UNIVERSITI TEKNOLOGI MALAYSIA

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SECD 2613 System Analysis and Design
Section 09

Phase 3:
System Analysis and Design

<MyCarelink System>

<Team 2: Communion>

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1.0 Introduction

1.1 Overview of the Project

The project is about the development of a new Customer Relationship System for MindCare which is a healthcare company that provides rehabilitation services. The purpose of this project is to attempt to build a new CRM system that could produce better performance than the current system for the parties of customers and the company. The current system of MindCare company is found that there are some weaknesses that cause a number of issues or problems when the business is growing bigger. These problems could cause inefficient workflow and unnecessary time consumption then lead to dissatisfaction among customers. Therefore, a new system is required to replace the current system. The change in the company system will improve the quality of the services provided to the customer. The staff task arrangement and management would be transformed into structured and more significant planning. Most of the processes in the workflow of the business will shift from manual operations to automated and more centralized operations.

In this project, the project team looked into the problems and came up with solutions in the proposal to overcome the requirements of the company by following SDLC(System Development Life Cycle) which is a phased approach to solving business problems. The activities in the phase of project planning have been viewed in this project proposal. For example, problem definition, feasibility study, and schedule planning.

We also discuss the information gathering process for developing the new CRM system. We use the interviewing method and the questionnaire method which are the data collection procedures in interactive methods to conduct with the clients and the company for data collecting

A logical DFD has also been used as the visual representation of how data moves through the current CRM system. Through this method, we could understand well about the workflow of the current CRM system and quickly figure out the improvement that enhances the current workflow.

A physical DFD has also been used as the visual representation of how data moves through the new CRM system. This method does offer some advantages to the development of the new system that could help us to be able to view the incoming data more thoroughly and effectively. Specification of every process has also been shown in the report to show detailed workflow of a process going from the beginning to the end and how different child processes in a process would integrate with each other

The project would aim to enhance the business of the company from different aspects, including efficiency, productivity, convenience, communication, satisfaction, effectiveness, responsiveness, predictability, flexibility, participation, management and arrangement. A Web app that combines different phases of the workflow like inquiry, booking, monitoring, screening, assessment etc. into a single platform would be one of the solutions for this project.

1.2 Organization Background

One of the UTM spin-off companies that were founded under DF & K Group Sdn.Bhd, MindCare Centre was offering rehabilitation services. The rehabilitation services provided by this company are occupational therapy (OT), speech therapy(ST), physiotherapy and early intervention (PEI) programs. Besides that, MindCare Centre also provides therapeutic tools, instructional materials and books through their online shop.

MindCare Centre put their focus on becoming the most compassionate and effective provider of rehabilitation by using innovative therapy, leading clinical research, and inspirational teaching. Their aim is to help everyone in building a better world for everyone, especially among the community of B40 families and people who need special assistance from professionals.

As of now, MindCare Centre is expanding its clientele by setting up additional branches around Johor. With this expansion of the company business, more interested customers will start getting in touch with MindCare Centre to inquire to access further information from MindCare Centre about the services which are provided by the company.

MindCare Centre has a CRM(Customer Relationship Management) system on the operation to execute the tasks in different phases of the business operation workflow. Most of the features of the current CRM system are in collaboration with the external software and website. For example, the use of different communication software like Whatsapp in the phase of inquiry between customers and therapists.

The current system could be divided into three main phases which are the inquiry phase, appointment management phase and data collection phase. In most cases, customers will contact the company by using different channels, for example the company's website, telephone, email, live chat, marketing materials and social media (Facebook, Instagram, WhatsApp, Telegram). At the moment, the therapists who are the person-in-charge (PIC) would communicate with the customer to reply to their enquiries. Then, the process will move to the next phase, which is appointment management. The therapists would be in charge of mutually managing the appointment through the various channels indicated above. An app with the name "Pantau" is launched as a communication application between parents and therapists in this phase to check the appointment with the therapists. The data of the customer would be recorded manually in the data collection phase for the next market campaign.

1.3 Background Study

Customer relationship management, or CRM is a general term describing a commonly used approach to managing customer interaction. It involves utilizing technology to organize, automate, and coordinate corporate processes, primarily those related to customer care, marketing and sales operation. The purpose of a CRM system is to manage customers and improve the services provided to them.

These days, a lot of businesses, including those in the healthcare sector, utilise CRM as a tool to provide better customer service. Since CRM is a crucial component of the e-business architecture, e-business without CRM is incomplete. Businesses use e-business and take advantage of current advancements in information and communication technology (ICT), particularly in Internet-related technology. Additionally, CRM systems involve the use of technology, automation, and culture change to enhance customer management in order to fulfill corporate goals like increased revenue, greater margins, longer selling hours, more successful campaigns, shorter phone wait times, etc.

CRM may be considered as a strategy to retain current clients and attract new clients. Customer retention is crucial for a business's development and sustainability. Better customer participation in service creation, shorter cycle times, and lower operating costs due to a redesigned business process that removes work that does not offer value for the customers. CRM systems can also be utilized to provide the consumer with additional services or goods. CRM must be viewed as a plan for significantly improving services by solidifying customer satisfaction, loyalty and advocacy using information and communication technology.

Additionally, it is a transnational and operational approach to customer management that is concentrated on the customer-facing departments, sales, marketing and customer service. Thus, human factors including consumer behavior, culture change, personal goals and new interaction between individuals and groups must be taken into account in CRM systems. A company must be aware that consumer behavior and expectations are always changing. Thus, the adaptability tactics which are embedded in CRM are necessary to take into account for handling the changing nature of client's requirements. The company must embrace the viewpoint of the clients and try to create a detailed strategy document and clear business objectives

CRM helps a healthcare provider company to gather crucial patient (customer) information that may be used wisely, particularly when integrating the patients' information into a system to encourage excellent service. Healthcare providers would have challenges, including how to attract prospective clients, keep them engaged while using the services, and extend various services in the future.

The CRM's widespread use enhances the communication between healthcare provider companies and their clients for both parties 'benefit. Now, with the increased competition among healthcare providers, CRM has already been a strategy that needs to be properly thought out to manage client relationships and deliver better services.

1.4 Scope of the Project

The purpose of the phase 1 report is to give the company a better understanding of the scenario of the project and the possible development direction of the project in the future. This report has highlighted the problems faced by the organization with the current system and the opportunities for improvements so that the company could understand the current situation their company is facing. In this report, the project team also proposed some solutions with different objectives to the company. With this, the company could understand the impact and the importance of the solutions to the company. The feasibility study and the project planning were also included in the report for the evaluation and the preparation of the company in the next phases of the project development.

The purpose of the phase 2 report is to present and discuss the information gathered from the stakeholder and the respondents who are the users of the current system. This report has highlighted the requirements of the users and stakeholders from the analysis of the information gathered. In this project, Logical DFD of the AS-IS system was also presented to show the workflow of the current system. With this, the team could understand about the current system in a more detailed way and this would be used for investigating the way of improvement that could be implemented in the new system

The purpose of the phase 3 report is to present the design of the new system. This report has highlighted the workflow of every process in the TO-BE system for the development of high fidelity prototypes in the next phase. In this project,the physical DFD, structured chart and the process specification of the TO-BE system are also presented to show how the new system would be realized.

The major users of this project are the company and the customers. From the perspective of the company and the therapists, the new system should be able to reduce most of the unnecessary manual operations. In other means, an automatic and digitalized system is required for the company. For example, an automatic chatbot that could respond to certain inquiries or messages from the customer would be included in the inquiry session. This could reduce the participation of the therapists in communication with the clients.

In the requirement elicitation workshop of MindCare Center, the therapist listed out some requirements of the inquiry session. One of the requirements or features that need to be included in the inquiry session is a potential customer identifying system that could help the therapist in prioritizing the services of the potential customer. Moreover, he also mentioned the communication sorting system that could streamline the inquiry response process via instant responses to the inquiry of the customer.

Furthermore, for the cooperation and relationships among the therapists, a convenient system is also needed to provide a good communication platform among the therapists so that the adjustment to their tasks and schedule could respond instantly to different situations and in a flexible way that would not disrupt the schedule of other therapists. The schedule or appointment arrangement of a therapist would be transparent to other therapists.

Through the showcase of the current system in the requirement elicitation workshop, multiple different processes should be combined in a single platform to reduce the complexity of the mechanism for the therapists and the customers. The customer data collection and sorting system need to be embedded in the project. This system is very important for the accurate analysis of data. Besides that, the data which is collected would be useful in the expansion of the market.

From the perspective of the customer and the therapists, the team is planning to develop an appointment arrangement system that could instantly respond to changes or updates from either the customer's side or the therapist's side. This could ensure that the customer is able to access the latest status of the therapist including the availability. The system would also be designed in a way that avoids overlapping of the appointment with others. The system should also be able to provide space and flexibility to customers and therapists to decide and arrange appointments

The duration of the project is 10 weeks, which is approximately 2 months and half. Meanwhile, the project team will also develop a CRM system within the budget provided by the school.

2.0 Problem Statement

2.1 Problems

Based on the CRM System Project Description document for MindCare Sdn Bhd and Requirement Elicitation Workshop (MINDCARE CRM SYSTEM), we found that the system has many problems to be solved for improvement. First of all, there is a limitation of the communication channel in the system which is via WhatsApp. From their experience using WhatsApp, the app has limitations from the features of chatbots of WhatsApp and the content size of the replying message. This will cause a need for the therapists to reply to the customer manually.

Next, the therapist may encounter some disturbance in communication with the customers. Sometimes, the response from the therapists could be delayed if the therapist leaves his or her position. Besides that, they may also have to conduct sessions with the current clients at the centre at the same time. In the current system, therapists are responsible for different tasks. For example, managing the appointment for screening, assessment and therapy sessions requested by the current clients manually from different channels. In the communication with the customers, the therapists are given at most 2 days to reply or follow up to the incoming inquiry. By having different tasks assigned to themselves, the therapists may not be able to catch up with the rate of incoming inquiry from the customer if there is any delay to occur. When there is a busy moment, they can’t handle the huge amount of inquiry from the customer manually.

Other than that, the enquiries are found to be sorted out with difficulty by manual means. If the therapists take longer time to reply to the enquiries and requests from the customers, this may be hard for the therapists to manually sort out the request one by one to perform the follow-up process. During the time when a therapist follows up with a customer, there are also some entries of inquiry from the new customers. This will disrupt the pace and progress in replying or following up with certain customers. This is because the enquiries from new customers will keep refreshing and pile up, and then the current communication could mix with them. The therapist may not be able to find the location of the current communication and have difficulty tracking back the communication with the current customer. This will waste their time as they need to continue the communication. This may also influence the emotion of the therapist when the process is delayed. If the therapist could not able to reply in a duration of 2 days, there may be a loss of potential customers

For the market campaign that is organized monthly, the current system can’t get accurate data with inquiry standards. Currently, all new customer enquiries are sorted manually inside WhatsApp business application. The process to sort out which has a high potential to be close-deal will consume much time. Due to that, they are unable to get accurate data for inquiry status such as the percentage of closed deals against failures.

In the aspect of arranging an appointment for a therapist, there may be a probability to have crashed in using the same space. There is a limitation in the space of the center and the number of rooms is not sufficient for the therapy treatments. This is because most of the spaces are occupied by 3 to 4 activities and programs.

Last of all, there is the inability of the current system to determine the potential customers. Since the current system is mostly manual, the therapists need to engage themselves in every communication with different customers. They could only determine the potential of a customer based on their estimations and experiences. Some customers only want to know information like the price but don't have the intention to have a consultation session with the company. This may take much time to find a customer to be a closed deal.

2.2 Proposed Solutions

There are still some opportunities for improvement that possibly solved the problems. One of these is the integration of different functions in a system. This could be a Web app which the company expects us to design. The app should be able to perform different functions for customers and therapists. For example, inquiry, Booking, Monitoring, Screening, Assessment etc. Currently, the company uses different platforms for different functionality. For example, WhatsApp for inquiries, and Appointlet for booking. With the designed web app, there is no need to do this. It could reduce the complexity of the procedures and handle all the processes easily. With this, the therapists also don't need to track different platforms for any update or change. This reduces the time consumed. Since all the functionality is combined into a web app, the therapists could respond quickly to the incoming inquiry of customers from doing other tasks. They could receive notifications when there is an incoming inquiry. The design could also reduce the occurrence of careless flaws from therapists.

Besides that, more efficient communication should be provided in the solution. The communication with customers should be sorted by a criterion: recently communicated. This could help the therapist to continue the recent communication from any disturbance. With this, the responsiveness which is the response speed of enquiries should be increased, and then the customer's satisfaction could be ensured.

Moreover, an effective connection with the potential customer should be built. The system should be able to estimate and anticipate the potential of a customer. Predictive analytics could be used to understand customers' behaviors and what their next step might be by using AI to look at some criteria: actively engaging during the conversation, reply rate, etc. Then, the potential customer could be filtered from the list of customers and the therapists could put their priority on these customers.

Other than that, the consumption of the company during the workflow should be reduced in the aspect of time. Changing the current system to be a digitalized and automatic system that could include these features: online booking, automatic chatbot etc. This could reduce the task assigned to the therapists because some processes could be handled by the customers themselves.

Furthermore, the automatic collection and sorting of data should be embedded in the designed system. All the data from the customers either non-potential or potential would be stored on the server. These data have been sorted into closed-deal and failure. With this, the process of analyzing data will be much easier and the company could directly do investigations of potential customers and non-potential customers. The customer behaviors in the inquiry session will also be recorded for the machine-learning model. By getting to know more and accurately about the customers, the company could be able to know and plan about their targeting of their potential customers. By using these data, the effectiveness of previous marketing campaigns could be evaluated and the company could organize more effective marketing campaigns to increase its clientele in the market.

Besides the connection between customers and therapists. The connection between therapists should be improved also. A communication link between the therapists should be established. The therapists could update their status including their appointments and their condition to each other so that they could help and cooperate with each other in their respective tasks. If a therapist is absent due to emergency cases or other reasons, other available therapists could be able to substitute their position to carry out the task. The work will not be delayed and the workflow is ensured to be not stopped.

Last of all, the designed system should be able to prepare a high-quality service of appointment arrangement. All therapists must update their appointment schedule on a weekly basis inside the booking system. The booking system could respond instantly to the latest update of the schedule. This could ensure the integrity of the information sharing between the customers and the therapists. The customers should be provided flexibility in booking sessions. The customer could know the availability of the slots for different therapists and book the slot with the corresponding therapist. In order to avoid all the therapists could have crashed by having the same slots, the system should be designed in a way that could respond instantly to the choice of the customers by closing the availability of a slot for other therapists when the slot is booked by a customer for a therapist. This could avoid inconvenience to the therapists and the customers. A notification system could also be embedded inside the system to remind the therapists when there is an incoming appointment so that they will not forget the task and be able to discuss with their customers and other therapists earlier when there is a change of the appointment.

2.3 Objectives

1. To design a system with automation that could reduce the manual process
2. To improve the customer experience in all sessions
3. To reduce the loss of clientele
4. To assist the company with systematic business relationships
5. To assist the company with systemic interactions with customers and potential customers
6. Helps the centre to stay connected to customers
7. To streamline the different processes in the workflow
8. To improve profitability
9. To analyze the effectiveness of the market campaign
10. To provide a good service of good quality to the customers
11. To determine the potential of the customers
12. To reduce the time consumption in inquiry session
13. To organize a more effective market campaign
14. To arrange the appointment in a flexible way
15. Expansion of the market

3.0 Information Gathering Process

3.1 Used Method 1 - Interview

This section aims to provide more clarity on customer and staff needs. This is done by interviewing one of the customers of the company and the managing director of Mind Care Sdn Bhd that handles the communication system at MindCare Centre. A pyramid structure has been used for both types of interviews which start off with closed questions and then expand into more detailed open-ended questions. This is done to warm up our interviewees to the questions asked. The interview also includes Bipolar questions as well as probe questions to provide more clarity.

