

CHAPTER 1

INTRODUCTION

1.1 Introduction

Development of web-based application has grown to a significance level that almost all organization in paperless working environment. Nowadays, many organizations and agencies had developed from manual system to computerized system. Online booking system does not only assist the facilities unit to achieve higher quality but it also helps to simplify the booking process and raise the efficiency in management.

In UMP, sport facility included badminton courts, squash courts, basketball courts, volleyball courts, takraw courts, netball courts, tennis courts, gymnasium courts, ping pong courts and football fields. Apart from that, sport equipment comprises badminton rackets, squash racket, basketballs, volleyballs, netballs, tennis racket, ping pong racket and football. The quantities of courts and equipments are limited, so the system is using first come first serve concept. Sport facility booking enables students and staffs to save their time and increase convenience to book the sport facility and equipment. They just choose required available time slot by click a few buttons then to complete the booking process.

The basic flow of the system is begins with Main Module to let the student and staff read through the detail of sport complex. On the Reservation Module where the student and staff shall pick up a date and type of court, then the time schedule will display the status for timeslot required, they just need to fill in their user ID and password in available slot to book it. After success to book their court, their name will display on there and if they want to cancel the booking just insert the password then click delete button. If the facility use for priority purpose then admin has authorities to cancel the booking and inform the user by SMS. Moreover, Report Module is used for user to report the sport facility or equipment which is spoilt to inform admin to solve the problem efficiently. For admin, he can view, search, delete report but also can reply status to member either the spoilt sport facility or equipment is available or no. Furthermore, admin can post the new announcement to announce the student and staff. If courts need to use for priority purpose such as become exam hall or organized some activity or some club organize new events, admin will cancel booking record and inform urgently through announcement board or SMS service. However, admin will help the new students and staffs to register as new members or update membership record on Registration Module. Last but not least, SMS module is for admin to view all receive and sent SMS.

1.2 Problem Statement

The main issue that arises in the main existing system is that the current system is not efficient. Firstly, members unable to know the status of sport facility because it not has viewable timeslot. It is wasted their time to click and view the status. Moreover, the booking steps for currently booking system is quite a lot and messy, sometime applicants confuse they have been apply on that court after the record saved message pop out but unfortunately they do not know last step need to click book, so the booking process is not complete. Furthermore, the booking record would not remove all record in once time because the existing system just allows admin to check the checkbox one by one to delete each record. The most important is foreigners cannot understand Malay language and

facing problem in making the application. However, lack of announcement board and report board therefore do not provide communication way between members and admin.

In order to solve the problems, advance sport facility booking is a right practice. The implementation of the system develops viewable timeslot. It is simplify the process for application to saving time and more users friendly. Moreover, the advance system will improve design of database to more user friendly. Furthermore, the system can perform in English and Malay language so that international students or staffs can make booking easily. Developing announcement board and report board where can enhance communication way between members and admin.

1.3 Objective

The objectives of the research are to:

- To develop a viewable timeslot to display status of the sport facility or equipment and provide announcement board and report board for communication way to raise the efficiency in notification.
- To develop a booking system to simplify the process for applies sport facility and improves the weakness of currently system so that it can become more user friendly.
- Integration SMS service with SFBS to increase efficiency management in urgent case.

1.4 Scope

The scope for this system comprise of:

- i. The main users of the system will be the UMP students and staffs to book their sport facility and admin who is responsible to manage the system.
- ii. The system will perform in English version and Malay version to solve international students or staffs understanding problem.
- iii. Provide communication way between members and admin through announcement board and report board.
- iv. The system is going to be developed using the Adobe Dreamweaver CS5 and phpMyAdmin with using web programming.

1.5 Thesis organization

This thesis consists of six chapters. Chapter one discusses an overview of the research conducted. It consists of five subtopics which are introduction, problem statements, objectives, scopes and thesis organization. Chapter two present the research works that was conducted and method chosen by researcher. All of the relevant articles taken from those researches will be discussed in detail. Meanwhile, chapter three reveals the techniques and requirements that will be used in performing this study. Discussion about the process flow of this research in detail is in this chapter. Chapter four discusses the details of the implementation. Results of the testing and discussion of the knowledge are described in Chapter five. Finally, chapter six concludes the entire thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review is made research about the critical points of current knowledge on a specific topic. It used to justify the choice of research question, theoretical or conceptual framework, and method. It is divided into two sub-reviews that are system or present review and method review. System review discusses on the comparison for existing system and find out unique feature which is not provided in UMP sport facility booking system whereas method review is study and analyses about the technique and methodology is suit for develop system.


2.2 Existing System


Existing system is example of functional online system which has its feature and has specific function with the related field such as business field, campus field or extra.


2.2.1 Sport Facility Booking online system (Carnegie Mellon University)


Purpose of this system is to simplify the process of booking by viewable timeslot on “My Reservation” module. So members can make request on available timeslot. Moreover, “Main” module is a good communication way between admin and member because admin can announce urgent or latest announce to notify user. “Contact” module is to enable user to make contact with the admin for asking problem. “Help” module can help user understand clearly for the process of booking with guide them step by step. “Register” module enables new user to register as member.


