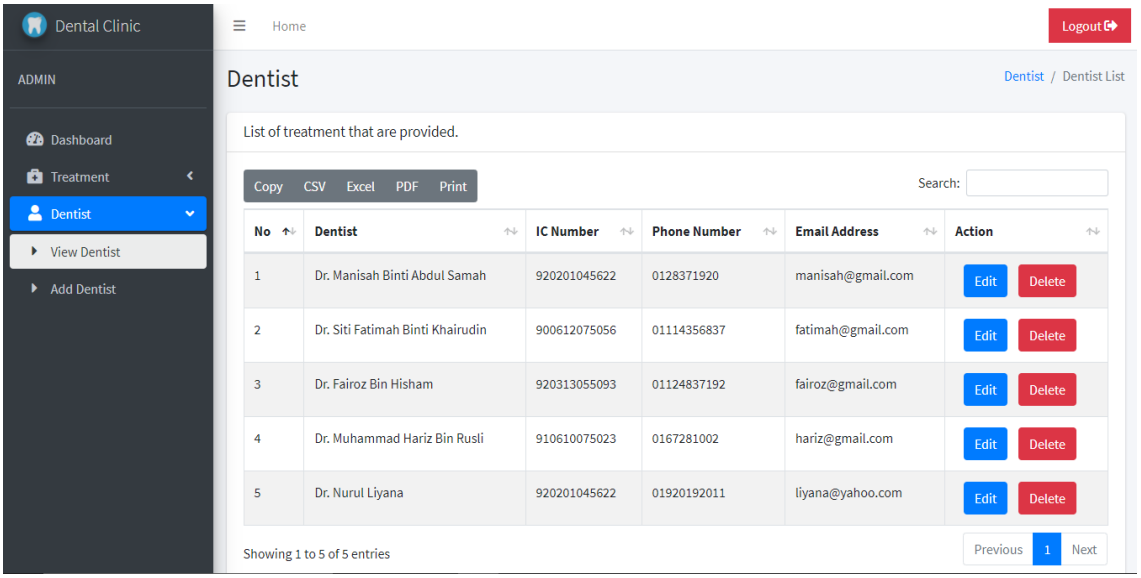

Figure 4.13: Admin Page – Dentist List

Figure 4.13 shows the dentist list in the admin page. Admin can create new dentist, delete, and make changes to the dentist.

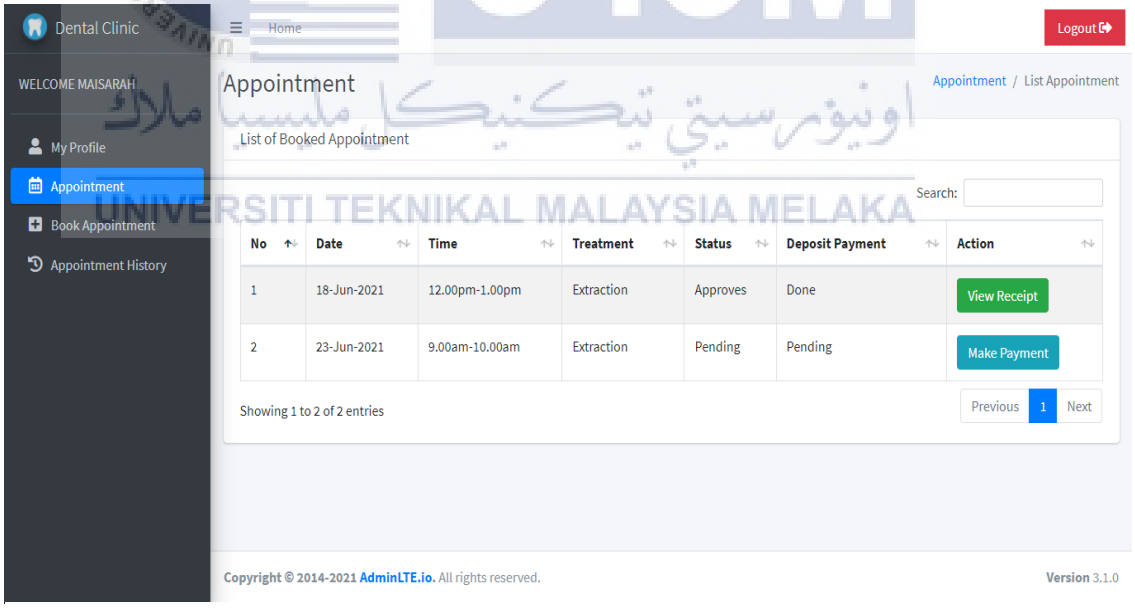

Figure 4.14: Patient Page – List of Booked Appointment

Figure 4.14 shows the list of booked appointment in the patient page.

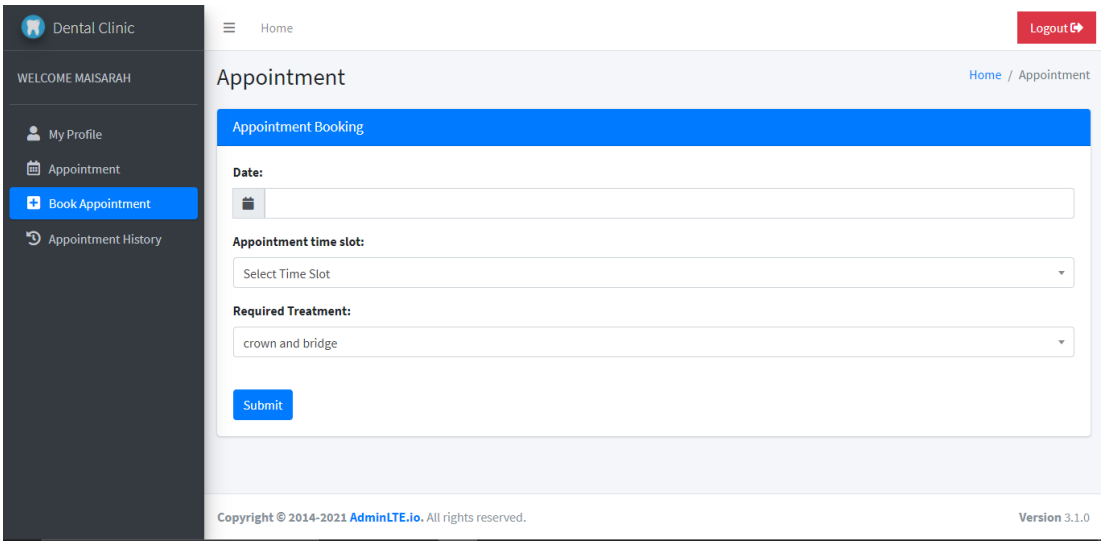

Figure 4.15: Patient Page – Appointment Booking

Figure 4.15 shows the appointment booking in the patient page. Patient can book appointment here and the submission will be sent to the staff for approval in staff page.

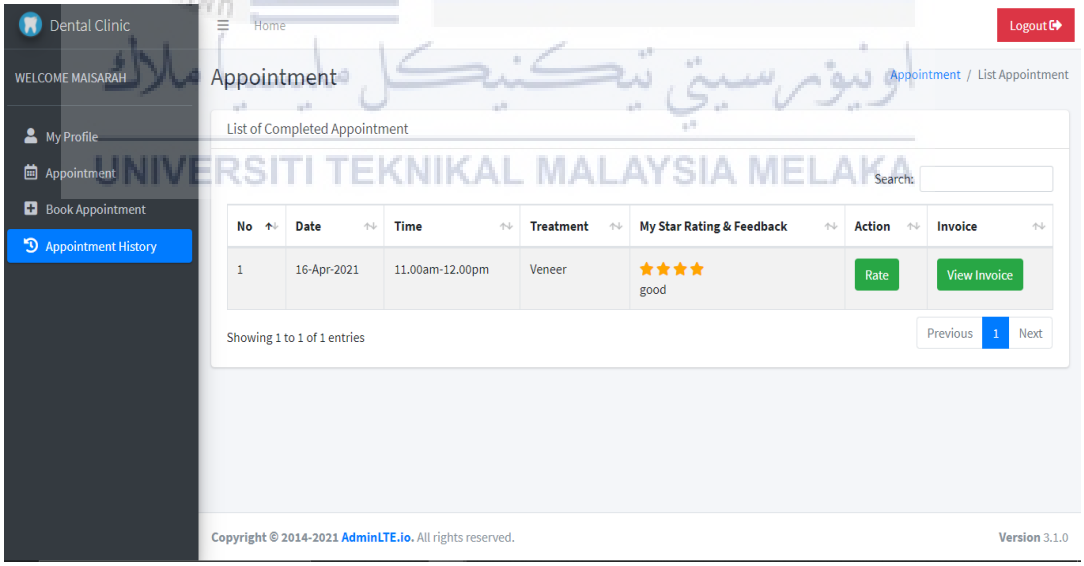

Figure 4.16: Patient Page – Appointment History

Figure 4.16 shows the appointment history in the patient. It is only shown the completed appointment and the rating and feedback from patient. The patient can also view the invoice.

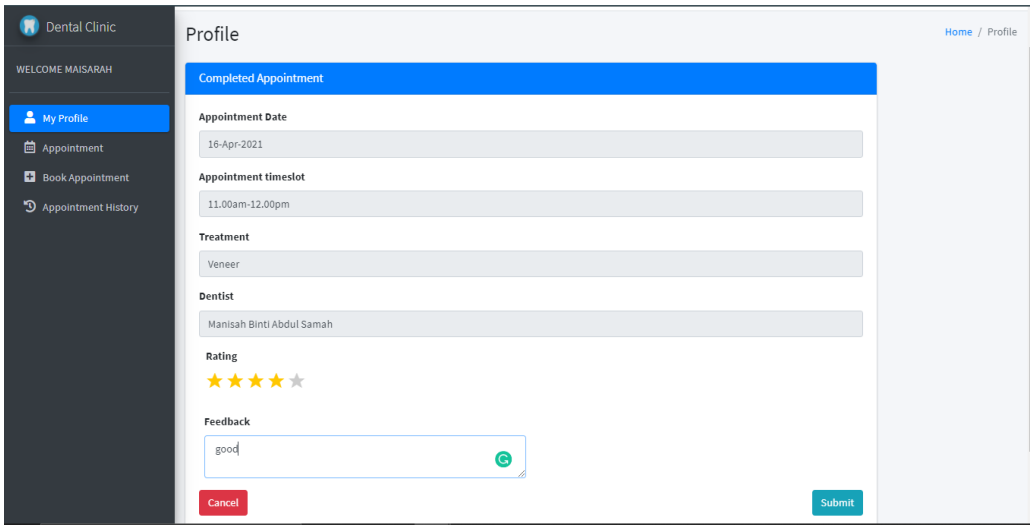

Figure 4.17: Patient Page – Patient Rating and Feedback Form

Figure 4.17 shows the appointment detail and the form for rating and feedback.

4.2.3 Database Design

4.2.3.1 Conceptual and Logical Database Design

Conceptual Database Design

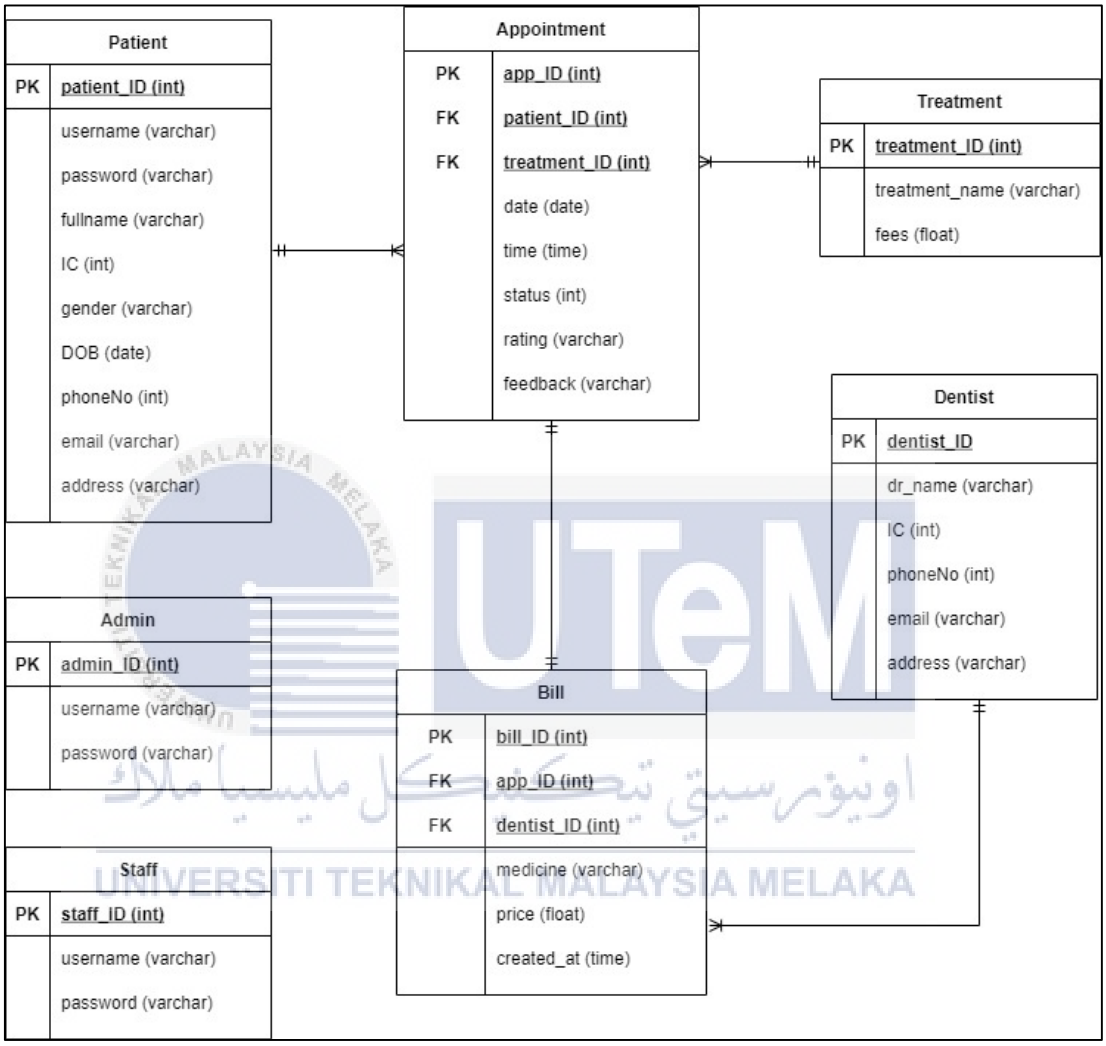

Figure 4.18: ERD for DCAS

The figure 4.18 shows the Entity Relationship Diagram (ERD. There are 5 tables that are relate to each other which are table for patient, appointment, treatment, dentist, bill, and another 2 table as for admin and staff login account.

