REQUIREMENT MODEL FOR MRSM TRANSKRIAN HOMEROOM MERIT DEMERIT SYSTEM

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ABSTRAK (BAHASA MALAYSIA)

Kajian ini bertujuan untuk memperkenalkan model yang dijadikan asas untuk membangunkan Sistem Pengurusan Merit Demerit Homeroom (HMDS) dalam membantu dan memudahkan kaunselor pelajar serta penasihat homeroom untuk mengurus dan mengendalikan perkembangan serta kemajuan pelajar.

Kajian ini juga dirangka untuk mengurangkan beban tugas kaunselor pelajar untuk merekodkan dan menguruskan mata dapatan Merit Demerit.

Notasi UML digunakan untuk memodelkan keperluan yang dikenalpasti. Teknik permodelan sistem dan prototaip digunakan untuk mengesahkan keperluan pengguna. Sementara itu pengguna akan mengguna dan menguji prototaip untuk mengesahkan model keperluan yang dihasilkan dalam kajian ini. Gambarajah UML dan satu senarai keperluan akan dihasilkan. Beberapa cadangan untuk kajian akan dating dibincangkan di akhir kajian ini.

ABSTRACT (ENGLISH)

This aim of study is to create a requirement model as a basis to develop a Homeroom Merit Demerit Management System (HMDS) so as to assist the counselor and the homeroom teacher in managing and monitoring the student progress and development.

It also targeted at minimizing the burden shouldered by the counselor in the process of recording and managing the Merit Demerit points.

UML notation is used to model out the requirements. System modeling and horizontal prototype are used to validate the users' requirements. Requirement model is validated by using system requirements testing, horizontal prototype and test case. UML diagrams and a set of requirements list will be produced in this research. Several recommendations for future research will be discussed at the end of this research.

ACKNOWLEDGEMENT

In the name of Allah, The most Gracious and The most Merciful. All praise belongs to Allah, Lord of the Universe. There is no god but Allah and Muhammad in his messenger, peace be upon him. Salam and Selawat on his Ahlal Bait and his companions. Salam and Selawat the Ulamaks who had imparted their knowledge to mankind so that the truth regarding our existence and the path to the final eternity was made known through their elaboration of the Holy Kitab Al-Qurannulkarim and the Hadith of the beloved Prophet Muhammad S.A.W in their writings, speeches and other means of imparting knowledge.

Praise be to Allah who has given us the mind to think, the eyes to observe and see things; the ears to hear nice and horrible sounds; the mouth to speak, to read, to drink, and to eat; the hands to write, to hold, and to do wonders with; the legs to walk, to run, to jump and to leap to the highest or our achievements in life; and the greatest gift of all is the strength and the will power to accomplish what we desire in our short life span of an average of 60-70 years if Allah wills one can just imagine if one of those senses are taken away what can happen may not happen at all.

Thank you God for everything that thou has given me and the strength to complete this project.

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CHAPTER ONE

INTRODUCTION

1.1 The context of the study

The homeroom program was first introduced to MRSM Seremban in 1972, went through further development and later introduced to other MRSMs. Since then, the homeroom program has become important and forms a vital part and basis of most activities at the schools. The Homeroom is comprised of a group of students of the same age living together as a family and a teacher who functions as the advisor and guardian.

The Homeroom Program forms the backbone to the MRSM education system in educating the students to be more matured and well-behaved and hence able to face the challenges in their future undertakings. The educational process is guided by a teacher as an advisor. Besides the usual academic learning activities, the students are also exposed to the culture of experimenting in science through enrichment programs. The MRSM educational process is shown in the diagram below:

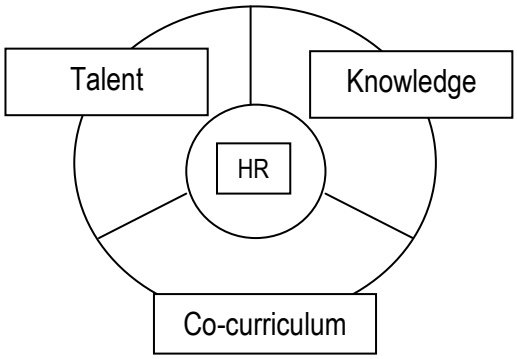

Figure 1: Homeroom as a backbone to the MRSM

1.2 Statement of the problem

MRSM Transkrian emerged as the best MRSM in the Penilaian Menengah Rendah (PMR) exam among all the MRSMs in 2008. In fact, in its time, it was the best PMR results ever since the establishment of MRSM. Unfortunately, the 2009 PMR results for MRSM Transkrian dropped dramatically to last place among the MRSM nationwide for some reasons which certainly requires a different study.

Since the Homeroom System forms the backbone to the MRSM education system, the management has decided to develop the system further to truly control the discipline of the students which has been identified as one of the main causes of the drop in the PMR results in 2009.

According to Azlina (2008), there is a correlation between students' discipline and their achievement. For example, students who smoke may tend to have a problem in memorizing facts. They are unable to give full concentration in their learning process.

The contents of the thesis is for internal user only

Thus the Homeroom Merit Demerit System, to be referred to as HMDS after this, was introduced and implemented in MRSM Transkrian in early January 2010. That year saw a decrease in discipline cases by 12% compared to 2009 and the PMR ranking for MRSM Transkrian went up slightly to be among the top twenty among all the MRSMs in the country. It goes to show that the HMDS plays quite an important role in improving the performance of the school in one way or another.

The HMDS implemented in MRSM Transkrian added a new element of competition among all the homerooms. The selection of the winning homeroom is based upon several criteria agreed upon by the Homeroom Committee. The main objectives in implementing the HMDS are:

i) to encourage each homeroom members to be active in all activities.

ii) to discipline the students in all aspects.

iii) to enhance the academic achievement.

iv) to create the environment of parenting in an academic institution especially among the teachers (read: homeroom advisors) and students.

The homeroom competition begins in January each year and the best homeroom award is announced during the school assembly in October of the same year. The award is given as per the categories below:-

a) The best homeroom for the year

b) The best homeroom for each form.

c) The best homeroom advisor

d) The best homeroom file

e) The best homeroom for the month.

f) The best homeroom in academic achievement

g) The best homeroom in co-curriculum activities participation

However, at present, there exist no standard systems which can be utilized to develop HMDS. The counselor will manually calculate the points according to the report submitted by each homeroom teacher fortnightly. The scores are recorded by each homeroom teacher using the homeroom merit demerit form. The form must be submitted together with the supporting documents and other proofs. The points will be added up, tabulated and analyzed by the Homeroom Committee. The result for each homeroom will be posted on the homeroom notice board to be viewed by the students to encourage them to perform better to get more points. Any objection or correction must be made within two days after the results are posted. At the end of the year, there will be a reward for the homeroom which obtained the highest score.

Based purely on observation, the homeroom (system) of MRSM Transkrian is not well organized in terms of documentation. The documents are not stored safely and often times not put under strict control. The homeroom advisors frequently face problems finding and retrieving the documents because they are placed in a large collection. Several documents might be missing. The teachers also face difficulty in searching for the documents because they are stored in various places.

When calculating the points, there are too many criteria which must be taken into consideration such as the students' behavior at the hostel and class, educational achievement, sports achievement, students' appearances, students' participation in co-curricular activities, homeroom activities and others. It is rather cumbersome to monitor an average of 750 students' records manually.

This MRSM needs a system whereby it could share all the latest and up to date information about the students' activities, achievements, discipline and other information with the parents. The management felt that the manual system currently used is not so efficient.

Managing the HMDS manually tends to bring about many problems as described above. A good computer system and possibly suitable software is urgently needed to ensure better efficiency. Currently, there exists no similar system, guideline, requirement or tested model that the Homeroom Committee can refer.

The development of a requirement model for HMDS is much needed here which can help the Homeroom Committee to develop a more credible HMDS.

1.3 The goals and objectives of the study

1.3.1 Goals

The goal of this study is to create a requirement model for HMDS for updating the merit and demerit points for homeroom.

1.3.2 Specific Objectives

The specific objectives of this study:

- To identify users' requirements for HMDS
- To construct a requirement model using Unified Model Language (UML).
- To create and validate the users' requirement model for HMDS by using horizontal prototype.

1.4 Significance of the study

The outcome of this study would hopefully increase the effectiveness of the homeroom system in MRSM Transkrian, in particular the HMDS. The users can easily understand the system through this model requirement. The requirement model will assist the developer to plan for a more credible development of the system. It can become a reference for other researchers to develop similar systems in the future. For instance, other researchers can refer to this requirement model to build a similar, if not better, system in other MRSMs.

1.5 Scope and limitations of the study

1.5.1 Scope of the study

This study will only focus on MRSM Transkrian, Penang which hosts 50 homerooms. Hopefully this study will lead to the development of a good requirement model for use in the homeroom system there.

1.5.2 Limitations of the study

This study will only develop a requirement model for one homeroom. The prototype can then be used for other homerooms.