[Main](#) | [My Reservations](#) | [Contact Info](#) | [Help](#) | [Log in](#) | [Register](#)



racquetball



squash


tennis


spinning


treadmills


arc trainers


special events

Treadmills

[▶ view entire week](#)

		Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Sunday, October 30									
		Treadmill #1	Treadmill #2	Treadmill #3	Treadmill #4	Treadmill #5	Treadmill #6	Treadmill #7	
9	:00a	available	available	available		available	available		
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10	:00	available	available	available		available	available		
	:30	available	available	available		available	available		
11	:00	available	available	available		available	available		
	:30	available	available	available		available	available		
12	:00	available	available	available		available	available		
	:30	available	available	available		available	available		

Figure 2.1 Booking Schedule Interface [1]

Regular Announcements

The New Reservation Site is ready for you to use. If you need to make a reservation or find out availability please click on the sport and select your time and day for your reservation. Reservations are accepted for Squash, Racquetball, Tennis, Treadmills, ARC Trainers or Spinning Bikes.

Fall Semester Hours for the University Center start Monday August 29th: Monday through Friday 6am to 2am and Saturday and Sunday from 9am to 2am.

Figure 2.2 Announcement Interface [1]

Table 2.1 Advantage and disadvantage of the Sport Facility Booking online system (Carnegie Mellon University)

Advantage		Disadvantage	
i.	Viewable timeslot view the request is available or booked.	i.	Announcement design is messy.
ii.	All data are managed and maintained in one centralized location, making it easy to retrieve record.	ii.	Applicant cannot book the equipment set via online.
iii.	Good guideline to guide new users.		
iv.	Communicate timely information between admin and user through announcement.		

2.2.2 Sport Facility Booking online system (Curtin University Sarawak)

Purpose of this system provides sports and recreation booking services. The “Fee for sporting facilities” Module enables user to make online payment. It reduces the burden of staff for collect money. Plus, on the “Opening hours for sporting facilities” Module has been provided the operating detail about sport complex. Furthermore, this system also provides guideline for new users to understand flowing of the booking process on “How to use the sporting facilities” Module.



Figure 2.3 Homepage Interface [2]

Online Booking Service

Booking A Room

RECREATION AND EVENT CENTRE - BADMINTON COURT 1
Choose Another Resource

Click the time frame that you want to book

<< Previous Week : Week Commencing **14 March 2011** : Next Week >>
or

Select a date: (day/month/year)

■ EP Timetable
 ■ Diploma Timetable
 ■ Foundation Timetable
 ■ Degree Timetable
 ■ Entry by admin
 ■ Booked
 ■ Your booking

Recreation and Event Centre - Badminton Court 1	Monday 14 March 2011	Tuesday 15 March 2011	Wednesday 16 March 2011	Thursday 17 March 2011	Friday 18 March 2011	Saturday 19 March 2011	Sunday 20 March 2011
8.00 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form
8.30 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form
9.00 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form
9.30 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form
10.00 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form
10.30 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form
11.00 AM	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form	Booking Form

Figure 2.4 Booking Schedule Interface [2]

**Table 2.2 Advantage and disadvantage of the Sport Facility Booking online system
(Curtin University Sarawak)**

Advantage	Disadvantage
i. Letting the user sees clearly what functions are available by display keyword.	i. Status for each timeslots is not visual able.
ii. Users understand the flowing of process with the guidelines provided.	ii. Not have well communication way between admin and applicants through announcement.

Advantage	Disadvantage
iii. Operation detail provided to enables user can refer different operation time for weekdays and weekend.	

2.2.3 Sport Facility Booking online system (Wai Hang Sports Centre & Dr. Stephen Hui Sports Hall)

This system allows members to apply sport facility which is available on “Sport Facilities Online Booking System” Module. Furthermore, this system also provided the latest news to user on “What’s New” Module and if user interested on it can apply the programs directly on “Forms and Documents to Download” module. On the other hand, this booking system provided optional language for user to make choice.



Figure 2.5 Homepage Interface [3]

最新通告 <i>What's new??</i>	
偉衡健身室使用證課程 (9/2011-10/2011) NEW!	Fitness Room User Training Courses at WHSC (9/2011- 10/2011) NEW!
偉衡體育中心游泳池延遲開放 NEW!	Delay of Opening date of WHSC Swimming Pool NEW!
租借偉衡體育中心更衣室儲物櫃事宜 (2011-12) NEW!	Hire of Lockers at the Changing Room of Wai Hang Sports Ctr. (2011-2012) NEW!
體育設施免費使用時段 (12/9/2011 – 1/12/2011) NEW!	Free Use of Sports Facilities (12/9/2011 – 1/12/2011) NEW!
「體育設施網上預訂系統」正式啟用	“Sports Facilities Online Booking System” in Operation
偉衡體育中心正門入口維修工程	Renovation work on the main entrance of Wai Hang Sports Centre
偉衡體育中心游泳池人造草區臨時封閉	Temporary Closure of Swimming Pool Turf Area at WHSC
(個人)租用多用途課室及活動室 (11/1/2010生效)	Individual Booking of MPC & AR (effective from 11/1/2010)

Figure 2.6 Announcement Interface [3]