Logical Database Design

- Logical scheme

admin (admin_ID, username, password)
Primary Key admin_ID

staff (staff_ID, username, password)
Primary Key ID

patient (patient_ID, username, password, fullname, IC, gender, DOB phoneNo, email, address)
Primary Key user_ID

treatment (treatment_ID, treatment_name, fees)
Primary Key treatment_ID

appointment (app_ID, patient_ID, treatment_ID, date, time, status, rating, feedback)
Primary Key app_ID
Foreign Key patient_ID references patient (patient_ID) ON UPDATE CASCADE ON DELETE CASCADE
Foreign Key treatment_ID references treatment (treatment_ID) ON UPDATE CASCADE ON DELETE CASCADE

dentist (dentist_ID, dr_name, IC, phoneNo, email, address)
Primary Key dentist_ID

bill (bill_ID, app_ID, dentist_ID, medicine, price, created_at)
Primary Key bill_ID
Foreign Key app_ID references appointment (app_ID) ON UPDATE CASCADE ON DELETE CASCADE
Foreign Key dentist_ID references dentist (dentist_ID) ON UPDATE CASCADE ON DELETE CASCADE

Data Dictionary

Table 4.1 Data Dictionary for Admin Table

Field Name	Data type	Field Length	Constrain	Description
admin_ID	int	11	Primary key	Admin ID. auto increment
username	varchar	20	Not null	Username for login
password	varchar	20	Not null	Password for login

The table 4.1 above shows the admin data dictionary in DCAS. The primary key for the admin table is admin_ID which is auto increment when the user entering new data. The other data in the table are username and password that are used to login into the DCAS.

Table 4.2 Data Dictionary for Staff Table

Field Name	Data type	Field Length	Constrain	Description
staff_ID	int	11	Primary key	Staff ID. auto increment
username	varchar	20	Not null	Username for login
password	varchar	20	Not null	Password for login

The table 4.2 above shows the staff data dictionary in DCAS. The primary key for the staff table is staff_ID which is auto increment when the user entering new data. The other data in the table are username and password that are used to login into the DCAS.

Table 4.3 Data Dictionary for Patient Table

Field Name	Data type	Field Length	Constrain	Description
patient_ID	int	11	Primary key	Patient ID. auto increment
username	varchar	20	Not null	Username for login
password	varchar	60	Not null	Password for login – password is encrypted
fullname	varchar	100	Not null	Patient full name
IC	varchar	20	Not null	Patient IC number
gender	varchar	10	Not null	Patient gender
DOB	date		Not null	Patient date of birth
phoneNo	varchar	20	Not null	Patient phone number
email	varchar	50	Not null	Patient email address
address	varchar	100	Not null	Patient home address.

The table 4.3 above shows the patient data dictionary in DCAS. The primary key for patient table is patient_ID which is auto increment when the patient entering new data. The other data in the table are username and password that are used to login into the DCAS. Meanwhile, full name, IC, gender, date of birth, phone number, email and address are the other data that needed for the patient's information record.

Table 4.4 Data Dictionary for Treatment Table

Field Name	Data type	Field Length	Constrain	Description
treatment_ID	int	11	Primary key	Treatment ID. auto increment
name	varchar	100	Not null	Name of the treatment
fees	float	20	Not null	Fees of the treatment

The table 4.4 above shows the treatment data dictionary in DCAS. The primary key for treatment table is treatment ID which is auto increment when the admin entering new treatment data. The other data are name and the fees of the treatment.

Table 4.5 Data Dictionary for Appointment table

Field Name	Data type	Field Length	Constrain	Description
app_ID	int	11	Primary key	Admin ID, auto increment
patient_ID	int	11	Foreign key	Patient ID, foreign key from the patient table.
treatment_ID	int	11	Foreign key	Treatment ID, foreign key from the treatment table.
date	date		Not null	Date for the appointment booking.
time	varchar	20	Not null	Timeslot selection for the appointment booking.
status	int	11	As defined: 1	Status appointment approval by staff.
rating	int	11	Not null	Rating from patient
feedback	varchar	200	Not null	Feedback from patient

The table 4.5 above shows the appointment data dictionary in DCAS. The primary key for appointment table is app_ID which is auto increment when the staff or patient create new appointment. The foreign keys are patient_ID which is refer to the patient table and the app_ID that refers to the appointment table. The other data are date, time for the appointment, and the status for the appointment which are approve by the staff before the appointment are being confirmed.

Table 4.6 Data Dictionary for Dentist Table

Field Name	Data type	Field Length	Constrain	Description
dentist_ID	int	11	Primary key	Dentist ID. auto increment
fullname	varchar	100	Not null	Dentist full name
IC	varchar	20	Not null	Dentist IC number
phoneNo	varchar	20	Not null	Dentist phone number
email	varchar	50	Not null	Dentist email address
address	varchar	100	Not null	Dentist home address.

The table 4.6 above shows the dentist table data in DCAS. The primary key for dentist table is dentist_ID which is auto increment when the admin adds new dentist record. The other data that are full name, IC number, phone number, email, and home address.

Table 4.7 Data Dictionary for Bill Table

Field Name	Data type	Field Length	Constrain	Description
bill_ID	int	11	Primary key	Bill ID, auto increment
app_ID	int	11	Primary key	app_ID, foreign key from the appointment table.
dentist_ID	int	11	Foreign key	dentist_ID, foreign key from the dentist table.
medicine	text		Not null	Date for the appointment booking.
price	float	(10,2)	Not null	Price of the appointment session.
created_at	timestamp		current_time stamp()	The time that bill is created.

The table 4.7 above shows the data dictionary for bill data in DCAS. The primary key for bill table is bill ID which is auto increment when the staff create new bill. The foreign keys are user_ID, which is refer to the patient table, app ID that refers to the appointment table and dentist ID that refer to the dentist table.

4.3 Detailed Design

4.3.1 Software Design

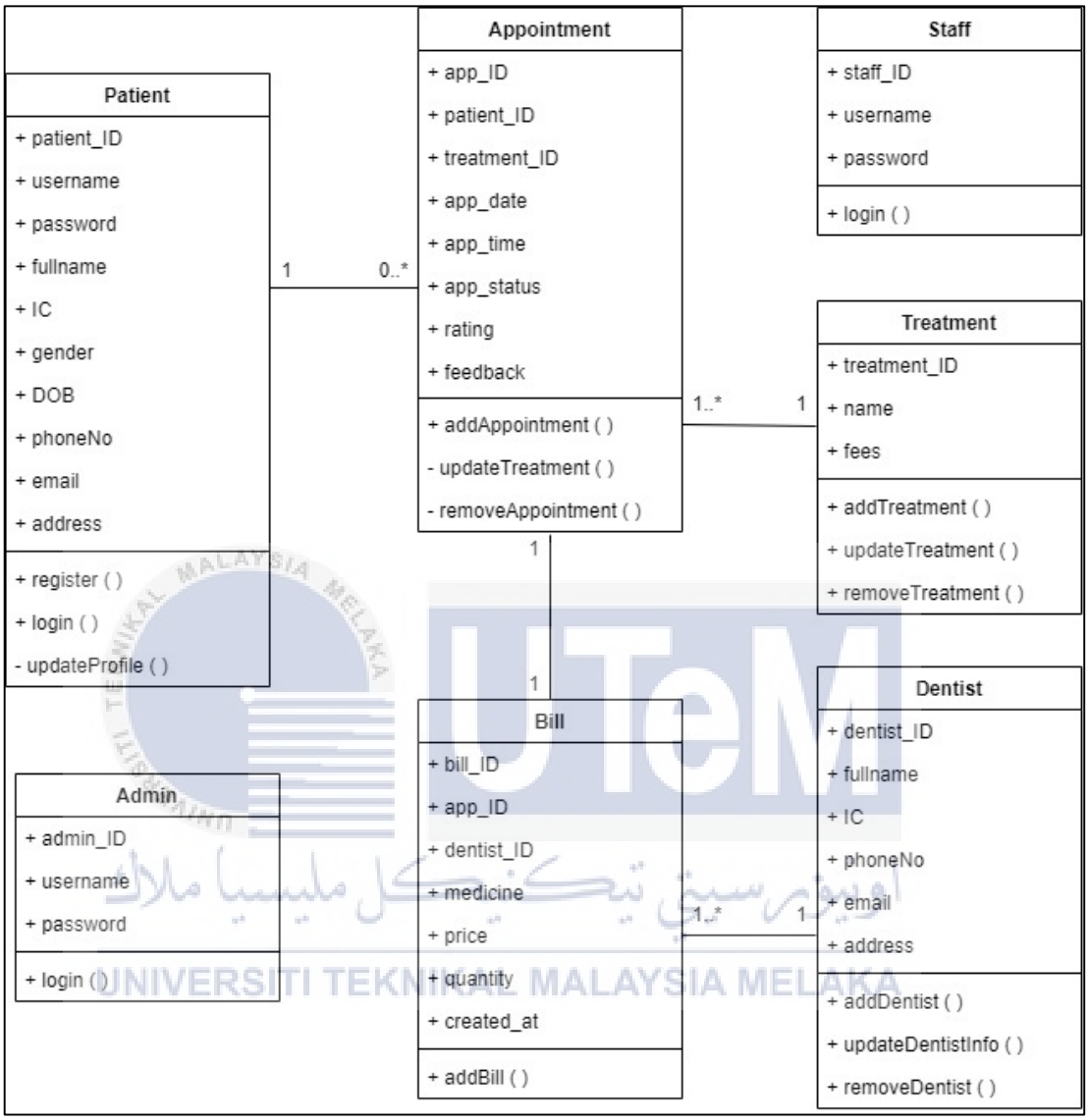

Figure 4.19: Class diagram for DCAS

The figure 4.19 above shows the class diagram for DCAS. There are 5 tables that are relate to each other which are table for patient, appointment, treatment, dentist, bill, and another 2 table as for admin and staff login account. Patient has a register, login account and update profile function. In treatment page, the treatment can be added, update and remove by the admin only. In appointment page, staff can add, update, and remove the existed appointment, but the patient can only add new appointment. For dentist details are managed by the admin only. The bill can only be created after appointment is completed which is manage by staff.

4.3.2 Physical Database Design

- Create database

```
CREATE DATABASE dental;
```

Figure 4.20: Create Database

- Create table for admin, appointment, bill, dentist, patient, staff, treatment

```
CREATE TABLE `admin` (
  `admin_ID` int(5) NOT NULL,
  `username` varchar(20) NOT NULL,
  `password` varchar(20) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.21: Create Admin Table


```
CREATE TABLE `appointment` (
  `app_ID` int(11) NOT NULL,
  `patient_ID` int(3) UNSIGNED NOT NULL,
  `treatment_ID` int(11) DEFAULT 1,
  `date` date NOT NULL,
  `time` varchar(20) NOT NULL,
  `status` int(11) NOT NULL DEFAULT 1,
  `rating` varchar(10) NOT NULL,
  `feedback` varchar(500) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.22: Create Appointment Table

```
CREATE TABLE `bill` (
  `bill_ID` int(11) NOT NULL,
  `app_ID` int(11) NOT NULL,
  `dentist_ID` int(11) NOT NULL,
  `medicine` text NOT NULL,
  `price` float NOT NULL,
  `created_at` timestamp NOT NULL DEFAULT current_timestamp()
    ON UPDATE current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.24: Create Bill Table

```
CREATE TABLE `dentist` (
  `dentist_ID` int(11) NOT NULL,
  `dr_name` varchar(50) NOT NULL,
  `IC` varchar(20) NOT NULL,
  `phoneNo` varchar(20) NOT NULL,
  `email` varchar(50) NOT NULL,
  `address` varchar(100) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.23: Create Dentist Table


```
CREATE TABLE `patient` (
  `patient_ID` int(3) UNSIGNED NOT NULL,
  `username` varchar(20) NOT NULL,
  `password` varchar(60) NOT NULL,
  `fullname` varchar(100) NOT NULL,
  `IC` varchar(20) NOT NULL,
  `gender` varchar(10) NOT NULL,
  `DOB` date DEFAULT NULL,
  `phoneNo` varchar(20) NOT NULL,
  `email` varchar(50) NOT NULL,
  `address` varchar(100) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.25: Create Patient Table

```sql
CREATE TABLE `staff` (
  `staff_ID` int(5) NOT NULL,
  `username` varchar(20) NOT NULL,
  `password` varchar(20) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.26: Create Staff Table

```sql
CREATE TABLE `treatment` (
  `treatment_ID` int(11) UNSIGNED NOT NULL,
  `treatment_name` varchar(100) NOT NULL,
  `fees` float NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.27: Create Treatment Table

- Insert data into table


```sql
INSERT INTO `admin` (`admin_ID`, `username`, `password`)
VALUES (1, 'admin', 'admin');
```

Figure 4.28: Insert into Admin Table

```sql
INSERT INTO `appointment` (`app_ID`, `patient_ID`, `treatment_ID`,
                           `date`, `time`, `status`, `rating`, `feedback`)
                           VALUES
(150, 35, 1, '2021-04-26', '9.00am-10.00am', 3, '0', ''),
(153, 44, 6, '2021-04-21', '3.00pm-4.00pm', 3, '4', 'good'),
(155, 35, 3, '2021-04-27', '9.00am-10.00am', 3, '5', 'excellent');
```

Figure 4.29: Insert into Appointment Table

```sql
CREATE TABLE `dentist` (
  `dentist_ID` int(11) NOT NULL,
  `dr_name` varchar(50) NOT NULL,
  `IC` varchar(20) NOT NULL,
  `phoneNo` varchar(20) NOT NULL,
  `email` varchar(50) NOT NULL,
  `address` varchar(100) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.31: Insert into Dentist Table

```sql
CREATE TABLE `bill` (
  `bill_ID` int(11) NOT NULL,
  `app_ID` int(11) NOT NULL,
  `dentist_ID` int(11) NOT NULL,
  `medicine` text NOT NULL,
  `price` float NOT NULL,
  `created_at` timestamp NOT NULL DEFAULT current_timestamp()
    ON UPDATE current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.30: Insert into Bill Table


```sql
CREATE TABLE `patient` (
  `patient_ID` int(3) UNSIGNED NOT NULL,
  `username` varchar(20) NOT NULL,
  `password` varchar(60) NOT NULL,
  `fullname` varchar(100) NOT NULL,
  `IC` varchar(20) NOT NULL,
  `gender` varchar(10) NOT NULL,
  `DOB` date DEFAULT NULL,
  `phoneNo` varchar(20) NOT NULL,
  `email` varchar(50) NOT NULL,
  `address` varchar(100) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.32: Insert into Patient Table

```
CREATE TABLE `treatment` (
  `treatment_ID` int(11) UNSIGNED NOT NULL,
  `treatment_name` varchar(100) NOT NULL,
  `fees` float NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.33: Insert into Treatment Table

```
CREATE TABLE `staff` (
  `staff_ID` int(5) NOT NULL,
  `username` varchar(20) NOT NULL,
  `password` varchar(20) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Figure 4.34: Insert into Staff Table

4.4 Conclusion

As for the conclusion, this chapter contains all the design that needed to be done in developing the system. The architecture of the DCAS is shown in the high-level design which are consist of design of the system architecture, user interface and database. Meanwhile at the detailed design, sequence diagram is shown as for give an illustrated of system on what the users can do based on their role authority.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

In this chapter, implementation of the system is carried out. At this phase, procedures to complete the design on the previous chapter is plan, perform, and install the development plan of the system. The output of this chapter is a complete documentation of the DCAS development.