Interview sample 1 - with therapist

Type of question	Interview question	
Opening	Interviewer	Good afternoon Sir, the purpose of this interview is to gather more information on the current CRM system. Thank you for being here with us!
	Interviewee	Good afternoon, thank you for having me. I will try my best to answer your questions and provide you with the information needed.
Q1 - closed question	Interviewer	To start off, what are the tasks that therapists handle at MindCare Centre?
	Interviewee	Currently, we are in charge of customer inquiries conducting sessions with clients as well as managing appointments for screening, assessment and therapy

		sessions.
Q2 - closed question	Interviewer	How do you usually conduct the inquiry session with a customer?
	Interviewee	Once the customer contacts the company, they receive an auto reply message to greet them and inform them that they will be contacted soon. During the office hours, we will reply manually using the standard copywriting template.
Q3 - closed question	Interviewer	After a customer sends an inquiry with no further replies, is there any process to keep updating the client or ask them if any extra information is needed?
	Interviewee	If we don't receive any reply from the customer, we follow up with them. After two days of receiving no replies, we record their data in the customer bank.
Q4 - closed question	Interviewer	Does the company currently utilize any applications in the system?
	Interviewee	Yes, we use an app called "Pantau", which is developed by our team. it is our Parent-Therapist communication tool and is

		used to check appointments with the therapists. We also used an application called "Appointlet" for booking appointments.
Q5 - closed question	Interviewer	So how exactly do you arrange and manage appointments?
	Interviewee	As I mentioned, we use Appointlet. Therapists would update their schedule in the system so the clients can check the availability of the slots. The therapists would then book the appointment slot. Each therapist can conduct 4- 1 hour sessions per day on weekdays and 6 sessions on weekends.
Q6 - bipolar question followed by probe question to provide clarity	Interviewer	Do you face any difficulty in managing customers and determining potential customers, can you explain why?
	Interviewee	Yes, WhatsApp lacks the feature to sort out conversations based on our criteria. So inquiries are sorted manually by therapists on WhatsApp based on the therapist's experience.
Q7 - open-ended question	Interviewer	Generally, what do you think are some of the most prominent issues

		therapists experience with the current CRM system?
	Interviewee	One of the biggest issues is when we receive multiple inquiries at the same time, the previous conversations are pushed by the new inquiries and then we would have to manually search through the conversations to find a specific customer and get back to them. Another issue is the delays customers can get when the therapist is on leave. And lastly I find the use of two different applications a bit confusing as we use Pantau for existing customers and Appointlet for new customers.
Q8 - open-ended question	Interviewer	Lastly, what improvements are you expecting from the new system and what platform would you prefer to use the most?
	Interviewee	We are hoping for the implementation of a chatbot for auto replies that is integrated with artificial intelligence. I believe this would be extremely helpful in managing and sorting our potential and non-potential customers automatically. We also

		believe setting up a new appointment system would be greatly beneficial to us when managing appointments. Regarding the platform used , in my opinion web applications would be the most suitable, as they’re easy to use and make changes to.
Closing	Interviewer	That’s all the questions we have for you. Thank you for your great insight and for being with us today!

Interview sample 2 - with customer

Type of question	Interview question	
Opening	Interviewer	Good afternoon Sir, the purpose of this interview is to gather more information on the current CRM system by analyzing customers' experience. Thank you for being here with us!
	Interviewee	Good afternoon, thank you for having me. I will try my best to answer your questions and provide you with the information needed.
Q1 - closed question	Interviewer	To start off, what is the process of reaching out to MindCare Centre

		like?
	Interviewee	As a new customer, we contact the company by sending our inquiry through WhatsApp. If you contact them outside of office hours you receive an auto reply message until a therapist reaches out and replies to our message.
Q2 - bipolar question	Interviewer	Do you usually experience delayed replies?
	Interviewee	Yes, most of the time there is no one available to answer our inquiries.
Q3 - open-ended question	Interviewer	What feature do you think is the most beneficial to you in the current system?
	Interviewee	The application Appointlet makes booking appointments very easy and clear for us in terms of determining the availability of the appointment slots and booking them.
Q4 - open-ended question	Interviewer	Generally, what are your issues with the current CRM?
	Interviewee	Firstly, the use of multiple applications for different purposes is extremely confusing to me as a new customer reaching out to the

		company. As I mentioned, the delayed replies can also be very inconvenient.
Q5 - open-ended question	Interviewer	Regarding your previous answer, what do you hope to be implemented in a new system?
	Interviewee	I believe that the auto reply messages could be improved to be more inclusive and useful to the customers to reduce the need to chat with the therapist just for a simple question. I also believe that multiple applications should be made into one application to make it easier for customers to reach out, book appointments or sessions.
Closing	Interviewer	That marks the end of our interview. Thank you for sharing your experience with us!

3.2 Used Method 2 - Questionnaires

In this section, we will use the questionnaire type to determine what we need versus what we want. It should be valuable and come from the respondent's point of view. We also focused specifically on the topic and had open-ended, long-form, or short-form questions.
Questionnaires should be concise and simple while offering the respondent's experience with MindCare Center.

Questionnaires sample 1 - with therapists

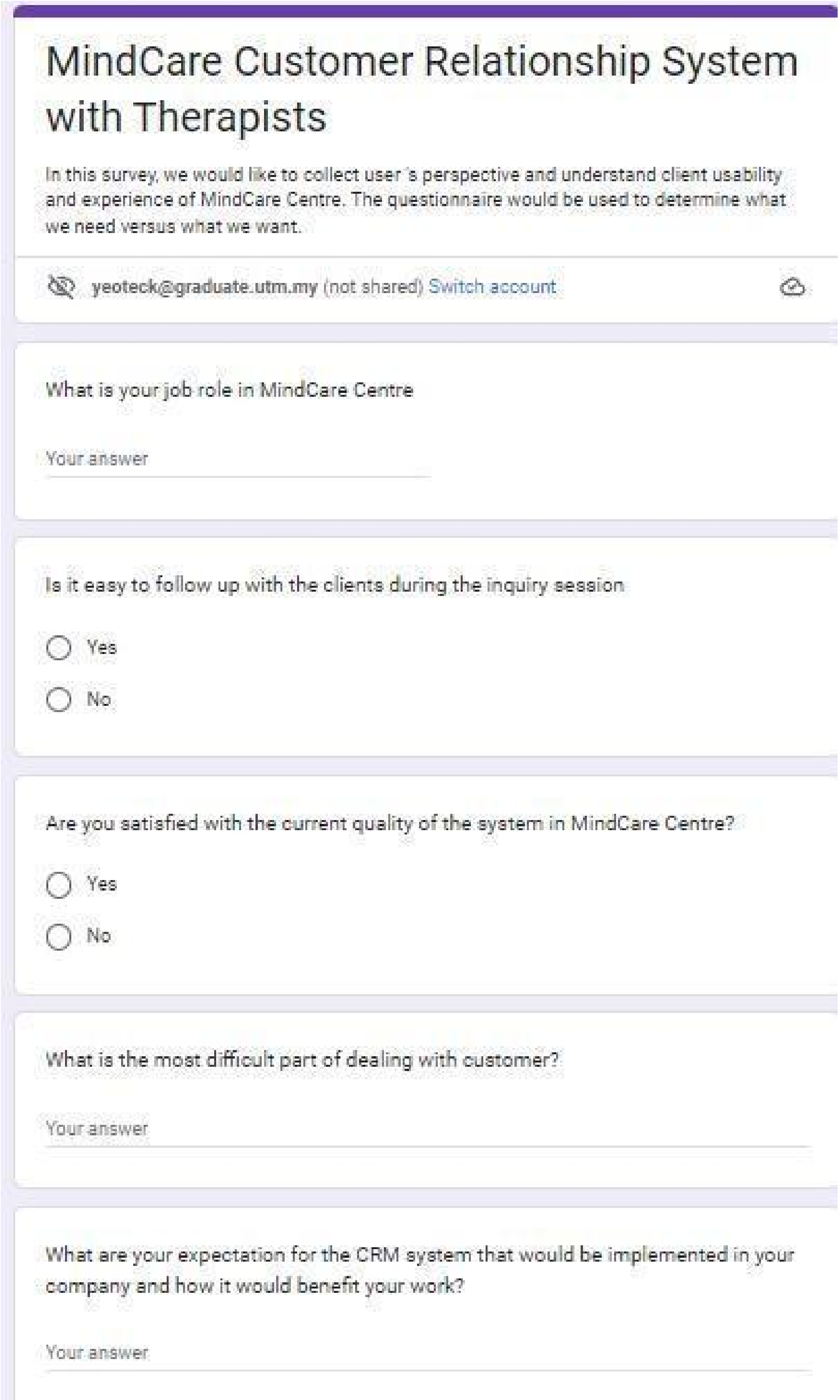
1. What is your job role in MindCare Centre?
    - closed question

2. How easy was it to talk to the customer at this MindCare Centre about their health condition ?
    - bipolar question

3. How would you rate the current quality of the system before new systems of CRM in MindCare Centre?
    - bipolar question

4. What is the most difficult part of dealing with customers?
    - open-ended question

5. What are your expectations for the CRM system that will be implemented in your company, and how will it benefit your work?
    - open-ended question



MindCare Customer Relationship System with Therapists

In this survey, we would like to collect user´s perspective and understand client usability and experience of MindCare Centre. The questionnaire would be used to determine what we need versus what we want.

yeoteck@graduate.utm.my (not shared) Switch account

What is your job role in MindCare Centre

Your answer

Is it easy to follow up with the clients during the inquiry session

- ◯ Yes
- ◯ No

Are you satisfied with the current quality of the system in MindCare Centre?

- ◯ Yes
- ◯ No

What is the most difficult part of dealing with customer?

Your answer

What are your expectation for the CRM system that would be implemented in your company and how it would benefit your work?

Your answer

Questionnaires sample 2 - with clients

1. How old are you?
   ( ) 18-24 years old
   ( ) 25-34 years old
   ( ) 35-44 years old
   ( ) 45-54 years old
   ( ) 55-64 years old
   ( ) 65-74 years old

   - demographic question
   - closed question

2. How has using our system helped you
   during therapy?
   ( ) Extremely good
   ( ) Very good
   ( ) Somewhat
   ( ) Not so good
   ( ) Not good at all

   - interval scale question
   - closed question

3. How satisfied or dissatisfied are you with the
   current system?
   ( ) Very satisfied
   ( ) Somewhat satisfied
   ( ) Neither satisfied nor dissatisfied
   ( ) Somewhat dissatisfied
   ( ) Very dissatisfied

   - interval scale question
   - closed question

4. What specific changes would most improve the company service quality in the current moment?
   ( ) Appointment Notifications
   ( ) Appointment Discussion
   ( ) Monitoring Appointment
   ( ) Booking Appointment
   ( ) Inquiry
   ( ) Others

   - closed question
   - multiple answers question

5. In your opinion, how can we improve your experience for the future?
    - open-ended question

6. If this CRM system were available today, how likely would you be to use it instead of competing services currently available from the other company?
    ( ) Extremely likely
    ( ) Very likely
    ( ) Somewhat likely
    ( ) Not so likely
    ( ) Not likely at all

    - interval scale question
    - closed question

7. In your own words, what are the things that you would most like to improve new systems in the MindCare Centre?
    - open-ended question

8. In your opinion, how can we improve your experience for the future?
    - open-ended question

MindCare Customer Relationship System with Clients

In this survey, we would like to collect user 's perspective and understand client usability and experience of MindCare Centre. The questionnaire would be used to determine what we need versus what we want.

yeoteck@graduate.utm.my (not shared) Switch account

How old are you?

- 18-24 years old
- 25-34 years old
- 35-44 years old
- 55-64 years old
- 65-74 years old

How has using our system helped you during therapy

- Extremely good
- Very good
- Somewhat good
- Not so good
- Not at all good

How satisfied or dissatisfied are you with the current system?

- Very satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Very dissatisfied

What specific changes would most improve the company service quality in the current moment

- [ ] Appointment Notification
- [ ] Appointment Discussion
- [ ] Monitoring Appointment
- [ ] Booking Appointment
- [ ] Inquiry Service
- [ ] Other: ______

If this CRM system were available today, how likely would you be to use it instead of competing services currently available from the other company?

- ○ Extremely likely
- ○ Very likely
- ○ Somewhat likely
- ○ Not so likely
- ○ Not at all likely

In your own words, what are the things that you would most like to improve new systems in the MindCare Centre

Your answer

In your opinion, how can we improve your experience for the future?

Your answer

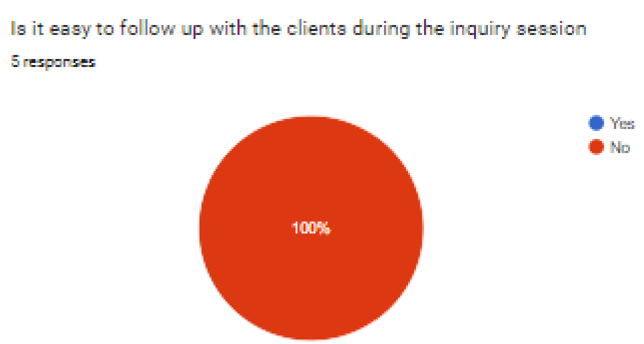
3.3 Summary

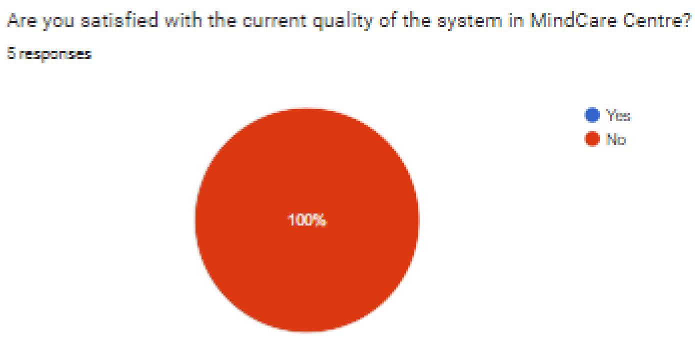
Based on the interview session questionnaire conducted, we had more understanding of the user requirements. From the interview session, we know more details about the development of the new system. Basically, we had known that the managing director of the company had listed out some requirements that needed to be considered in the development of the system. The company requires a system that would increase the efficiency in responding to the inquiry request from the clients which took a lot of time and effort because the operation is mostly manual at the current moment. Besides that, the company would like to reduce the workload of the therapists. Hence, the managing director asked to design an auto-reply chat bot to try to minimize the participation of the therapist in the inquiry service.

According to the requirements of the company, the system needs to have functionalities in order to improve the quality of different services provided. For example, to respond to the inquiry request of the client automatically, identifying the potential clients and others. Basically, the system would need to be developed with the purpose to enhance the relationship among the company and the clients so that both parties could benefit.

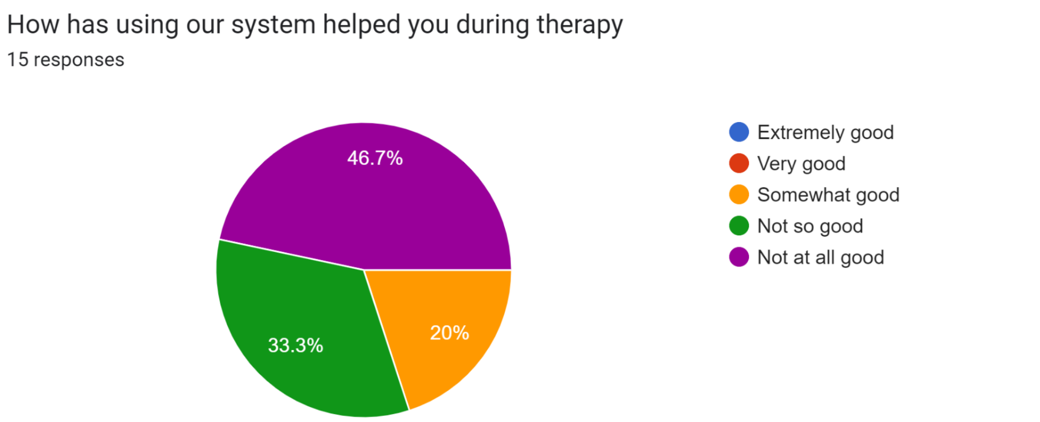
On the other hand, from the interview session, we were able to learn what workflow the current system follows. We also successfully gathered information about the problem faced by the company at the current moment and their expectation of the newly designed system. With the information gathered, we could focus on the development of our system according to the requirements.