<p>Step 1 Login 第一步 登入</p> <p>Step 2 Select Facility 第二步 選擇運動項目</p> <p>Step 3 Confirm 第三步 確定</p> <p>Step 4 Pay Online 第四步 網上即時繳費</p> <p>Step 5 Acknowledgement 第五步 收取確認通知</p>	<p>Please Enter Booking Detail / 請輸入租訂資料</p> <p>Date / 日期: <input type="text" value="選擇日期 / Choose Date"/></p> <p>Facility / 設施: <input type="text"/></p> <p>Venue / 場地: <input type="text" value="全部 ALL"/></p> <p>Time / 時段: <input type="text" value="Morning / 上午 8:30am - 1:30pm"/></p> <p><input type="button" value="Clear / 清除"/> <input type="button" value="Search / 查詢"/></p>	<p>≤ March 2010 ≥</p> <table border="1"> <thead> <tr> <th>Sun</th> <th>Mon</th> <th>Tue</th> <th>Wed</th> <th>Thu</th> <th>Fri</th> <th>Sat</th> </tr> </thead> <tbody> <tr> <td>28</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>7</td> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> </tr> <tr> <td>14</td> <td>15</td> <td>16</td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> </tr> <tr> <td>21</td> <td>22</td> <td>23</td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> </tr> <tr> <td>28</td> <td>29</td> <td>30</td> <td>31</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> </tr> </tbody> </table>	Sun	Mon	Tue	Wed	Thu	Fri	Sat	28	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10
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<p>Check Booking 查看已預訂的運動項目</p> <p>Manage Account 帳戶管理</p> <p>Exit / Logoff 離開 / 登出</p>	<p>Booking Change or Replacement / 更改預訂或補場</p> <p><input type="button" value="Booking Change 更改預訂"/> <small>You may change booking by 24 hours before booking start. However, only the same facility with same charge can be booked and subjected to availability. All booking is non-refundable.</small></p> <p><input type="button" value="Booking Replacement 補場"/> <small>You may replace the booking which is cancelled by center (e.g. bad weather) within 7 days. However, only the same facility with same charge can be booked and subjected to availability. All booking is non-refundable.</small></p>																																																		
<p>Online Help / 網上說明 FAQs / 常見問題 Contact us / 聯絡我們</p>																																																			

Figure 2.7 Booking Schedule Interface [3]

**Table 2.3 Advantage and disadvantage of the Sport Facility Booking online system
(Wai Hang Sports Centre & Dr. Stephen Hui Sports Hall)**

Advantage		Disadvantage	
i.	Download form ease user to register interested event and staff also easy to manage on it.	i.	Status for each timeslots is not visual able.
ii.	Users can choose their known language to fill in their detail with correctly.	ii.	Unable to book equipment via online.
iii.	Communicate timely information between admin and applicants through announcement.		

Table 2.4 Comparison Existing System

No.	Features	Carnegie Mellon University	Curtin University Sarawak	Wai Hang Sports Centre
1	Viewable Timeslot	View the request is available or booked.	Not provided.	Not provided.
2	Announcement Board	Communicate timely information between admin and user.	Not provided.	Communicate timely information between admin and user.
3	Transaction payment online	Not provided.	Reduce burden of staff to collect money.	Not provided.

No.	Features	Carnegie Mellon University	Curtin University Sarawak	Wai Hang Sports Centre
4	Optional Language	Interaction language in English language.	Interaction language in English language.	Users can choose their required language to fill in their detail conveniently.
5	Centralized Management	All data are managed and maintained in one centralized location, making it easy to retrieve record.	All data are managed and maintained in one centralized location, making it easy to retrieve record.	All data are managed and maintained in one centralized location, making it easy to retrieve record.
6	Good guideline For New User	To guide new user to book system smoothly.	To guide new user to book system smoothly.	To guide new user to book system smoothly.

2.3 Type of Application

2.3.1 Web Based Application

Web-based system can define as visualization-based manipulation and planning of design model to share information. The Web-based system integrates with a distributed feature so it can support service remotely under centralized control. Due to the effective utilization of the Web and Java technologies, web-based application can function in independent platform, scalable, and provided a geographically distributed design to enable

concurrent design activities operate effectively. Therefore, multiple users can use the system simultaneously and remotely.

Web service architecture was utilized to develop a new generation of a communication protocol SOAP (Simple Object Access Protocol) and manufacturing platform based on XML schemas to enable data exchange, interoperable, integration and Internet accessibility of services. Application Service Providers (ASPs) is provided a remote invoking and manipulation to support distributed product design and development. It bring a lot of advantages included simplify installations for personal computer and reduce complication of upgrading application modules process [4].

Organization of the Web-based application is based on a multiple-layer server and client architecture which is consists of four functional modules: (i) a front-end client embedded in a Web browser to support the visualization of design models, invocation of remote process planning optimization services, and display and manipulation of optimization results, (ii) a look-up service to register, manage and search for services deployed in the Internet, (iii) the process planning services deployed in the Internet, and (iv) a database system for storing information about available machines, cutters and their costs. This system can communicate with a distributed feature-based design system to retrieve design models represented in an XML format.

