FIK CLUB MANAGEMENT SYSTEM

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(INTERNET COMPUTING)

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DECLARATION

I hereby declare that this report is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Sultan Zainal Abidin or other institutions.

_____

Name : Muhammad Mursyid bin Hazizan

Date : 24 MAY 2018

CONFIRMATION

This is to confirm that:
The research conducted and the writing of this report was under my supervision.

_____

Name : Puan Norkhairani Binti Abdul Rawi

Date : 24 MAY 2018

DEDICATION

In the name of Allah the most Gracious and the Most Merciful May His Blessing be upon the Prophet Muhammad S.A.W.

I would like to express my gratitude to who support me in this project directly or indirectly. Special thanks to my beloved and dedicated supervisor, Puan Norkhairani binti Abdul Rawi for her guidance, ideas, comments and advices to the whole process in completing this final year project in time.

My personal gratitude to my beloved family especially to my parents for moral support that they gave to me.

Thank also to all my friends who helped me in this final year project.

ABSTRACT

Faculty of Informatics and Computing (UniSZA) staff club have been created that provide welfare to the staff and give benefit to the member club. Staff needs to register for the club to become a member. However, the data recorded manually and not centralized. Besides that, all information need to announce to all member of the club has faced with limitation because some of the staff member not notify some information from the club. Furthermore, the member eligible to get benefit from the club. The objective of the project is to make sure staff easy to register through the system and make sure the club management more reliable. However, the system is developed to decide who is eligible to get benefits from the club. Rule-Based system method has been applied in this development. Hopefully, this project makes the club management more systematic and easier to use.

ABSTRAK

Fakulti Informatik Komputeran Universiti Sultan Zainal Abidin telah menubuhkan sebuah kelab yang menjaga kebajikan staf FIK dan menyediakan pelbagai faedah untuk ahli kelab tersebut. Semakin hari semakin meningkat jumlah yang berdaftar sebagai ahli dalam kelab ini. Data ahli yang telah direkod disimpan secara manual. Selain itu, segala informasi yang perlu disebarkan menghadapi limitasi kerana kemungkinan semua ahli tidak mendapat informasi secara meluas. Selain itu, setiap ahli boleh mendapatkan faedah daripadanya. Oleh yang demikian, objektif kajian ini adalah untuk memudahkan pendaftaran ahli kelab dan memudahkan lagi pengurusan bagi menjamin kebajikan ahli kelab. Walaubagaimanapun, sistem yang dibangunkan akan menentukan ahli yang layak untuk mendapatkan faedah mengikut kreteria yang telah ditetapkan. Kaedah yang digunakan dalam pembangunan sistem ini ialah "Rule-Based System". Rule-Based sistem digunakan sebagai satu jalan untuk menyimpan dan mengubah satu pengetahuan untuk ditafsirkan kepada informasi yang berguna. Kaedah ini selalunya digunapakai dalam "artificial intelligence". Akhir sekali, diharapkan sistem ini dapat dibangunkan dengan jayanya dan dapat memudahkan lagi pengurusan kelab akan datang.

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LIST OF ABBREVIATIONS / TERMS / SYMBOLS

CD	Context Diagram
DFD	Data Flow Diagram
ERD	Entity Relationship Diagram

CHAPTER I

INTRODUCTION

1.1 BACKGROUND

A system is a set of things working together as part of a mechanism or an interconnecting network. It a set of principle or procedures according to something is done with all algorithm and method uses in the system. The system is very useful to provide convenience to the user to solve their problem

Faculty of Informatics Computer University Sultan Zainal Abidin (UniSZA) has created a club for their staff. Staff can get benefits through the club after they register for the club. But the data recorded manually without any system.

System is develop to accommodate convenience for the club management. The system will make the decision to get the eligibility among the member club using the rule-based method. The system officially for staff FIK UniSZA. However, staff needs to register all information to the system include family info.

In addition, the system can notify all activity about the club and remind all member to pay an annual fee from time to time. All member will receive notification through the system directly.

Based on the methodology above, rule-based system is used as a way to store and manipulate knowledge to interpret information in a useful way. It’s often used in artificial intelligence to make a decision in the system.

In conclusion, FIK staff need this system implemented for the club management to make sure all member information updated time to time and staff will get all benefits from the club. At the same time, all progress monitoring depends on system response.

1.2 PROBLEM STATEMENT

FIK staff club manages their data manually. The data not centralized without the system management. Besides that, the staff does not receive the invitation, information about the club because not have a one-stop center to announce the information to notify all member of the club. The club member will miss some information about the club. Furthermore, the club cannot specify those who involved in the activity. It will be hard to identify eligibility of benefits for each member in the club.

1.3 OBJECTIVES

a) To design the FIK club management system.

b) To develop the FIK management system.

c) To test the usability of the system.

1.4 SCOPE

a) User. The role of the user is to key in all information to the system and get update all news feed in the system.

b) Admin. They can log in to the system and manage all data in the database of the system and update any news update to the system.

c) Rule-Based is the methodology implement the system. The rule-based need the knowledge and combination of the database to make the decision.

1.5 LIMITATION OF WORK

The limitation of work from this web-apps project focus on developing the web system using the rule-based technique for FIK club of UniSZA. The system will let all user (staff) register to the system and get more information from the system. This system is ability to make a selection of the user that eligible to get benefit from the club based on the criteria decided. From the system, it will notify the annual fee that needs to pay by the member of the club. Lastly, this project development will take the club more systematic in management and user easy to interact freely with the system.

CHAPTER II

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter is discussed the system that related to the club. This chapter is very important in developing the system. Besides that, research has been made to make sure the club management are fluently function. However, the user can understand what the system needs. In addition, the system can solve the problem and fulfill the user requirement. All the eligibility to get benefits from the cub are made by the system using a rule-based system. It will implement the system with the condition have been decided.

2.2 DEFINITION OF RULE-BASED SYSTEM

The rule-based system is known as *an expert system* is the simplest for artificial intelligence. The rule-based system uses the knowledge representation for knowledge coded into the system. The rule-based definition depends on the expert system which the system act as a human in resolving a knowledge-intensive problem. Besides that, rule-based system represents knowledge in term of a set of rules that tell us what to do to conclude in a different situation.