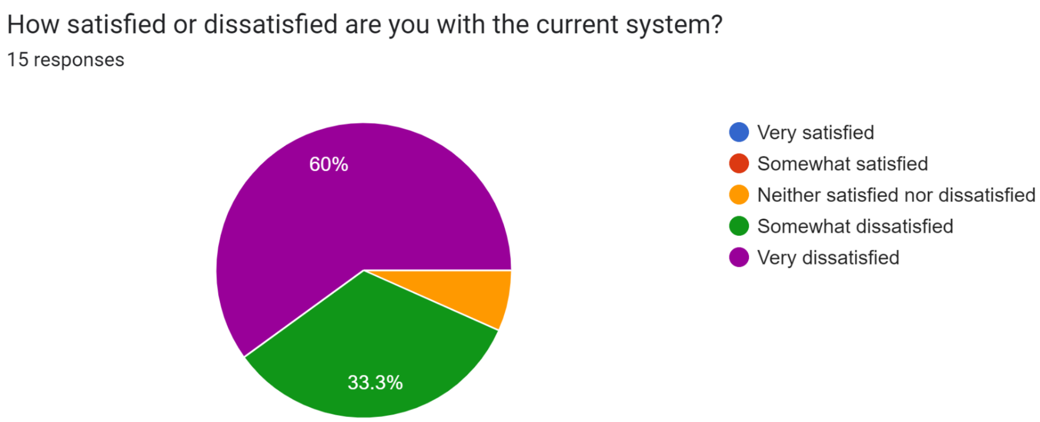
After the interview session, we also conducted two small-scale questionnaires with therapists and clients to gauge the opinions from their respective views and understand their experiences as different users of the current system. Besides that, we also need to investigate whether the system generated is needed by the majority of the users and the availability of the operational feasibility. The result from the respondents would be used to determine the specific direction and focus of the development of the project system. There are 5 therapists and 15 customers involved in our questionnaire.





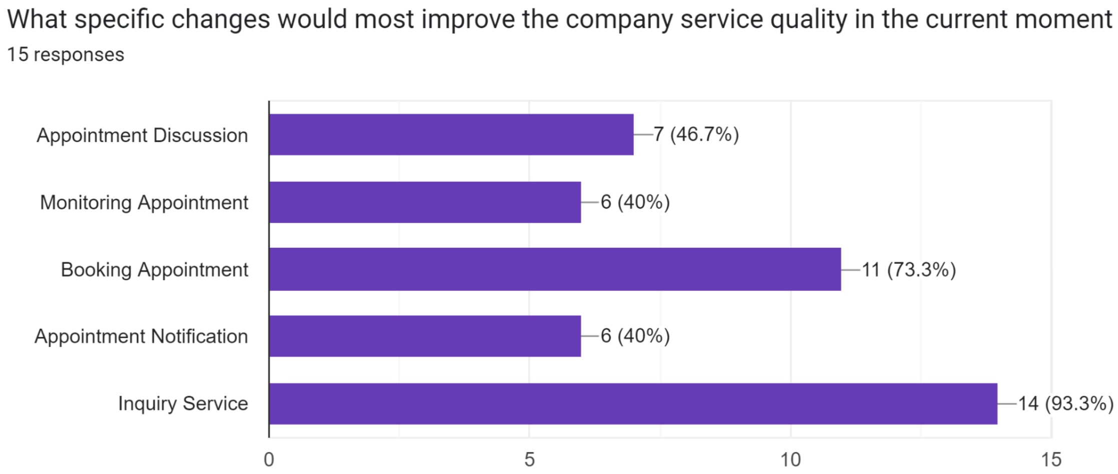
Both of the above diagrams are the summary of the responses to the questionnaire that involves 5 therapists. Based on the diagram, we could know that the majority of the therapists (100%) state that they are not satisfied with the current system and the current system is not able to let them follow up easily with the clients. Hence, there is a need for the company to develop a new system. They also share their experience about the most difficult part of dealing with customers by answering open-ended questions. Overall, they emphasize the difficulty in handling a big amount of data entries. They expect the new CRM system could turn most of the manual operations to automatic so that their workload could be reduced.





Both of the above diagrams are the summary of the responses to the questionnaire that involves 15 clients. Based on the diagram with the question "How has used our system helped you during therapy", the majority of the clients had given answers which are worse than average. 46.7% and 33.3% of the clients were giving the responses "Not at all good" and "Not so good" respectively to the current system in the aspect of helping them during therapy. Only a few of the clients which are 20% had given an average answer that is "Somewhat good".

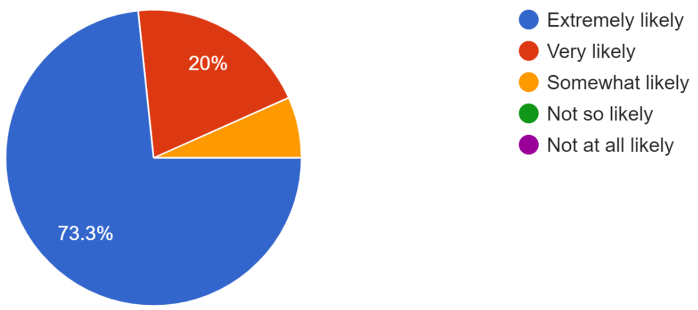
Based on the diagram with the question "How satisfied or dissatisfied are you with the current system", the majority of the clients also gave answers which are worse than average. 60% and 33.3% of the clients were giving the responses "Very dissatisfied" and "Somewhat dissatisfied" respectively to the current system in the aspect of helping them during therapy. Only a client had given an average answer that is "Neither satisfied nor dissatisfied".



Based on the diagram above, we can determine the specific focus in the development of the new system. The diagram shows that the majority of the users consider that the specific change to the inquiry service(93.3%) would most improve the company service quality at the current moment. Other than that, they also consider that the specific change to booking appointments (73.3%) would improve the company service quality. Beside these two aspects, we also know that specific changes to monitoring appointments (40%), appointment notification(40%) and appointment discussion(46.7%) would also improve the company service quality in the current moment.

If this CRM system were available today, how likely would you be to use it instead of competing services currently available from the other company?

15 responses



If we made the changes to the aspects we mentioned above in the development of the new system, the majority of the clients would use the system instead of competing services currently available from the other companies. The clients had given responses which were greater than the average. 73.3% of the clients state that they would be extremely likely to use the system. 20% of the clients would be very likely to use the system. Only a client which is 6.7% of the clients would be somewhat likely to use the system. This shows that the new system with these changes would be able to be accepted by the clients.

In the questionnaire, most of the clients expect that we could develop a new system that could respond quickly to their demands without delay so that they could have a greater user experience. With this, the appointment management and inquiry service should be improved.

In conclusion, the information-collecting approach, whether it was done through an interview or a questionnaire, enabled us to identify the problems as well as the requirements of the company, the therapists and the clients. Using the data acquired, we could create a solution that meets their need quickly and efficiently.

4.0 Requirement Analysis (AS-IS)

Requirement analysis is an important aspect of project management. It is a process of determining the functions involved in the current system and what users expect from a new or modified product. In this section, several steps will be conducted which are the current business process that includes the scenario and workflow of our system, functional and non-functional requirements and the logical data flow diagram AS-IS system.

4.1 Current Business Process

4.1.1 Scenario

The Client sends the inquiry to the admin by using the WhatsApp application. The in-built chatbot would reply to the client by sending a general message.Then, the therapist would answer the questions. The therapists would check every inquiry one by one and answer the questions by using the prepared standard copywriting template with the purpose of shortening the time of replying to specific questions

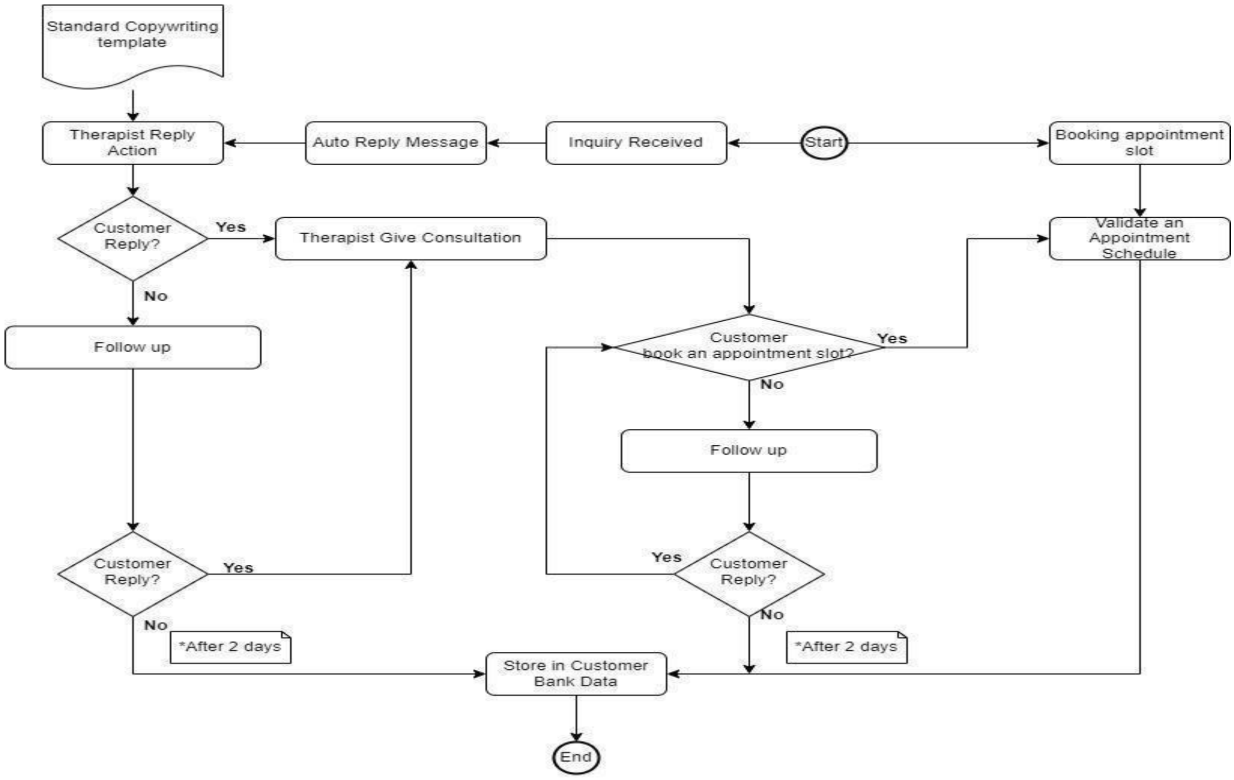
During the process of replying, if the client replies to the message, the therapists would give consultation online. Oppositely, if the clients don't reply to the responses from the therapist, the therapist would follow up with the clients.

If the follow-up process is successful, the therapist will give consultation to the clients based on their condition. After the consultation session with the client, the client would book an appointment slot. If the client doesn't book an appointment slot, the therapist would follow up with the client and it is a similar situation to the one mentioned above. If the follow-up process is successful, the client may book an appointment slot and the therapists would be ready to follow up with the customer if they didn't book an appointment slot until the
The follow-up process fails.

The customer could also book the appointments, without sending the inquiry to the admin. They could book the appointment via Appointee. If the clients have booked up the appointments, their appointments schedules would be validated by the Head of Department.

After that, the info on the booking and the appointment and the clients would be stored in the customer bank data/ The info of the clients who are involved in the unsuccessful follow-up processes would also be stored in the customer bank data if there is no reply from the clients after 2 days.

4.1.2 Workflow



4.2 Functional Requirement

Functional requirements define the characteristics and functions that a product must have. The AS-IS system satisfies the functional requirements which the input, process and output have been mentioned below.

Therapist

Input	Process	Output
Follow Up Message	Reply Inquiry	Follow-up Message
Therapist Work Status	Update Work Status	Therapist Work Slot
Appointment Info	Update Appointment Info	Appointment Slot
Appointment Discussion	Discuss Appointment	Discussion Chat Log
Incoming Discussion Message	Delivering System Message	Notification Message
Account Info	Sign Up	User Account Record
Account Info	Log In	Access Permission
Account Info	Log In	Request on Relogin
Updated Work Slot	Delivering System Message	Notification Message
Updated Appointment Info	Delivering System Message	Notification Message

Clients

Input	Process	Output
Requested Inquiry	Auto-reply Message	Response Message
Requested Inquiry	Follow Up	Response Message
Follow Up Request	Delivering System Message	Notification Message
Requested Inquiry	Reply Inquiry	Unsuccessfully auto-reply status
Booking Info	Book Appointment	Booking Appointment Record
Booking Appointment Slot	Monitor Appointment	Appointment Info

Appointment Discussion	Discuss Appointment	Discussion Chat Log
Incoming Discussion Message	Delivering System Message	Notification Message
Updated Appointment Info	Delivering System Message	Notification Message
Account Info	Sign Up	User Account Record
Account Info	Login Account	Access Permission
Account Info	Login Account	Request on Relogin

Admin

Input	**Process**	**Output**
Intent Configuration	Update Chatbot	Chatbot File
Inquiry Client Record	Access Client Data	Client Data
Appointment Client Record	Access Client Data	Client Data
Client Behavior Model	Visualize Client Behavior Model	Client Behavior Model Visualization
Data Analyzation	Process Analytical Report	Analytical Report
Client Data	Send Awareness Message	Awareness Message
Account Info	Sign Up	User Account Record
Account Info	Login Account	Access Permission
Account Info	Login Account	Request on Relogin
Unsuccessfully auto-reply status	Delivering System Message	Notification Message

Head of Department

Input	**Process**	**Output**
Therapist Work Slot	Validate Update	Slot Validation
Appointment Slot	Validate Update	Appointment Validation
Account Info	Sign Up	User Account Record

Account Info	Login Account	Access Permission
Account Info	Login Account	Request on Relogin

4.3 Non-functional Requirement

Non-functional requirements list a system's fundamental characteristics. They are sometimes referred to as superior qualities. Below is the non-functional requirement which is achieved by the AS-IS system.

Non-functional Requirements	Description
Performance	● The client can check and view the therapist's info. ● The client can choose the service provided by the therapist.
Control	● The booking status will automatically fail if the appointment is booked.
Security	● The client's data is not leaked.
Usability	● The system is easy to use by therapist, client and head of department.

4.4 Logical DFD AS-IS System

The business events that take place and the data required for each event are displayed in the logical DFD. The physical DFD, which shows how the system would implement in terms of the hardware, software, and people involved, would be supported and designed based on this solid foundation. The data flow diagram for this project shows four primary entities: the clients, the administrator, the therapist, and the head of department.

4.4.1 Context Diagram

The content diagram of the MindCare Centre's AS-IS system is displayed in figure 1 below. As we mentioned before, the clients, the therapists, the administrator, and the department head would be the four major entities. Each of the entities has its own responsibilities and connections to the CRM system. As an example, the client data may be collected and sorted by the administrator for the market campaign, system feedback and training client behavior model.

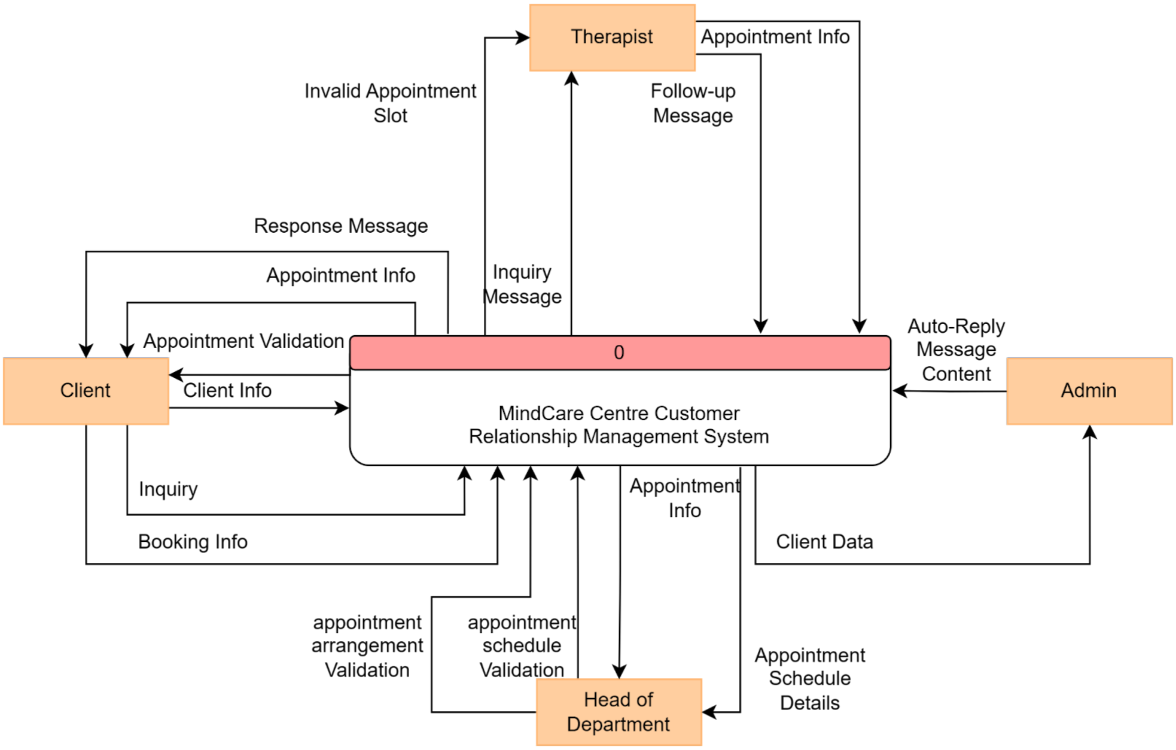


Figure 1: Context Diagram of CRM System

4.4.2 Parent Diagram DFD Level-0

Figure 2 below displays the MindCare CRM system's level-0 data flow diagram. In the diagram, there are data stores and four processes. Reply Inquiry, Update Appointment, Book Appointment, Store Data are all the processes while Appointment Master is the data stores involved in diagram 0.