2.3.1.1 Interaction between web client and server

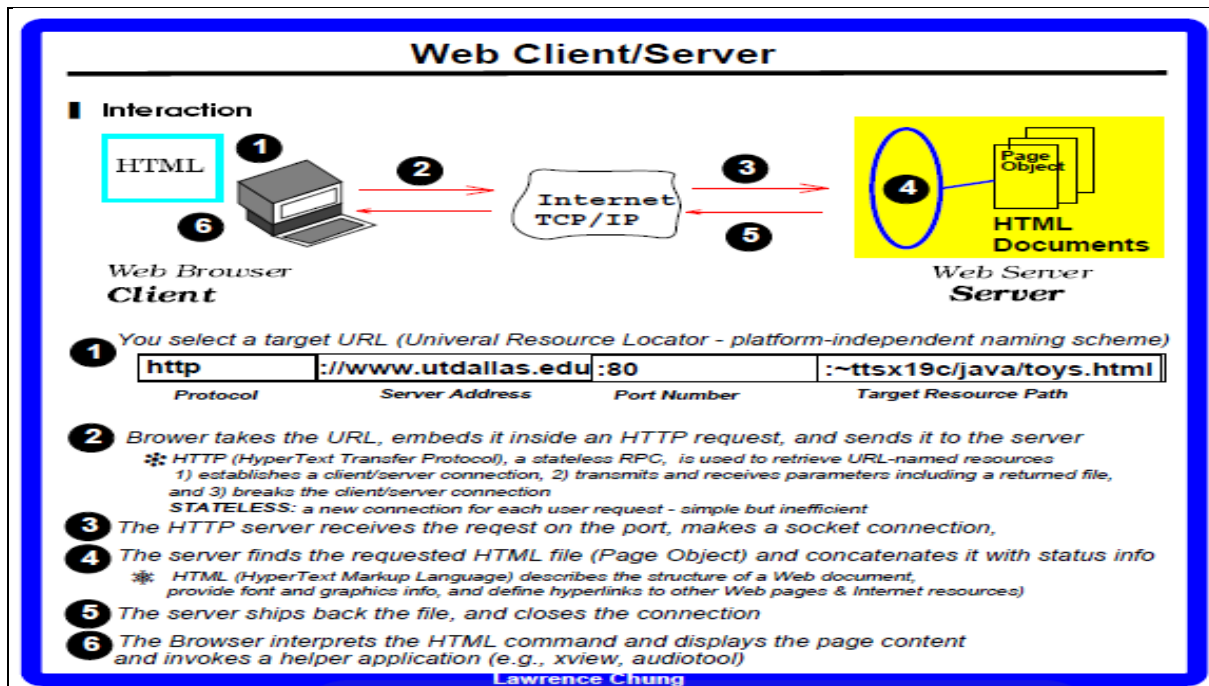


Figure 2.8 Interaction between web client and server [5]

2.3.1.2 Interaction forms, database updates

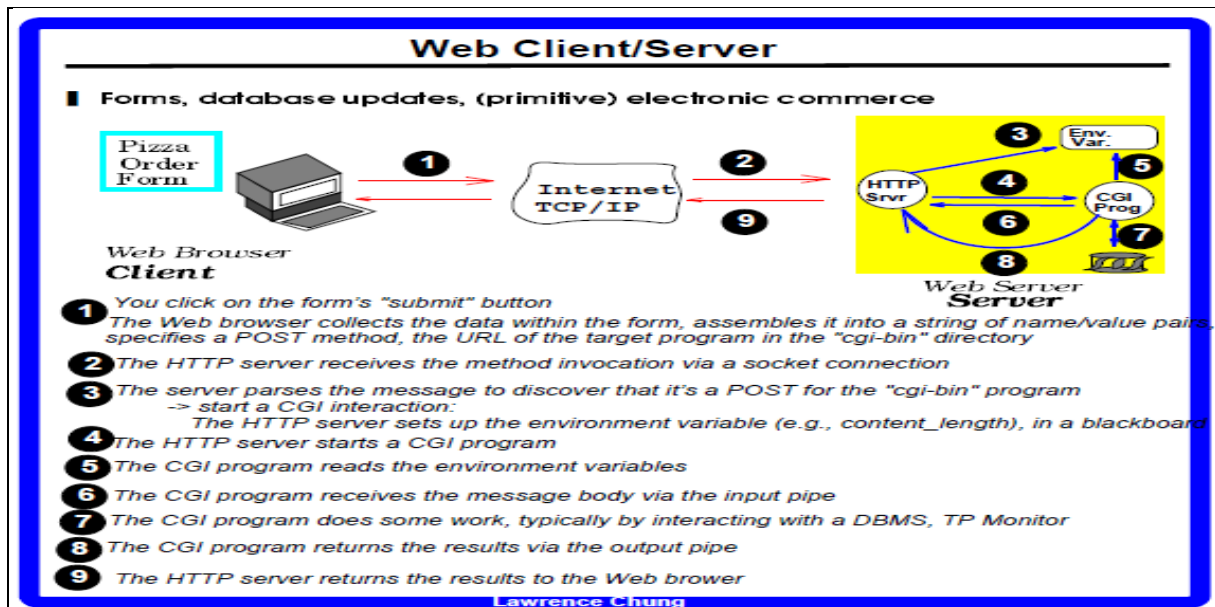


Figure 2.9 Interaction forms, database updates [5]

2.3.2 Stand-alone Application

A computer that did not connect to other computers with a network connection so you cannot accomplish any of the tasks you might want to do that depend on those things (such as check email, browse the Internet, download or updates software, share files with other users) not locally stored on that computer.