2.3 STRUCTURE OF RULE-BASED SYSTEM

In the early seventies, Newell and Simon from Carnegie- Mellon University proposed a production model, the foundation of the modern rule-based system. The production model based on the idea that human solves problems by applying their knowledge to a given represented by problem-specific information. The production rule stored in long-term memory and fact are stored in short-term memory. Combination of production rule and fact to make reasoning and the output are the conclusion.

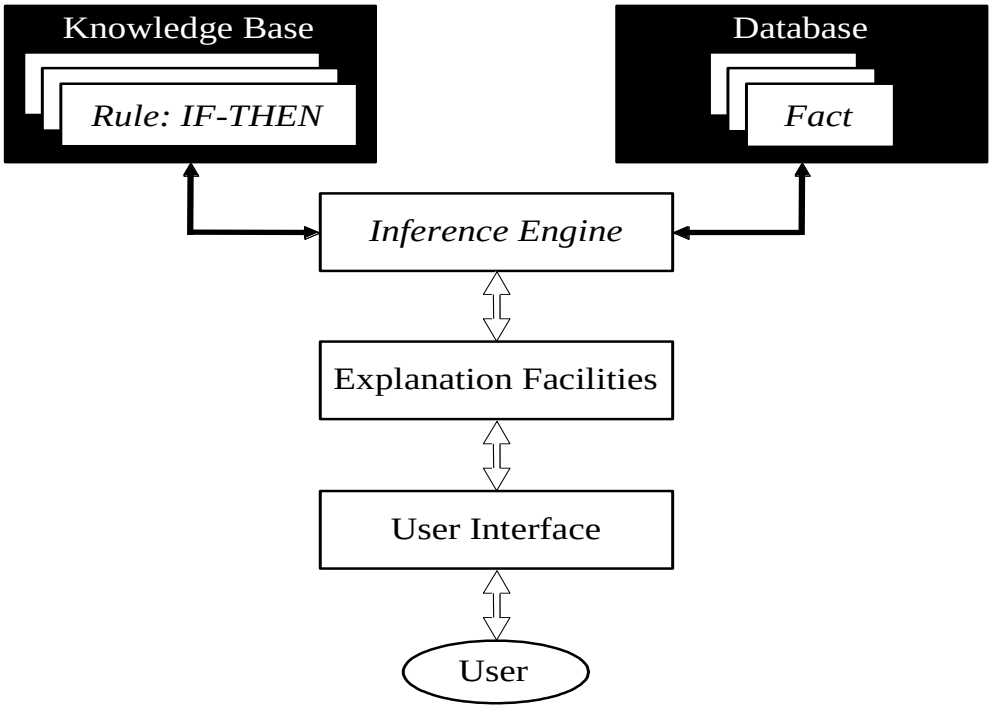

Figure 2.1 Structure of Rule-Based System

2.4 CLUB MANAGEMENT SYSTEM

Previously, club management system is stored all user information to the database. System is legal can access by the member of the club who has registered to the system. Besides that, expert system is not apply to the management system. Therefore, the system cannot make a decision and predict for the user.

For this development, the expert system will apply to make the system more intelligent. An expert system used to make sure the system can make the decision and predict based on the knowledge given and the fact from the database are matching each other. Therefore, the rule-based system needs to implement to this club management system.

2.5 ADVANTAGES OF RULE-BASED SYSTEM (EXPERT SYSTEM)

There are many advantages the rule-based system uses. The advantages of a rule-based system due to the following:

2.5.1 SEPARATION OF KNOWLEDGE FROM IT PROCESS

The structure of a rule-based expert system provides an effective separation of the knowledge base from the inference engine. This structure makes it possible to develop another application using the same expert system shell.

2.5.2 DEALING WITH INCOMPLETE KNOWLEDGE

The rule-based system is able to represent and reasoning rules with incomplete and uncertain knowledge.

2.5.3 SIMILARITY TO THE HUMAN COGNITIVE PROCESS

Newel and Simon have shown that rules are the natural way of modeling how humans solve problems. Rules make it easy to apply and explain the structure of knowledge to the expert.

2.5.4 UNEMOTIONAL AND RESPONSE AT ALL TIME

The system is unlike humans. They do not get tense or panic and work steadily during an emergency situation.

2.6 DISADVANTAGES OF RULE-BASED SYSTEM (EXPERT SYSTEM)

There is also some disadvantage the rule-based system uses. The disadvantages of a rule-based system due to the following:

2.6.1 INEFFECTIVE SEARCH STRATEGY

The inference engine applies an exhaustive search through all the production rules during each cycle with a large set of rule. This can make it slow and rule-based system are unsuitable for real-time application.

2.6.2 INABILITY TO LEARN

Rule-based expert system does not have an ability to learn from experience. The knowledge engineer is still responsible for revising and maintaining the system for new knowledge.

2.6.3 COMPLEX DOMAINS

Some domain is so complex that many of condition of rules need to represent for the possible situation.

CHAPTER III

3.0 METHODOLOGY

3.1 INTRODUCTION

The methodology is a way to systematically solve the research problem. It is also the guidelines to ensure the project follow the flow to get the best result. The system methodology also a framework that is used to structure, plan and control the process of developing an information system. There are many types of the methodologies can be used in development will be discussed at the next session.

3.1.1 TYPE OF METHODOLOGY

The following are the types of methodologies:

3.1.1.1 DYNAMIC SYSTEM DEVELOPMENT MODEL (DSDM)

The DSDM was developed in the U.K. in the mid-1990s. It is the evolution of rapid application development (RAD). There are the principles of DSDM. The principles of DSDM are active user involvement, empowered teams that the authority that can make a decision, focus on frequent delivery of products, using fitness for business purpose as the essential criterion for acceptance of deliverables and reversible changes during development.

3.1.1.2 SYSTEM DEVELOPMENT LIFE CYCLE (SDLC)

The SDLC is a conceptual model used in project management that describes the stages involved in a system development project from an initial feasibility study through maintenance of the completed application. Several methodologies have been developed to guide the process involved including waterfall model (the original SDLC method).