1.6 Organisation of the Report

This report is divided into five chapters which are:

a. Chapter One: This chapter presents the overview of the study.

b. Chapter Two: The studies on requirement and requirement model which are related to this study will be described in this chapter.

c. Chapter Three: Methodology used in this study is discussed. Requirement analysis from Maletz *et al*. (2007) is adapted and used as a methodology in this study.

d. Chapter Four: This chapter presents and discusses the key findings of this study.

e. Chapter Five: This provides conclusion of the study, highlights the problem encountered during the study, and states several recommendations for improvement.

CHAPTER TWO

LITERATURE REVIEW

A literature review is an analysis of published information that researchers have written on a certain topic. It expresses thoroughly the issues or problems that the researchers wish to address.

In literature review, the focus is on the management of information system, the types of requirement, requirement model and examples that guide this study. The discussion will focus on the studies that are significant in designing a suitable model for HMDS which is a computerized method of adding/deducting points and management of the merit demerit system at MRSM Transkrian.

2.1 Introduction

According to Shelly (2010), a computer is an electronic device, operating under the control of instructions stored in its own memory. An information system is a combination of human, technology, process and organization mechanism to fully utilize the use of Information Technology (IT), thus improving the proficiency and efficiency of the organization (McNurlin, 2004). Abdul Rahman (2001) further adds the function of information system can be manually or electrically operated in which the computer is used as an aid in producing computerized information system.

2.2 Management Information System (MIS)

Turban (2004) says that the MIS deals with data that can be used for formulating, planning, supervision and regulation. According to Sarwani (2003), Management Information System can be described as any system which changes the collected data from normal transaction into information, where it is able to directly assist the ability of decision-maker to make a decision. She also mentions that the main function of MIS is to supply the top management with general information about the organization and to make it easier for the information to flow in or out of the organization. The ability of a decision-maker to make a decision based on the data garnered from a system is one of the key elements in the education system.

By having HMDS online, the action and respond needed to deliver intended intention is almost in real-time basis. With the system, parent may monitor the progress of their child's and may retrieve the updated information from anywhere.

Some of the management information systems used in the educational field are described in sub-sections:

2.2.1 eSIS (Student Information System) for Portland Public Schools

Portland Public Schools, founded in 1851, is an urban school district in Portland, Oregon. With approximately 47,000 students in 85 schools, it is the largest school district in the Pacific Northwest.

Portland Public Schools (PPS) migrated to eSIS at the end of the 2002-2003 school years. eSIS is a web based student information system created by AAL Solutions. It contains many functions and features such as student demographics, attendance, course scheduling, mark/grade reporting, incident tracking, student testing information and others.

2.2.2 eSIS for Lebanon Community School (Parent Assist Module)

The Parent Assist Module (P.A.M) and Student Assist Module (S.A.M) allow parents and students to access student information via any Internet access at school or at home. P.A.M & S.A.M uses web access to serve the student and family to improve the effectiveness of the students. This open, yet secure distribution of information requires no additional work from teachers or administrators. The benefits of P.A.M and S.A.M are:

i) Increased Home-School Communication

ii) Real-Time student progress reporting

iii) Increased Student Involvement

iv) Universal and Secure Data Access

v) Student Access without high Administrative overhead.

vi) Multi language choices (English, French, Spanish)

The eSIS server and school website provide the needed security between the viewer and the confidential teacher records. The specific student information can only go to the person holding their parent's or student's unique ID and PIN.

There are two types of Account: Student Accounts and Parents Accounts. Student accounts allow access to one student's data. The Parent account allows parents to view all their children's data at one time. Parents' accounts also have access to more data than a student's account.

In accordance to the above examples, it is time for MRSM Transkrian to follow the footsteps of the school system and design its own effective information system any burden especially that shouldered by the counselor and to share the updated information with the parents.

If the needs and requirements are met, the possibility of the system being able to satisfy the users is greater. Therefore, users' requirements analysis needs to be carried out in order to develop an effective information system.

2.3 Requirements

A requirement is described as a statement of what the system must do or what characteristics it must have. According to Gunter *et al*. (2000), the requirement indicates how the system could fulfill the customer needs. Bennet *et al.* (2002), added that the software development project is successful only if it can fulfill the users' needs. The system developed will fail if it cannot meet the users' requirement. Shelly (2001) concluded that a requirement is a condition that the system must satisfy or an outcome that the system must achieve.

Thus it can be concluded that requirement is what the users need in order to solve the problem of the current system. The new or proposed system should have the ability to solve the problem.

There are two major types of requirement according to Sommerville (2001) and Whitten *et al*. (2001). They are functional requirement and non-functional requirement.

2.3.1 Functional Requirement

According to Whitten *et al.* (2001), functional requirement is where the system must provide the description of activities and services whereas Sommerville (2001) stated that the functional requirement is the system services, which are expected by the user of the system. Sommerville (2001) further says that the functional requirement will present the functions or features that must be included in a particular system to satisfy the business needs and be acceptable to the users. The features or functions include:

i. description of the processing that the system will be required to carry out

ii. details of the inputs into the systems from paper forms and documents, interactions between people and other systems.

iii. details of the output that are expected from the system in the form of printed documents and reports, screen displays and transfers to other system.

iv. details of the data that must be held in the system.

2.3.2 Non-Functional Requirement

According to Mairiza (2007), a non-functional requirement describes the properties characteristics or constraints that a software system must exhibit. It also describes the quality attributes that the software product must have. Bennet *et al*. (2002) stated that non-functional requirements are those that describe aspects of the system that are concerned with how well it provides the functional requirement. The examples of non-functional requirements include performance (throughput, response time), ease of learning and use and also security consideration.

Thus it can be concluded that requirement is what the users need in order to solve the problem of the current system. The definition which is defined by Malet *et al.* (2007) will be used in this study. This is because according to Malet *et al.* (2007), that requirement could be said as what the users need in order to solve the problem of the current system. The new or proposed system should have the ability to solve the problem. So with requirement, the needs of the user will be fulfilled and satisfied.

Thus, to better apprehend the requirements, a requirement model need to be developed. The following section describes requirement model.

2.4 Requirement Model

According to Bennet e*t al.* (2002) a requirement model is a diagram used to model out the requirement. Requirements models are the starting point of software development. They are used to specify system functionalities from the customer viewpoint according to Nora (2006).

According to Whitten *et al.* (2001), a model is an illustration of reality. People can understand and visualize the system through the model. Thus, in order to understand a complex system is through developing a model for the particular system.

Christian (2006) says that the requirement model process ends when the model has fulfilled the users' budget, risk and time. Thus, in order to model out a good requirement, the model should be easy to understand and visualize, able to meet the users need, budget, risk and time.

The following sub-sections describe the examples of the various requirement models.

2.4.1 MEMO

MEMO comes from the abbreviation Multimedia Environmental for Mobile. This is a project between ACT (Advanced Communication Technology and Services) and the European Commission. The memo system uses 'Unified Modeling Language' to model out the user's requirement. It is aimed to 'capture a common view of the Memo System as seen from outside.' This is the preface in understanding the structure of MEMO

specification for future 'implementers' or the network provider. By using this type of model, the users, analyst and the developer cooperate to understand the system roughly without seeing the real thing. (Ruottinen & Wittborn, 1999).

2.4.2 PEKA Management

According to Lembaga Peperiksaan Malaysia (LPM), in the PEKA Physics manual, PEKA physics is a mechanism used nowadays in achieving the objectives of the Physics subject as targeted by the Ministry of Education (MOE). This type of assessment helps the students to identify their own problems and try to find a solution for it by enhancing their own way of learning.

This method of assessment is implemented at the school level as part of the teaching and learning process. Aloyah (2002) found that the teachers are uncertain in using and designing their own scoring rubric even though training is provided. Besides that, due to the fact that this method is rather time-consuming, this extra teaching workload is not easy to be handled and performed successfully. Due to that, it is advisable that the rubric scoring should be build specifically for this PEKA so that the marks will be constructed automatically by the system.

2.4.3 FREMA

FREMA is a project by the Joint Information System Committee, an e-Learning Programme. The aim is to develop a reference model for a system in the assessment domain that is built using Service-Oriented Architectures, such as the Web Services, the

Grid and not forgetting the JISC e-learning Framework (ELF). The goal for this project is to provide a reference model for the assessment domain of the ELF. This domain involves the specification of services which focuses upon the creation and execution of recording of electronic assessments which are accessible across institutions. Once it is complete, this project will help to ease the development of further services and promote the re-use of existing ones by acting as a focus point for community development of the Service Framework.