Stand alone application is more securing than web application because no connection equal to no hacking. Even computers that are connected to the internet can be stand-alone in the sense of not being connected with other computers and this can also reduce security risk because no-one inside or outside the organization can access the auction system through another computer in the network.

2.3.3 Comparison between web-based application and stand-alone application

Table 2.5 Advantage and disadvantage between web-based application and stand-alone application

	Web Based Application	Stand-Alone Application
Advantage	<ul style="list-style-type: none"> i. Distributed system <ul style="list-style-type: none"> - Service remotely [4]. ii. Accessed by different operating system [4]. iii. Concurrent design <ul style="list-style-type: none"> - Multiple users use system simultaneously [4]. 	<ul style="list-style-type: none"> i. Operate efficiency ii. Privatized data <ul style="list-style-type: none"> - Only admin can login and use it. iii. Dependency platform iv. Technical skills <ul style="list-style-type: none"> - Using system with basic technical skills.

	Web Based Application	Stand-Alone Application
	<ul style="list-style-type: none"> iv. Independent platform v. Available <ul style="list-style-type: none"> - 24 hours a day and 7days a week. [5]. vi. Centralized data <ul style="list-style-type: none"> - Update files or organize information securely [6]. vii. Saving time and efficiency <ul style="list-style-type: none"> - Enhance interaction way between users. 	<ul style="list-style-type: none"> v. Saving cost <ul style="list-style-type: none"> - Low cost for install and maintenance [7]. vi. More secure <ul style="list-style-type: none"> - Reduce attack risk from hacker [7].
Disadvantage	<ul style="list-style-type: none"> i. Server problem <ul style="list-style-type: none"> - User who connects to the server is affected or process becomes slower if the server is down [4]. ii. Security risks <ul style="list-style-type: none"> - Easier to pass around a virus due to network is connected [6]. 	<ul style="list-style-type: none"> i. Inconvenient <ul style="list-style-type: none"> - Cannot share data with other computer. - Harder to keep files updated or organize information.

2.4 Study of Methodology

2.4.1 Object-Oriented Analysis Methodology

Development of information systems consist of three approaches that are process-oriented (called methods), data-oriented (called methods) and object-oriented (Combine data –oriented and process-oriented called objects). Object-oriented can used to represent

data, complex relationships and data processing with a consistent notation, this ease blending of design and analysis in an evolutionary process. Moreover, Object-oriented analysis methodology also makes system elements more reusable, thus improves system productivity and quality the productivity of systems analysis and design. (Hoffer et al. 2002) [9].

2.4.2.1 Mechanism of Object-oriented Approach

Mechanism of object-oriented consists of three approaches. Firstly, encapsulation approach which objects encapsulate both data and behaviour. Next is inheritance approach is an object able to inherit characteristic from the global instance of the object form parent object to avoid redundancy. Lastly is polymorphism approach which differ object is extracted to a global level or understand the function of a process and enable object that require a similar instance of functionality. (Cackowski 2000) [9].

2.4.2.2 Unified Modeling Language (UML)

Object-oriented language is using for specifying, visualizing constructing, and documenting the artifacts of software systems. Unified Modeling Language uses simple, intuitive notation and nonprogrammers also can also understand UML models. If users can understand UML diagram, thereby they can improve their chances of create an application that truly solves a business problem (Apicella 2000) [9]. The UML notation is useful for graphically describes object-oriented analysis and design model provides a basis prototype to developer.

2.4.2.3 Use-case Modeling

According to Jacobson et al. (1992), use-case modeling has been developed in the analysis phase of the object-oriented system development life cycle [9]. It represents a set of work performed by using the operational system. Use-case models consist of actors (external entity that interact with the system that request services from the system) and use case (sequence of action initiated by actor to accomplish a specific goal that describes the scenario) (Hoffer et al. 2002) [9].