5.2 Software Development and Environment Setup

- For local hosting of database server is run on port 8000
- Use XAMPP to run local web server on laptop.

- The database used is MySQL in phpMyAdmin
- Bootstrap framework uses for template design on site.
- Push the code into GitHub for backup. by using the GitKraken desktop apps.

5.3 Software Configuration Management

5.3.1 Configuration Environment Setup

The database server runs on port 8000 for local hosting. On the laptop, XAMPP is used to operate a local web server. XAMPP allows you to create a website on your computer's local web server. The “cross-platform” portion refers to the fact that this simple and lightweight solution works on Windows, Linux, and Mac.

Figure 5.1: XAMPP Logo

Figure 5.1 is the XAMPP logo. XAMPP are needed to run the DCAS site which is an offline system. Before running the system on localhost server, the MySQL and Apache option that is shown in the XAMPP control panel must be start by clicking on the start button.

Figure 5.2: phpMyAdmin Logo

The phpMyAdmin logo is seen in Figure 5.2. The database that is saved in MySQL is accessed in phpMyAdmin after starting the MySQL that is operating in XAMPP. phpMyAdmin is a free PHP-based software application for managing MySQL databases over the internet.

Figure 5.3: Bootstrap 4 Logo

A logo for the Bootstrap 4 framework is seen in Figure 5.3. Bootstrap is a free and open-source CSS framework for front-end web development that is responsive and mobile-first. It includes design templates for typography, forms, buttons, navigation, and other interface elements that are based on CSS and (optionally) JavaScript. The template for this system is bootstrap 4. All of the resources are downloaded and saved to a system file. The code is then obtained with the help of the link script.

Figure 5.4: GitKraken logo

Figure 36 is a GitKraken logo. Gitkraken is classified as "Source Code Management Desktop Apps" and "Integrated Development Environment" tools respectively. The app is being used to push the code into the GitHub in order to avoid data and coding loss.

5.4 Implementation Status

Here we will see the duration each of the implementation status. Every implementation takes a different duration to completed.

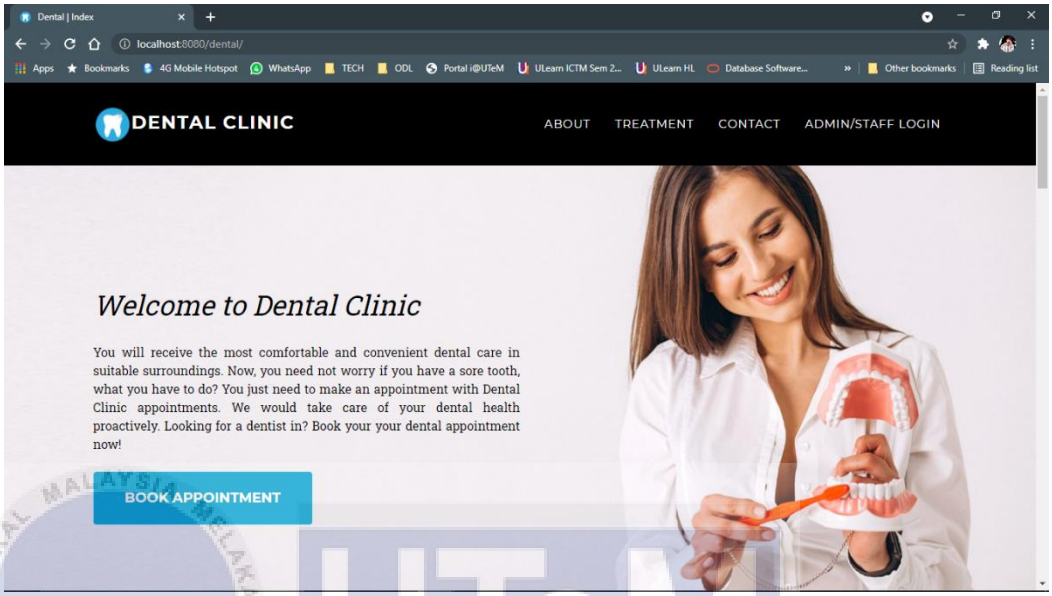

Figure 5.5: Homepage of DCAS

Name: Home page module

Description: This module is when user enter the system and the index.html will be displayed on the screen. The navigation to login available here.

Duration to complete: 3 days

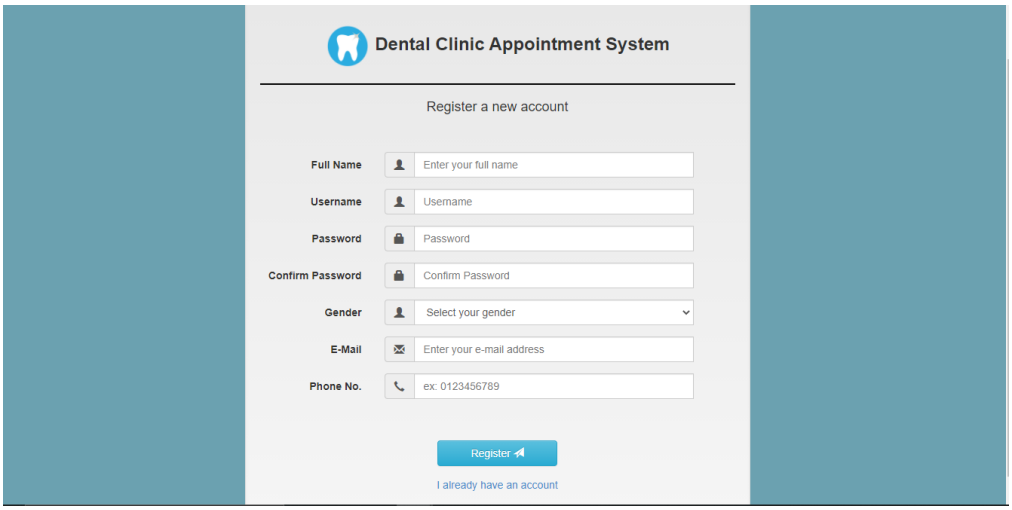

Figure 5.6: Patient Registration Page

Name: Registration module

Description: Form for the patient registration

Duration to complete: 2 days

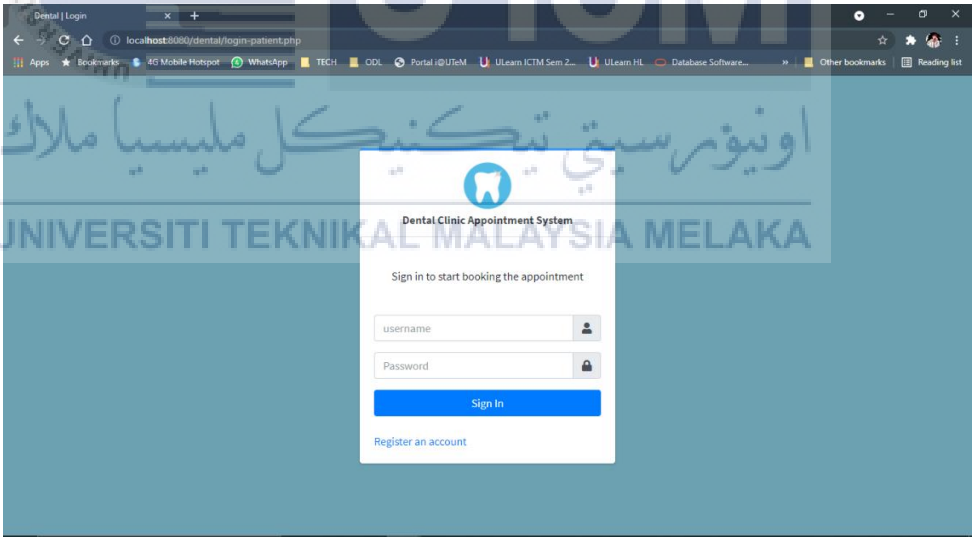

Figure 5.7: Login Page User

Name: Login module

Description: Enables the registered user to enter their username and password into the required field in the provided form to login into system.

Duration to complete: 2 days

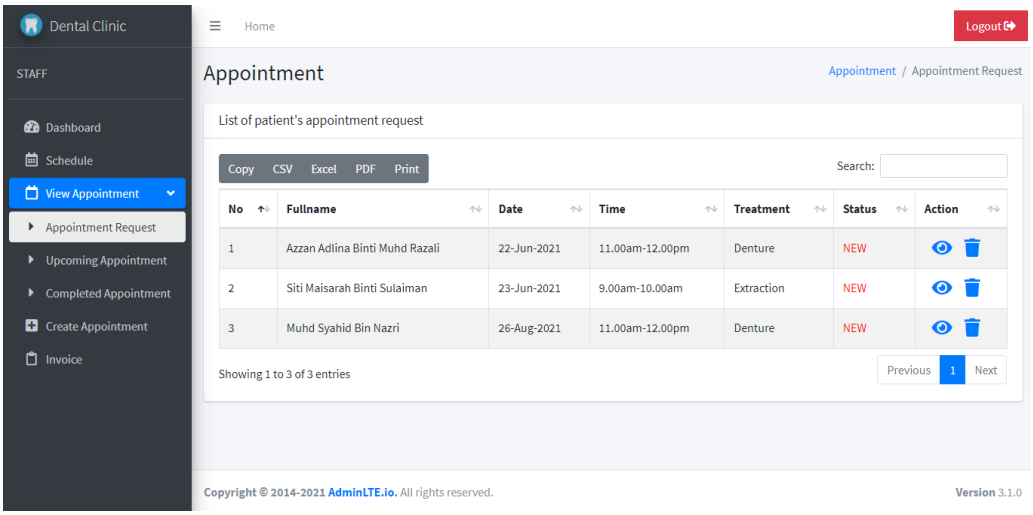

Figure 5.8: List of Appointment Request

Name: Appointment management module

Description: The system allows the user to add, update and delete the dental appointment from the system

Duration to complete: 4 days

Figure 5.9: Appointment Reminder

Name: Appointment reminder module

Description: The registered patient from the system gets the appointment reminder after getting the confirmation approval from the administrator.

Duration to complete: 4 days

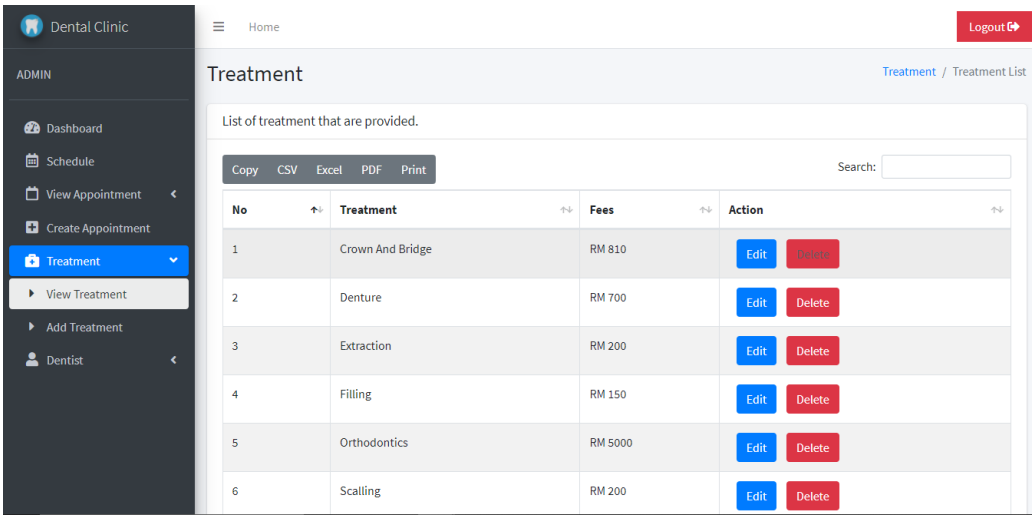

Figure 5.10: List of Treatment

Name: Treatment management module

Description: The system allows the administrator to add, update and delete the treatment from the system

Duration to complete: 3 days

Figure 5.11: List of Dentist

Name: Dentist management module

Description: The system allows the administrator to add, update and delete the dentist from the system

Duration to complete: 3 days

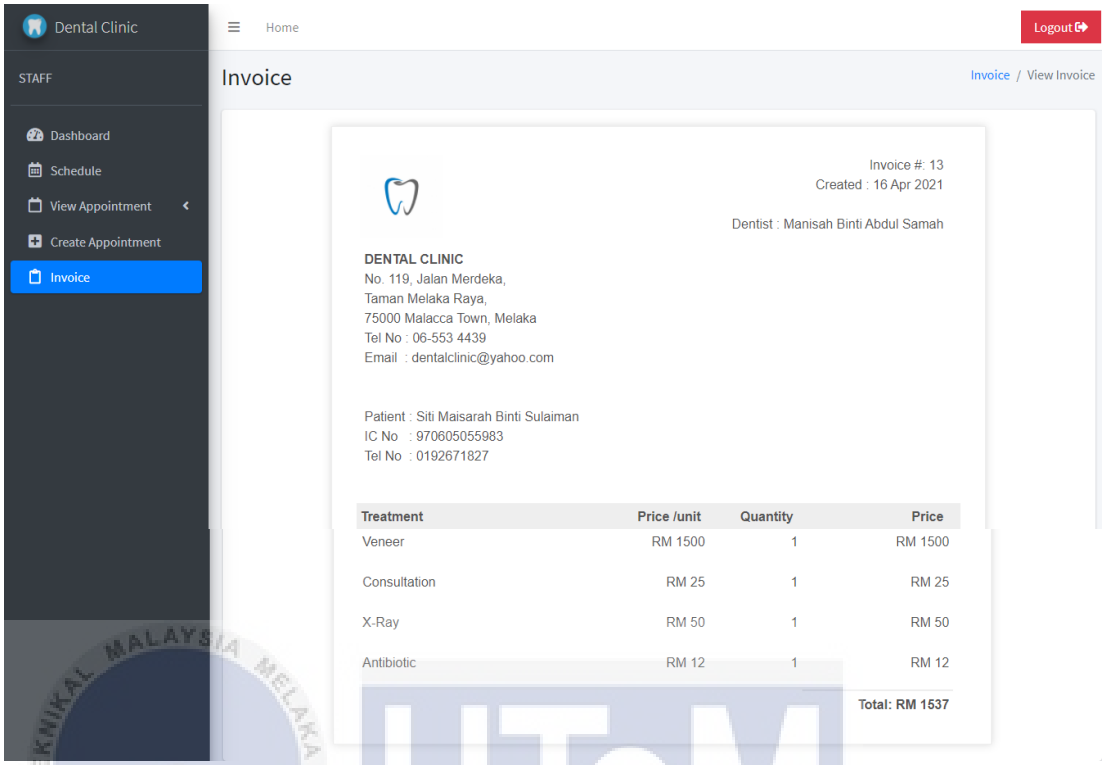

Figure 5.12: Invoice

Name: Invoice generated module

Description: The system generate invoice after the patient complete their appointment.