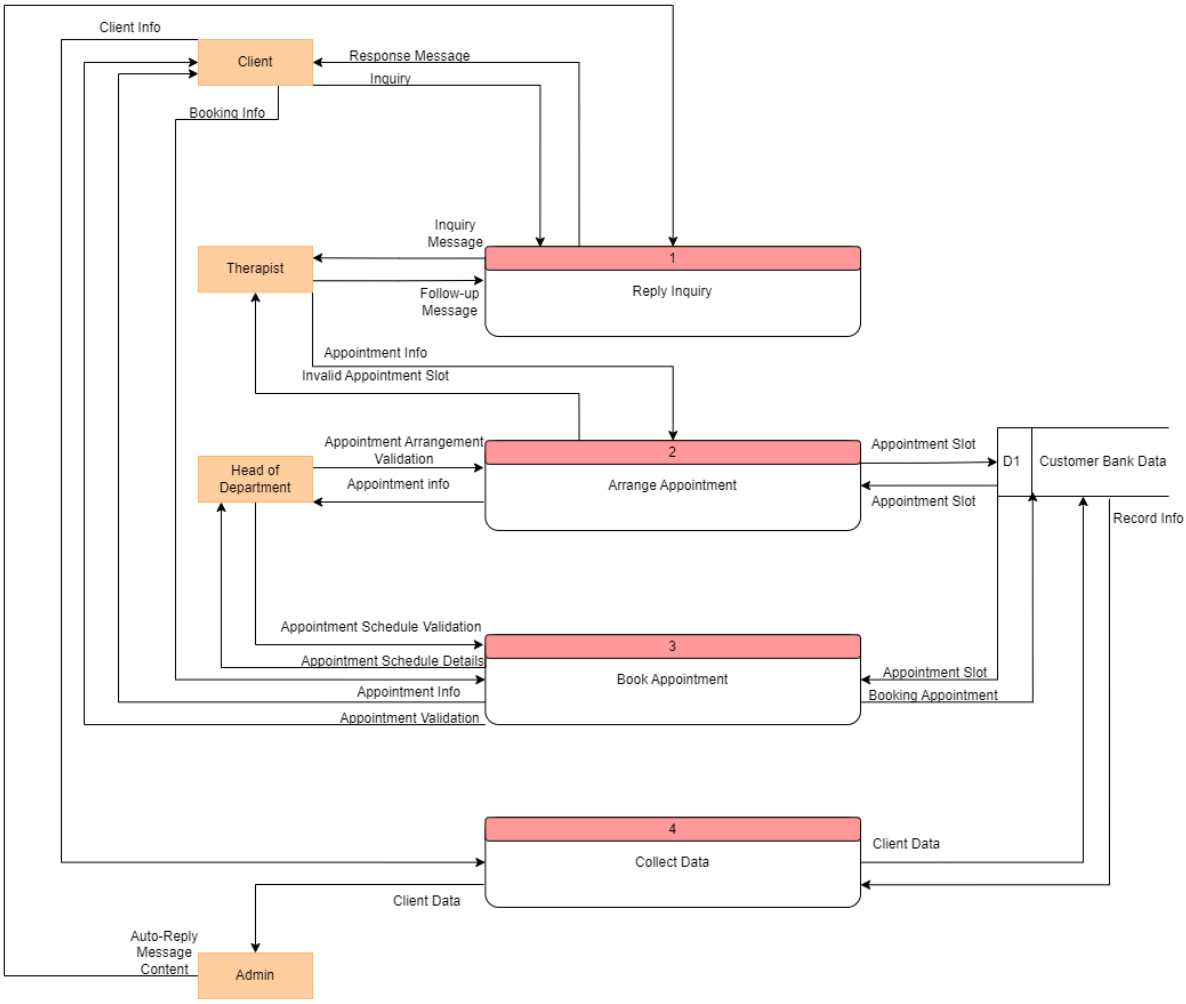


Figure 2: Diagram 0 of CRM System

4.4.3 Child Diagram DFD Level-1 for Process 1: <Reply Inquiry>

Figure 3 below displays the child diagram of "Reply Inquiry" in the parent diagram above. It has several child processes that include auto-reply inquiry and follow-up reply.
Some of the data flow in these processes would involve some data stores that are mentioned in the diagram.

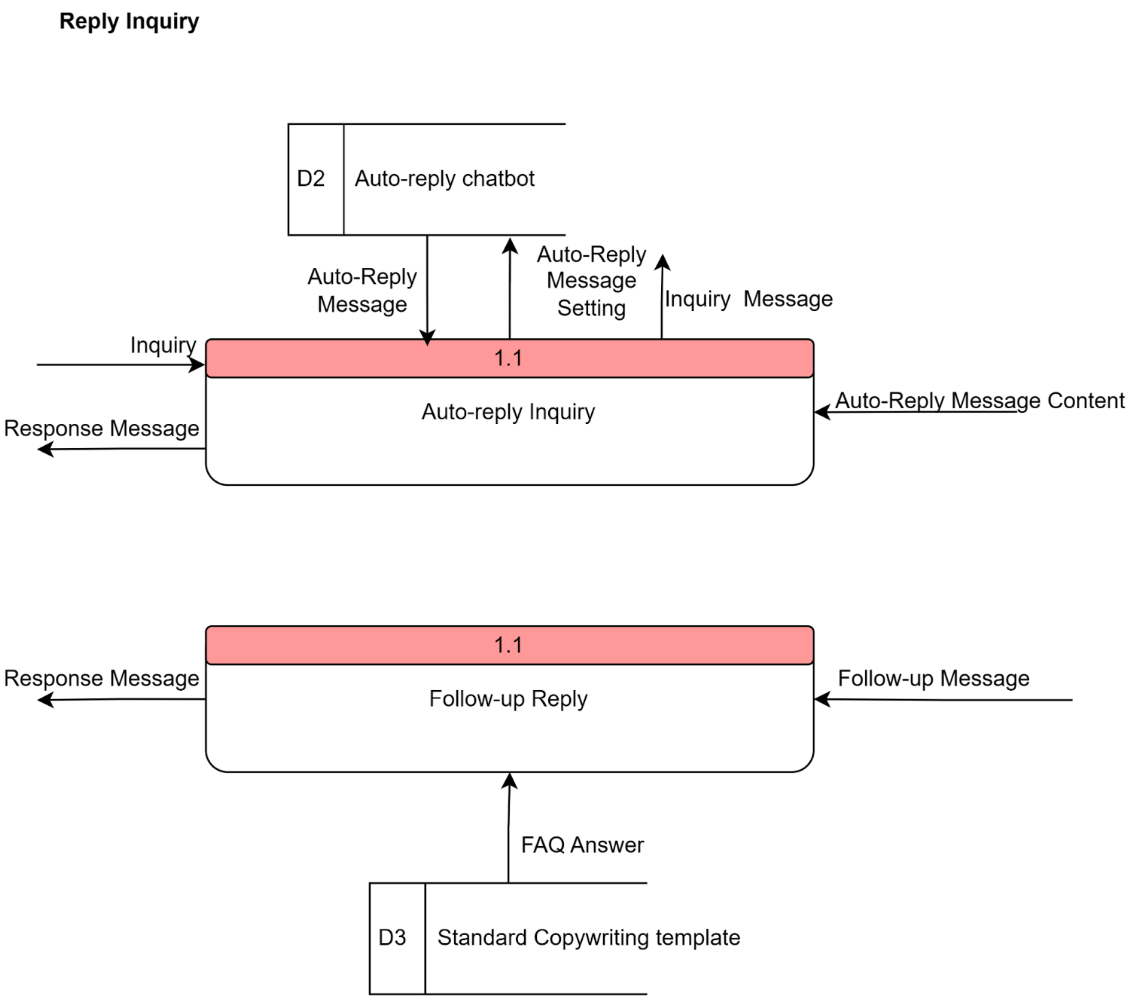


Figure 3: Child Diagram for Process 1 - Reply Inquiry

4.4.4 Child Diagram DFD Level-1 for Process 2: <Arrange Appointment>

Figure 4 below displays the child diagram of "Arrange Appointment" in the parent diagram above. It has several child processes that include update appointment and validate appointment arrangement.. The therapist would update the info of the appointments including services provided, duration, schedule and others. These info would be stored in Customer Bank Data as appointment slots. Then, the appointment slot would be taken to be validated to determine the availability of the appointment arrangement.After the validation, the appointment slot would be updated to the customer bank data. The invalid appointment slots would be passed to the therapists so that they could know the arrangement is invalid and update the appointment info.

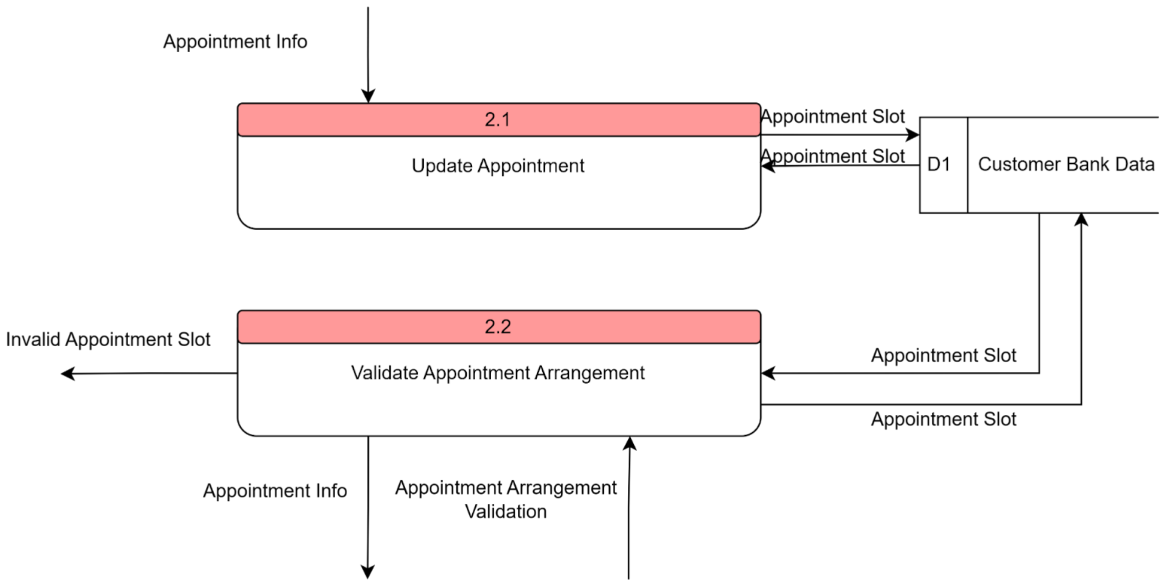


Figure 4: Child Diagram for Process 2 - Arrange Appointment

4.4.5 Child Diagram DFD Level-1 for Process 3: <Book Appointment>

Figure 5 is the child diagram of the process of book appointment. There are three child processes included in the diagram which are listing appointment info, booking appointment and validating appointment. The data of the appointment is stored in the data store named Customer Bank Master.

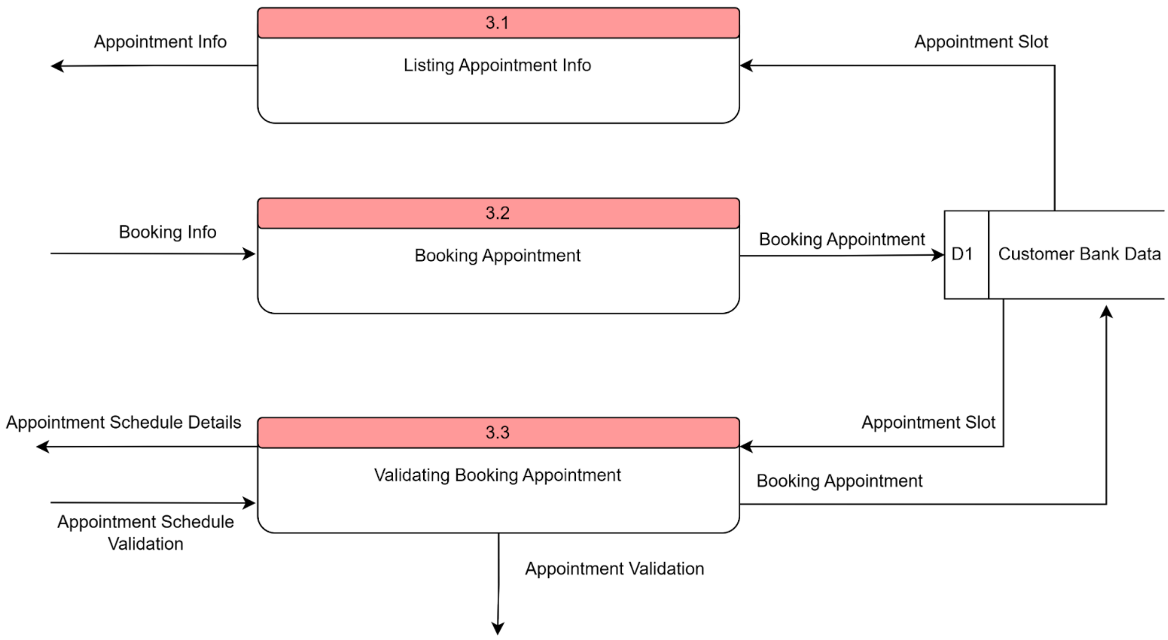


Figure 5: Child Diagram for Process 3 - Book Appointment

4.4.6 Child Diagram DFD Level-1 for Process 4: <Collect Data>

Figure 6 is the child diagram of the process “Collect Data”. There are two child processes included in the diagram which are “store data” and “access data”. The data of the client would be stored in the data store named Customer Bank Master. Then the client data would be accessed from the record in the customer bank data which consists of the appointment info, client info and others.

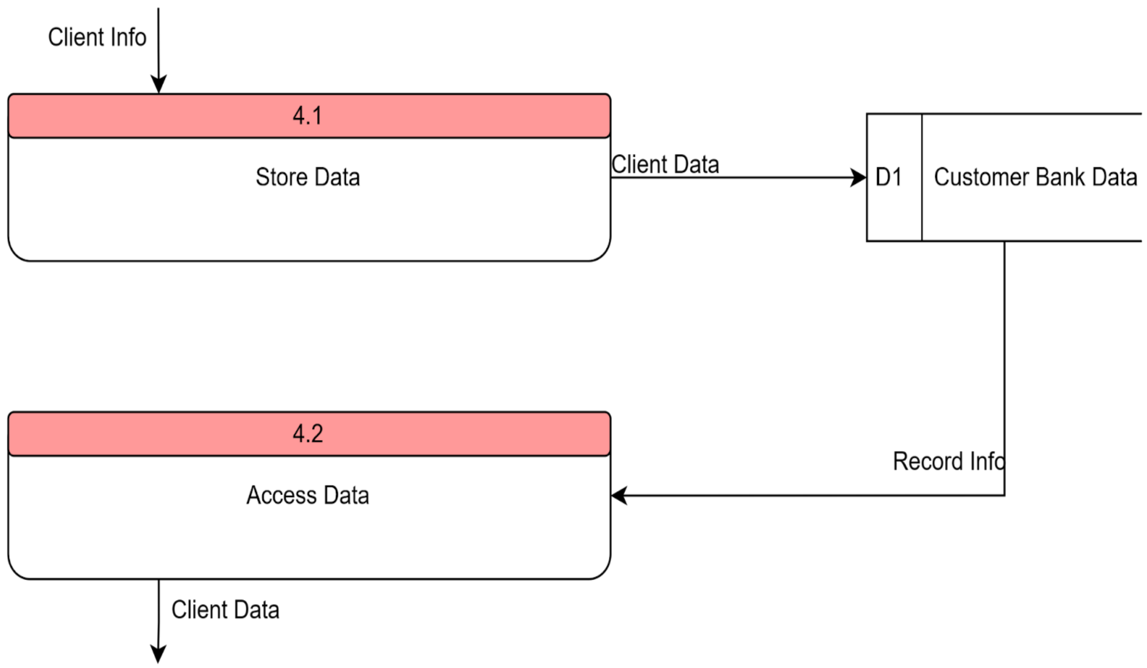


Figure 6: Child Diagram for Process 4 - Collect Data

4.5 Summary

In requirement analysis, we create a scenario and workflow for our system which shows the process of the operation of the system. The functional requirements are pointed out with its input, process and output. Other than that, we also list out the non-functional requirements from different aspects such as performance, control, security and usability. There are three parts of the data flow diagram which are the context diagram, parent diagram and child diagrams that are extracted from the parent diagram.