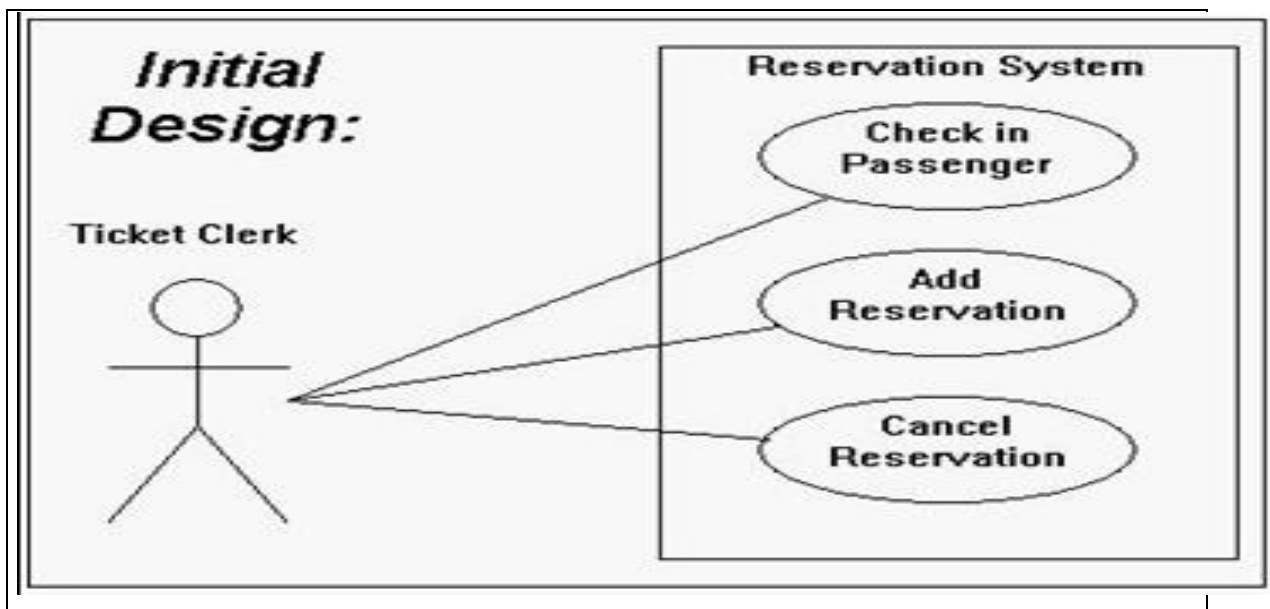


Figure 2.10 Ticket clerk (actor) who want to accomplish a specific goal (cases) such as check in passenger, add reservation or cancel reservation via the reservation system. The cases are ellipses with their names inside and are performed by the actors outside the system. Interaction among other use-cases can extend with reflected by single hollow arrow lines [10].

2.4.2.4 Class Modeling

A class is a set of objects that share the same operations, methods and attributes. The class is represented by a rectangle with three compartments, they are class name, attributes list, and the operations list which are separate by a horizontal line.



Figure 2.11 Airline flight class modelling [11]

Four type of operations included constructor, update, query, and scope operation. Query operation access the state of object but do not alter the state (Fowler 2000) [9]. However, class modeling also consists of few concepts as below:

- i. **Inheritance** refers to one class (child class) to inherit the identical functionality of another class (super class), and then included its own new functionality.

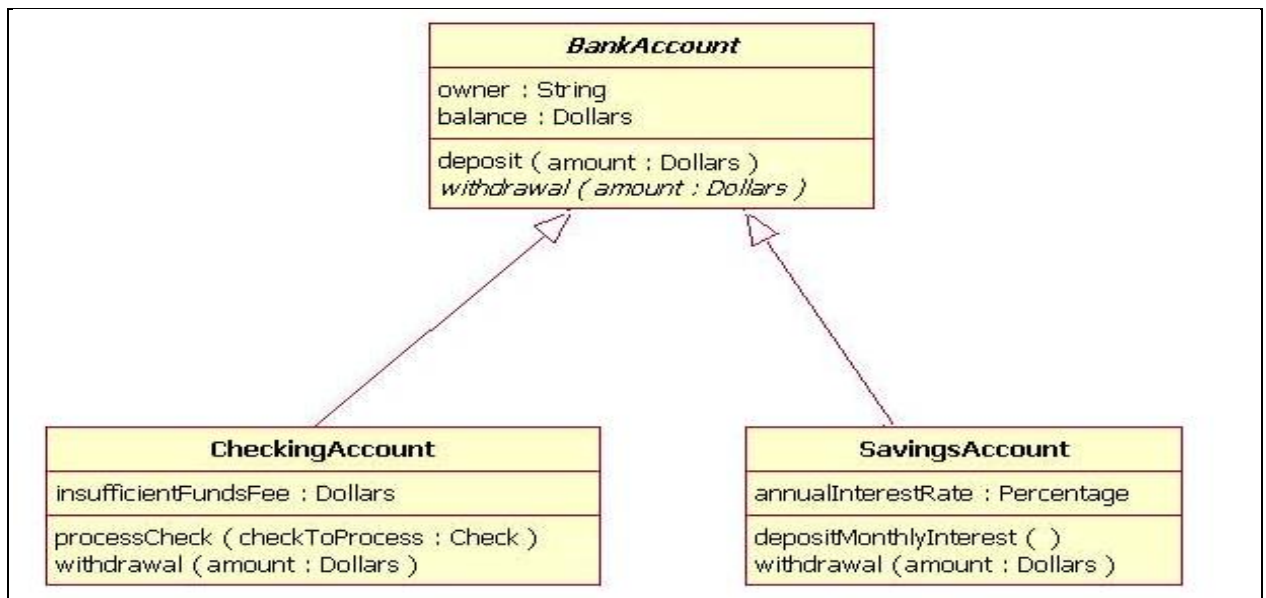


Figure 2.12 The inheritance relationship for each account subclass. [11]

- ii. **Association** refers to a class which includes relationship details. The association relationship may be unary, binary, ternary, or n-ray (Hoffer et al. 2002) [9].