3.1.1.3 WATERFALL (TRADITIONAL METHODOLOGY)

The waterfall model is a popular version of the SDLC model for system development. This model describes a development method that is rigid and linear. Waterfall development has a distinct goal for each phase of development where each process of every phase are completed, for next one is a start and no turning back.

3.2 METHODOLOGY USED IN DEVELOPMENT

In this project, the methodology chosen is system development life cycle (SDLC). SDLC is a conceptual model used in project development that shows the stages from initial feasibility study through maintenance of the completed project. Besides that, the SDLC methodologies have been developed to guide the process involved including waterfall model where the waterfall model was the original SDLC method.

The SDLC consists of five phases to improve the quality of the project. The phase of SDLC is a feasibility study, analysis, design, implementation, support and operation. Figure 3.1 showed a graphical representation of the various stages of SDLC.

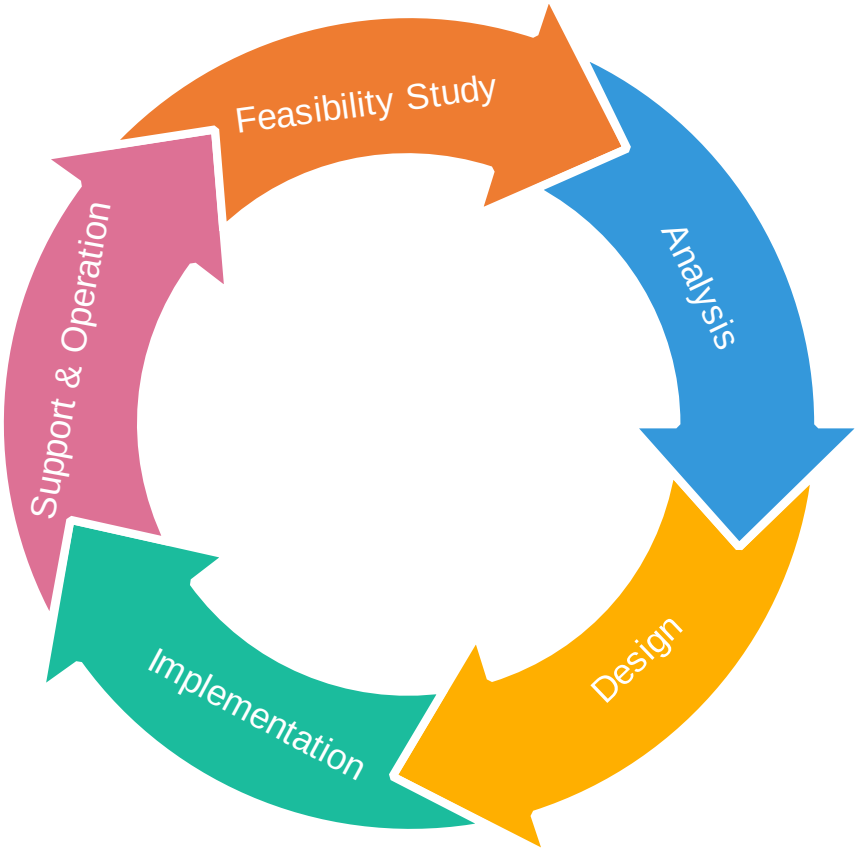

Figure 3.1 System Development Life Cycle

3.2.1 PHASE1: FEASIBILITY STUDY

A feasibility study is the first stage of SDLC. This phase to identify the title of the project from the supervisor and discuss the objective, problem statement, and scope of this system development. The objective of the feasibility study is to establish the reasons for developing the web development and also to determine whether the software can be implemented using the current technology within the specific time.

In this phase, all information about the FIK club needs to be gathered to study the objective of the FIK club system. All the information is used to make sure the system will fulfill the user requirements. Besides that, brainstorming with supervisor needed to discuss a plan which is to make sure the system development project running smoothly. All plan have been set must be followed to complete the project successfully.

3.2.2 PHASE2: ANALYSIS

The analysis is a process of collecting factual data. Besides that, the analysis is the process to understand the flow of the system development, identifying the problem of the previous system and recommending suitable suggestion to improve the system function in development. This also involves the studying the gathering operational data, understand the information flow and evolving solutions for the system to achieve the goal.

In addition, all research, journal, and review from the internet, should analysis to identify technique and method suitable for the project. Therefore, this project will implement PHP and HTML in developing the web-based system and use the rule-based system to make a decision in the system.

3.2.3 PHASE3: DESIGN

In this stage, all information that studied and analyze transform into graphical information. The design will show the flow of the system more specific and give the

overview of the system goal. Architecture design, user interface (UI) design and database design is carried out at this phase

Besides that, the context diagram (CD), data flow diagram (DFD) and entity relationship (ERD) are included in this phase to show the relationship of the entity to show the flow of the database. The good architecture design can give a clear view in developing the project.

3.2.4 PHASE4: IMPLEMENTATION

This phase is the developing stage. This project system started with coding using HTML and implement the CD and DFD have been created to apply in the system flow process. This FIK Club Management System development use programming language HTML, PHP, and the local server are called XAMPP to get a host to the database. Therefore, implementation is the part to verify that the system meets the objective and the user requirement has been confirmed.

3.2.5 PHASE5: SUPPORT AND OPERATION

Support and operation phase involves maintenance and require a regular system update. This phase commonly focuses on the performance of the system and the abilities to fulfill user requirements.

3.3 GANTT CHART

Table 3.1 below show the planned and actual progress on project development.

No.	Tasks		Month						
			2	3	4	5	6	7	8
1	**Planning Phase**		✓						
	1.1	Problem Definition	✓						
	1.2	Project Identification	✓						
	1.3	Project Proposal	✓						
2	**Analysis Phase**			✓	✓				
	2.1	User Requirements		✓	✓				
	2.2	System Requirements		✓	✓				
3	**Design Phase**				✓	✓			
	3.1	Process Design			✓	✓			
	3.2	Database Design			✓	✓			
	3.3	Interface Design			✓	✓			
4	**Implementation Phase**						✓	✓	✓
	4.1	Develop database					✓	✓	✓
	4.2	Admin Module					✓	✓	✓
	4.3	User Module					✓	✓	✓
	4.4	Implement Rule-Based					✓	✓	✓
	4.5	Develop Rule-Based System					✓	✓	✓
5	**Operation Phase**								✓
	5.1	System Test							✓
	5.2	User Test							✓

Table 3.1 Gantt Chart

3.4 SYSTEM REQUIREMENT

System requirement is set of documentation that describes the features and behavior of a system. Its conclude the varieties of user requirement to satisfy their different uses. All the materials development have been listed.