Requirement analysis involves all the tasks conducted to identify the needs of the stakeholders. From the analysis of the current system, there are some requirements that we need to fulfill to make the system easier to use by the therapists and clients of MindCare Centre.

Thus, requirement analysis is vital for the project as it can help us study project requirements throughout the project's lifecycle. Besides, it also helps to maintain the project's requirements in line with the needs of the stakeholders. A good requirements analysis process will bring up a system that meets future goals and objectives.

5.0 Physical DFD TO-BE System

The TO-BE System would be displayed in the form of Physical DFD to model the implementation of the system. Similar to the Logical DFD of AS-IS System, Physical DFD would be started with a level 0 diagram then going deeply into the child diagrams. The difference with AS-IS System logical DFD is the implementation details had been added to show the detail about the physical aspects of the activities.

5.1 Context Diagram

The content diagram of the MindCare Centre ’s TO-BE system is displayed in figure 1 below. The clients, the therapists, the administrator, and the department head would be the four major entities. Each of the entities has its own responsibilities and connections to the CRM system. As an example, the client data may be collected and sorted by the administrator for the market campaign, system feedback and training client behavior model.

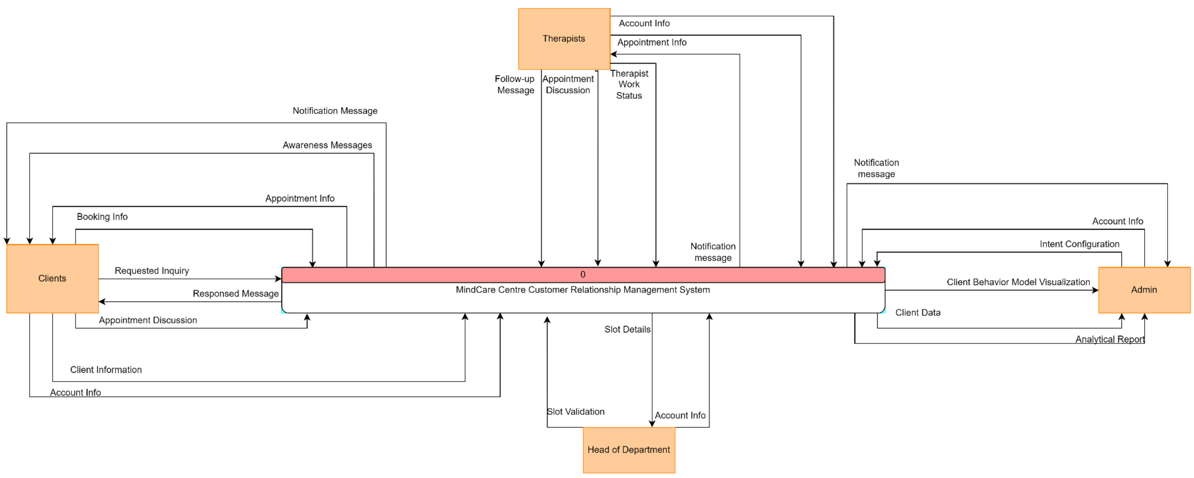


Figure 7: Context Diagram of CRM System

5.2 Parent Diagram DFD Level-0

Figure 7 below displays the MindCare CRM system's level-0 data flow diagram. In the diagram, there are 4 data stores and six processes.Access System,Reply Inquiry, Deliver System Message, Update, Manage Appointment, Transfer Data are all the processes while Conversation Master, Therapist Work Slot Status Master, Appointment Master, User Master are the data stores involved in diagram 0.

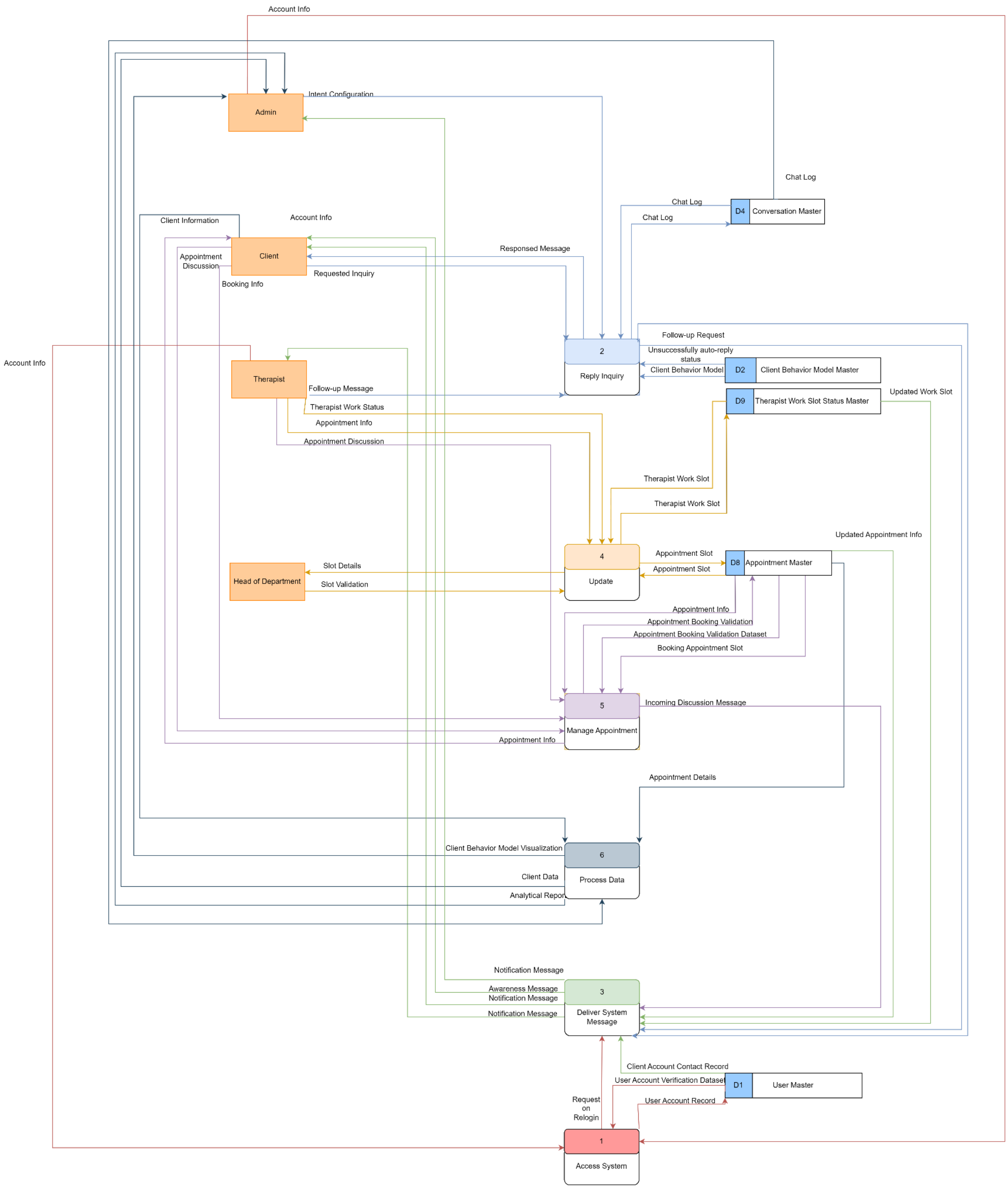


Figure 8: Diagram 0 of CRM System

More Details: https://drive.google.com/file/d/1Qg-jSo6UFRZYcAdUD724q071lUOMdRdh/view?usp=sharing

5.2.1 Partition DFD

The processes in TO-BE system ‘s level-0 data flow diagram were partitioned into different groups as different system components based on their functionality ‘s main purposes and their main users for carrying out operations for certain purposes. There are four partitions in the TO-BE system. According to the figure 9 below, Access System and Reply Inquiry are placed in the first partition, Update and Manage Appointment are placed in the second partition, while Transfer Data and Deliver System Message are divided into separated partitions which are the third and fourth partition.

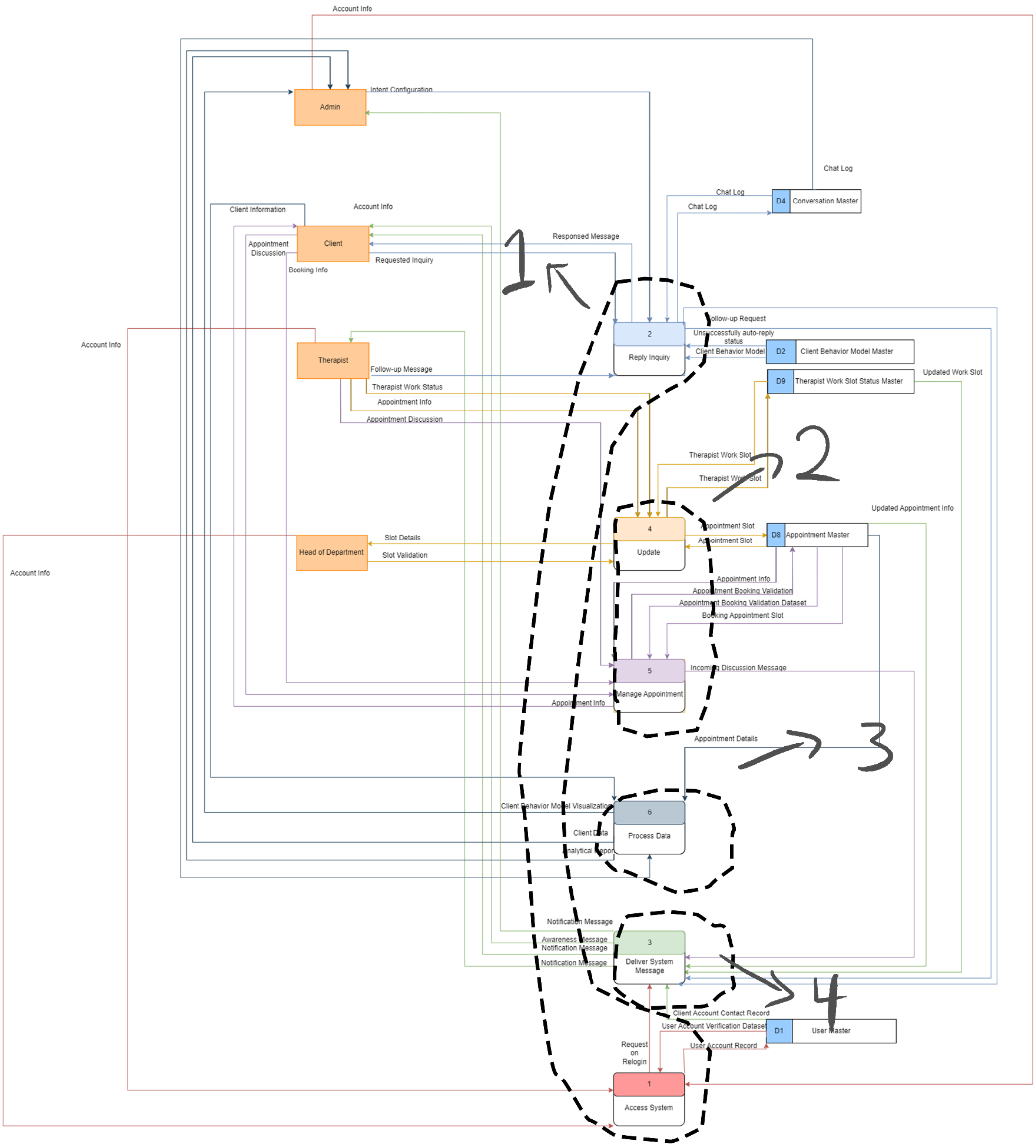
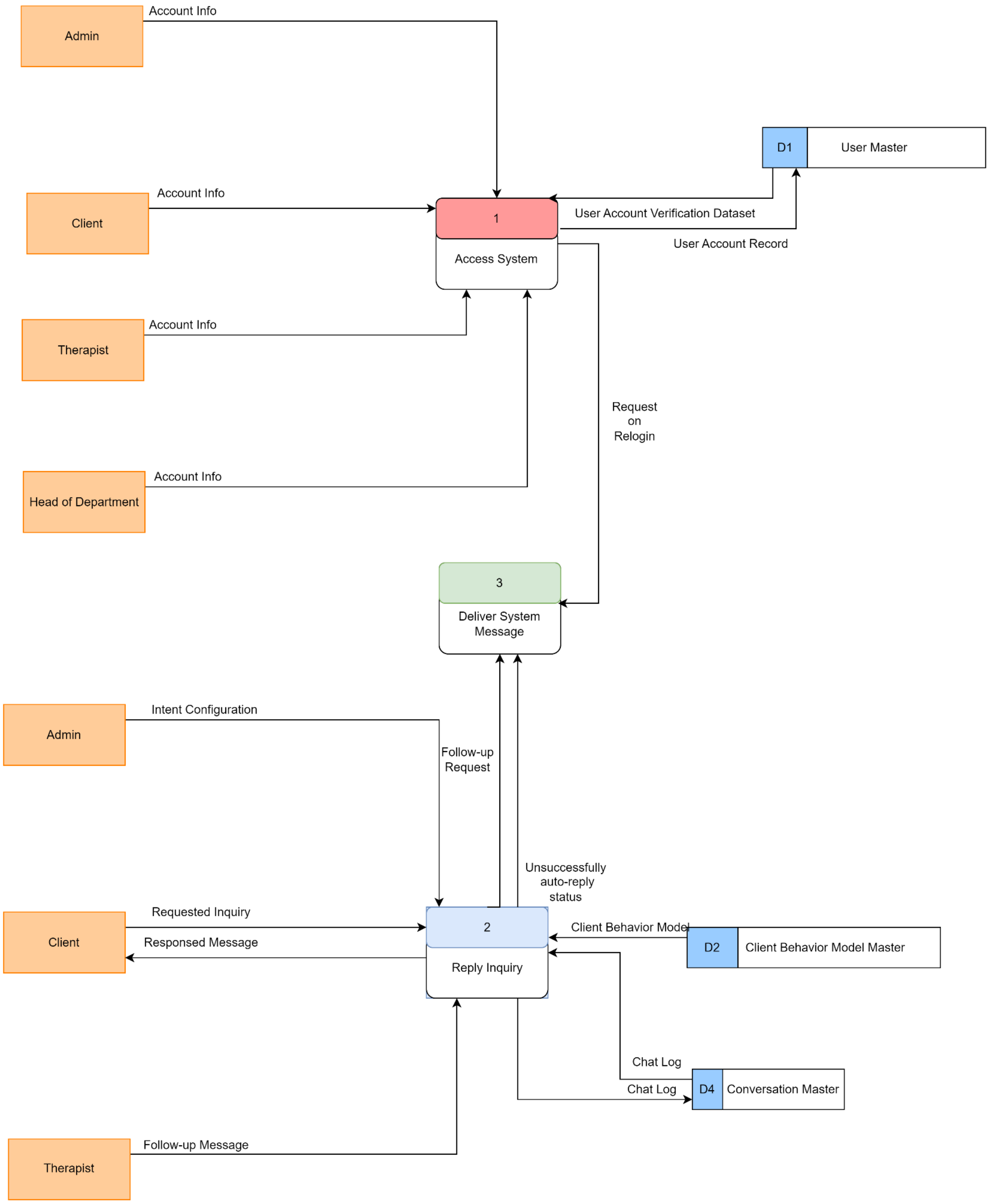