The methodology for requirement model from Maletz *et al*. (2007) will be used as the reference in this study. There are four (4) modeling process which has been explained by Maletz *et al.* (2007).

i) Process 1: Requirement Elicitation

In this study, methods used to gather information is by interviewing, observation and review on related documents.

ii) Process 2: Analyze Requirement

Unified Modeling Language (UML) was used in this study to model out users' requirement. This model provides the task of what the system will do. It also provides guidelines, which should be taken into consideration while designing the final system.

iii) Process 3: Requirement Management

In this study the ASPX were used as tools to design a prototype of HMDS interface.

iv) Process 4: Requirement validation.

In this study a set of questionnaires was developed and feedback from users was obtained.

2.5 Homeroom

According to Arshad (1999), a homeroom is a group of students of the same age living together as a family and a teacher who is also an advisor is the guardian during their studies at MRSM.

The homeroom is a program where students can discuss their school, home and any other problems. This program does not only involve indoor activities but also outdoor ones. The purpose of organizing these activities is for the teacher to know each student individually so that the teacher can understand them more.

Informal and permissive interaction between the student and the teacher will make the student feel more at ease and comfortable to share their problems and their secrets. Moreover, the teacher and the students in each homeroom can know more about each other and make them feel like a family. Their advisor will be somewhat like a father or mother to them.

2.6 Merit Demerit System

Disciplinary problems in schools have been on the increase, particularly in secondary schools. Any system introduced to curb disciplinary problems must be fair to students. Several years ago, Education Department had encouraged schools to introduce Merit Demerit System to curb increasing disciplinary problems in schools. However, implementing it will take up a lot of discipline teachers' time. The schools must have a proper way of recording to keep track of students' behavior. It needs the cooperation of all the teachers for it to be successful. It is the amount of paper work that discourages most schools from its implementation.

In the 1980s, the Ministry of Education had come up with different categories of indiscipline. Types of disciplinary problems were listed out with codes for easier analysis. In 1997, School Division introduced a computer program to record different types of discipline occurred in schools to provide feedback to the Education Department. Basically, teacher-in-charge has to key in all the disciplinary problems from their disciplinary record book, where teachers record whenever disciplinary problems were brought to their attention. However, the program only record disciplinary problems.

In Merit Demerit System, the school must record both, good and bad deed of students all the schools needs to do is to award negative points to each and every disciplinary problems in the list. On the positive side, schools needs to list out all the activities that deserve to be given merit points. Merit points can be given to various posts held by students. Important posts with heavier responsibilities will be given higher merit points.

Merit points should also be given for students who achieve a good result in the examination.

In this study, a requirement model of a computer program are developed which may help in the computer system development. With the implementation of a computer Merit Demerit System, the burden of doing paper work will be reduced. Keeping track of records of all students in MRSM Transkrian will be taken care of by the system. All the counselor need to do is to enter into the system all the merits and demerits of every student as soon as possible so that the system can provide the up-to-date disciplinary information of the school.

2.7 Summary

From the literature review, a lot of facts have been gathered to help in developing HMDS. From the study, there are some features that can be adapted to promote the use of HMDS in the future. Besides that, it lends credence to the believe that this HMDS is indeed a very useful tool to improve the roles and functions of the homeroom and needs to be improved and further-developed from time to time to meet the needs of the moment. This requirement model of HMDS generally gives a lot of benefits and is important not only to the developer and designer of the HMDS and the Homeroom Committee but also more importantly, the school.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter explains the methodology used in order to complete this study. The requirement model for Homeroom Merit Demerit System is developed based on the process of requirement modeling by Maletz *et al*. (2007).

3.1 Introduction

According to Nunamaker *et al*. (1990), methodology is defined as the philosophy of process that integrates various values and assumptions as a standard for interpreting and getting a conclusion. Whitten & Bentley (2001) defined methodology as the physical implementation of the logical life cycle that includes roles, sequential activities, and system delivery.

There are four main phases in the methodology: requirement elicitation, requirement analysis, requirement management and requirement verification. The requirement modeling phases which has been explained by Maletz *et al*. (2007) is shown in Figure 2.

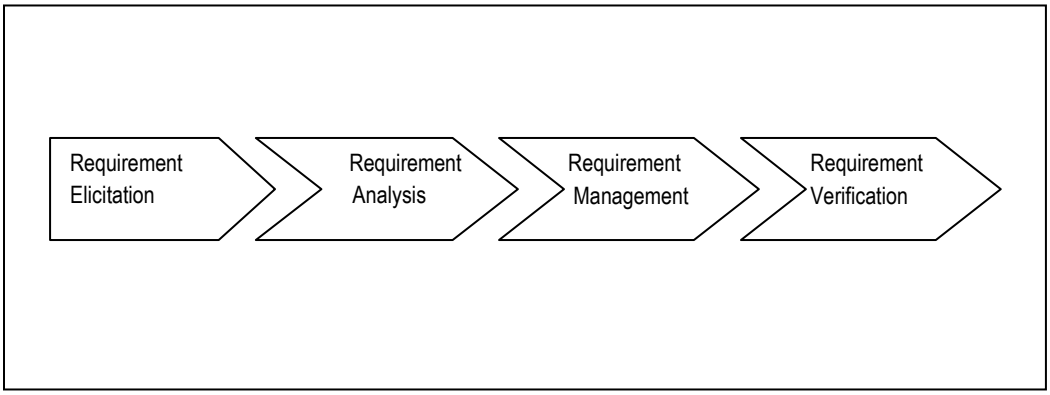

Figure 2: Requirement modeling process

3.2 Phase 1: Requirement Elicitation

The first phase in the requirement modeling process is the elicitation of requirement. According to Perez (2009), the aim of this phase is to gather the users' requirement. By interviewing the users, the information needs can be elicited in order to capture the requirement of each individual person, helping them to identify their needs and so on.

Observation, document sampling and interviews with the counselor and homeroom teachers in MRSM Transkrian are the fact finding techniques which were used to gather the information in order to create the HMDS requirement model.

3.2.1 Interview

According to Shelly (2001), an interview is a planned meeting during which one obtained information from another person. For the interview session, the informants were selected individuals within the sample homeroom teachers who had an experience of implementing the Merit Demerit Program.

The structured interviews are conducted face-to-face which allow researcher to be responsive and adapt to what the user says. The users are one (1) counselor, three (3) homeroom teachers and two (2) parents. A set of related questions (refer to Appendix E) are prepared before the interviews take place.

Any opinion or suggestion from the sample can help system designer or developer to understand the actual problem. This is to get more background information about the homeroom environment to perform a good interview session.

In the study, the interviews were held at the counselor's room and science social department and took about twenty five (25) minutes per interview.

3.2.2 Observation.

Seeing the current system in action, one gets the additional perspective and better understanding of system procedures. Personal observation allows one to verify statements made in interviews and determine whether procedures really operate as described, according to Shelly (2001).

In order to create HMDS requirement model, the chosen site for observation was the counselor's managing room. The observation was done at different time of a day and different days of a week.

3.2.3 Document review

Whitten *et al*. (2001) describes that a good analyst always gets fact from documents compared to the people. Therefore in this study, all related documents are collected and reviewed in order to identify the functions needed for HDMS. Among the documents are: -

i) MRSM Transkrian merit demerit regulations

ii) Point schemes

iii) Calculating Merit and Demerit Points

iv) Determining homeroom member status

3.3 Phases 2: Requirement Analysis.

Analyzing the requirements was the second phase in this requirement modeling process. According to Perez (2009), in this step the requirements are analyzed in order to detect conflict between them, missing information and inconsistencies.

According to Christel (1992), requirement analysis is a process in which requirements for a system to be developed are elicited and modeled. This process has to deal with difference viewpoints, and it uses a combination of methods, tools and actors. In order to model the requirements, system modeling techniques and tools are use.

3.3.1 System Modeling

System modeling helps the users, counselor and the systems developer to understand current or new system designs. It involves graphical methods and nontechnical language that represent the system at various stages of development.

In this study, Unified Modeling Language (UML) will be used to describe user interaction with the system, and functional decomposition diagrams to show the homeroom system functions and process.

3.3.2 Unified Modeling Language (UML)

UML is a leading modeling language for the model-based specification of systems because of its widespread use and its common notation, according to Holger (2008). UML provides an overview of the most important diagrams used in the visual modeling of computing programs. UML is the programming-language independent and has become a standard modeling language.

Nevertheless, the UML is a standardized notation easy to use and understand. The most useful, standard UML diagrams are use case diagram, class diagram, sequence diagram, activity diagram, component diagram, and deployment diagram.

In this study, the Rational Rose 2000 software is used to construct the UML Diagrams. The Rational Rose 2000 provides the software developer with a complete set of visual modeling tools for development of robust, efficient solutions to real business needs in the client/server, distributed enterprise, and real-time systems environments.

3.3.3 Prototype Development

In this study, prototype will be developed by creating the interface only. A prototype was developed to show the system protocol of HMDS. In order to create the interface for this prototype, Active Server Pages (ASP) was used.

ASP is an HTML page that includes one or more scripts (small embedded programs) that are processed on a Microsoft Web server. ASP is a program that runs inside IIS (Internet Information Services). With ASP, developers can build dynamic websites very easily.