- **Software list:**

No	Software	Purpose
1	Notepad ++	HTML,CSS,PHP,MySQL editor
2	PHP,HTML	Programming Language
3	MySQL	Database platform
4	MS2013	Documentation of the system
5	Google Chrome/ Mozilla Firefox	Localhost, view database

Figure 3.2 Software list

- **Hardware list:**

No	Hardware	Description
1	Laptop	Asus A556U Series
2	Processor	Intel Core i5-6200U up to 2.8Ghz
3	Memory	8GB RAM
4	Windows and System Type	Win10 and 64bit Os

Figure 3.3 Hardware list

3.5 SYSTEM DESIGN

System design is the process of defining element system like architecture, components, and their interface. Besides that, data from a system based on the specified requirements. In this development will show system design for this project development. Several system designs used in this development and will show at the next topic.

3.5.1 CONTEXT DIAGRAM (CD)

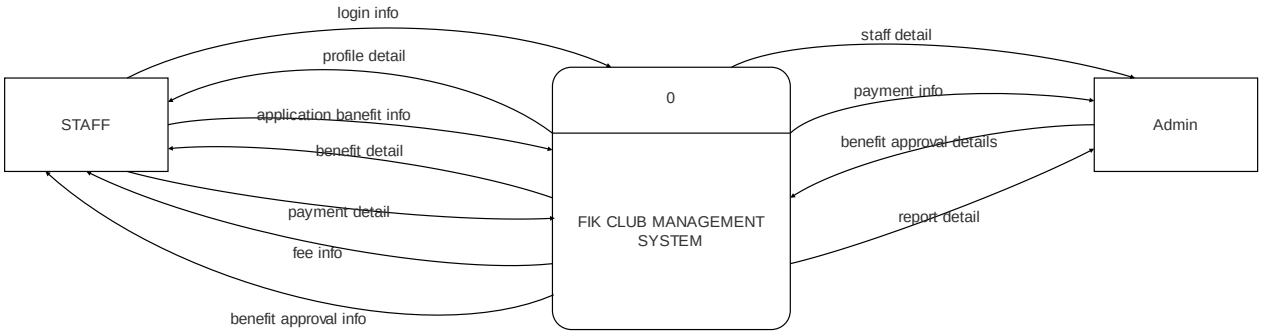

Figure 3.2 Context Diagram

Figure 3.2 shows that the context diagram consists of an entity and involves the flow that generally shows to the system an overview of the system flow. FIK Club Management System involves two entities, FIK staff, and admin.

3.5.1.1 ENTITY: STAFF

From the context diagram, staff will log in to the system. After login, staff can make payment, show activity, choose benefits and apply for benefits to

the system. This system is strictly for FIK staff only those who are deployed at UniSZA. Staff in this system involved by staff academic and administrative staff.

3.5.1.2 ENTITY : ADMIN

Admin is any staff that pointed as the manager of the system. All the staff details, payment details, benefits list, benefits application info will send to the admin as a report to the club activity.

3.5.2 DATA FLOW DIAGRAM (DFD) LEVEL 0

Figure 3.3 shows the process of FIK club Management System between staff, admin and data store.