Figure 9: Partition DFD of CRM System

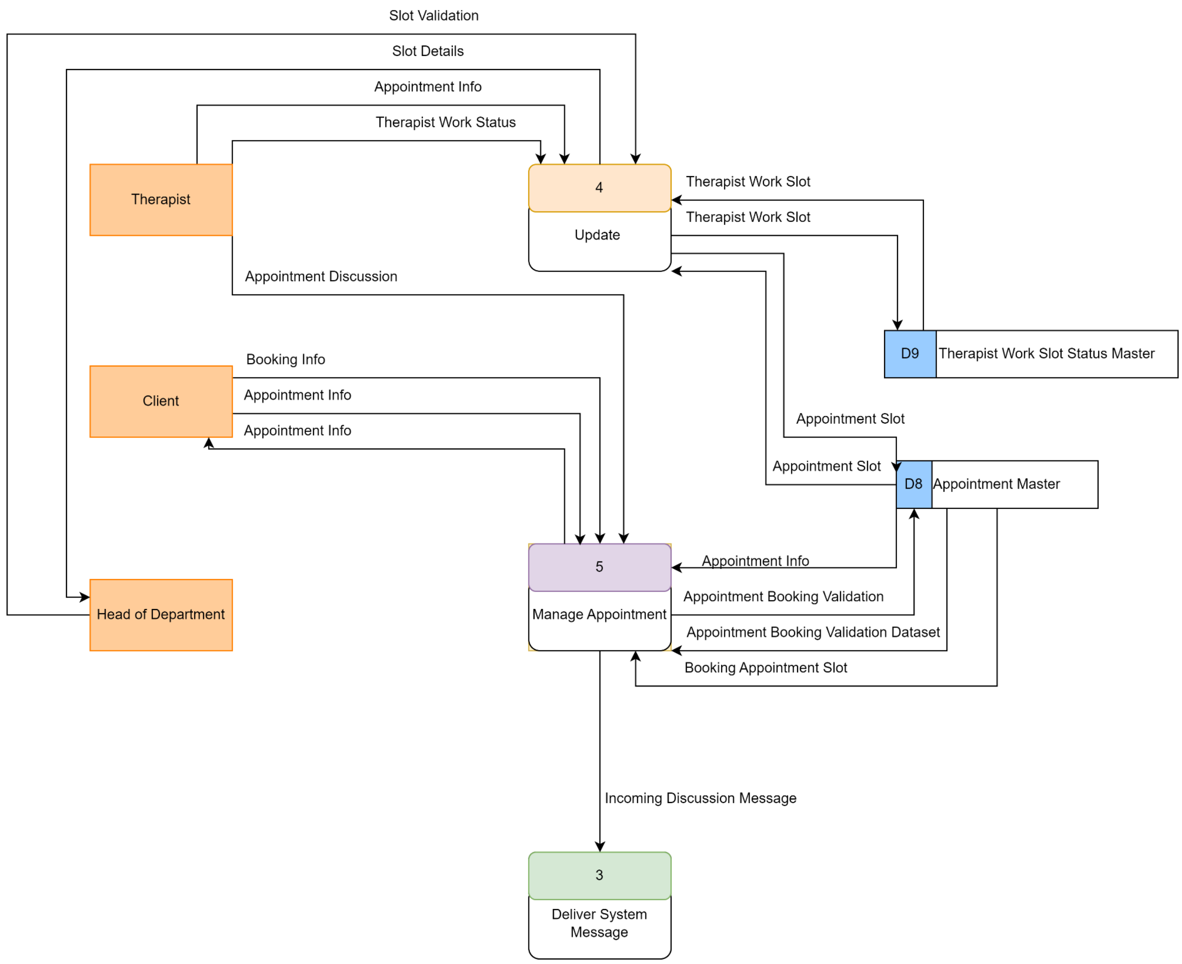
The first partition is called Client Service Access. It consists of Access System and Inquiry Service. The purpose of this partition is mainly for the efficiency in providing services as the beginning of the effective communication between both sides of the therapist and the clients which is inquiry replying so that the clients could be ensured to be served in a good quality.

The process, Access System is mainly designed for the client side so that they could access the system directly to carry out different services. The system would be the medium between the company side and the client side. Building an user account in the system is not only for accessing the functionality of the system. This could be a way for the company in identifying the client. This is very important for the therapist side to follow up in the communication with the clients to maintain a good quality of service which has the least delay.

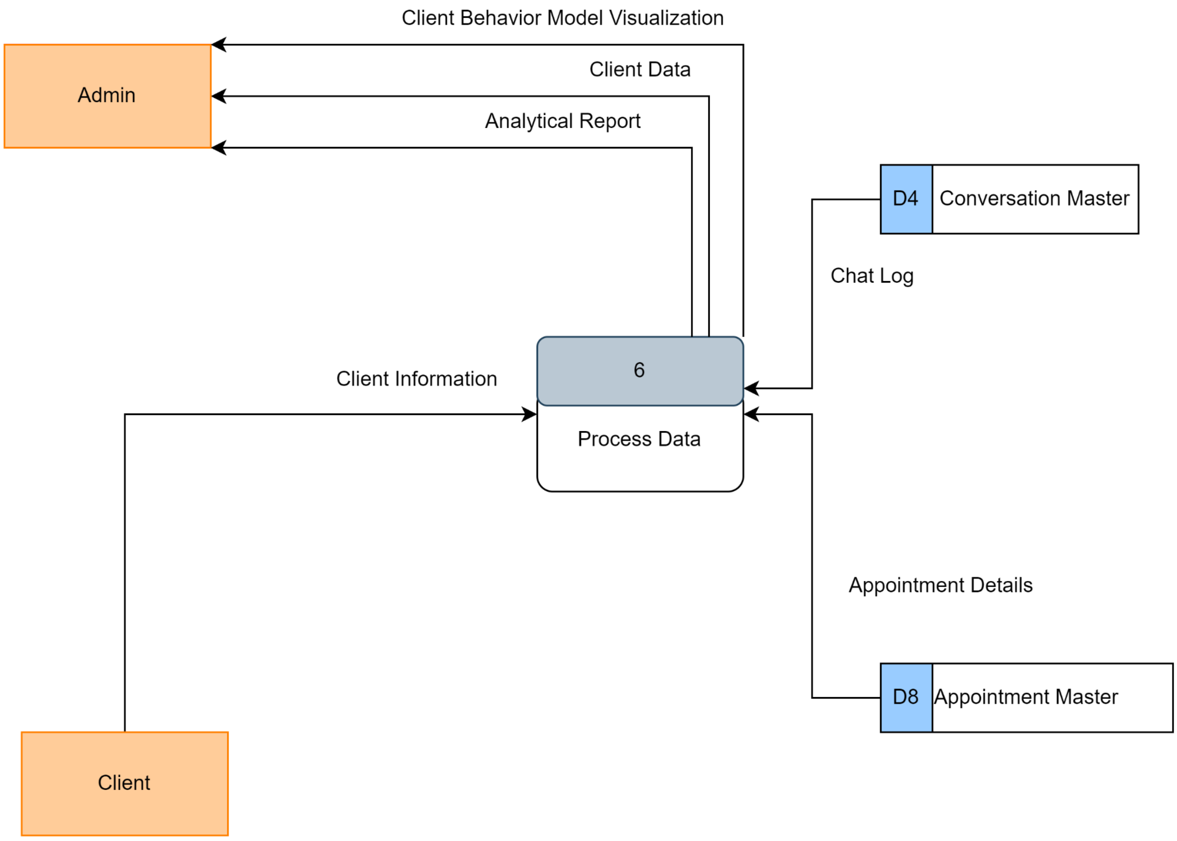
The process, Reply Inquiry is for solving the doubts of the clients about the company in multiple aspects like services provided, company details and others. This is also an important step for the clients to initiate the contact with the company by having a well understanding of their requirements after the inquiry session. In conclusion, This partition would focus on increasing the interest of the clients to the company services


Admin
Account Info
D1
User Master
Client
Account Info
1
Access System
User Account Verification Dataset
User Account Record
Therapist
Account Info
Request
on
Relogin
Head of Department
Account Info
3
Deliver System
Message
Admin
Intent Configuration
Follow-up
Request
Unsuccessfully
auto-reply
status
Client
Requested Inquiry
Responsed Message
2
Reply Inquiry
Client Behavior Model
D2
Client Behavior Model Master
Chat Log
Chat Log
D4
Conversation Master
Therapist
Follow-up Message

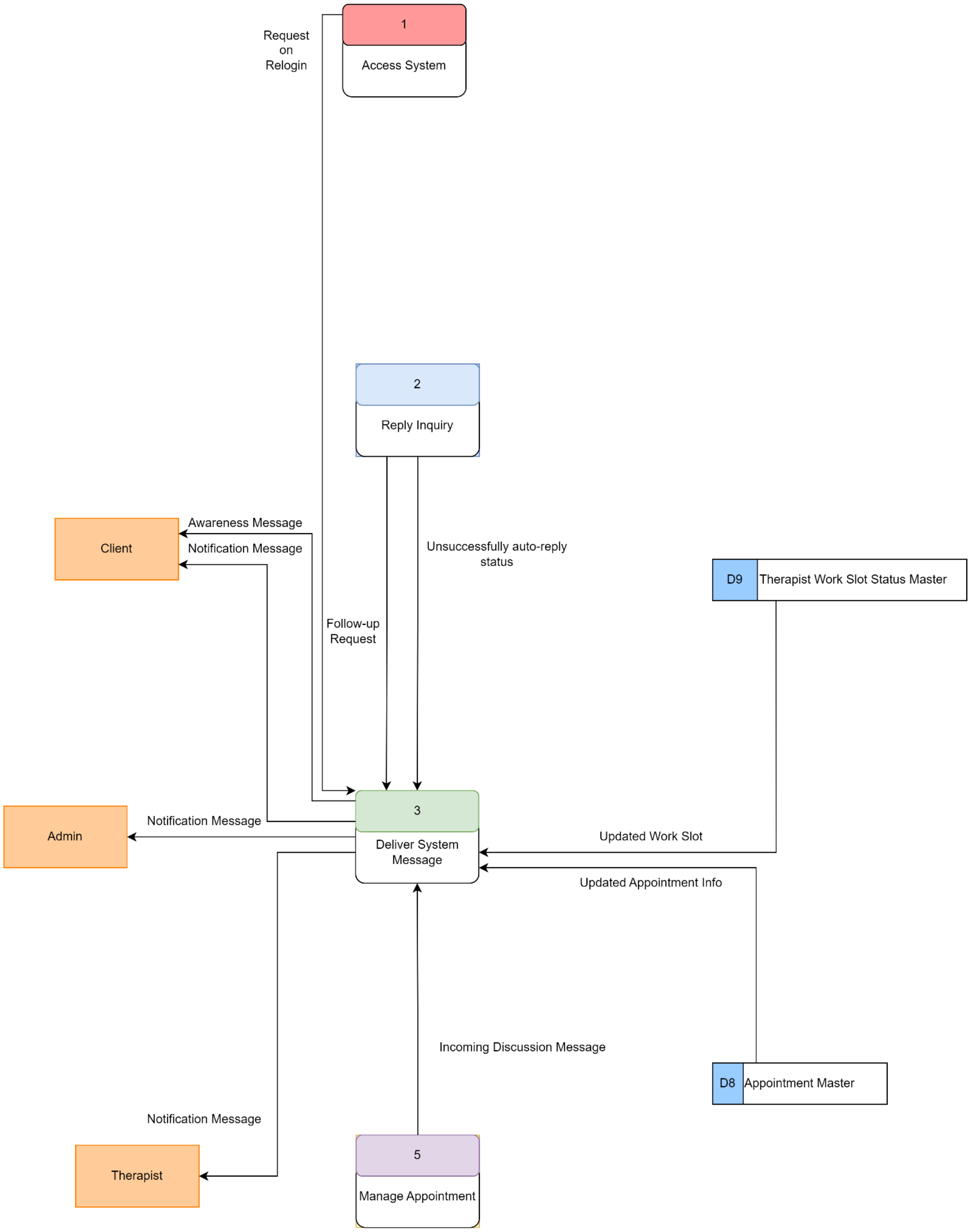
The second partition is called Service Management. It consists of Update and Manage Appointment. The processes in this partition are mostly controlled by the company side to manage their services that are provided to the client side. The services provided by the company would be managed and decided based on different situations to maintain the company services ‘s operation. This is important to ensure that the clients would not have any trouble and inconvenience in their appointment participation. The company would also try to manage the services provided in their best to meet the needs of the client in the services ordered by them. The information about the services provided would be confirmed to be accurate before transferring to the client. In short, through this partition, the company would plan the services and initiate the service according to the plan before these services are opened to the clients . Then the client would order the services under the arrangement of the company..



The third partition is called Service Analyzation. It consists of Transfer Data alone. This partition is used in collecting the client data for investigation of the client and analyzing the business and the services provided by the company based on different criteria for understanding the current performance of the company. This partition would be very important for determining the future plan for the development and the operation of the company. The data would be collected from the client and other service partitions to these partitions. In this company, this partition would be only accessed by the admin and the operations or the processes are carried out behind the system that the therapist and clients would not be aware of the operation of this partition. Hence, Transfer Data is separated as a partition of itself from other processes.



The fourth partition is called Go-in-Between. It consists of a Delivering System Message. This partition is used as a medium between the users and the system. The users include clients and therapists. This partition is mostly operated automatically without any control access of anybody. The purpose of this partition is to notify the users via system message so that they could be updated with the latest information. Since Transfer Data is an automated process, it is separated from other processes as a partition alone to specify it is a partition that wouldn't need manual control.



5.2.2 Structure Chart

A structure chart is a diagram that shows the organization of a system or the relationships between the components of a system. It is a graphical representation of the hierarchical structure of a system, and it is used to show the relationships between the different parts of the system and how they work together.

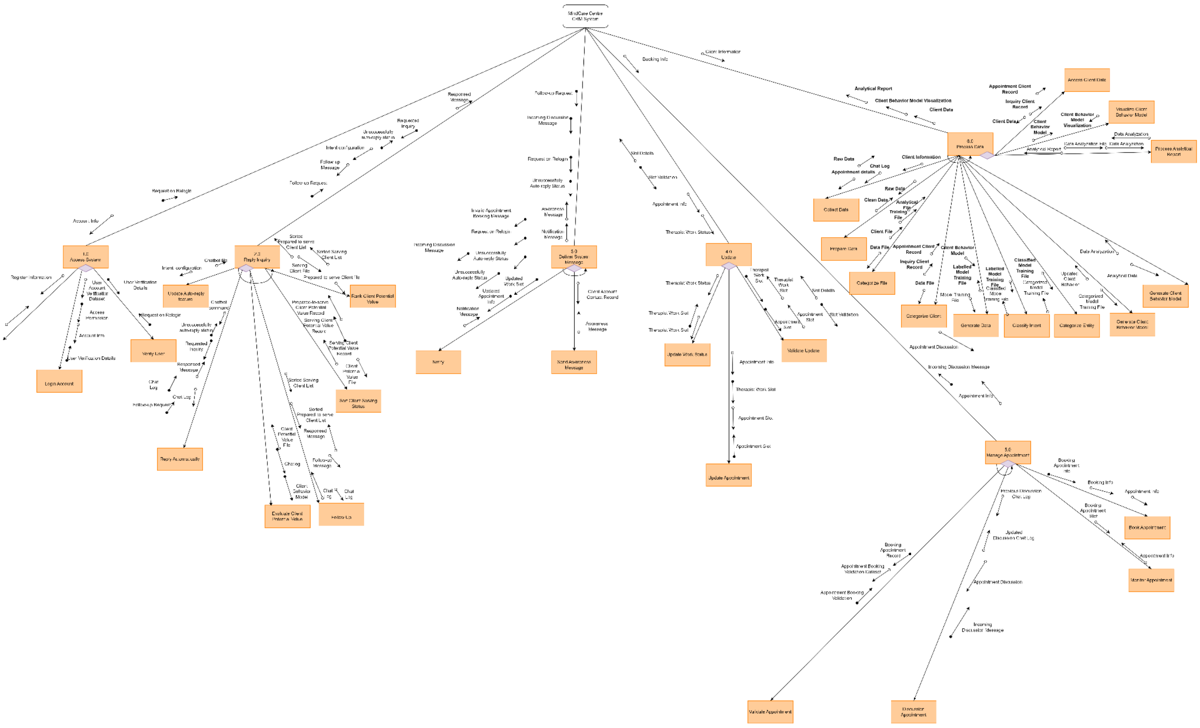


Figure 10: Structured Chart of CRM System

More Details:

https://drive.google.com/file/d/1H9-ixov1-zQoPlZA9lLsEm97b2_2vuxx/view?usp=sharing