3.4 Phase 3: Requirement Management

The next step was managing the requirements. In this third step, Active Server Page was used as tools to design a prototype of HMDS. Changes always happen in the requirement during the system development lifecycle and these changes had been tracked and traced (Malet *et al*., 2007).

3.5 Phase 4: Requirement Validation

This final step is to identify and correct all errors without proving that the requirements are correct. A product was deemed successful (by means of satisfying the customer) if all requirements are fulfilled (Malet *et al*., 2007). HMDS was tested to ensure that the solution solves the original problem.

According to Maria (2009), the requirement model validation is done by involving the users after all preceding processes have been completed, and the most appropriate measures are

provided. Based on the users' feedback, results are analyzed whether it meets the user requirements.

the user once the process has been executed and the most suitable similarity measures have been provided to him with the results received. The user analyzes if the results are ones he expected and in case they are not, he might realize inaccuracies and could modify or refine them.

In this study, the users' requirement will be tested and validated by the constructing the horizontal prototype.

3.5.1 Horizontal Prototype

According to Mario (2004), a prototype is a simplified model of a proposed system that is built for a specific purpose such as formulating and evaluating requirements, specifications and designs.

3.6 Chapter Summary

Methodology is made up of several techniques, procedures and tools that are utilized by a system designer or developer. It is usually written down as a method statement relating to a particular enquiry.

CHAPTER 4

FINDINGS

4.1 Introduction

In this chapter, the HMDS requirement model which is documented using UML notation is described in detail. This includes descriptions on use case specifications, class diagrams, sequence diagrams, collaboration diagrams, activity diagrams and set of requirement lists. At the end of the chapter, validation results is discussed in detail.

The current HMDS system consists of 4 main processes namely homeroom registration, assign members to homeroom, award merit demerit point to member of homeroom and award for the best homeroom as model in Figure 3.

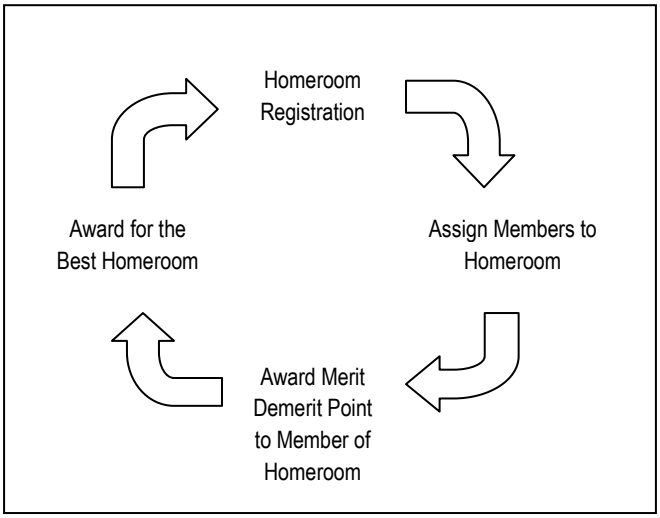

Figure 3: Model of HMDS

Documents related to the above processes are gathered and analyzed to gain better understanding of the system, and hence basic requirements of the system are obtained.

Details of the analysis are provided in the following sections.

4.2 Requirement modeling

The modeling part consists of four main phases which are:

Phase I : Requirement Elicitation

Phase II : Requirement Analysis

Phase III : Requirement Management

Phase IV : Requirement Verification

The process undertaken and the findings of the above mentioned phases are described in the following sections.

4.3 Phase 1: Requirement Elicitation

Recall that requirement elicitation phase involve three (3) different techniques: observation, interview and document review. From the observation, it is found that the document management system and its information security need to be improved in the sense that the security requirement is gathered.

From the document review, better understanding of the system and details of the process are obtained. The details include merit demerit regulations, point schemes, merit demerit points

calculations and decision on homeroom member status. Through the interview, the details of the requirement are gathered. Structured interview were conducted with six users namely a counselor, homeroom teachers (3) and parents (2).

The interview session gave more insight of the real situation at Homeroom Unit and better understanding of its functions. As the scope of this study was to capture the users' requirements for HMDS, the question asked were mainly about the problems faced by the users with the existing system and the expected functions needed for the new system. The overall results of the interviews are concluded as the following:

- There are no common system used to evaluate Merit Demerit Point
- The users need an on-line system.
- The functions needed are:
    i. To register and edit member in the Homeroom list.
    ii. To register and edit merit demerit point
    iii. To view the homeroom activities
    iv. To print member merit demerit points and homeroom member profile
    v. To enter merit demerit points and to check the members' collected points according to the homeroom.

Based on the interview results, a list of requirement was produced as shown in Table 1. Results from observation and document review were also incorporated.

4.3.1 Requirement List for HMDS

The requirement list includes a column to show which use cases provide the functionality of each requirement (Bennet *et al.,* 2002). In this requirement list, use cases with their descriptions and requirement numbers are shown in Table 1.

Table 1: Requirement List for HMDS

No	Use Case Name	Requirement Number	Requirement Description	Requirement Type
1	Authentication Procedure	REQ-01-001	To authenticate the counselor or homeroom teacher	Functional
		REQ-01-002	To inform counselor or homeroom teacher invalid username or password	Functional
		REQ-01-003	To authenticate the parent	Functional
		REQ-01-004	To inform the parent invalid username or password	Functional
2	Register Member	REQ-02-001	To register member name, member id to specific homeroom	Functional
		REQ-02-002	To inform the user that the member name, member id is already exists in the homeroom.	Functional
		REQ-02-003	To print the list of member who registered for a particular homeroom.	Functional
3	Edit Member	REQ-03-001	To add or remove any registered member	Functional

		REQ-03-002	To inform the user that the homeroom code does not exist	Functional
		REQ-03-003	To print the new list of members who registered for a particular homeroom.	Functional
4	Register Homeroom	REQ-04-001	To register the homeroom name, homeroom code.	Functional
		REQ-04-002	To inform the user that the homeroom name, homeroom code is already exists.	Functional
		REQ-04-003	To inform the user that the form is incomplete	Functional
		REQ-04-004	To print the list of homeroom that has registered for the particular year.	Functional
5	Edit Homeroom	REQ-05-001	To add or remove any registered homeroom name, homeroom code.	Functional
		REQ-05-002	To inform the user that the homeroom name and homeroom code does not exist. (may be the user has mistakenly key in the wrong code).	Functional
		REQ-05-003	To inform the user that the form is incomplete.	Functional
		REQ-05-004	To print the edited homeroom detail	Functional
6	Delete Homeroom	REQ-06-001	To delete homeroom name, homeroom code.	Functional
		REQ-06-002	To inform the user that the homeroom	Functional

			name, homeroom code cannot be deleted because the homeroom does not exist (may be the user mistakenly key in the wrong homeroom code).	
7	Enter homeroom activities	REQ-07-001	To enter the homeroom activities information	Functional
		REQ-07-002	To inform the user that the homeroom name, homeroom code does not exist. (may be the user has mistakenly key in the wrong homeroom code).	Functional
		REQ-07-003	To inform the user that the form is incomplete	Functional
		REQ-07-004	To print the homeroom activities.	Functional
8	Edit homeroom activities	REQ-08-001	To edit the homeroom activities	Functional
		REQ-08-002	To inform the user that the homeroom name, homeroom code does not exist. (may be the user has mistakenly key in the wrong homeroom code).	Functional
		REQ-08-003	To inform the user that the form is incomplete	Functional
		REQ-08-004	To print the edited homeroom activities	Functional
9	Enter academic merit point	REQ-09-001	To enter the academic merit point	Functional
		REQ-09-002	To inform the user that the homeroom code does not exist (may be the user mistakenly	Functional

			key in the wrong code).	
		REQ-09-003	To print the list of Academic Merit point of the member	Functional
10	Edit academic merit point	REQ-10-001	To edit member academic merit point	Functional
		REQ-10-002	To inform the user that the homeroom code does not exist (may be the user mistakenly key in the wrong code).	Functional
		REQ-10-003	To print the edited member academic merit point	Functional
11	Enter co-curriculum merit point	REQ-11-001	To enter the co-curriculum merit point	Functional
		REQ-11-002	To inform the user that the homeroom code does not exist (may be the user mistakenly key in the wrong code).	Functional
		REQ-11-003	To print the list of Co Curriculum Merit point of the member.	Functional
12	Edit co-curriculum merit point	REQ-12-001	To edit member co-curriculum merit point	Functional
		REQ-12-002	To inform the user that the homeroom code does not exist (may be the user mistakenly key in the wrong code).	Functional
		REQ-12-003	To print the edited member co-curriculum merit point	Functional