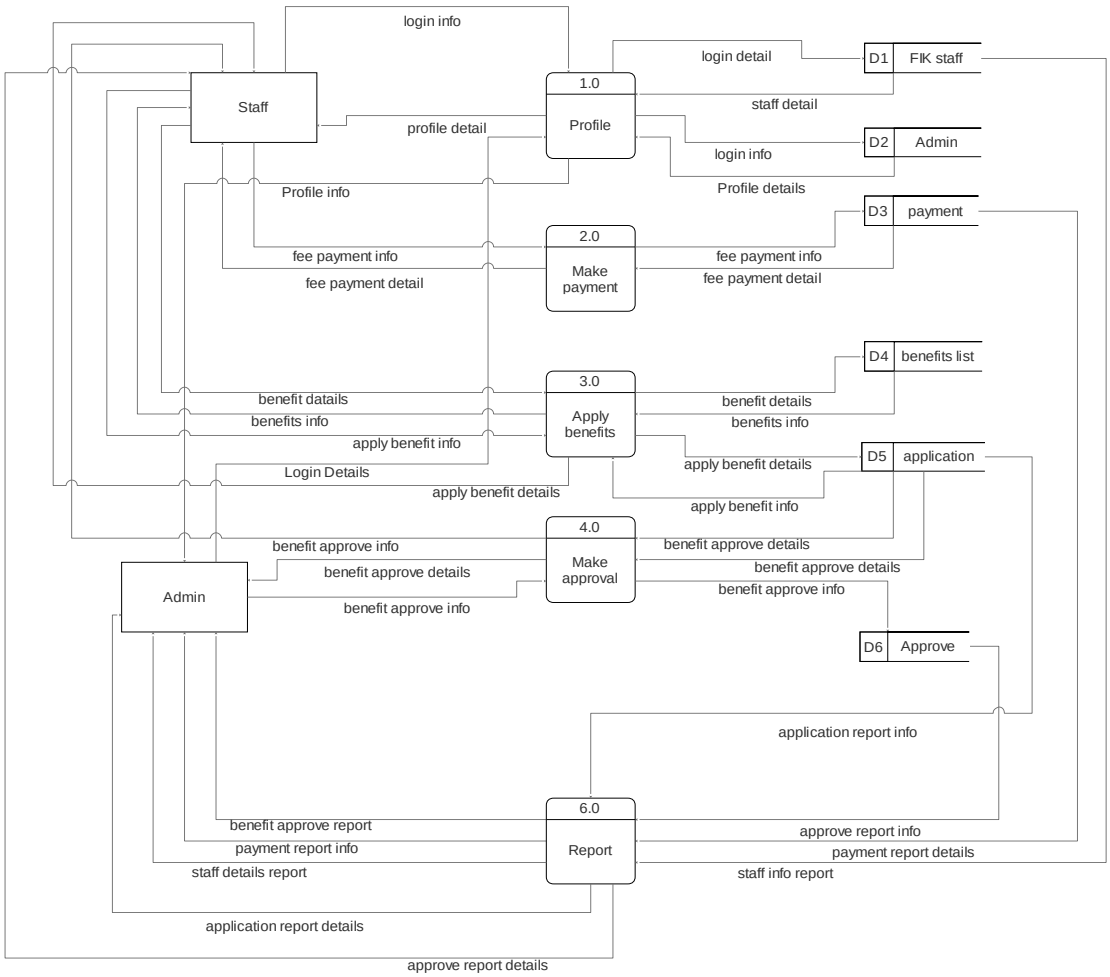

Figure 3.3 Data Flow Diagram

From the DFD above, staff as user login to the system. The system is restrict for staff only. The data store have FIK staff info only. Therefore, other staff cannot login to the system. After staff login the system, the system will view all information to the staff. About the activity club, payment details, benefits of the club that can be apply. Admin will monitor the system and update the payment details and add any benefit to the system. Admin also will approve the benefit that have been applied by the staff. Its depend on the eligibility of the staff to get the benefits. Admin will get report of the staff details, benefits and approval list of the application.

3.5.3 DATA FLOW DIAGRAM (DFD) LEVEL 1 (PROFILE)

Figure 3.4 show the process of the register that contain Staff and Admin can view and update their profile.

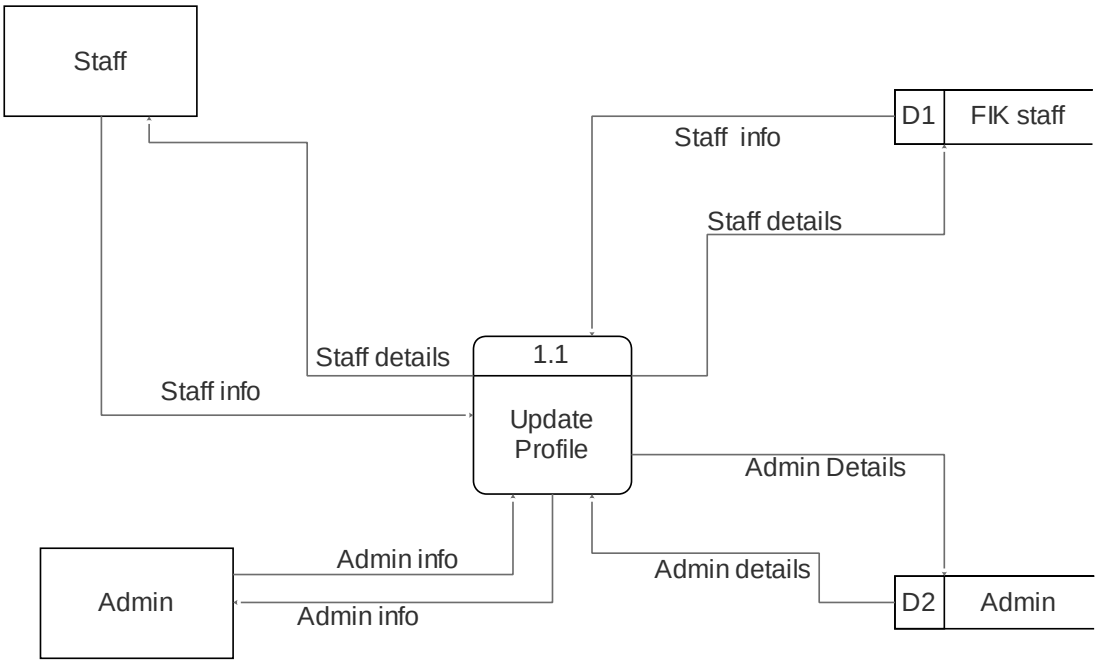

Figure 3.4 Data Flow Diagram LEVEL 1 (Register process)

From the process, staff can update their profile and all staff information will send to the staff store. Besides that, staff can retrieve their info from the system. Admin also can update their profile at the system. All admin details will store to the admin database.

3.5.4 DATA FLOW DIAGRAM (DFD) LEVEL 1 (PAYMENT)

Figure 3.5 shows the process of the payment that will made by the staff for fee payment of the club

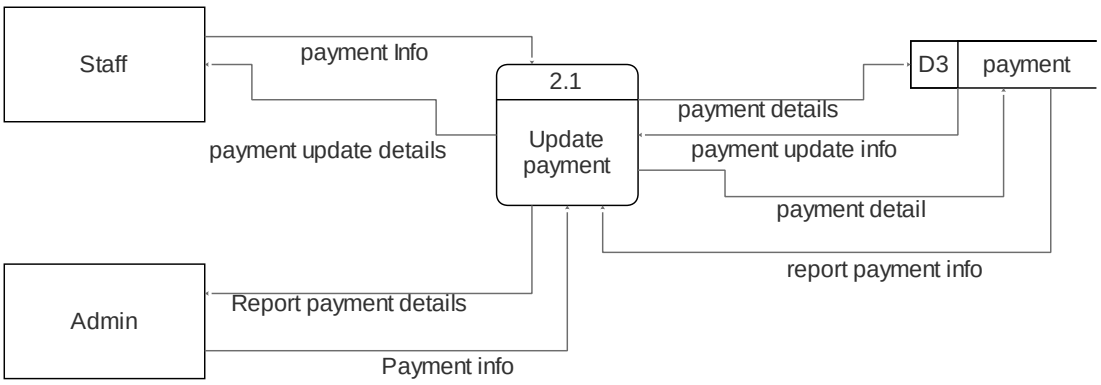

Figure 3.5 LEVEL 1 DFD (Payment)

. This process will update to the database and admin will get report from the payment have been made. Staff will pay fee for the club management through the system. Staff need to update their resit to the system as an evidence of payment. Admin will retrieve detail of payment have been made from the system.

3.5.5 DATA FLOW DIAGRAM (DFD) LEVEL 1 (APPLY BENEFITS)

Figure 3.6 show the process application of benefits from the club. This process is include staff and admin.