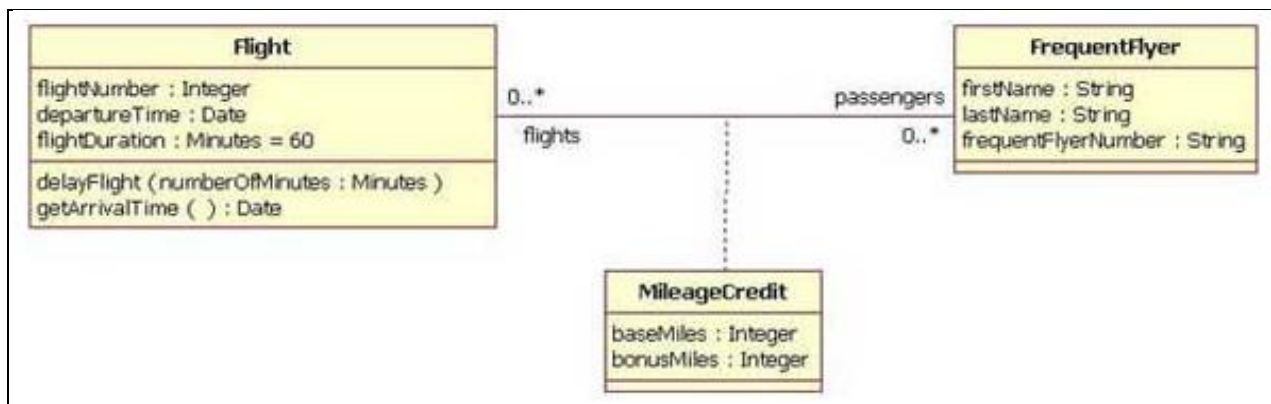


Figure 2.13, the association between the Flight class and the FrequentFlyer class results in an association class called MileageCredit. [11].

- iii. **Aggregation** used to model a “whole to its parts” relationship and the lifecycle of class is independent from the whole class’s lifecycle.

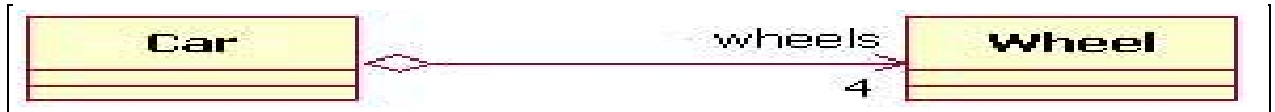


Figure 2.14 Example of an aggregation association [11].

2.4.3 Rational Unified Process (RUP)

The RUP methodology is flexible in developmental path as any stage can be edited whenever. Software organization has been customizes framework as his need to produce high quality software to meet the stipulated project budget and project plan.

The development process can consider on changing requirement and integrates with reuse component. If risk and defect have discovered, then it can be addressed or improve during the integration process. RUP contribute a prototype at for each iteration, which ease developers to synchronize and implement changes [34].

2.4.3.1 Four Phase of RUP Methodology

They are four phases of RUP methodology which are Inception phase, Elaboration phase, Construction phase and Transition phase. Inception phase initial with basic idea apply into a reality by analyze its scope and purpose. Factors related to success and risks are contents should be consider in business case. Elaboration phase minimizes the risk through the analysis. It includes development of the project architecture and descriptions of the use case. Use case used to represent the development plan of the project. Development of the equivalence components and application features are done on Construction phase. The code is develops for the each component and integrated into the product and the

system for testing is made to ensure that the required behaviours are achieved. Transition phase is implements beta testing and improve the project quality plan detail during the inception phase. During this phase, developer should be made sure whether user requirements and needs are met or not but also improved by fixing the bugs, identifying the weakness and enhance them. If client satisfy with it then system is process to production stage and training is provided [35].

2.4.3.2 Six Disciplines of RUP Methodology

RUP methodology includes six disciplines of software engineering. These are Business Modeling, Requirements Gathering, Analysis and Design, Process of Software Development and Implementation, Software Application Testing and Deployment.

Firstly, Business Modeling discipline shows the creation of the description between business and software models. Use cases are used to analyze the relationship between business and the business processes. Moreover, Requirements discipline discusses about the client requirement and the document contains feasibility and constrain. Use case is created according to the actor's needs.

Furthermore, Analysis and Design discipline is develop a functional system operate in a specific implementation environment that met features specified by client's requirements. The design model consists of well defined interface design and combination of subcomponent. During Software Implementation discipline, structural of the code is defined and implement onto subsystems.

In addition, Software Application Testing discipline is an integration of the each component where object interact with each other to identify and eliminate fixing bugs. Deployment discipline success to produce product and releases the software to client.

On the other hand, three other disciplines play a supportive role. These are Environment discipline provide the software development under the software development environment. Configuration and Change Management configures resultant artifacts to minimize clashing of problems and Project Management is equivalence objectives, manage risk, and solve constraints to deliver a proper product which suit to client's requirement.

2.4.3.3 Four Functional Layers of RUP

Layering represents functional group with the specific application place in the upper layers, spans application domains local in the middle layers, and deployment environment function place at the lower layers.

- i) Application layer contains specific service and presentation services. There are tools to support interface.
- ii) Business layer is a tool to support the Business logic and consist of reusable subsystems.
- iii) Middleware layer consists of the component such as GUI and database management system. There are tools to support transaction management and inter-process communication
- iv) System software layer consists components such as operating system, database or interface to specific hardware and so on. Functional tool can support operating systems and database management systems.