Duration to complete: 3 days

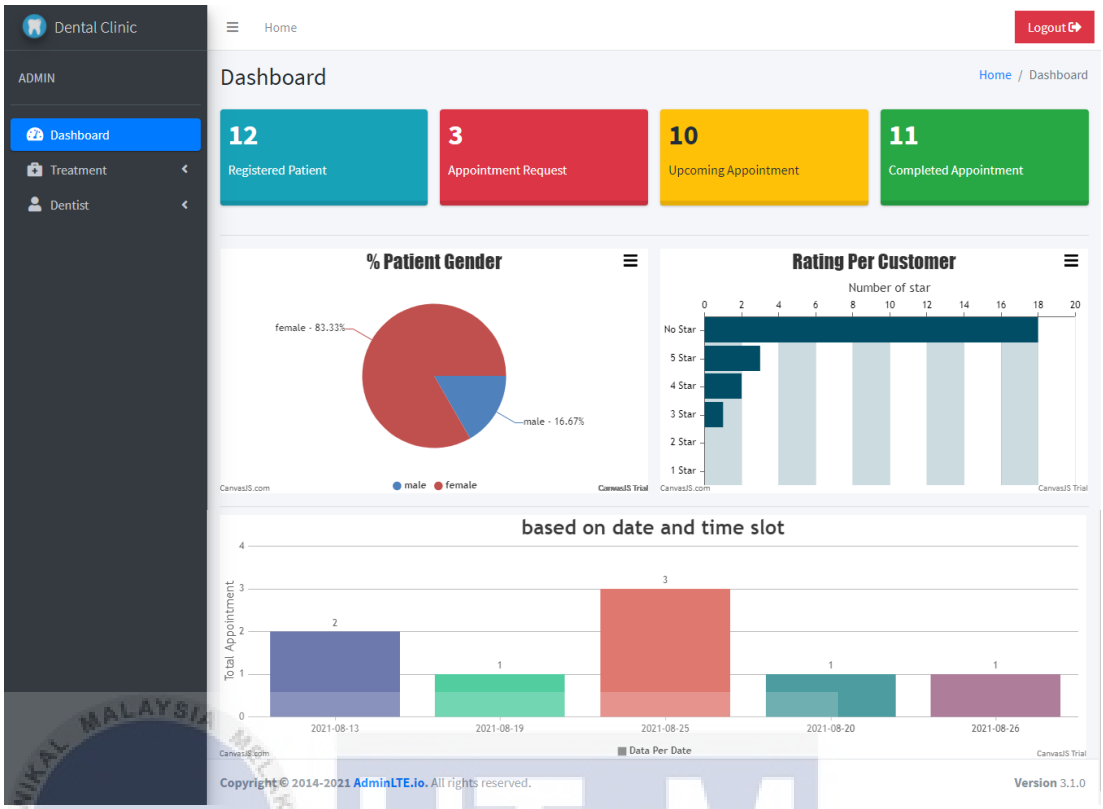

Figure 5.13: Admin Dashboard

Name: Appointment Reporting Module

Description: The system generates automated reporting by retrieving the appointment data from the database

Duration to complete: 5 days

5.5 Conclusion

In summary, this chapter describes the implementation of DCAS. The implementation has just been created in a web application where the design works. The following chapter describes about the system testing of the DCAS.

CHAPTER 6: TESTING

6.1 Introduction

This chapter focus on performing software testing on the developed system to identify bugs and errors. Software testing is a combination of people, methods, measurement, and equipment which are integrated to test a software. The testing also provides an overview of the system indicating whether the system's objectives have been met. The testing documentation will include the test plan, strategy, design, and result. Before the system can be deployed for end-user to use, it must be thoroughly tested.

6.2 Test Plan

The test plan is the detail of objective, resources, and processes for a test of a software product. The breakdown structure of the system in figure 6.1 is showing each module as to test the system. The system is tested as below.

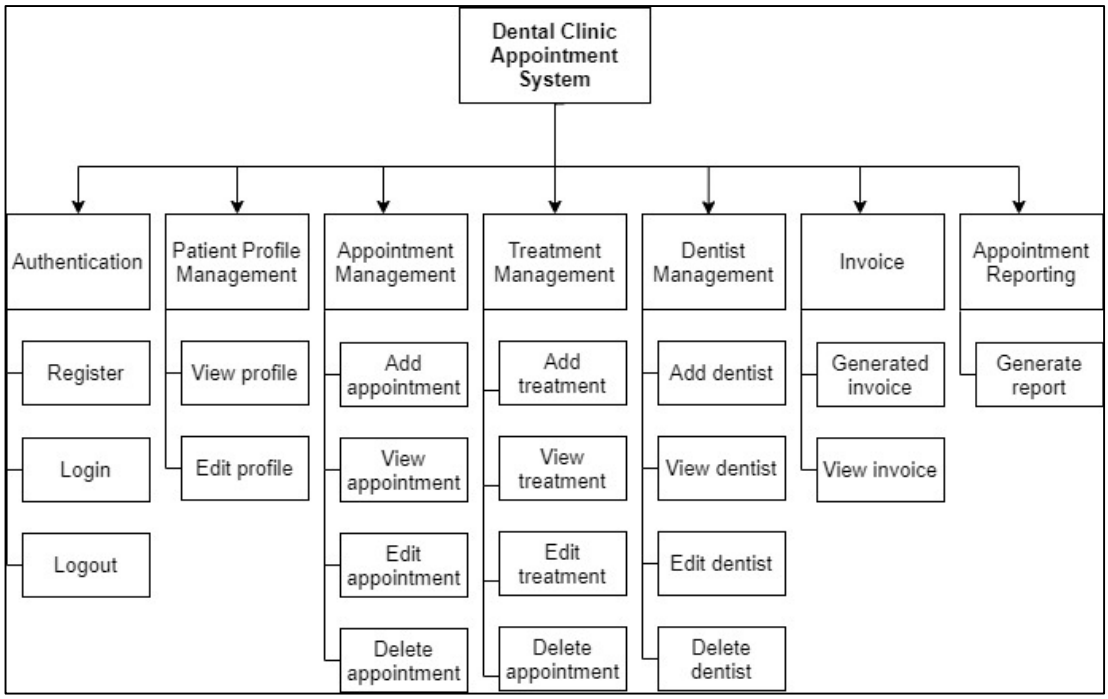

Figure 6.1: Breakdown of the system to be tested.

6.2.1 Test Organization

The test organization is the person who is involve in the testing of the system. The person who is involved is described with their responsibility.

Table 6.1 Role description

Test manager	Responsible for the testing plan, resources, and training to see whether testing objective have been reached.
Tester	Responsible to conduct and contribute to test plan.

6.2.2 Test Environment

A test environment is an environment that allows testers to conduct test cases that have been assigned by the test manager. The test environment can be in the form of a system on a server which can be accessed by all the testers. It involves hardware and network configuration of the implemented system. As for the hardware and software requirements, the equipment as stated in the table 6.2 below.

Table 6.2 Hardware and Software Requirement

Hardware / Software	**Minimum requirement**
Operating system	Windows 7, Windows 8, Windows 8.1, Windows 10 or later
Processor	Intel Pentium 4 processor or with speed of at least 2.0Mhz
Web Browser	Chrome: Google Chrome 45.0.2454.86, or latest Safari: 4.0.4 Nov 13th, 2009, or latest Firefox: Mozilla Firefox 2.0.0.20, or latest
Internet connection	10Mbps or faster internet connection

Table 6.2 shown the hardware and software requirement that needed in the test environment for the DCAS.

6.2.3 Test Schedule

The test is required 20 days to be completed, starting from 2 August 2021 until 22 August 2021. The test is undergoing only one cycle that shown in figure 6.3.

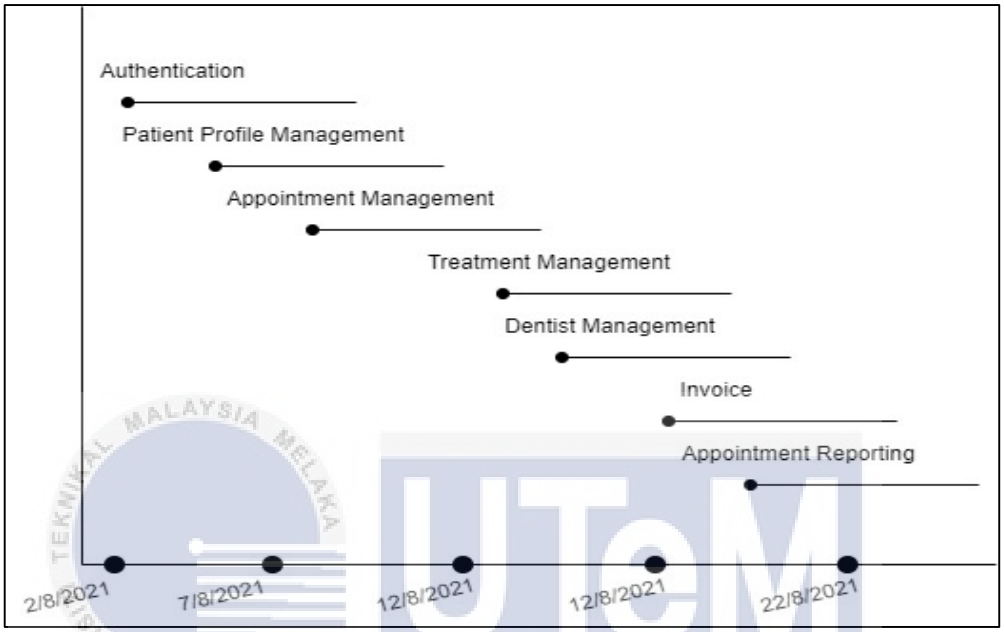

Figure 6.2: Testing Schedule of DCAS

6.3 Test Strategy

A test strategy is a well-defined collection of software testing methods that specifies the testing methodology and objectives for a software application. The system is evaluated using black box testing techniques. Black box testing concentrates on the application's externals. The goal of the testing approach is to find mistakes, boost confidence, and reduce risks connected with the system under test's general and specialized behaviors, functions, and reactions. System testing is performed on the entire system to see whether it performs as expected. Decision testing, path analysis, equivalence analysis, and use case are some of the test techniques that may be used in system testing. In a conclusion, this technique is used to validate and verify the system, guaranteeing that DCAS's production system can be runs smoothly.

6.3.1 Classes of Test

There are different sorts of tests are run on the system, with a focus on functionality, performance, reliability, usability, and security of the system. Functionality testing ensures that a system's functionality meets the requirements specifications and is within the system's capabilities. The acceptance test is conduct by distribute the questionnaire survey to the people through Google Form link sharing. The questionnaire consists of seven sections in total including the demographic question. The other sections are Perceived Ease of Use (EU), Perceived Usefulness (PU), Capability (CP), Trustworthiness (TW), Attitude (AT), and Intention to Use (IU).

6.4 Test Design

The focus of test design is on the tests themselves, including how many will be required, the test settings, and the testing techniques. It is critical to establish a test plan since it defines and enhances the quality of software testing to discover problems.

6.4.1 Test Description

The test case and intended outcome of the type of testing of a test case will be described in the test description.

6.4.1.1 Unit testing

The test design below will be subjected to the unit testing. Fault insertion, error handling, string testing, statement coverage, and condition coverage are all tested on each unit. To avoid system integration errors, the unit must function properly.

Unit testing 1: User registration module

Table 6.3 Test case for user registration module

TC-ID	Test case	Expected result
TC-1	Register as patient	Successfully created a new account.
TC-2	Login as patient	Successfully log into the patient page of the system as patient.
TC-3	Login as staff	Successfully log into the employee page with the role of staff.
TC-4	Login as admin	Successfully log into the employee page with the role of admin.
TC-5	Logout from the system	Successfully clear the state of the authentication token.

Table 6.3 shows the test case for user registration module. There are five test case that included in the testing which are for patient registration, login for all user role and system logout.

Unit testing 2: Patient profile module

Table 6.4 Test case for patient profile module

TC-ID	Test case	Expected result
TC-6	View patient information	Successfully view registered patient information in the system.
TC-7	Update patient information	Successfully edit registered patient information in the patient page.

Table 6.4 shows the test case for patient profile module. There are two test case that are included for testing which are view and update the patient information in the patient's profile.

Unit testing 3: Appointment management module

Table 6.5 Test case for appointment management module

TC-ID	Test case	Expected result
TC-8	Add appointment	Successfully created a new appointment on the patient and staff page.
TC-9	View appointment	Successfully display the appointment list on the system.
TC-10	Update appointment	Successfully update appointment by staff and then email is sent to the patient.
TC-11	Remove appointment	Successfully remove appointment from staff page.

Table 6.5 shows the test case for appointment management module. There are four test case that are included for testing which are add, view, update and remove appointment.

Unit testing 4: Treatment management module

Table 6.6 Test case for treatment management module

TC-ID	Test case	Expected result
TC-12	View treatment	Successfully display the treatment list on the system.
TC-13	Add treatment	Successfully created a new treatment on the admin page.
TC-14	Update treatment	Successfully update treatment by admin.
TC-15	Remove appointment	Successfully remove treatment from admin page.

Table 6.6 shows the test case for treatment management module. There are four test case that are included for testing which are view, add, update, and remove treatment.

Unit testing 5: Dentist management module

Table 6.7 Test case for dentist management module

TC-ID	Test case	Expected result
TC-16	View dentist	Successfully display the dentist list on the system.
TC-17	Add dentist	Successfully created a new dentist on the admin page.
TC-18	Update dentist	Successfully update dentist by admin.
TC-19	Remove dentist	Successfully remove dentist from admin page.

Table 6.7 shows the test case for dentist management module. There are two four case that are included for testing which are view, add, update, and remove dentist.

Unit testing 6: Invoice module

Table 6.8 Test case for invoice module

TC-ID	Test case	Expected result
TC-20	Generate invoice	Successfully generate invoice in the staff page.
TC-21	View invoice	Successfully display the invoice on the system.

Table 6.8 shows the test case for invoice module. There are two test case that are included for testing which are generate and view invoice.

Unit testing 7: Appointment reporting module

Table 6.9 Test case for appointment reporting module

TC-ID	Test case	Expected result
TC-22	Generate appointment reporting	Successfully generate appointment reporting in the staff and admin page.

Table 6.9 shows the test case for appointment reporting module. There is only one test case that is included for testing which is generate appointment reporting.

6.4.2 Test Data

1. User registration module

Test Case ID	TC-1
Test Case	Register as patient
Test Steps	1. Go to the registration page. 2. Fill the registration form. 3. Click on the “Register” button.
Test Data	Full Name: Syasha Izrina Binti Fuad Username: syasha17 Password: syasha@123 Gender: female Email: izrinas@gmail.com Phone No: 0104529112
Prerequisite	None
Expected output	User successfully registered as patient.