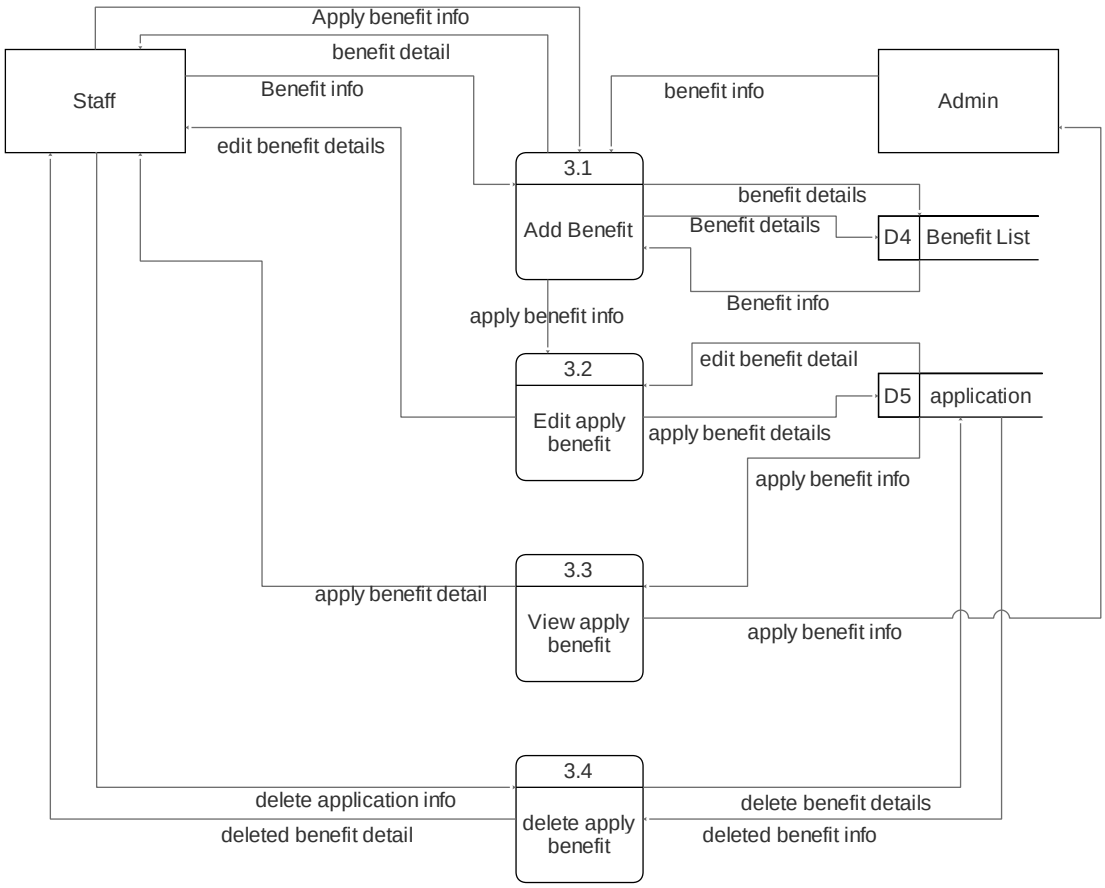

Figure 3.6 DFD LEVEL 1 (Benefits)

In this process, staff can make application from the system based on benefits listed. Staff can add benefits that want to apply. If to cancel, staff can edit to delete the application before confirm the application and after confirm the benefits applied, the benefits application will send to the application store. Admin use the system to see the applied benefits from the staff and give approval.

3.5.6 DATA FLOW DIAGRAM (DFD) LEVEL 1 (Approval)

Figure 3.7 show that the process of make approval by admin.

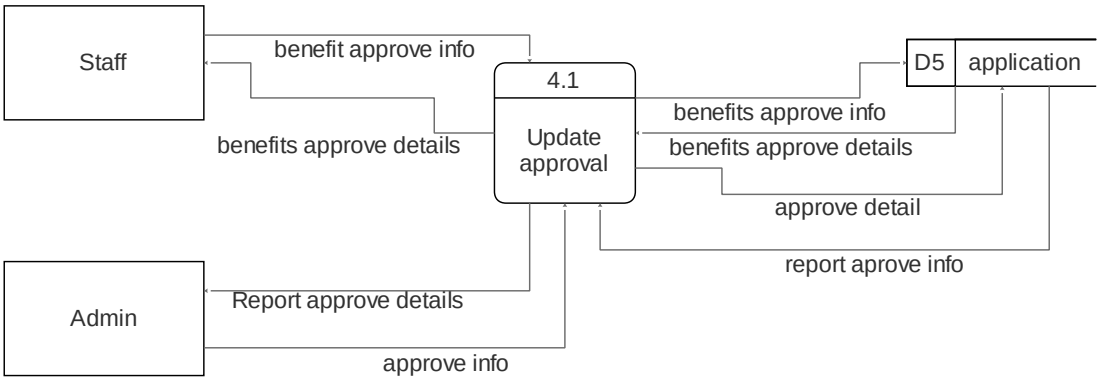

Figure 3.7 DFD LEVEL 1 (Make Approval)

This is the process to update the approval status to the staff. Staff can view the benefits applied have been approved by the admin. Admin will retrieve all details from the application store. After that, staff will approve based on eligibility from the club management. Staff can review the approved benefits from the system.

3.5.7 DATA FLOW DIAGRAM (DFD) LEVEL 1 (REPORT)

Figure 3.8 shows process of report from staff, payment, application and approval process that send to staff and admin.