13	Enter discipline demerit point	REQ-13-001	To enter the discipline demerit point	Functional
		REQ-13-002	To inform the user that the homeroom code does not exist (may be the user mistakenly key in the wrong code).	Functional
		REQ-13-003	To print the list of Discipline Demerit point of the member.	Functional
14	Edit discipline demerit point	REQ-14-001	To edit member discipline demerit point	Functional
		REQ-14-002	To inform the user that the homeroom code does not exist (may be the user mistakenly key in the wrong code).	Functional
		REQ-14-003	To print the edited member discipline demerit point.	Functional
15	View academic merit point	REQ-15-001	To let the user view the selected member academic merit point in the particular year	Functional
		REQ-15-002	To inform the user that the member does not exist (may be the user mistakenly key in the wrong member id).	Functional
		REQ-15-003	To print the selected member academic merit point in the particular year	Functional
16	View co-curriculum merit point	REQ-16-001	To let the user view the selected member merit co-curriculum point in the particular year.	Functional
		REQ-16-002	To inform the user that the member does not	Functional

			exist (may be the user mistakenly key in the wrong member id).	
		REQ-16-003	To print the selected member merit co-curriculum point in the particular year	Functional
17	View discipline demerit point	REQ-17-001	To let the user view the selected member discipline demerit point in the particular year.	Functional
		REQ-17-002	To inform the user that the member does not exist (may be the user mistakenly key in the wrong member id).	Functional
		REQ-17-003	To print the selected member discipline demerit point in the particular year	Functional
18	View homeroom activities	REQ-18-001	To view the selected homeroom list of activities for the particular year	Functional
		REQ-18-002	To inform the user that the homeroom name, homeroom code does not exist. (may be the user has mistakenly key in the wrong homeroom code).	Functional
		REQ-18-003	To print the selected homeroom the list of activities for the particular year.	Functional
19	View member profile	REQ-19-001	To let counselor or homeroom teacher views the selected member profile	Functional
		REQ-19-002	To let the parents view his/her own child profile	Functional

		REQ-19-003	To inform the counselor or homeroom teacher the member id has been wrongly entered.	Functional
		REQ-19-004	To inform the parents that the member id has been wrongly entered.	Functional
		REQ-19-005	To let counselor or homeroom teacher print the selected member profile	Functional
		REQ-19-006	To let the parents print his/her own child profile.	Functional
20	View Homeroom Merit Demerit Point	REQ-20-001	To let counselor or homeroom teacher views the homeroom cumulative merit demerit point.	Functional
		REQ-20-002	To let the parents view his/her own child's homeroom cumulative merit demerit point.	Functional
		REQ-20-003	To inform the counselor or homeroom teacher the homeroom code has been wrongly entered.	Functional
		REQ-20-004	To inform the parents that the homeroom code has been wrongly entered	Functional
		REQ-20-005	To print the selected homeroom merit demerit point for the particular year.	Functional

Based on the requirement list for HMDS, six (6) users were asked to verify the users' requirements (refer to Appendix F). The results showed that the entire requirements needed have been included in the list.

Based on the results, the users' requirements were modeled by using Rational Rose which consists of Uses case Diagrams, Class Diagrams, Sequence Diagrams, Collaboration Diagrams and Activity Diagrams.

4.4 Phase 2: Requirement Analysis

4.4.1 Use Case Diagram

Use case diagram is a powerful concept for helping an analyst to understand how a system should behave. Avik (2007) defines use case an actor-system interaction scenarios from the point of view of an actor. Use cases were developed as a technique for capturing the required behavior of a system.

According to Donald (2003), the main purpose of the use-case diagram is to help development teams visualize the functional requirements of a system, including the relationship of "actors" (the person who interact with the system) to essential process, as well as the relationships among different use cases.

There are six (6) main use cases which are:

i) Manage Member Registration

ii) Manage Homeroom

iii) Manage Merit Demerit Point

iv) View Merit Demerit Point

v) View Homeroom Profile

vi) View Homeroom Result

All use cases must first go through the login use case. The use case diagram for HMDS is shown in Figure 4. There are twenty-one (21) use cases as listed in table 2 below:

Table 2: Use Cases for HMDS

Main Use Case	**Use Cases**
Manage Member Registration	Register Member Edit Member
Manage Homeroom	Register Homeroom Edit Homeroom Delete Homeroom Enter homeroom activities Edit homeroom activities
Manage Merit Demerit Point	Enter Academic Merit Point Edit Academic Merit Point Enter Co Curriculum Merit Point Edit Co Curriculum Merit Point Enter Discipline Demerit Point Edit Discipline Demerit Point
View Merit Demerit Point	View Academic Merit Point View Co-Curriculum Merit Point View Discipline Demerit Point

View Homeroom Profile	View Homeroom Activities View Members Profile
View Homeroom Result	View Homeroom Merit Demerit Point
Print (Optional)	
Authentication Procedure (compulsory)	

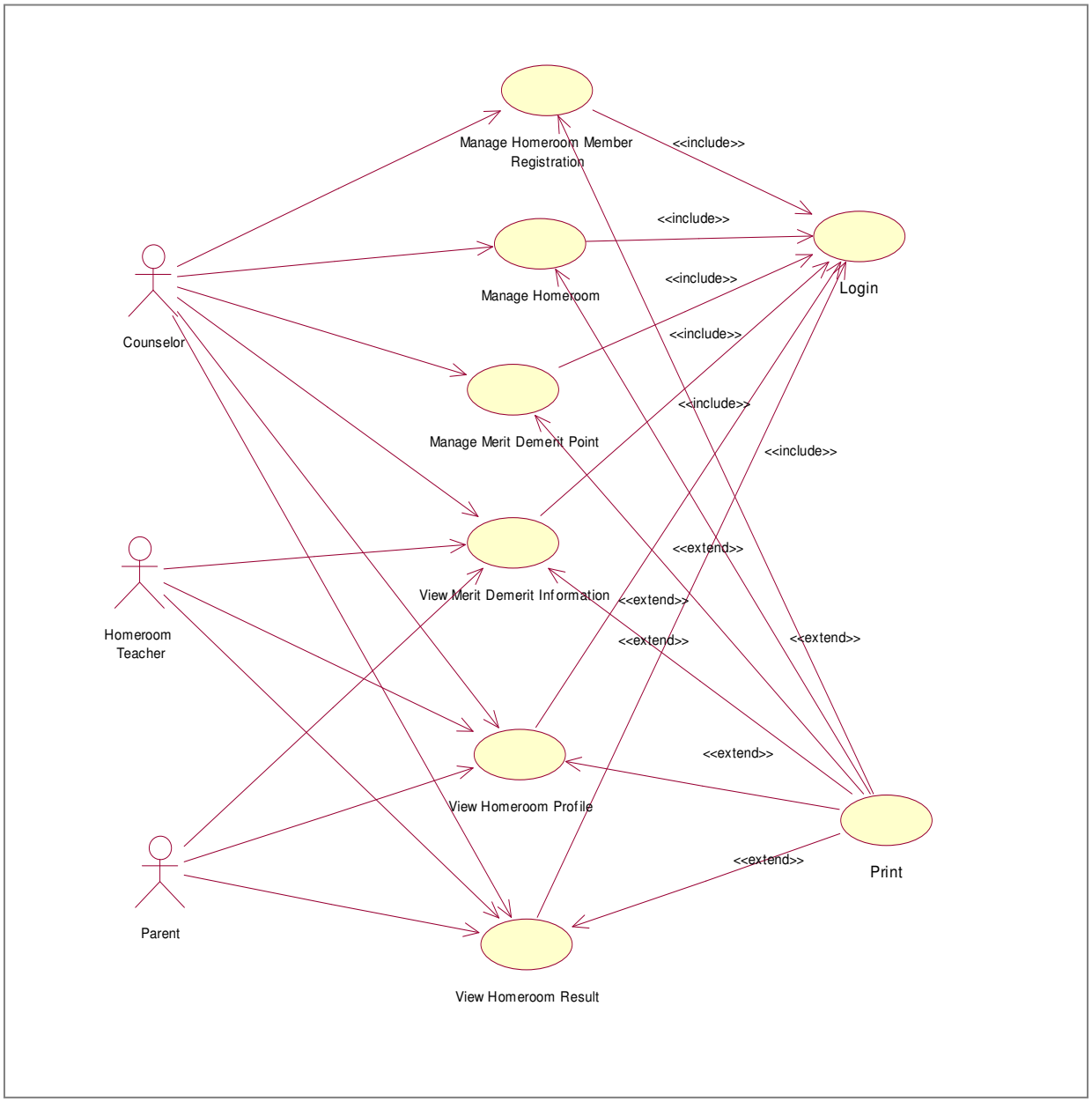

Figure 4: The Use Case Diagram for HMDS

There are six (6) main use cases. Each use case has more than one operation. Below is the elaboration of each main use case.