Condition	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valid username	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	N	N
Valid password	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N	Y	Y	Y	N
Valid email	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Valid phone no	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Output	Pass	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error

Test Case ID	TC-2			
Test Case	Login as patient			
Test Steps	1. Go to the login page. 2. Enter “username” and “password” in the form. 3. Click on the “Sign in” button			
Test Data	Username: syasha17 Password: syasha@123			
Prerequisite	Registered as a patient			
Expected output	System navigates directly to patient homepage.			
Condition	1	2	3	4
Valid username	Y	Y	N	N
Valid password	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-3			
Test Case	Login as staff			
Test Steps	1. Go to the login page. 2. Enter “username” and “password” into the form. 3. Click on the “Sign in” button			
Test Data	Username: staff Password: staff@123			
Prerequisite	Registered as a staff.			
Expected output	System navigates directly to staff homepage.			
Condition	1	2	3	4
Valid username	Y	Y	N	N
Valid password	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-4			
Test Case	Login as admin			
Test Steps	1. Go to the login page. 2. Enter “username” and “password” into the form. 3. Click on the “Sign in” button			
Test Data	Username: admin Password: admin@123			
Prerequisite	Registered as an admin			
Expected output	System navigates directly to admin homepage.			
Condition	1	2	3	4
Valid username	Y	Y	N	N
Valid password	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-5
Test Case	Logout from the system
Test Steps	1. Click on the navigation bar at the upper right. 2. Click on “Logout” in the navigation.
Test Data	-
Prerequisite	Logged in to the system on either patient, staff, or admin account.
Expected output	User should be navigated to homepage of the system and user token state is empty.

2. Patient profile module

Test Case ID	TC-6
Test Case	View patient information
Test Steps	1. Login as patient. 2. Click on “Profile” at the left sidebar menu.
Test Data	-
Prerequisite	Logged in to the system as patient.
Expected output	System displays the patient information on the profile page

Test Case ID	TC-7
Test Case	Update patient information
Test Steps	1. Login as patient. 2. Click on “Profile” at the left sidebar menu. 3. Click “Edit Profile” button. 4. Edit the fields that the user wants to make changes. 5. Click “Submit” button.
Test Data	Full Name: Syasha Izrina Binti Fuad IC Number: 900223045032 Date of Birth: 23 Feb 1990 Phone No: 0104529112 Email: izrinas@gmail.com Home address: No. 24, Jalan TU 30, Taman Tasik Utama, Ayer Keroh, 75450 Melaka
Prerequisite	Logged in to the system as patient.
Expected output	Profile successfully updated.

3. Appointment management module

Test Case ID	TC-8
Test Case	Add appointment.
Test Steps	1. Login as staff. 2. Click on “Create appointment” at the left sidebar menu. 3. Click at the plus icon at the chosen patient from the patient list. 4. Fill the appointment booking form. 5. Click “Submit” button.
Test Data	Date: 25 August 2021 Timeslot: 9.00AM – 10.00AM Treatment required: Extraction
Prerequisite	Logged in to the system as staff.
Expected output	User should be able to add new appointment for the patient.

Test Case ID	TC-9
Test Case	View appointment
Test Steps	1. Login as staff. 2. Click on “View appointment” at the left sidebar menu and choose the “Appointment Request”.
Test Data	-
Prerequisite	Logged in to the system as staff.
Expected output	System displays the list of appointment that have been booked by the patient.

Test Case ID	TC-10
Test Case	Update appointment
Test Steps	1. Login as staff. 2. Click on “View appointment” at the left sidebar menu and choose the “Appointment Request”. 3. Click the eyes icon at the chosen patient from the list. 4. Fill the required field that need for changes. 5. Tick the approved box and then, click “Submit” button. 6. System automatically sends the appointment’s detail to the patient’s email.
Test Data	Date: 25 August 2021 Timeslot: 9.00AM – 10.00AM Treatment required: Extraction
Prerequisite	Logged in to the system as staff.
Expected output	1. Appointment successfully updated. 2. The patient gets an email for the appointment’s detail.

Test Case ID	TC-11
Test Case	Remove appointment
Test Steps	1. Login as staff. 2. Click on “View appointment” at the left sidebar menu and choose the “Appointment Request”. 3. Click at the trash icon at the chosen patient from the appointment list. 4. Once the alert message appears, click “OK” button to proceed delete.
Test Data	-
Prerequisite	Logged in to the system as staff.
Expected output	Appointment successfully deleted.

4. Treatment management module

Test Case ID	TC-12
Test Case	View treatment
Test Steps	1. Login as admin. 2. Click on “Treatment” at the left sidebar menu and choose the “View Treatment”.
Test Data	-
Prerequisite	Logged in to the system as admin.
Expected output	System displays the list of treatment.

Test Case ID	TC-13
Test Case	Add treatment.
Test Steps	1. Login as admin. 2. Click on “Treatment” at the left sidebar menu and choose the “Add Treatment”. 3. Fill the treatment creating form. 4. Click “Submit” button.
Test Data	Treatment: Extraction Fees: RM 200
Prerequisite	Logged in to the system as admin.
Expected output	Treatment successfully added.

Condition	1	2	3	4
Valid treatment	Y	Y	N	N
Valid fees	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-14
Test Case	Update treatment
Test Steps	1. Login as admin. 2. Click on “Treatment” at the left sidebar menu and choose the “View Treatment”. 3. Click the “Edit” button at the chosen treatment from the list. 4. Fill the required field that need for changes. 5. Click “Submit” button.
Test Data	Treatment: Extraction Fees: RM 200
Prerequisite	Logged in to the system as admin.
Expected output	Treatment successfully updated.

Condition	1	2	3	4
Valid treatment	Y	Y	N	N
Valid fees	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-15
Test Case	Remove treatment
Test Steps	5. Login as admin. 6. Click on “Treatment” at the left sidebar menu and choose the “View Treatment”. 7. Click the “Delete” button at the chosen treatment from the appointment list. 8. Once the alert message appears, click “OK” button to proceed delete.
Test Data	-
Prerequisite	Logged in to the system as admin.
Expected output	Treatment successfully removed.

5. Dentist management module

Test Case ID	TC-16
Test Case	View appointment
Test Steps	1. Login as admin. 2. Click on “Dentist” at the left sidebar menu and choose the “View Dentist”.
Test Data	
Prerequisite	Logged in to the system as admin.
Expected output	System displays the list of dentists.

Test Case ID	TC-17
Test Case	Add treatment.
Test Steps	6. Login as admin. 7. Click on “Treatment” at the left sidebar menu and choose the “Add Treatment”. 8. Fill the treatment creating form. 9. Click “Submit” button.
Test Data	Treatment: Extraction Fees: RM 200
Prerequisite	Logged in to the system as admin.
Expected output	Treatment successfully added.

Condition	1	2	3	4
Valid treatment	Y	Y	N	N
Valid fees	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-18
Test Case	Update treatment
Test Steps	5. Login as admin. 6. Click on “Treatment” at the left sidebar menu and choose the “View Treatment”. 7. Click the “Edit” button at the chosen treatment from the list. 8. Fill the required field that need for changes. 10. Click “Submit” button.
Test Data	Treatment: Extraction Fees: RM 200
Prerequisite	Logged in to the system as admin.
Expected output	Treatment successfully updated.

Condition	1	2	3	4
Valid treatment	Y	Y	N	N
Valid fees	Y	N	Y	N
Output	Pass	Error	Error	Error

Test Case ID	TC-19
Test Case	Remove dentist
Test Steps	9. Login as staff. 10. Click on “Dentist” at the left sidebar menu and choose the “View Dentist”. 11. Click the “Delete” button at the chosen treatment from the dentist list. 12. Once the alert message appears, click “OK” button to proceed delete.
Test Data	-
Prerequisite	Logged in to the system as admin.
Expected output	Dentist successfully removed.

6. Invoice module

Test Case ID	TC-20
Test Case	Generate Invoice
Test Steps	1. Login as staff. 2. Click on “Invoice” at the left sidebar menu. 3. Click the “Create Invoice” button at the chosen patient’s appointment from the list. 4. Fill the required field in the form. 5. Click “Submit” button.
Test Data	Dentist: Fairoz Bin Hisyam Other treatment: - Treatment: Consultation - Quantity: 1 - Price: RM 25 Medicine Description: - Medicine: Paracetamol - Quantity: 2 - Price: RM 10
Prerequisite	Logged in to the system as staff.
Expected output	Invoice successfully generated.

Condition	1	2	3	4	5	6
Valid treatment	Y	Y	Y	N	N	N
Valid quantity	Y	Y	N	N	Y	Y
Valid price	Y	N	Y	N	Y	N
Output	Pass	Error	Error	Error	Error	Error

Test Case ID	TC-21
Test Case	View invoice
Test Steps	1. Login as staff. 2. Click on “Invoice” at the left sidebar menu. 3. Click the “View Invoice” button at the chosen patient’s appointment from the list.
Test Data	-
Prerequisite	Logged in to the system as staff.
Expected output	System displays the patient’s appointment invoice.

7. Appointment reporting module

Test Case ID	TC-22
Test Case	View appointment reporting
Test Steps	1. Login as admin. 2. Click on “Dashboard” at the left sidebar menu. 3. The number of patients, total appointments and rating are displayed on the page.
Test Data	-
Prerequisite	Logged in to the system as admin.
Expected output	System displays the appointment reporting in bar graph illustration.

6.5 Test Result and Analysis

The system has been undergone testing phase and the system is tested with the user acceptance questionnaire. For this questionnaire, six sections have already been selected to be given to the respondent. Davis introduced the TAM as a technique for forecasting or explaining the components driving IT usage, four of them which are perceived ease of use, perceived usefulness, attitude, and intention of use. (Davis, F.D., 1989).

Below is the acceptance questionnaire that been given to the respondent. This is the analysis result of the acceptance questionnaire 32 respondent that already fill the questionnaire. 32 respondents are enough because the minimum number of respondents that needed are 30 only. Hence, the results are reliable to achieve the project objective.

Section 1: Demographic question.

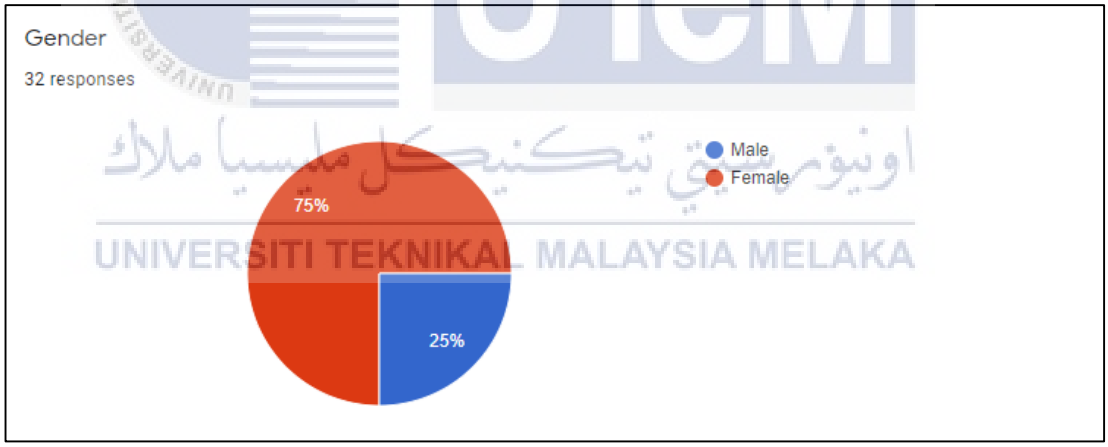

Figure 6.3: Total of respondent based on gender

Figure 6.3 shows the analysis of the respondent where the majority of the respondent are female that have 75% where the other 25% are male respondent.

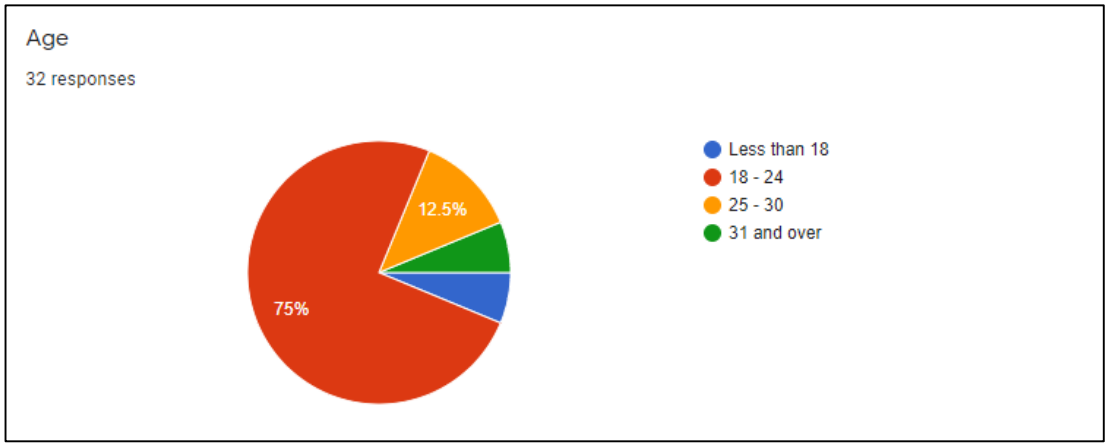

Figure 6.4: Total of respondent based on age

Figure 6.4 shows the analysis of the respondent where the majority of the respondent's age are between 18 to 24 which are 75%. Other respondents who age between 25 to 30 are 12.5% meanwhile 6.3% are same for age which are less than 18 and over 31.

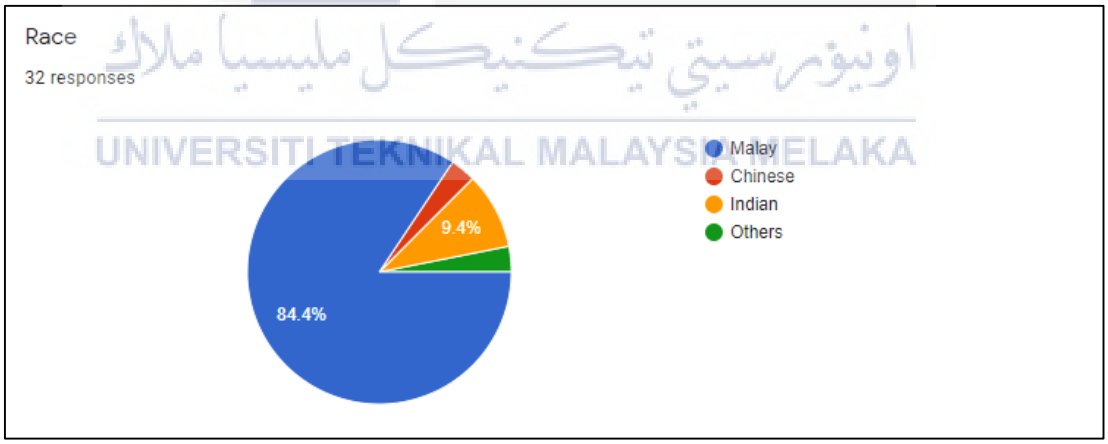

Figure 6.5: Total of respondent based on race

Figure 6.5 shows the analysis of the respondent where the majority of the respondent's race are Malay which are 84.4%. Another respondent who Indian are 9.4% meanwhile 3.1% are same for Chinese and others race.