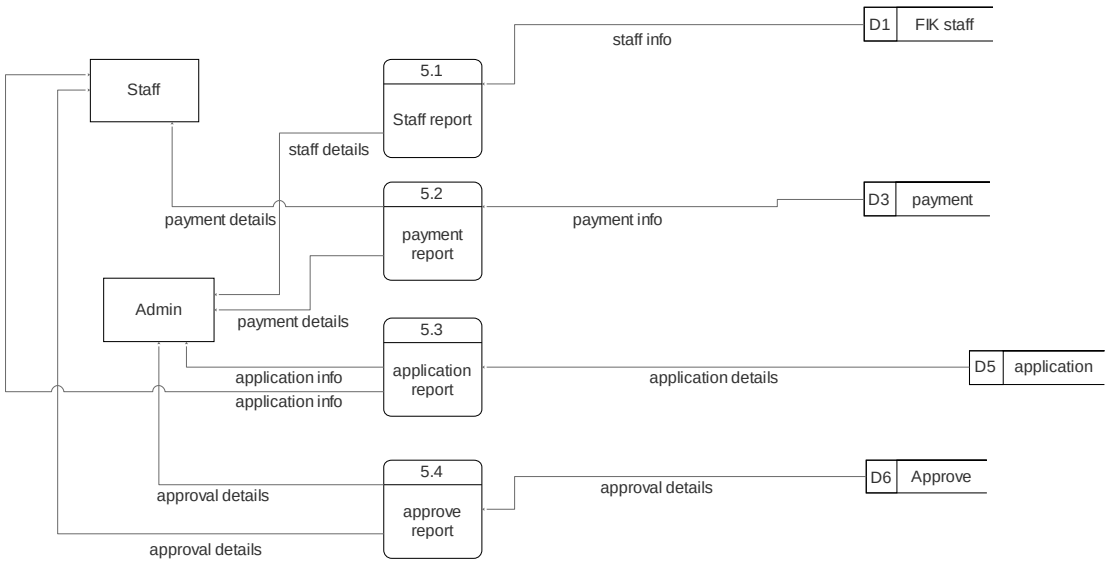

Figure 3.8 DFD LEVEL 1 (report)

This process show the report process that will send all details to admin and approved benefits to the staff. This process generated from the FIK staff store, payment store, application store and approve store.

3.6 DATABASE DESIGN

The database is very important in system development. The database is used to save data and give permission to the user to retrieve data and admin can manage the data in the database. This database makes all information managed. Generally, information collected will record in the database that has been structured.

3.6.1 ENTITY RELATIONSHIP DIAGRAM (ERD)

Entity relationship diagram (ERD) used to describe the data in the data store. The relation of the data in FIK Club Management System involved admin and staff.

Staff will make an input to the system and the input data will send to the data store. The diagram 3.9 below shows the ERD of the FIK Club Management System.

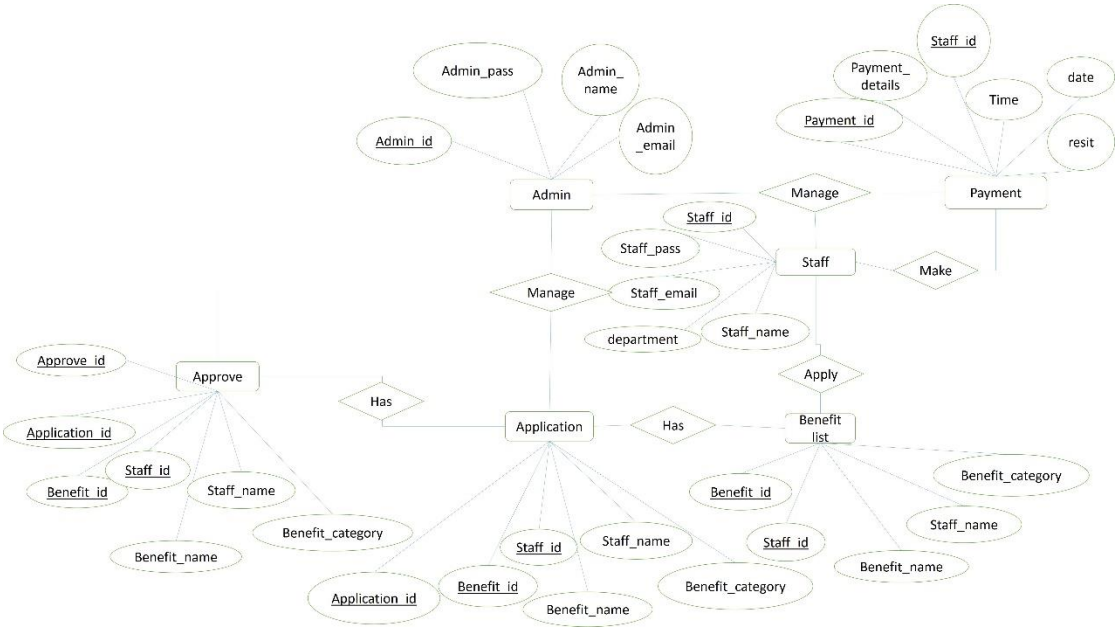

Figure 3.9 ERD FIK Club Management System

This ERD show how the data generated in the database. Admin and staff are involved in this relationship. ERD show all attributes that involved in every entity. The following list of the attributes of every entity.

3.6.1.1 ADMIN DATABASE

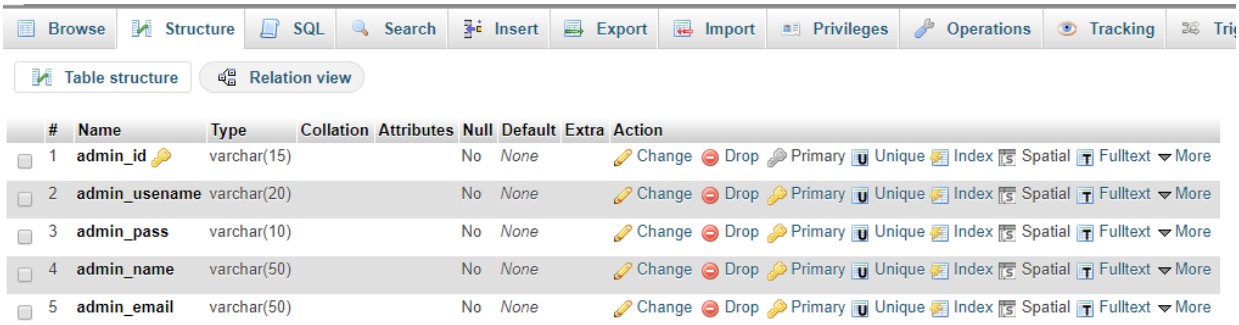

Figure 3.10 Table of Admin

Admin attribute consists of admin id, admin password, admin name and admin email. Id serves as a primary key in represent table such as admin_id for table admin. Admin login to the system with the username and password to the system and can update their profile.