5.3 Child Diagram DFD Level-1 for Process 1: <Access System>

Figure 11 below displays the process of “Access System” in the parent diagram above. It has several child processes that include Register Account ,Login Account and Verify User. Some of the data flow in these processes would involve some data stores that are mentioned in the diagram

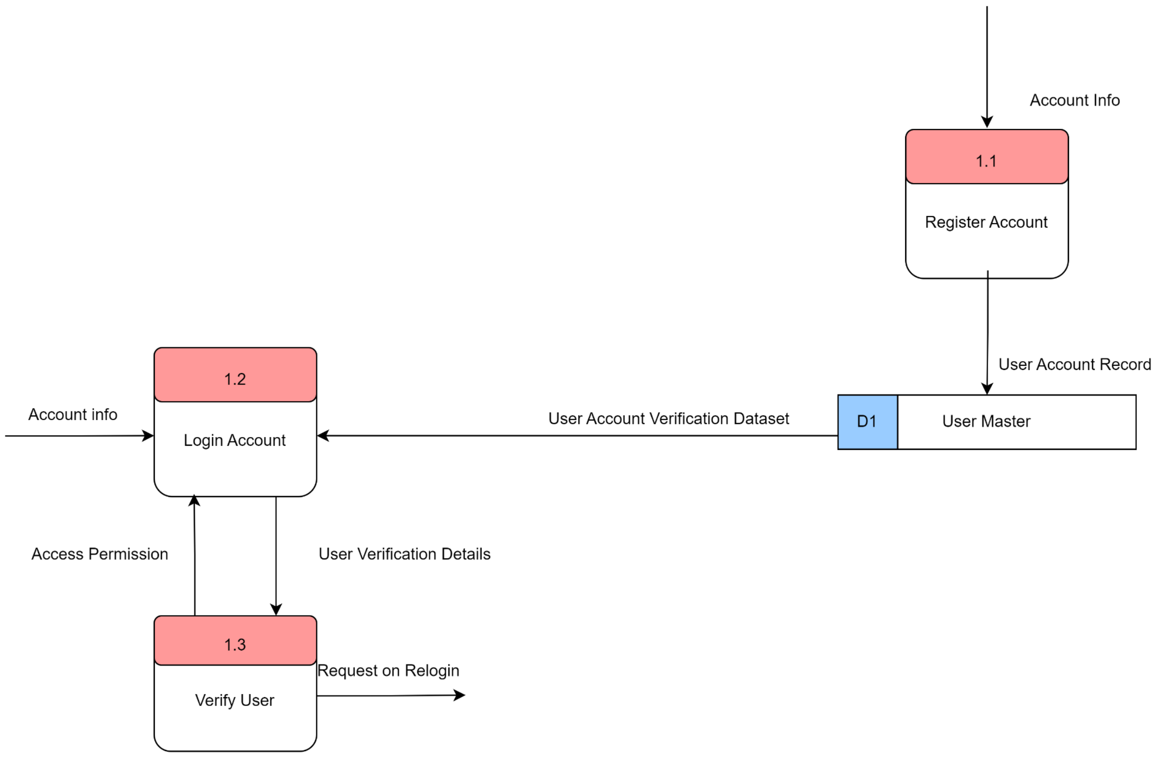


Figure 11: Child Diagram for Process 1 - Access System

5.3.1 Process Specification for Process 1: <Access System>

```
PROCESS 1.1 Register Account

IF(User REGISTER as client)

      DO WHILE(NOT Register Information is ready AND User still intend to
register)

            ENTER Register Information

      END DO

      IF(Register is successful)

      UPDATE account authority to "Client"

      MOVE User Account Record to User Master

      END IF

END IF

      IF(User REGISTER as staff)

            DO WHILE(NOT Register Information is ready AND User still
intend to register)

                  ENTER Register Information

            END DO

            IF(Register is successful)
```

```
            IF(User ENTER Therapist authority code)
                  UPDATE account authority to "Therapist"
                  MOVE User Account Record to User Master
            ELSE IF(User ENTER Head of Department authority code)
                  UPDATE account authority to "Head of Department"
                  MOVE User Account Record to User Master
            ELSE IF(User ENTER Admin authority code)
                  UPDATE account authority to "Admin"
                  MOVE User Account Record to User Master
            ELSE GENERATE Register Error Status
            END IF
      END IF
END IF
```

```
PROCESS 1.2 Login Account
IF(User Login)
      DO WHILE(NOT Log in Info is ready AND User still intent to login)
            ENTER Log in Info
  END DO
      MOVE User Account Verification Dataset from User Master for verify
      IF Log in Info verify
```

```
        User successfully log in
    ELSE
        Request on relogin to user
    END IF
END IF
```

5.4 Child Diagram DFD Level-1 for Process 2: <Reply Inquiry>

Figure 12 below displays Reply Inquiry in the parent diagram above. It has several child processes that include Update Chatbot, Reply Automatically, Evaluate Client Potential Value, Sort Client by Serving Status, Rank Client Potential Value, Follow Up. Some of the data flow in these processes would involve some data stores that are mentioned in the diagram

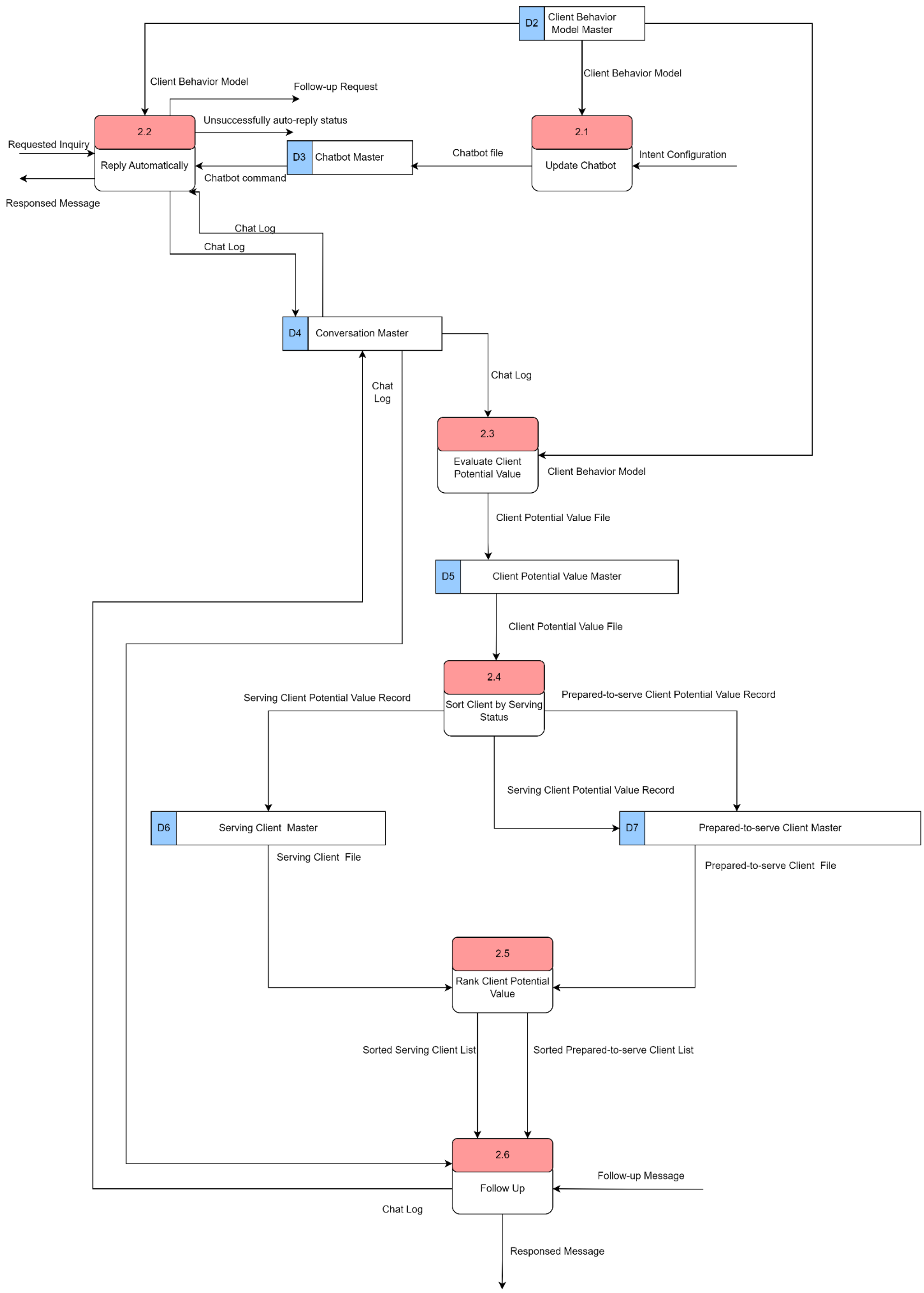


Figure 12: Child Diagram for Process 2 - Reply Inquiry

5.4.1 Process Specification for Process 2: <Reply Inquiry>

PROCESS 2.1 Update Chatbot

```
Do WHILE (Client Behavior is ready)
      CHOOSE Chatbot Intent
      Configure intent
      UPDATE Chatbot file to Chatbot Master
END DO
```

PROCESS 2.2 Reply Automatically

```
DO WHILE (client has requested inquiry and client behavior model is ready)
      READ chat log from Conversation Master
      ANALYZE requested inquiry
      IDENTIFY inquiry intent
      DO WHILE(NOT inquiry is AT THE END)
            IF(inquiry intent match analyzed intent)
                  MOVE Chatbot command from Chatbot Master
                  SEND Responsed Message to Client
                  UPDATE message auto-reply status to "Successful"
                  Request on Follow-up
                  IF(Client intent to chat with therapist)
                        UPDATE Client Follow-up Status to "Y"
            END IF
            ELSE UPDATE message auto-reply status to "Unsuccessful"
                  UPDATE Client Follow-up Status to "Y"
                  Request on Follow-up
            END IF
      END DO
      UPDATE Chat Log to Conversation Master
END DO
```

PROCESS 2.3 Evaluate Client Potential Value

```
DO WHILE(Chat Log is updated and client behavior model is ready)
      IF(Client Follow-up Status is "Y")
            READ Chat Log from Conversation Master
            ANALYZE Chat Log
            EVALUATE Client Potential Value
            UPDATE Client Potential Value File to Client Potential Value
Master
      END IF
END DO
```

PROCESS 2.4 Sort Client by Serving Status

```
DO WHILE(Client Potential Value File is ready)
      IF(Therapist Serving Status is "Y")
            MOVE Serving Client Potential Value Record to Prepared-to-serve
Client Master
            IF(Serving Client Potential Value Record Match
Prepared-to-serve Potential Value Record)
                  remove Prepared-to-serve Client Potential Value
```

```
            END IF
            Update Client Potential Value Record to Serving Client Master
      END IF
      IF(Therapist Serving Status is "N")
            Update Client Potential Value Record to Prepared-to-serve
Client Master
      END IF
END DO
```

PROCESS 2.5 Rank Client Potential Value

```
DO WHILE(Prepared-to-serve Client File is updated or Serving Client File is
updated)
      IF(Prepared-to-serve Client File is updated)
            Read Prepared-to-serve Client File
                         Sort Prepared-to-serve Client List in descending
order from top to bottom
      END IF
      IF(Serving Client File is updated)
            Read Serving Client File
                         Sort Serving Client List in descending order from
top to bottom
      END IF
                         Move Sorted Client List for follow-up by Serving
Therapist
END DO
```

PROCESS 2.6 Follow Up

```
      DO WHILE (Sorted Serving Client List is ready)
            IF(Therapist follow up to Serving Client)
                  Choose Client
                  Read Chat Log from Conversation Master
                  DO WHILE(Follow-up Message is ready)
                              SEND Response Message to Client
                  END DO
                  UPDATE Chat Log to Conversation Master
            END IF
            IF(NOT Client conversation change after 2 days )
                  UPDATE Client Follow-up Status to ”N”
            END IF
      END DO

      DO WHILE (Sorted Prepared-to-serve Client List is ready)
            IF(Therapist follow up to Prepared-to-serve Client)
                  Choose Client
                  Read Chat Log from Conversation Master
                        DO WHILE(Follow-up Message is ready)
                              SEND Response Message to Client
                              UPDATE Therapist Serving Status to "Y"

                        END DO
```

```
            UPDATE Serving Therapist ID
            UPDATE Chat Log to Conversation Master
      IF(NOT Client conversation change after 2 days )
            UPDATE Client Follow-up Status to ”N”
      END IF
      END IF
END DO
```

5.5 Child Diagram DFD Level-1 for Process 3: <Delivering System Message>

The child diagram for process 13 is shown in figure 13. Delivering System Message has two major functions which are notifying and sending awareness messages. Talking about notifying, it is used to notify the clients and the therapists. For the therapists, when the system detects their updated or uploaded work slot is unavailable due to certain reasons, then the system would notify other therapists so that they could prepare well to substitute the position to continue the task. Besides that, the failure of updating the appointment slot and work slot would also be notified to the therapist so that they could make a change to their slot arrangement. The system would also notify the therapist when their uploaded appointment is successfully booked by any client and also send them the related appointment info. For the client, the system would notify them about the validation of their appointment booking and the change of their appointment. This process is also used to notify the users when they login unsuccessfully and request them to re login. When a required inquiry couldn't be replied automatically, then this process would also notify the therapist that they get an incoming inquiry request to follow up. For the interaction or the communication between the therapist and his clients, the process would notify them when either side from them reply to each other.

As to sending awareness messages, it is used as a strategy of market expansion to ask generally the client whether they need a therapy service. The message also encourages the client to share the company service with the surroundings to let more people know about them

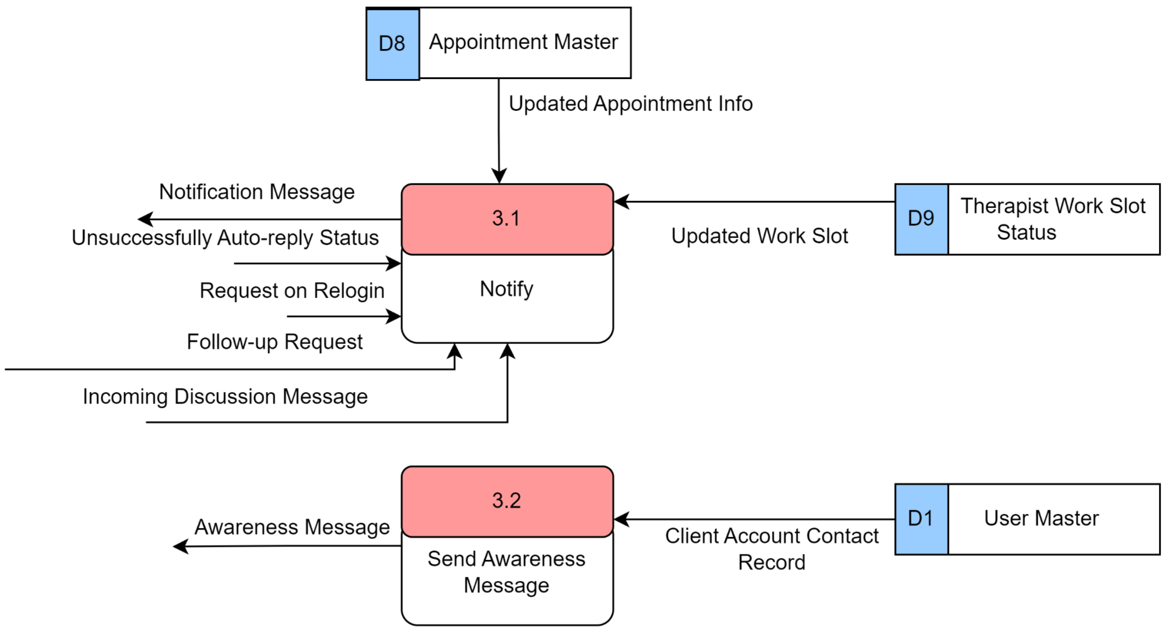


Figure 13: Child Diagram for Process 3 -Deliver System Message

5.5.1 Process Specification for Process 3: <Deliver System Message>

Process 3.1

```
RETRIVE Work slot

FROM Therapist work slot status

IF (Status is unavailable)

            SEND Notification for alerting

            TO Therapists

END IF


IF ( updating Appointment slot OR updating work slot failed)

            SEND Notification for alerting

            TO therapist

END IF


IF (Uploaded appointment is successfully booked by client)

SEND Notification for alerting

TO Therapist

AND

RETRIEVE Appointment info

FROM Appointment Master

SEND Appointment info

TO Therapist

END IF


IF (Appointment booking validated)

            SEND Notification for informing

            TO Client
```

```
END IF

IF (User Log in)
DO WHILE (Log in unsuccessful)
      SEND Notification to request re log in
      TO User
END DO
END IF

IF ( Inquiry received and auto reply unsuccessful)
            SEND Notification to follow up inquiry.
            TO Therapist
END IF

IF (Therapist sends message to client)
            SEND Notification for alerting
            TO Client
END IF

 IF (Client send message to therapist)
            SEND Notification for alerting
            TO Therapist
END IF
```

Process 3.2 sending awareness message

```
IF (User is a client)
RETRIEVE Account Contact Record
```

```
FROM User Master

SEND Awareness message to Client

END IF
```

5.6 Child Diagram DFD Level-1 for Process 4: <Therapist Update>

Figure 14 below displays the therapist update in the parent diagram above. It has three child processes: Update Work Status, Update Appointment and Validate Update..The updated appointment info and therapist work status would be generated as work slot and appointment slot respectively. The data about these slots would be stored in the data stores.The change in the status of the work slot would also update the status of the appointment slot if both of the slots overlapped between each other. The updated work slot or appointment slot would be validated by the Head of Department. The validation would be stored with the corresponding slot in the datastore.