Section 2: Perceived Ease of Use (EU)

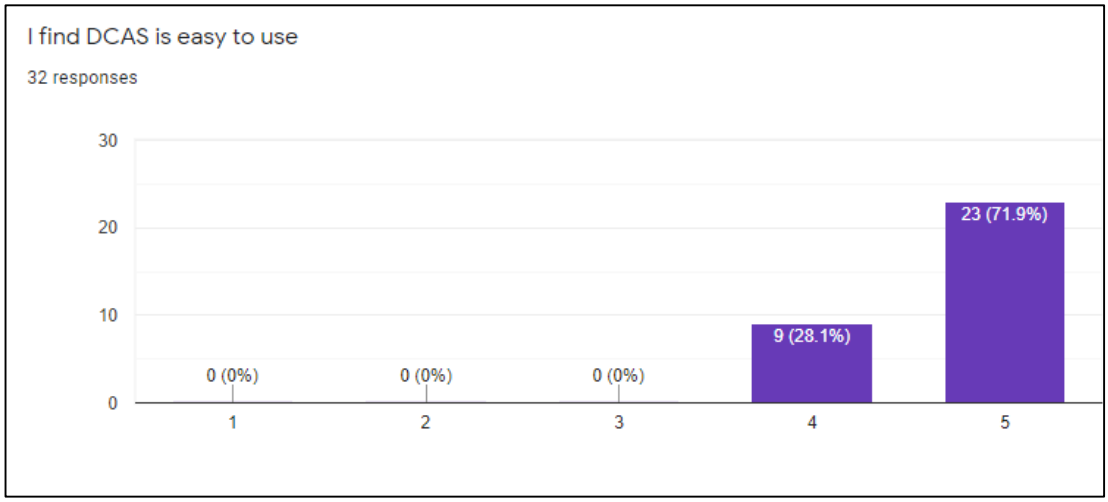

Figure 6.6: Bar Chart for Question EU1

Figure 6.6 represents the 23 (71.9%) respondents totally agree that DCAS is easy to use, and 9 (28.1%) respondents are agreed.

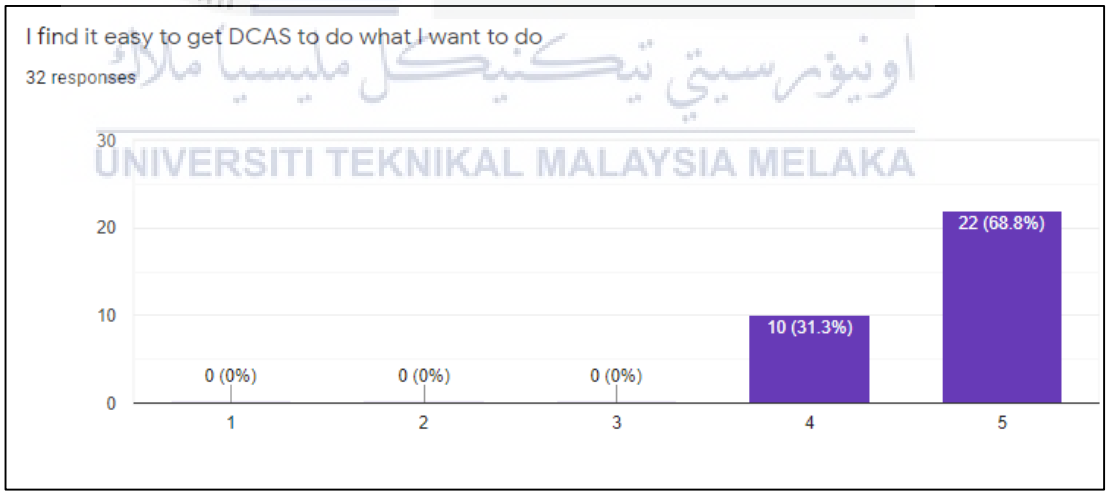

Figure 6.7: Bar Chart for Question EU2

Figure 6.7 represents the 22 (66.8%) respondents totally agree that DCAS is easy to get the DCAS do what they want to do, and 10 (31.3%) respondents are agreed.

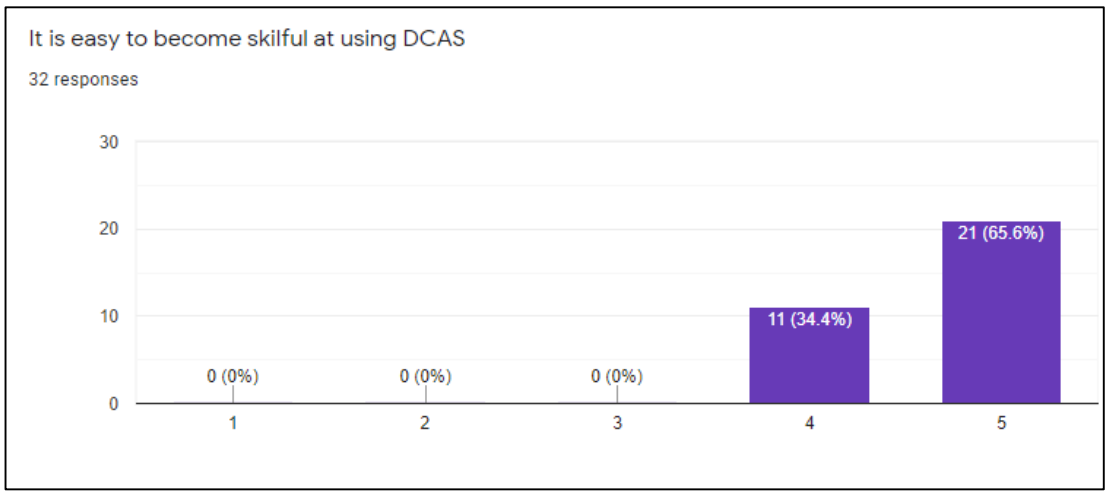

Figure 6.8: Bar Chart for Question EU3

Figure 6.8 represents the 21 (65.6%) respondents totally agree that it is easy to become skillful at using DCAS, and 11 (34.4%) respondents are agreed.

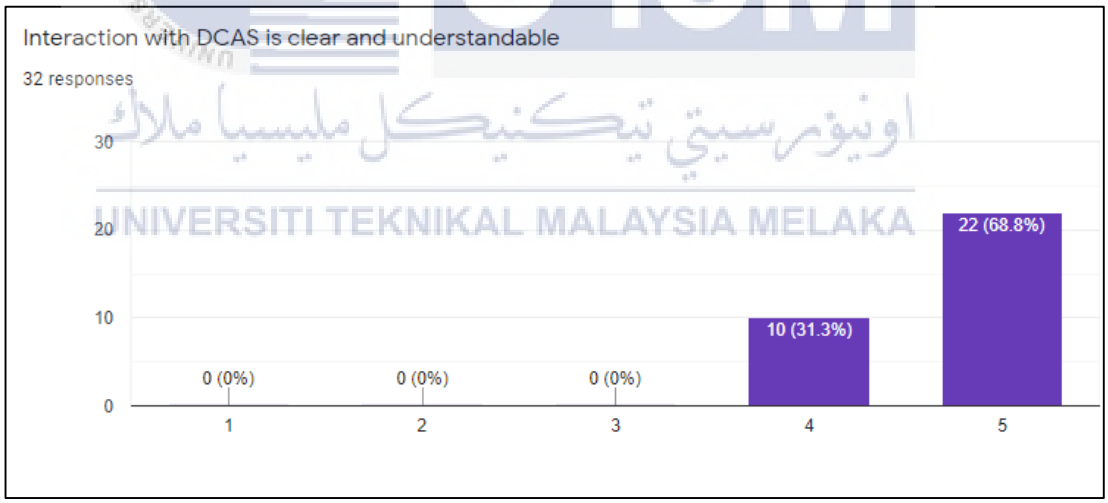

Figure 6.9: Bar Chart for Question EU4

Figure 6.9 represents the 22 (68.8%) respondents totally agree that the interaction between respondent with DCAS is clear and understandable, and 10 (31.3%) respondents are agreed.

Section 3: Perceived Usefulness (PU)

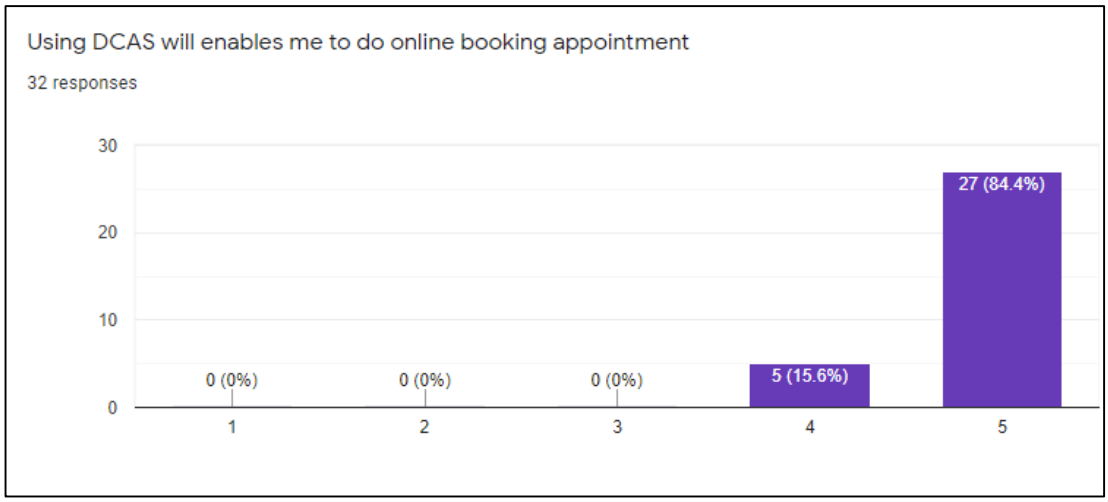

Figure 6.10: Bar Chart for Question PU1

Figure 6.10 represents the 27 (84.4%) respondents totally agree that using DCAS will enable them to do online booking appointment, and 5 (15.6%) respondents are agreed.

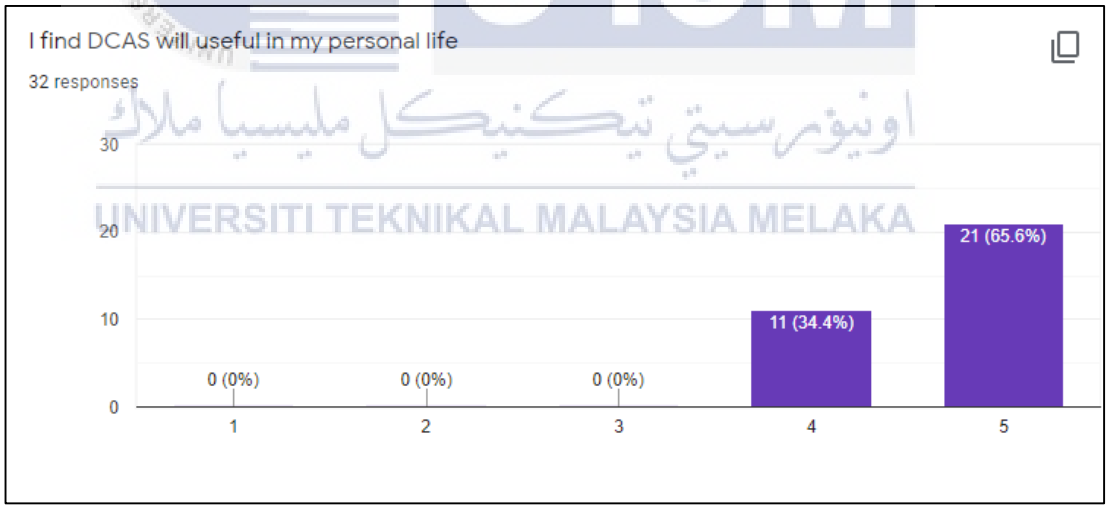

Figure 6.11: Bar Chart for Question PU2

Figure 6.11 represents the 21 (65.6%) respondents totally agree that DCAS will be useful in their personal life, and 11 (34.4%) respondents are agreed.

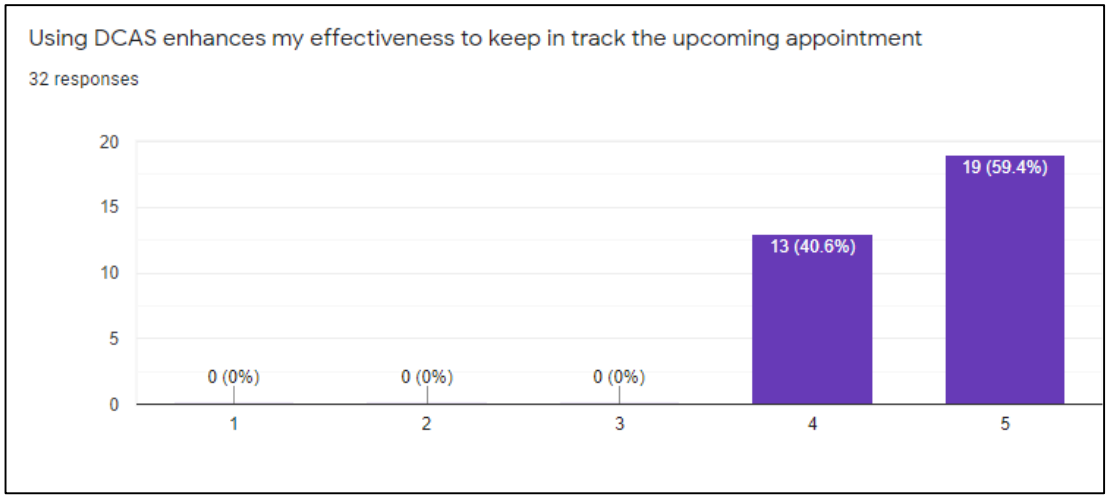

Figure 6.12: Bar Chart for Question PU3

Figure 6.12 represents the 19 (59.4%) respondents totally agree that using DCAS enhance their effectiveness to keep in track the upcoming appointment, and 13 (40.6%) respondents are agreed.

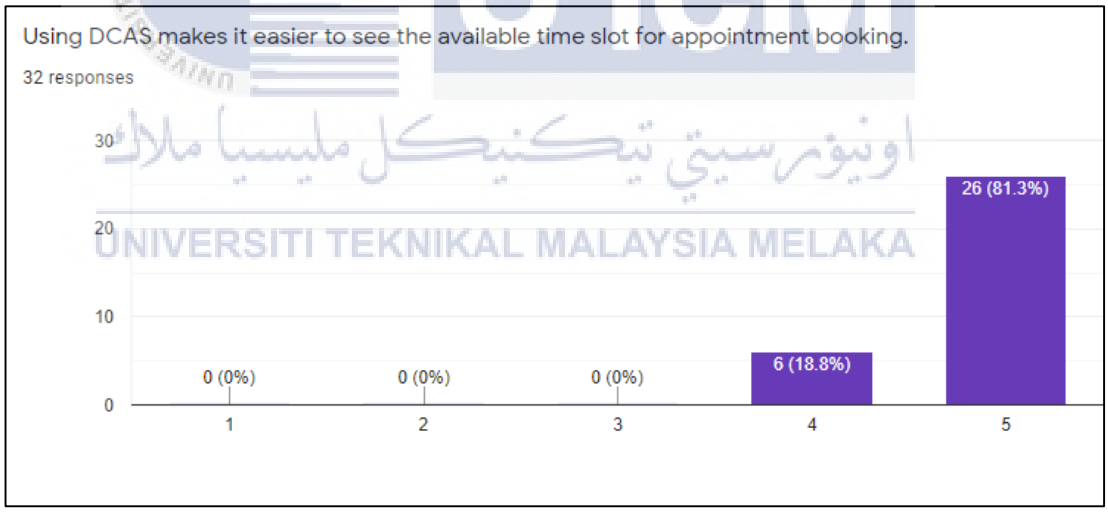

Figure 6.13: Bar Chart for Question PU4

Figure 6.13 represents the 26 (81.3%) respondents totally agree that using DCAS makes it easier to see the available time slot for appointment booking, and 6 (18.8%) respondents are agreed.