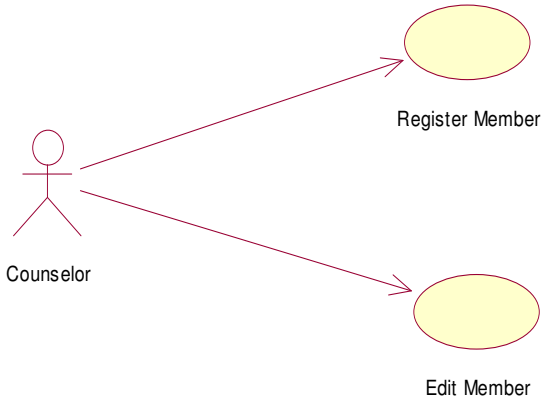

Figure 5: Use Case for Manage Member Registration

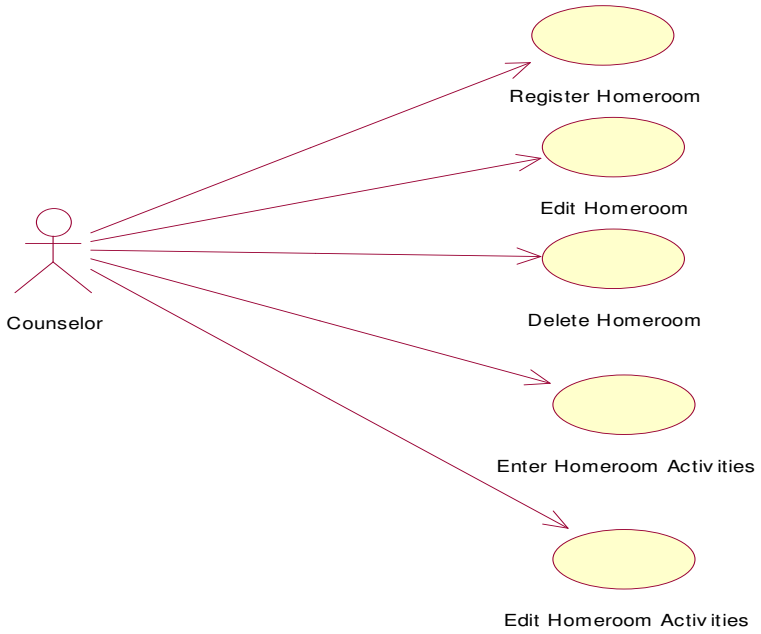

Figure 6: Use case for Manage Homeroom

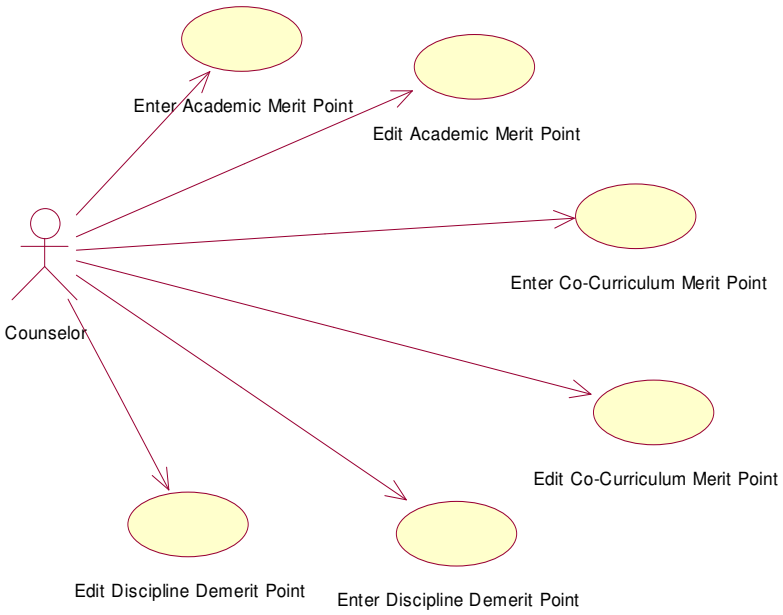

Figure 7: Use case for Manage Merit Demerit Point

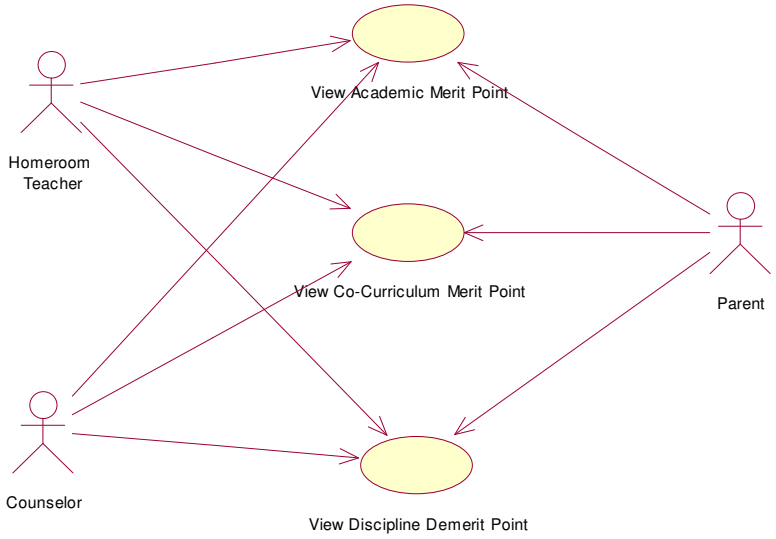

Figure 8: Use case for View Merit Demerit Point

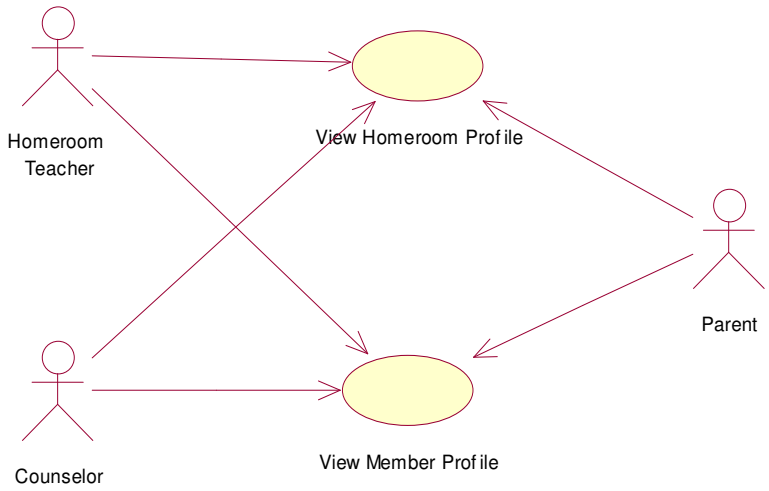

Figure 9: Use Case for View Homeroom Profile

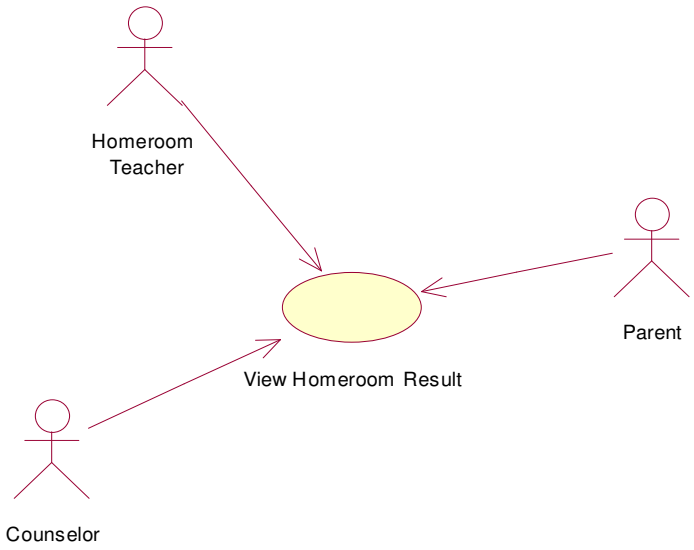

Figure 10: Use case for View Homeroom Result

The use case diagram for HMDS has four (3) actors, which are:

a. Counselor
b. Homeroom Teacher
c. Parent

Below are the definitions for each actor.

4.4.2 Definition of Actors in Use Case

a. Counselor

The counselor is the key person in the HMDS. He is the administrator who manages the homeroom merit demerit system at MRSM Transkrian. His responsibility is very wide which include updating, registering and deleting registered homeroom, enter and edit all category points and registering and editing any students. He prints and views merit demerit information, homeroom profile and homeroom result.

b. Homeroom Teacher

The homeroom teacher is the user who could only print and view merit demerit information, homeroom profile and merit demerit results.

c. Parent

The parents fall under the same category as the homeroom teacher who can use this system just to view and print merit demerit information, homeroom profile and merit demerit results.

4.4.3 Explanation of Use Cases in the Horizontal Prototype

Table 3 shows a brief explanation on the use cases in the horizontal prototype.