3.6.1.2 STAFF DATABASE

Figure 3.11 show staff in database:

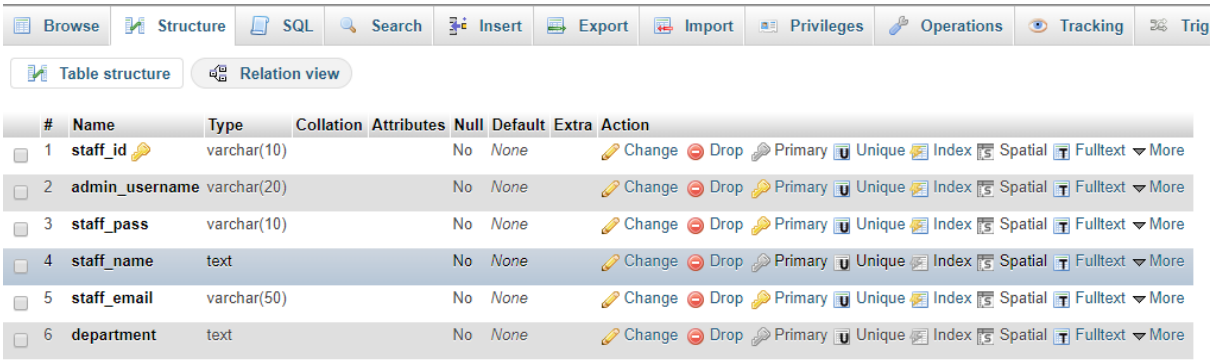

Figure 3.11 Table of staff

Figure 3.11 shows the data of staff store in the database. Staff login to the system by using username and password. Staff also can update their profile through the system.

3.6.1.3 PAYMENT DATABASE

Figure 3.12 show payment in database:

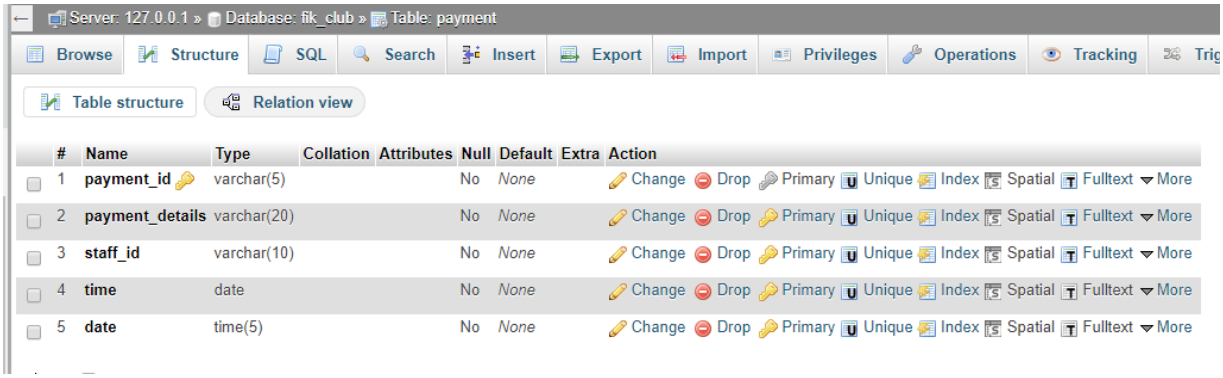

Figure 3.12 Table of payment

Figure 3.12 shows the payment table. Payment table shows the summary of payment has been made by staff. This payment details will send information to the admin for report analysis to the club management. Time and date are been set to verify time payment have been made.

3.6.1.4 BENEFIT LIST DATABASE

Figure 3.13 shows the benefits list in the database

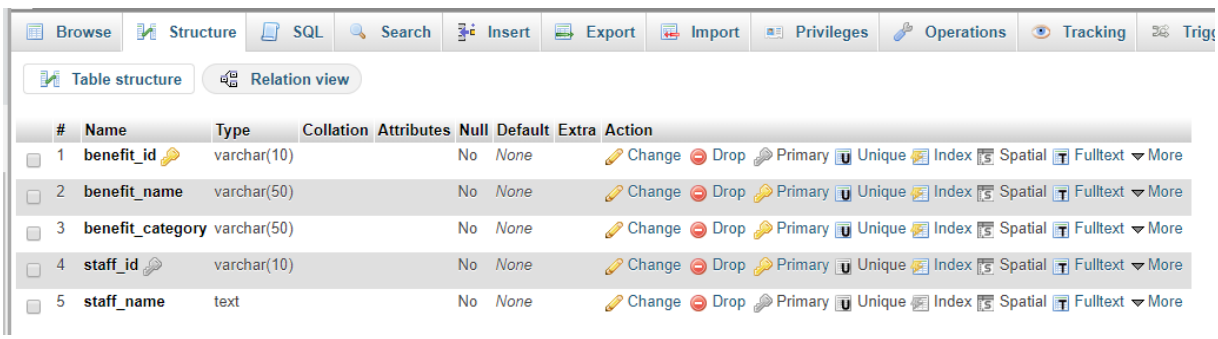

Figure 3.13 Table of benefits list

Figure 3.13 shows the benefits list. Every benefit has different id and name. Benefits list will sort in several categories of the benefits. The benefits can be updated by admin to add new benefits and show to the staff.

3.7 SUMMARY

It can be summarized that System Development Life Cycle can help the project development run efficiently and not much dealing with the problem. It also helps to solve the problem in the development phase.

REFERENCES

I. S. Torsun. *Foundations of Intelligent Knowledge-Based Systems*. Academic Press, London, San Diego, New York, Boston, Sydney, Tokyo, Toronto, 1995.

A. Vermesan and F. Coenen, editors. *Validation and Verification of Knowledge Based Systems. Theory, Tools and Practice*. Kluwer Academic Publisher, Boston, 1999.

A. Vermesan. *The Handbook of Applied Expert Systems*, chapter Foundation and Application of Expert System Verification and Validation. CRC Press, 1998.

Antoni Ligęza. *Logical Foundations for Rule-Based Systems*. Springer-Verlag, Berlin, Heidelberg, 2006.