Section 4: Capability (CP)

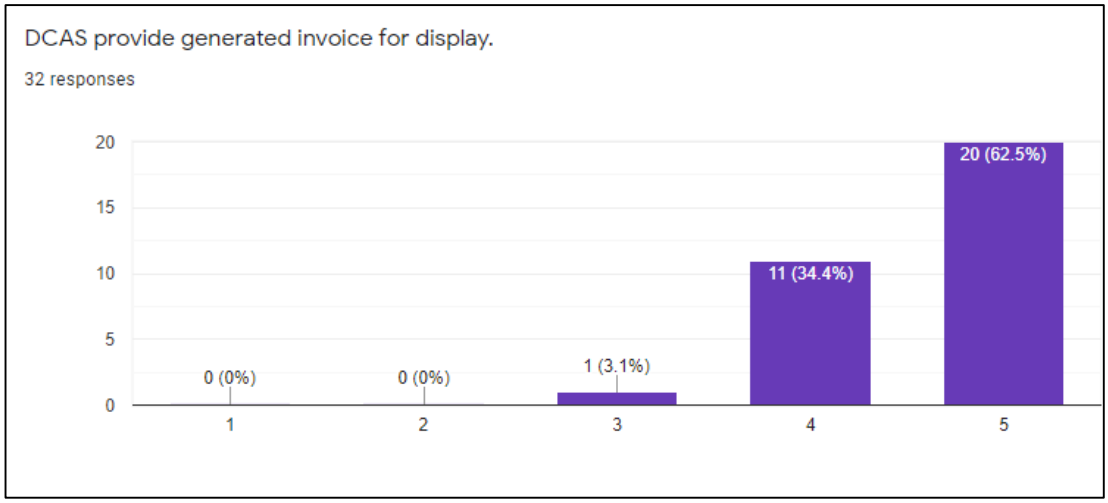

Figure 6.14: Bar Chart for Question CP1

Figure 6.14 represents the 20 (62.5%) respondents totally agree that DCAS provide generated invoice for display, 11 (34.4%) respondents are agreed and 1 (3.1%) is on average.

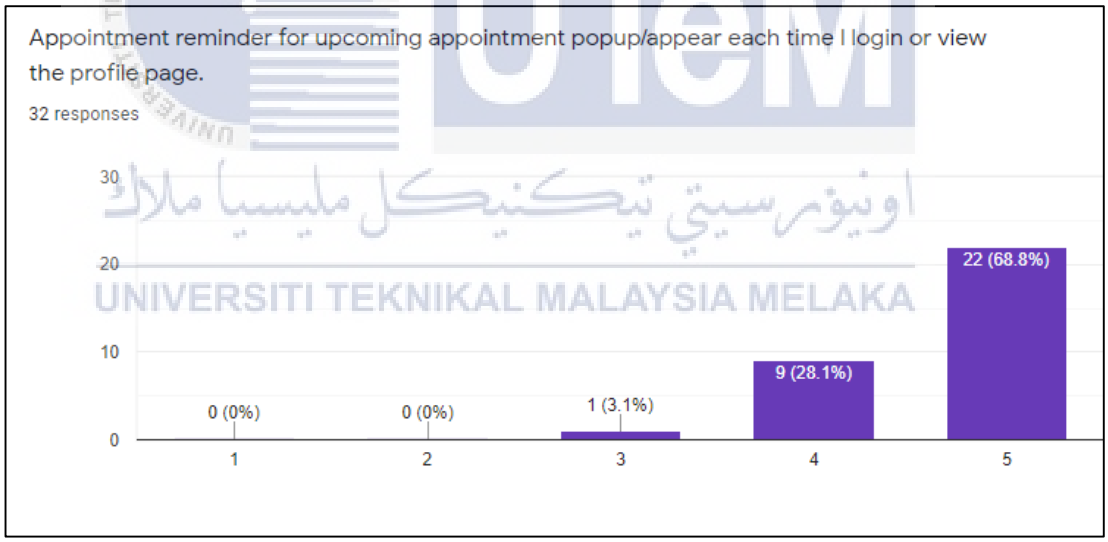

Figure 6.15: Bar Chart for Question CP2

Figure 6.15 represents the 22 (68.8%) respondents totally agree that appointment reminder for upcoming appointment popup or appear each time they login or view the profile page, 9 (28.1%) respondents are agreed and 1 (3.1%) is on average.

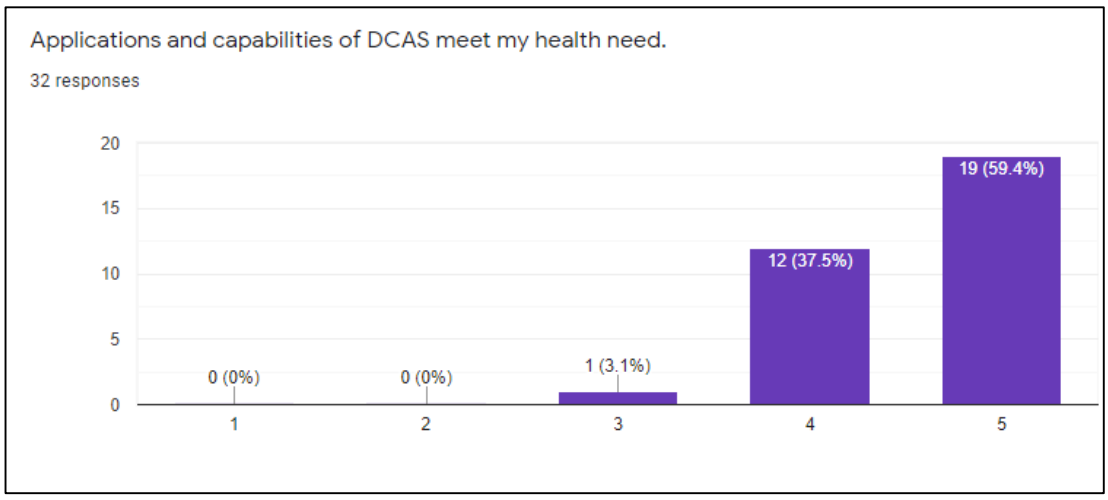

Figure 6.16: Bar Chart for Question CP3

Figure 6.16 represents the 19 (59.4%) respondents totally agree that applications and capabilities of DCAS meet their health need, 12 (37.5%) respondents are agreed and 1 (3.1%) is on average.

Section 5: Trustworthiness (TW)

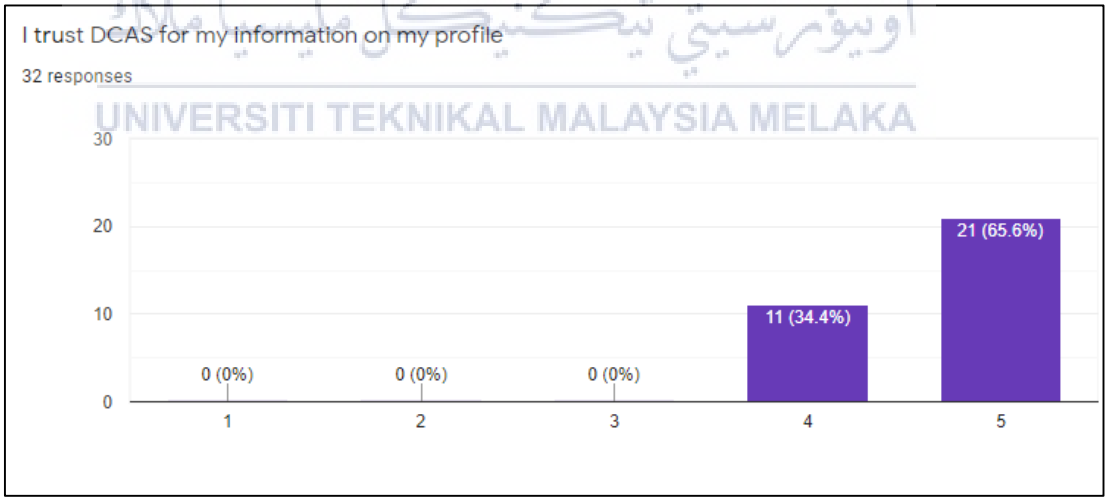

Figure 6.17: Bar Chart for Question TW1

Figure 6.17 represents the 21 (65.6%) respondents totally agree that they trust DCAS for their information on the profile, and 11 (34.4%) respondents are agreed.

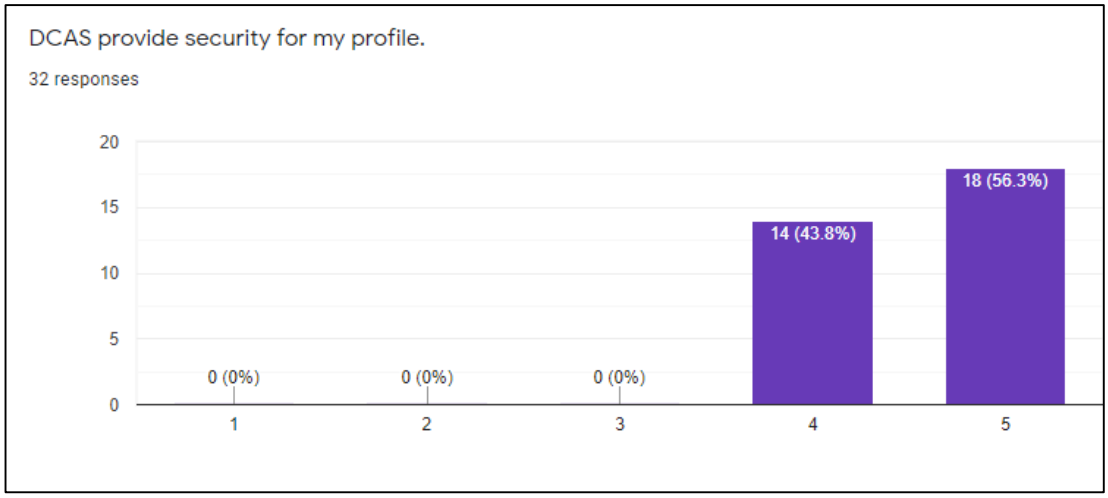

Figure 6.18: Bar Chart for Question TW2

Figure 6.18 represents the 18 (56.3%) respondents totally agree that DCAS provide security for their profile, and 14 (43.8%) respondents are agreed.

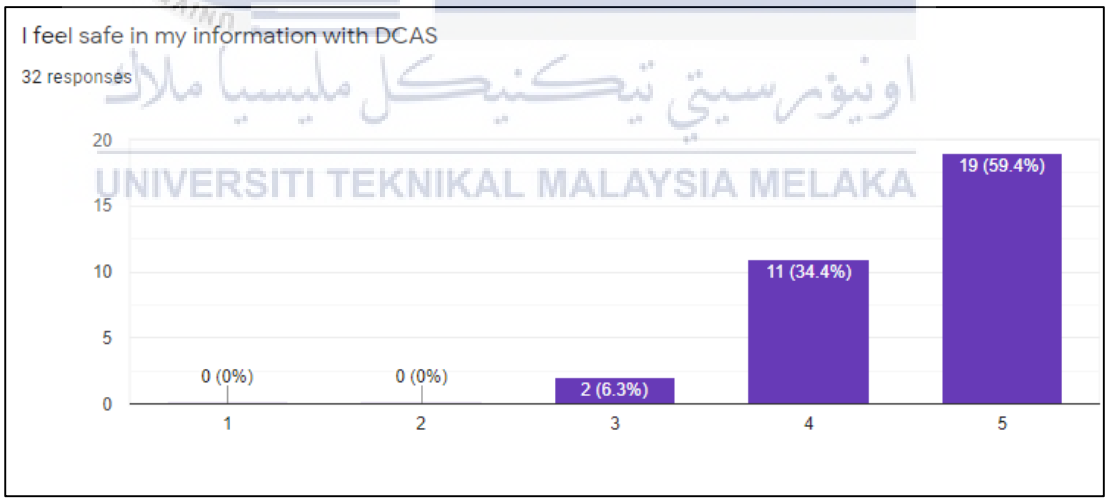

Figure 6.19: Bar Chart for Question TW3

Figure 6.19 represents the 19 (59.4%) respondents totally agree that applications and capabilities of DCAS meet their health need, 11 (34.4%) respondents are agreed and 2 (6.3%) are on average.

Section 6: Attitude (AT)

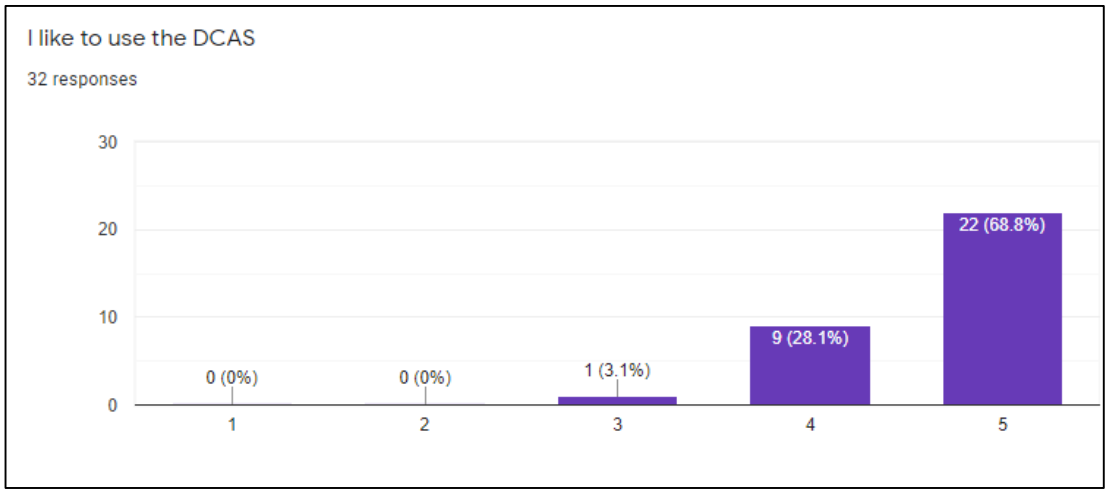

Figure 6.20: Bar Chart for Question AT1

Figure 6.20 represents the 22 (68.8%) respondents totally agree that the respondent like to use the DCAS, 9 (28.1%) respondents are agreed and 1 (3.1%) is on average.