Table 3: Description of Use Cases in the Horizontal Prototype

Use Case Name	Requirement Description
Authentication Procedure/Login	Three factors start this use case. They are the counselor, homeroom teacher and parent. They start this use case by logging into the system.
Register Member	The counselor starts this use case. It provides the ability to register member to the specific homeroom.
Edit Member	The homeroom counselor starts this use case. It provides the ability to add or remove registered member.
Register Homeroom	The counselor starts this use case. It provides the ability to register the homeroom name and homeroom code.
Edit Homeroom	The counselor starts this use case. It provides the ability to edit, add and remove the homeroom name, teacher name and homeroom code.
Delete Homeroom	The counselor starts this use case. It provides the ability to delete the whole record of a particular homeroom.
Enter Homeroom Activities	The counselor starts this use case. It provides the ability to enter all information regarding homeroom activities.
Edit Homeroom Activities	The counselor starts this use case. It provides the ability to edit, add or remove the activities
Enter Academic Merit Point	The counselor starts this use case. It provides the ability to enter academic merit point.
Edit Academic Merit Point	The counselor starts this use case. It provides the ability to edit, add or remove academic merit point.
Enter Co-Curriculum Merit Point	The counselor starts this use case. It provides the ability to enter co-curriculum merit point.

Edit Co-Curriculum Merit Point	The counselor starts this use case. It provides the ability to edit, add or remove co-curriculum merit point.
Enter Discipline Demerit Point	The counselor starts this use case. It provides the ability to enter discipline demerit point.
Edit Discipline Demerit Point	The counselor starts this use case. It provides the ability to edit, add or remove the discipline information.
View Academic Merit Information	All the actors (counselor, homeroom teacher and parent) start this use case. It provides the ability to view the selected member academic information. However, if the user is the parent, the user has restrictions to view his/her own child Academic merit information only.
View Co-Curriculum Merit Information	All the actors (counselor, homeroom teacher and parent) start this use case. It provides the ability to view the selected member co-curriculum information. However if the user is the parent, the user has restrictions to view his/her own child Co-Curriculum merit information only.
View Discipline Demerit Information	All the actors (counselor, homeroom teacher and parent) start this use case. It provides the ability to view the selected member discipline information. However, if the user is the parent, the user has restrictions to view his/her own child discipline demerit information only.
View Homeroom Activities	All the actors (counselor, homeroom teacher and parent) start this use case. It provides the ability to view all of the homeroom activities for the particular year.
View Homeroom Members profile	All the actors (counselor, homeroom teacher and parent) start this use case. It provides the ability to view the selected homeroom member profile. However, if the user is the parent, the user has restrictions to view his/her child profile only.
View Homeroom Merit Demerit Point	All the actors (counselor, homeroom teacher and parent) start this use case. It provides the ability to view the result of total homeroom merit demerit point.

4.4.4 Use Case Specification

Use case specification is the detailed description of a use case. According to Stephane (2007), use cases are described in a use case diagram that shows use case names, actors, relationships between actors and use cases, and relationships between use cases.

According to Whitten *et al*. (2001), use case specification is used to textually describe the sequence of steps of each interaction between the actor and the use case. Use case specification is the textual description of a use case which is narrating the behavior through a sequence of actor-system interactions according to Avik (2007).

User can describe the required details of each individual use case through the creation of use case description according to Dennis (2005). There are 21 use case specifications. The following are the use case specifications in this requirement model, as shown in Appendix A, which are:

a. Use case specification for Authentication Procedure
b. Use case specification for Register Member
c. Use case specification for Edit Member
d. Use case specification for Register Homeroom
e. Use case specification for Edit Homeroom
f. Use case specification for Delete Homeroom
g. Use case specification for Enter Homeroom Activities
h. Use case specification for Edit Homeroom and Activities
i. Use case specification for Enter Academic Merit Point

j. Use case specification for Edit Academic Merit Point

k. Use case specification for Enter Co-Curriculum Merit Point

l. Use case specification for edit Co-Curriculum Merit Point

m. Use case specification for enter Discipline Demerit Point

n. Use case specification for edit Discipline Demerit Point

o. Use case specification for view Academic Merit Point

p. Use case specification for view Co-Curriculum Merit Point

q. Use case specification for view Discipline Demerit Point

r. Use case specification for view Homeroom Activities

s. Use case specification for view Homeroom Member Profile

t. Use case specification for view Homeroom Merit Demerit Point

u. Use case specification for Print

4.4.5 Class Diagram

Class diagram shows how the different entities (people, things and data) relate to each other according to Donald (2003).

According to Shelly (2001), a class diagram represents a detailed view of a single use case which shows the classes that participate in the use case, and documents the relationship among the classes. The class diagrams for HMDS are shown in Figure 11.

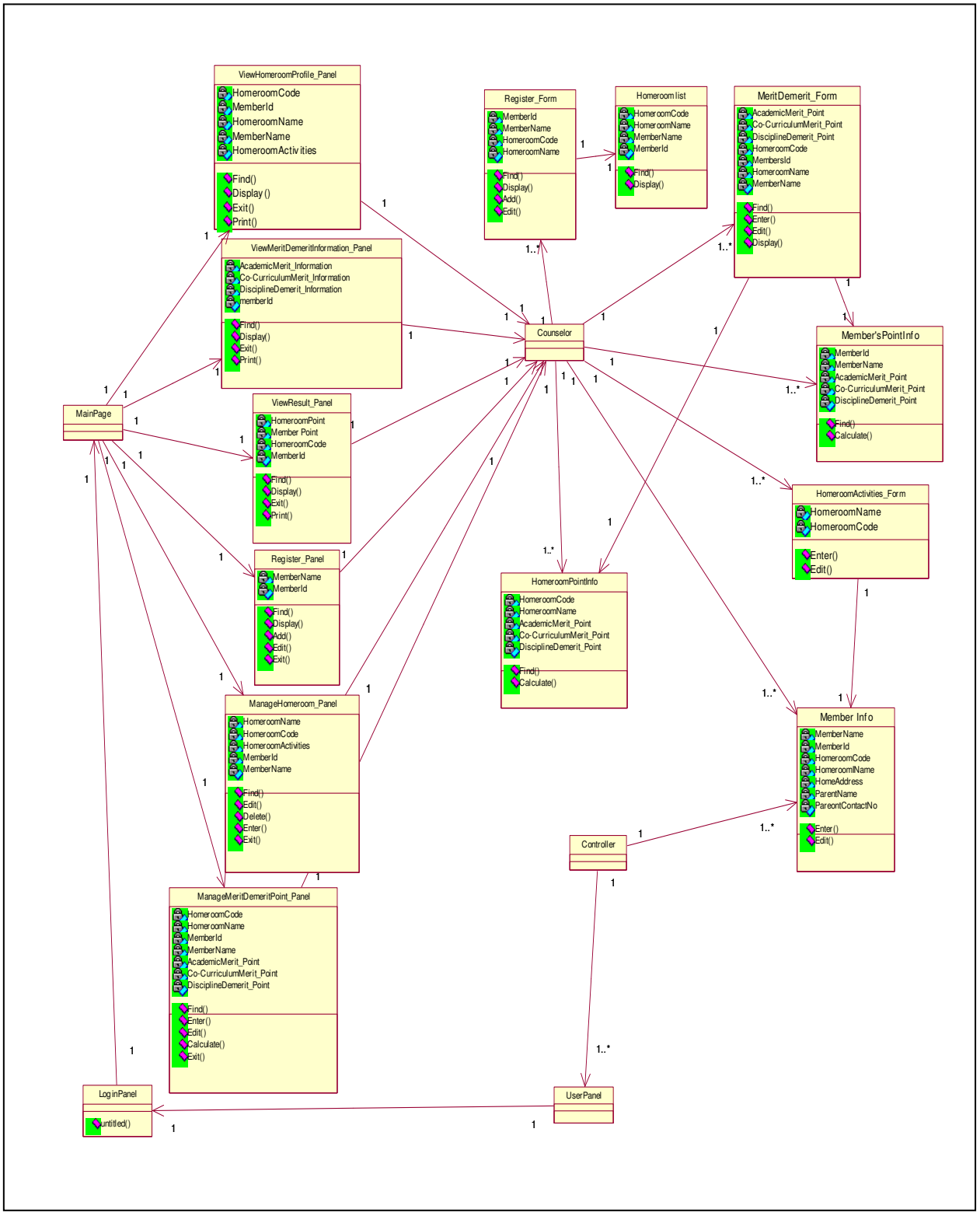

Figure11: Class Diagram for HMDS

4.4.6 Interaction Diagram

Interaction diagrams are used to model the dynamic aspects of a software system. They help you to visualize how the system runs. An interaction diagram is often built from a use case and a class diagram. The objective is to show how a set of objects accomplish the required interactions with an actor.

According to Booch *et al*. (1999), interaction diagram can be divided into two types, which are sequence and collaboration diagram. These interaction diagrams were constructed for each use case.