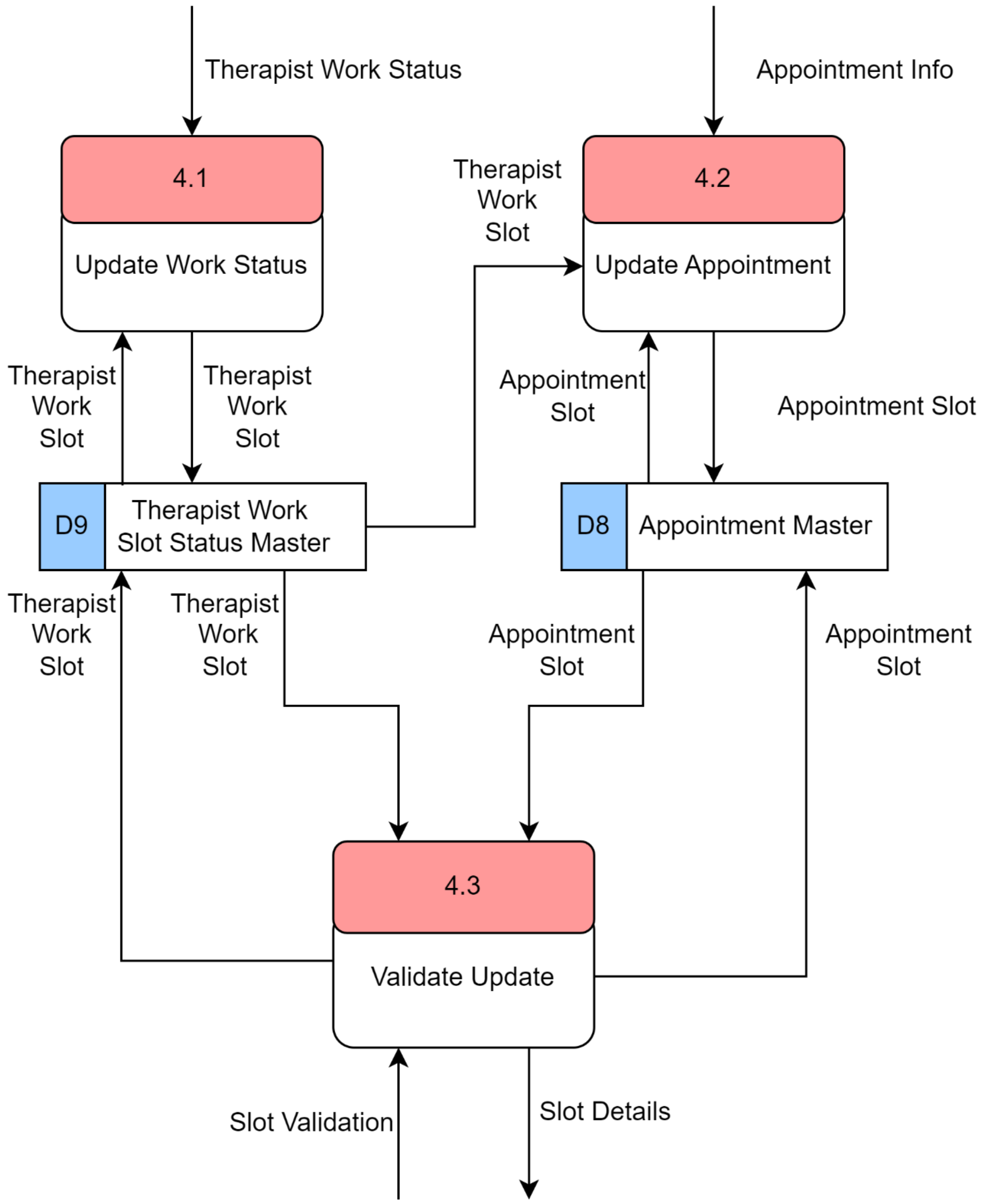


Figure 14: Child Diagram for Process 4 - Therapist Update

5.6.1 Process Specification for Process 4: <Therapist Update>

PROCESS 4.1 UPDATE WORK STATUS

```
DO WHILE (Therapist update work status)
      ENTER new work status
      UPDATE Therapist Work Slot to Therapist Work Slot Status Master
      LIST Therapist Work Slot from Therapist Work Slot Status Master
END DO
```

PROCESS 4.2 UPDATE APPOINTMENT

```
DO WHILE (Therapist update appointment)
      MOVE Therapist Work Slot from Therapist Work Slot Status Master for
scheduling
      ENTER new appointment info
      UPDATE Appointment Slot to Appointment Master
      LIST Appointment Slot from Appointment Master
END DO
```

PROCESS 4.3 VALIDATE UPDATE

```
DO WHILE (Therapist update work status or appointment)
      MOVE Therapist Work Slot from Therapist Work Slot Status Master for
validating
      MOVE Appointment Slot from Appointment Master for validating
      SEND Slot Details
      Validate Update

      IF (Validation not approved)
            Reject update
            SEND Slot Validation
      ELSE IF (Validation approved)
            Approve update
            SEND Slot Validation
      END IF

      UPDATE Therapist Work Slot to Therapist Work Slot Status Master
      UPDATE Appointment Slot to Appointment Master
END DO
```

5.7 Child Diagram DFD Level-1 for Process 5: <Manage Appointment>

The child diagram for process 4 is shown in Figure 15 below. Before the clients book an appointment with the therapists, they could view the list of available appointment slots with different schedules under different therapists. The info on every appointment including the availability, the responsible therapist, and service content could also be accessed on the side of the clients. After deciding to book an appointment, the client would need to fill in some information including requirements, faced problems, client persona description, etc. The booking appointment info would be stored in the booking master as a booking record for validation by using the corresponding latest appointment booking validation dataset. The corresponding appointment that would be used for validation not only include the appointment which the client booked, also include the list of appointments which share the same slots with the booked appointment. This process of validation is used for instant response to the changes of the appointments made by multiple clients at a time in order to avoid the possibility of having multiple clients booking the same appointment or appointments that share the same slot at the same time. The result of appointment booking validation would be stored in the appointment master for later notification to the client .For clients who have successfully booked appointments, they could monitor their successful appointment to know about the appointment info. The clients and the therapists could discuss their appointment in the system like appointment arrangement alternation and others. In this system, the client could also cancel their booking appointments.

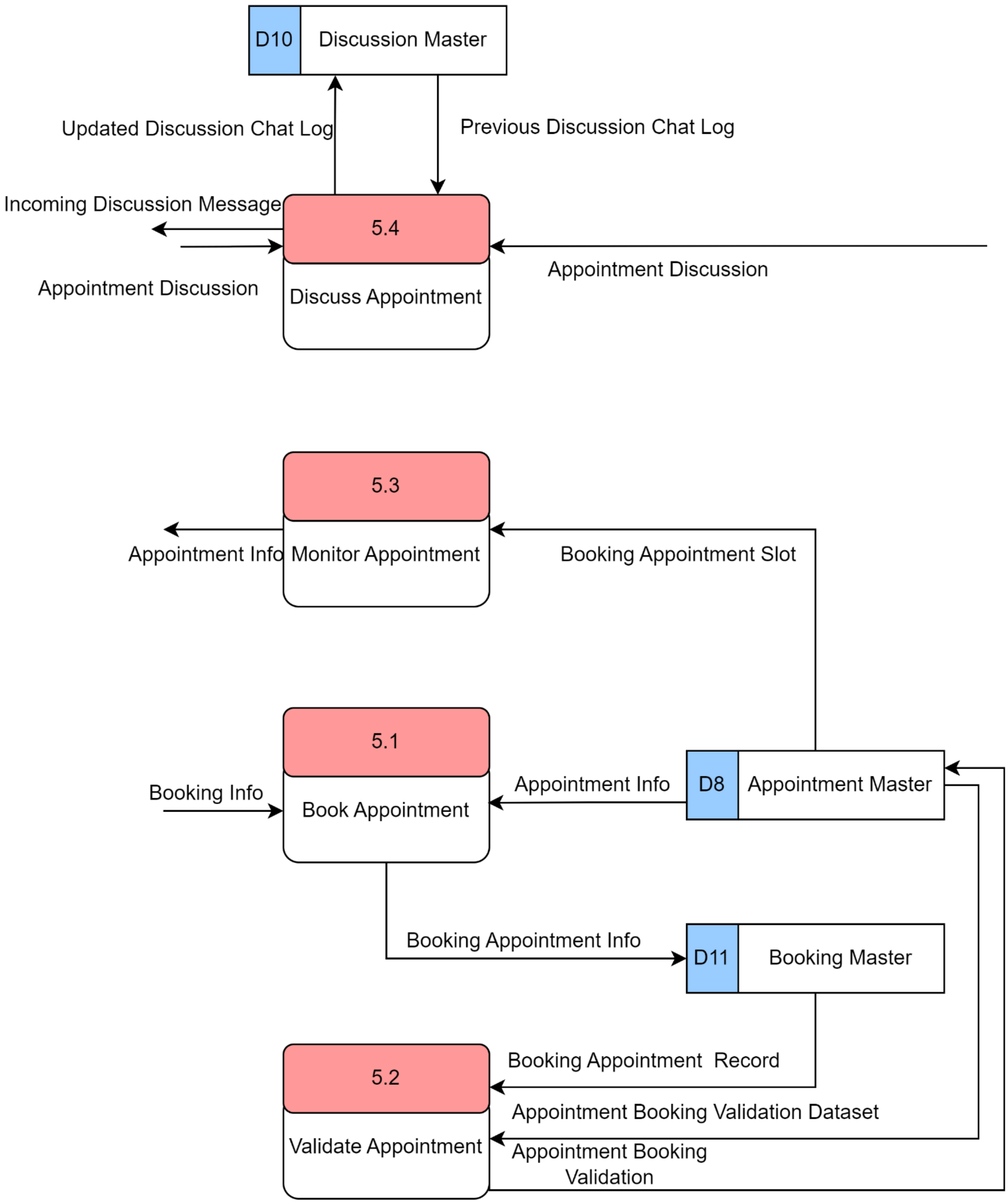


Figure 15: Child Diagram for Process 5 - Therapist Update

5.7.1 Process Specification for Process 5: <Manage Appointment>

PROCESS 5.1 BOOK APPOINTMENT

```
DO WHILE (Client request to view appointment info)
      MOVE Appointment Info from Appointment Master
      IF (Client make appointment)
            Enter Booking Info
            MOVE Booking Appointment Info to Booking Master
      END IF
END DO
```

PROCESS 5.2 VALIDATE APPOINTMENT

```
DO WHILE (Client booked appointment)
      MOVE Booking Appointment Record from Booking Master for validating
      Validate Appointment
      MOVE Appointment Booking Validation Dataset from Appointment Master
for checking
      MOVE Appointment Booking Validation to Appointment Master
END DO
```

PROCESS 5.3 MONITOR APPOINTMENT

```
DO WHILE (Client request to monitor appointment)
      MOVE Booking Appointment Slot from Appointment Master
      List Appointment Info
END DO
```

PROCESS 5.4 DISCUSS APPOINTMENT

```
IF (Client request to discuss appointment)
      READ Chat Log from Discussion Mater
      DO WHILE (Client send discussion message)
            Therapist send discussion message to Client
      END DO
      UPDATE Discussion Chat Log to Discussion Master
END IF
```

5.8 Child Diagram DFD Level-1 for Process 6: <Process Data>

Figure 16 depicts the DFD Level-1 child diagram for process 6 with the name “Process Data”. The chat logs from the conservation master and the appointment details from the appointment master would be collected always. The client information would also be collected. These collected information would be combined to form a raw dataset. In order to have a high quality of data collections, the data would be prepared to remove invalid data and data redundancy before these collected data get stored in the MediCare Data Bank. After that, the data would be categorized according to the use of these data. These data could be used to generate analysis reports based on different criteria, client behavior model visualization and also investigate the clients.

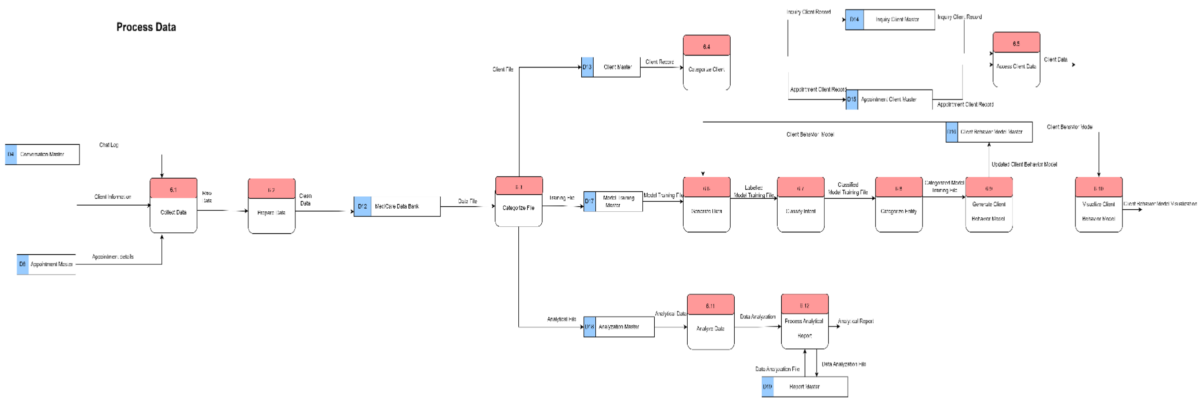


Figure 16: Child Diagram for Process 6 - Collecting and Analyzation

More Detaiks:
https://drive.google.com/file/d/1zakYIOk0QtNRJ87eaWEjx13wTEcfFQRv/view?usp=sharing

5.8.1 Process Specification for Process 6: <Collecting and Analyzing Client Data>

Process 6 : Analyzing Client Data

```
START

IF (Data collection from customer is successful)

SORT data into closed-deal and failure categories

STORE data on server

ANALYZE data for machine-learning model

EVALUATE effectiveness of previous marketing campaigns

ELSE

SEND notification for data collection failure

END IF

IF (Appointment management button is clicked)

ALLOW therapists to schedule and manage appointments

DISPLAY data on past appointments

END IF

IF (Search button is clicked)

ALLOW easy finding and filtering of customer data

END IF

IF (Data collection page button is clicked)

ALLOW manual recording of customer data for next market campaign

END IF

IF (Analytics Report is clicked)

DISPLAY data on customer interactions

DISPLAY number of closed deals and failures

DISPLAY customer behavior data for machine-learning analysis

END IF

END
```

6.0 Summary

The MyCarelink System is a revolutionary new customer relationship management tool designed to improve the efficiency and convenience of the healthcare industry. Developed specifically for MindCare Centre, this powerful system streamlines the process of appointment booking, allowing clients and therapists to easily manage their schedules online. With MyCarelink, clients can quickly and easily view the availability of therapists and services, while therapists can update their work status and manage their schedules with ease. The system is intuitive and user-friendly, making it easy for both clients and therapists to navigate and utilize. Additionally, MyCarelink helps to save time for therapists by automating many of the manual processes that are currently in place. Overall, MyCarelink is a powerful and effective solution for managing customer relationships in the healthcare industry, providing both clients and therapists with a more efficient and convenient experience.

7.0 References

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