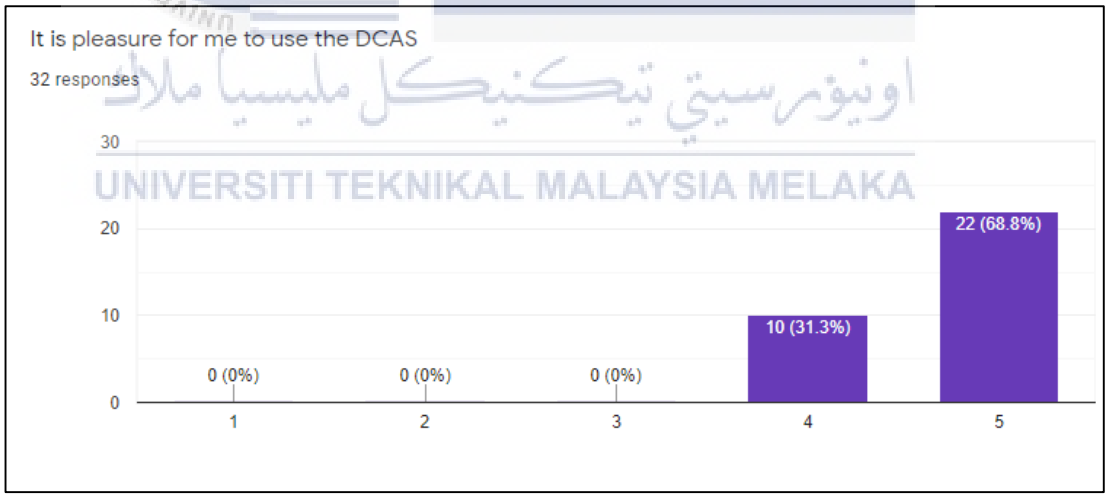

Figure 6.21: Bar Chart for Question AT2

Figure 6.21 represents the 22 (68.8%) respondents totally agree that it is pleasure for them to use the DCAS, and 10 (31.3%) respondents are agreed.

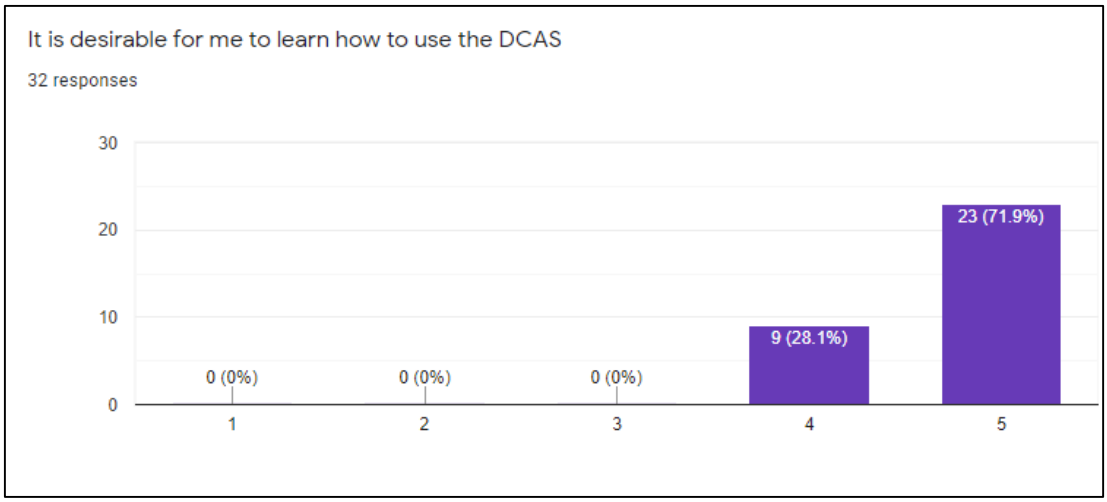

Figure 6.22: Bar Chart for Question AT3

Figure 6.22 represents the 23 (71.9%) respondents totally agree that it is desirable for them to learn on how to use the DCAS, and 9 (28.1%) respondents are agreed.

Section 7: Intention to Use (IU)

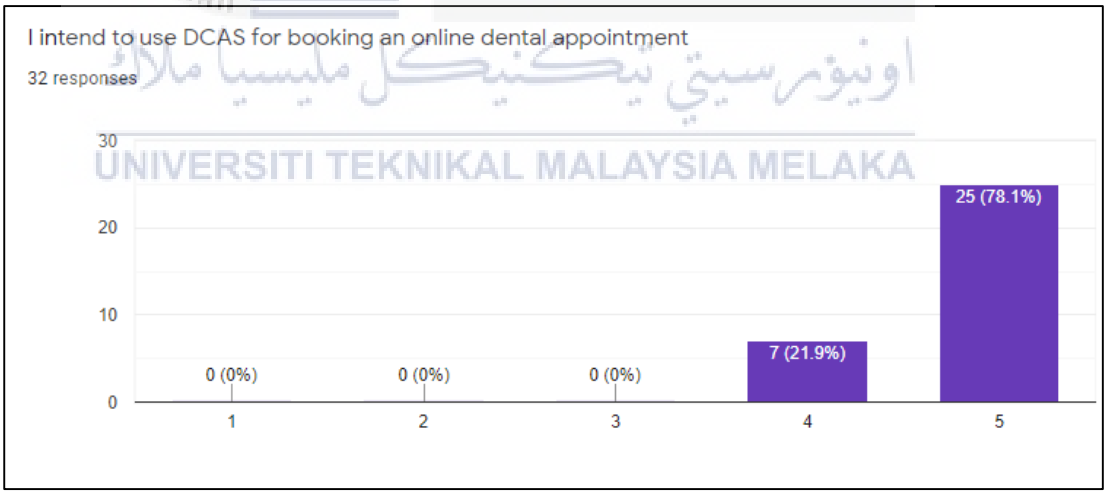

Figure 6.23: Bar Chart for Question IU1

Figure 6.23 represents the 25 (78.1%) respondents totally agree that they intend to use DCAS for booking an online dental appointment, and 7 (21.9%) respondents are agreed.

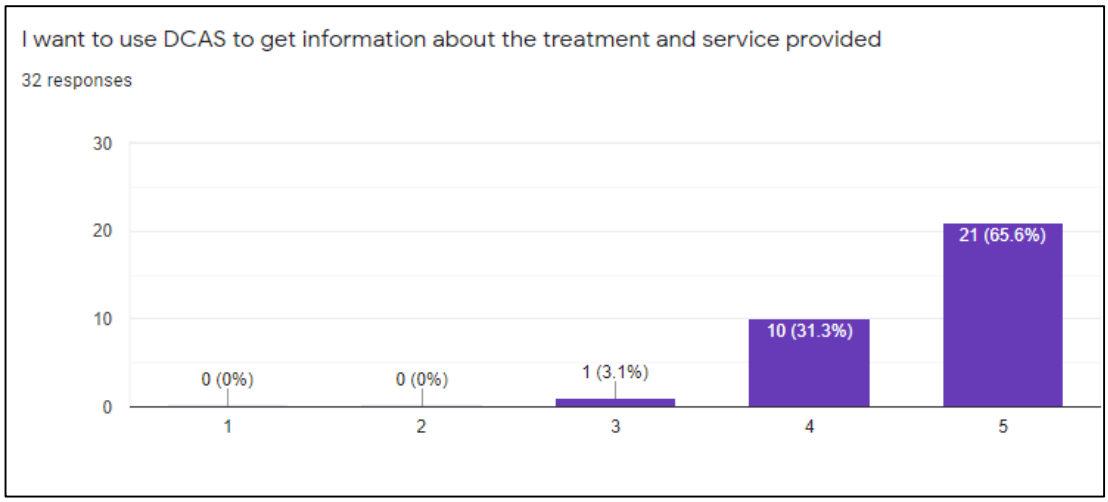

Figure 6.24: Bar Chart for Question IU2

Figure 6.24 represent the 21 (65.6%) respondents totally agree that they want to use DCAS to get information about the treatment and service provided, 10 (31.3%) respondents are agreed, and 1 (3.1%) is on average.

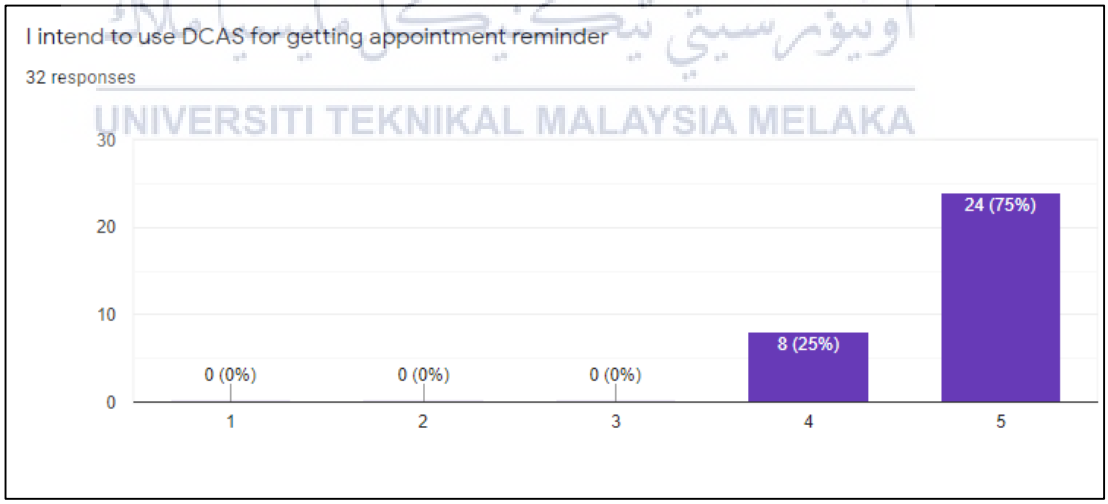

Figure 6.25: Bar Chart for Question IU3

Figure 6.25 represent the 24 (75%) respondents totally agree that they intend to use DCAS for getting appointment reminder, and 8 (25%) respondents are agreed

6.6 Conclusion

In summary, the testing phase for DCAS is describe in this chapter and conducted. The test plans are containing the test of organization, environment, and schedule. At the test strategy, the classes of test are explained briefly. In the test design there are test description and the test data that using the black box technique. For the test result and analysis are taken from the user acceptance questionnaire survey that had been answered by the 32 respondents.

CHAPTER 7: PROJECT CONCLUSION

7.1 Observation on Weaknesses and Strengths

Every application system has its own weakness and strengths. Even in the manufacturing system, there are faults and room for development. This might be deliberate since it allows for greater potential for development as the world's technology advances, or it could be inadvertent because it necessitates corrections and updates.

The weakness of DCAS is the system only accept booking from registered patient. A public user cannot just get into the website to do the online dental booking. They must register an account in the system before they and the staff can proceed to book an online dental appointment. Other than that, there are no dentist information on the website. Hence, the patient having no information about the dentist who works in the clinic and which dentist are meant to do the treatment on them.

Meanwhile, as for the strength of DCAS is the system help the patient to book online dental appointment without making a call or going straight to the clinic. Sometimes, when making a call, there might be issues when there another person on the line or being indecisive in choosing the appointment date and time on the spot. In addition, they can also get reminder for upcoming appointment so they will not be missing the appointment date. The staff can also work efficiently only by managing all the appointment in the system. They do not have to write down on book to do all the appointment recording anymore.

7.2 Propositions for Improvement

The DCAS can be improved by implementing several features. The features are already in mind but cannot be added due to the limitation of time in this final year project.

The features that can be added are adding a forgot password for patient. Patient who forgot their password cannot recover and reset their password for their account in DCAS. Hence, forgot password can be added as the improvement of DCAS. Once the patient attempting their password for 5 times, the system can email the patient a link to reset their password.

Other than that, adding a feature for entering password into confirmation box for data deletion. Alert message that appears and then clicking on the confirm button to proceed for data deletion are too much simple. This action may lead them to do mistakes in which data they supposed to delete. The staff and admin must enter their password into the confirmation box before they can proceed to permanently delete the data.

7.3 Project contribution

The project of DCAS is completed as schedule regarding of support that are offered by several individuals. There are few people to mention for contribution toward this success, which are the supervisor, family, fellow friends, and the respondents of the system. Their support and feedback have been a great addition toward the system. This system is beneficial for patient and dental clinic staff. This is because, it will help patient to do online appointment booking at any time. In addition, the staff will be easier to find out and get a list of patients and getting appointment request upon patient's appointment booking. With this system, patient can choose the available time slot that shown in the booking form. In addition, they can also view history of appointment and invoice after done getting treatment from the clinic. It is also very beneficial because the dental management records are manageable hence, staff are no longer needed to do manually record all the patient information and appointment on book anymore.

7.4 Conclusion

The development of the Dental Clinic Appointment System (DCAS) might make it easier for patients to arrange an online dental appointment, reducing the need for them to hurry to the clinic. Problems arising from the misplacement of all critical documents are no longer a cause for concern. The DCAS might assist the staff in handling the paperwork and the patient's forthcoming appointment. Analyzing articles and journals is being done to ensure that the system can be developed effectively within the given timeframe. User acceptance questionnaire survey are distributed to the respondent to get their feedback for the system’s acceptance. In a conclusion all the system’s module are function well while getting a majority result from respondent that choosing totally agreed for acceptance in the whole system.

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APPENDICES

APPENDIX A – DCAS User Acceptance Questionnaire

Hello and assalamualaikum.

I'm student of BITS from the Faculty of Information and Communication Technology.

Dental Clinic Appointment System (DCAS) is my project for PSM. This survey is conducted as to know the user acceptance for this system development.

Thank you in advance for spending your time to provide answers to this survey and for your kind feedbacks and participations.

Perceived Ease of Use (EU)

1 - Totally disagree

2 - Disagree

3 - Average

4 - Agree

5 - Totally agree

		1	2	3	4	5
EU1	I find DCAS is easy to use					
EU2	I find it easy to get DCAS to do what I want to do					

EU3	It is easy to become skillful at using DCAS					
EU4	Interaction with DCAS is clear and understandable					

Perceived Usefulness (PU)

1 - Totally disagree

2 - Disagree

3 - Average

4 - Agree

5 - Totally agree

		1	2	3	4	5
PU1	Using DCAS will enables me to do online booking appointment					
PU2	I find DCAS will be useful in my personal life					
PU3	Using DCAS enhances my effectiveness to keep in track the upcoming appointment					
PU4	Using DCAS makes it easier to see the available time slot for appointment booking.					

Capability (CP)

1 - Totally disagree

2 - Disagree

3 - Average

4 - Agree

5 - Totally agree

		1	2	3	4	5
CP1	DCAS provide generated invoice for display.					
CP2	Appointment reminder for upcoming appointment popup/appear each time I login or view the profile page.					
CP3	Applications and capabilities of DCAS meet my health need.					

Trustworthiness (TW)

1 - Totally disagree

2 - Disagree

3 - Average

4 - Agree

5 - Totally agree

		1	2	3	4	5
TW1	I trust DCAS for my information on my profile					
TW2	DCAS provide security for my profile.					
TW3	I feel safe in my information with DCAS					

Attitude (AT)

1 - Totally disagree

2 - Disagree

3 - Average

4 - Agree

5 - Totally agree

		1	2	3	4	5
AT1	I like to use the DCAS					
AT2	It is pleasure for me to use the DCAS					
AT3	It is desirable for me to learn how to use the DCAS					

Intention to Use (IU)

1 - Totally disagree

2 - Disagree

3 - Average

4 - Agree

5 - Totally agree

		1	2	3	4	5
AT1	I intend to use DCAS for booking an online dental appointment					
AT2	I want to use DCAS to get information about the treatment and service provided					
AT3	I intend to use DCAS for getting appointment reminder					