4.4.6.1 Sequence Diagram

A sequence diagram shows the interaction between objects arranged in a time sequence. It can be drawn at different levels of detail and to meet different purposes at several stages in the development life cycle. It is used to represent the detailed object interaction that occurs for one use case or for one operation.

System diagram is defined as an interaction diagram that shows different processes. A sequence diagram is shown as parallel vertical lines (lifelines), different processes or objects that live simultaneously and as horizontal arrows, the messages exchanged between them. This allows the specification of simple runtime scenarios in a graphical manner. Sequence diagram is categorized into three flows: normal flow, alternative flow and exceptional flow. Refer to Appendix B for full representation of sequence diagram.

4.4.6.2 Collaboration Diagram

Collaboration diagram is sometimes called communication diagram. It holds the same information as sequence diagrams. It shows the link between objects that participate in the collaboration. Collaboration diagrams are probably more useful during analysis while sequence diagrams are better at representing design detail. Collaboration diagram emphasizes the flow of messages through a set of objects. Refer to Appendix C for detailed of collaboration diagram.

4.4.7 Activity Diagram

Activity diagrams describe the workflow behavior of a system. Refer to Appendix D for a preview of activity diagram. Table 4 shows the summary list of sequence diagrams, collaboration diagrams and activity diagrams.

Table 4: Summary list of sequence diagram, collaboration diagram and activity diagrams for Each Use Case

No	Use Case Name	Sequence Diagram Number	Collaboration Diagram Number	Activity Diagram Number
1	Login/Authentication Procedure	BF1:SEQ-01-001 BF2: SEQ-01-003 E1: SEQ:-01-002 E2: SEQ:-01-004	BF1:COL-01-001 BF2: COL-01-003 E1: COL:-01-002 E2: COL:-01-004	ACT-01-001
2	Register Member	BF: SEQ:-02-001 E1: SEQ:-02-002 A1: SEQ-02-003	BF: COL:-02-001 E1: COL:-02-002 A1: COL-02-003	ACT-02-001
3	Edit Member	BF: SEQ-03-001 E1: SEQ-03-002 A1: SEQ-03-003	BF: COL-03-001 E1: COL-03-002 A1: COL-03-003	ACT-03-001

4	Register Homeroom	BF: SEQ-04-001 E1: SEQ-04-002 A1: SEQ-04-003	BF: COL-04-001 E1: COL-04-002 A1: COL-04-003	ACT-04-001
5	Edit Homeroom	BF: SEQ-05-001 E1: SEQ-05-002 E2: SEQ-05-003 A1: SEQ-05-004	BF: COL-05-001 E1: COL-05-002 E2: COL-05-003 A1: COL-05-004	ACT-05-001
6	Delete Homeroom	BF : SEQ-06-001 E1: SEQ-06-002	BF : COL-06-001 E1: COL-06-002	ACT-06-001
7	Enter Homeroom Activities	BF: SEQ-07-001 E1: SEQ-07-002 A1: SEQ-07-003	BF: COL-07-001 E1: COL-07-002 A1: COL-07-003	ACT-07-001
8	Edit Homeroom Activities	BF: SEQ-08-001 E1: SEQ-08-002 A1: SEQ-08-003	BF: COL-08-001 E1: COL-08-002 A1: COL-08-003	ACT-08-001
9	Enter Academic Merit Point	BF: SEQ-09-001 E1: SEQ-09-002 A1: SEQ-09-003	BF: COL-09-001 E1: COL-09-002 A1: COL-09-003	ACT- 09-001
10	Edit Academic Merit Point	BF: SEQ-10-001 E1: SEQ-10-002 A1: SEQ-10-003	BF: COL-10-001 E1: COL-10-002 A1: COL-10-003	ACT-10-001
11	Enter Co-Curriculum Merit Point	BF: SEQ-11-001 E1: SEQ-11-002 A1: SEQ-11-003	BF: COL-11-001 E1: COL-11-002 A1: COL-11-003	ACT-11-001
12	Edit Co-Curriculum Merit Point	BF: SEQ-12-001 E1: SEQ-12-002 A1: SEQ-12-003	BF: COL-12-001 E1: COL-12-002 A1: COL-12-003	ACT-12-001
13	Enter Discipline Demerit Point	BF: SEQ-13-001 E1: SEQ-13-002 A1: SEQ-13-003	BF: COL-13-001 E1: COL-13-002 A1: COL-13-003	ACT-13-001

14	Edit Discipline Demerit Point	BF: SEQ-14-001 E1: SEQ-14-002 A1: SEQ-14-003	BF: COL-14-001 E1: COL-14-002 A1: COL-14-003	ACT-14-001
15	View Academic Merit Point	BF: SEQ-15-001 E1: SEQ-15-002 A1: SEQ-15-003	BF: COL-15-001 E1: COL-15-002 A1: COL-15-003	ACT-15-001
16	View Co-Curriculum Merit Point	BF-SEQ-16-001 E1: SEQ-16-002 A1: SEQ-16-003	BF-COL-16-001 E1: COL-16-002 A1: COL-16-003	ACT-16-001
17	View Discipline Demerit Point	BF-SEQ-17-001 E1: SEQ-17-002 A1: SEQ-17-003	BF-COL-17-001 E1: COL-17-002 A1: COL-17-003	ACT-17-001
18	View Homeroom Activities	BF-SEQ-18-001 E1: SEQ-18-002 A1: SEQ-18-003	BF-COL-18-001 E1: COL-18-002 A1: COL-18-003	ACT-18-001
19	View Member Profile	BF- SEQ-19-001 BF2: SEQ-19-002 E1- SEQ-19-003 A1: SEQ –19-004 A2: SEQ-19-005	BF- COL-19-001 BF2: COL-19-002 E1- COL-19-003 A1: COL –19-004 A2: COL-19-005	ACT-19-001
20	View Homeroom Merit Demerit Point	BF- SEQ-20-001 E1: SEQ-20-002 A1:SEQ-20-003	BF- COL-20-001 E1: COL-20-002 A1:COL-20-003	ACT-20-001

4.5 Phase 3: Requirement Management

The third step was managing the requirements. In this step, a prototype of HMDS was designed and built based on user requirement by using several types of tools.

4.6 Phase 4: Requirement Verification.

According Maletz *et al*. (2007), the final phase is the validation of the requirement model. Once the prototype of HMDS was completely developed, it is has been tested by the users: counselor, Three (3) homeroom teachers and three (2) parents. Six (6) users (the similar users who have tested the requirement list) participated in the system requirements testing. For the horizontal prototype, the users validated the requirements by using the system requirements testing and applying the prototype while the rest of the requirements were tested by using sequence diagrams. The users were briefed on the flow of the diagrams. The test proved that the whole users requirements had been met.

For the conclusion, the users' requirements for HMDS have been successfully met. The similar ten (6) users verified that the requirements needed have been fulfilled.

4.7 Summary

The results derived from the interviews, the requirement list, system requirement testing and horizontal prototype have been discussed in detail. The requirement model for HMDS using use case specifications, use case diagrams, sequence diagrams, collaboration diagrams and activity diagrams have been discussed in detail.

CHAPTER 5

CONCLUSION

5.1 Project Summary

Requirement model is used to model out the user's requirement. The requirement model in this study can easily be understood and referred by other system developers or designers. It can be a guideline to create a real HMDS or in any other related areas. It consisted of use case diagram, use case description, activity diagram, sequence diagram, collaboration diagram, and class diagram. In order to validate the requirement model, a prototype for the system has been built.

In order to define a good requirement model for HMDS for MRSM Transkrian, several tasks have been followed:

i. Review some theories or principles regarding software development and homeroom merit demerit system.
ii. Make data collection to get user requirements. Conduct interview with several users (counselor, homeroom teachers and parents).
iii. Analyze user requirement and demonstrate it through models.
iv. Build a prototype based on requirement model.
v. Construct user acceptance testing to get feedback from them.

In this study, each chapter describes and demonstrates several tasks detailed:

Chapter one describes the background of the problem, problem statements, objectives, scopes and project importance.

Chapter two describes the literature review of software development phase, methods, tools and etc.

Chapter three describes the methodology. There are four steps to accomplish this study which is requirement elicitation, requirement analysis, requirement management and requirement verification.

Chapter four describes the findings. In this chapter, HMDS were demonstrated in detail through list of requirements, use case diagram, use case description, activity diagram, sequence diagram, collaboration diagram, class diagram and prototype.

5.2 Problem and limitation

During this study, the main problem and limitation which occur is the HMDS contains many users comprising of the counselor, homeroom teacher and parents. Therefore, it is a little complicated to develop and design the system.

5.3 Recommendation for Future Project

In the future, it is good to design and develop a requirement model of web application which can manage whole part in schools including the student hostel outing system and attendance system.

5.4 Summary

Overall, the objective of this study has been achieved which is to study and analyze the existing HMDS in MRSM Transkrian, create a requirement model of HMDS MRSM Transkrian and design and build a prototype of HMDS.

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