2.4.3.4 Different between Relational Unified Process (RUP) and Object-oriented Analysis and Design (OOAD)

Table 2.6 Different between RUP and OOAD

	RUP	OOAD
Feature	<ul style="list-style-type: none"> i. Iterative software development process. ii. Four Functional Layers included <ul style="list-style-type: none"> a. Application layer contains specify service and presentation services. There are tools to support interface. b. Business layer is a tool to support the Business logic and consists of reusable subsystems. c. Middleware layer consists of the component such as GUI and database management system. There are tools to support transaction management and inter-process communication. 	<ul style="list-style-type: none"> i. Development of information system. ii. Three approaches included <ul style="list-style-type: none"> a. Inheritance refers to one class (child class) to inherit the identical functionality of another class (super class), and then included its own new functionality. b. Association refers to a class which includes valuable relationship details. The association relationship may be unary, binary, ternary, or n-ray. c. Aggregation used to model a “whole to its parts” relationship and the lifecycle of class is independent from the whole class’s lifecycle.

	RUP	OOAD
	<p>d. Middleware layer consists of the component such as GUI and database management system. There are tools to support transaction management and inter-process communication.</p> <p>e. System software layer is standards and tools to support systems management (e.g. operating systems, database management systems).</p> <p>iii. Use-Case View</p> <ol style="list-style-type: none"> a. Logical view b. Implementation view c. Process view d. Deployment view 	<p>iii. OOAD structure</p> <p>Establish core requirements</p> <ul style="list-style-type: none"> - Analysis <ol style="list-style-type: none"> a. Use Case Model (Uses Cases and Activity Diagram.) b. Object Model (class relations, object interaction). - Design <ol style="list-style-type: none"> a. Database Design b. Design elements c. Design components d. GUI element - Evolution <ol style="list-style-type: none"> a. Grow and change the implementation through successive refinement. - Maintenance <p>Manage post-delivery evolution.</p>
Advantage	<ol style="list-style-type: none"> i. Accurate documentation <ul style="list-style-type: none"> - Emphasis accurate documentation with correct methodology [30]. ii. Change request management <ul style="list-style-type: none"> - Able to solve the project risks [30]. 	<ol style="list-style-type: none"> i. Safety <ul style="list-style-type: none"> - Using UML even exits errors but all are not lost [9].

	RUP	OOAD
Advantage	iii. Saving time <ul style="list-style-type: none"> - Less time is required for by reuse component [30]. iv. Free source <ul style="list-style-type: none"> - Online tutorial [30]. v. Higher level of reuse. vi. The reuse of code is easy and faster.	ii. Reusable elements <ul style="list-style-type: none"> - Reusable elements with enhance system quality and productivity of systems analysis and design [9]. iii. Saving time. iv. Class Modeling shares the same element.
Disadvantage	i. Expert skill <ul style="list-style-type: none"> - Members should have expert skill in each own field [30]. ii. Complexity <ul style="list-style-type: none"> - Complex and disorganized development process [30]. iii. Confusion <ul style="list-style-type: none"> - Increase confusion because of multiple processes [30]. 	i. Constraints <ul style="list-style-type: none"> - Analysis models not able to consider constraints exist.

2.5 GSM Modem

2.5.1 What is GSM Modem

GSM modem is a wireless modem that works with a GSM wireless network. It behaves like a dial-up modem but receives and sends data through radio waves. GSM device comes with a SIM card which used to connect to GSM network to

operate. In case of outgoing messages, a message is sent out by SMS Gateway from computer then it is directed to the GSM device which is attached to computer by USB cable and transmits the outgoing message to the SMSC (SMS Center). After this, it will forward to recipient via wireless link. By the way in case of incoming messages, the incoming message is stored in GSM modem's memory or on the SIM card and a notification is sent to GSM modem SMS Gateway about this message. Then the gateway receives the notification which will read the message from memory [37].

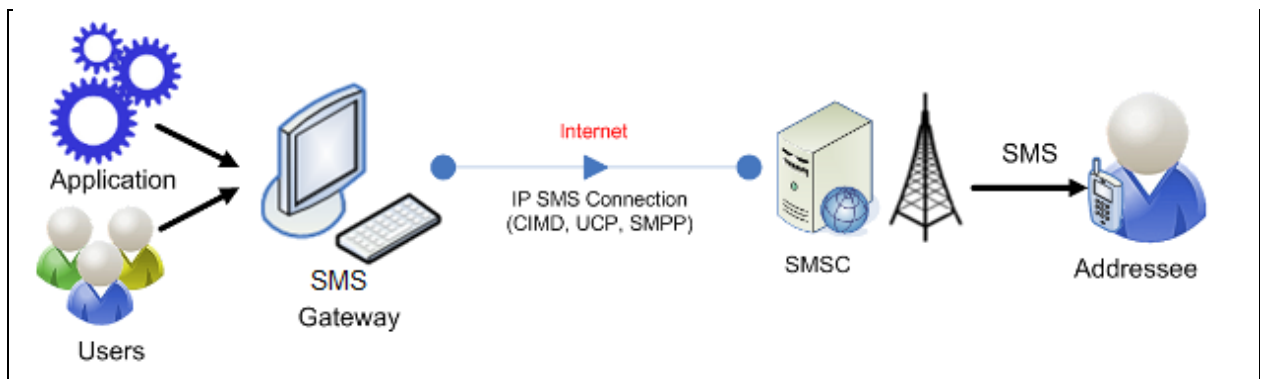


Figure 2.15 IP SMS connection

2.5.2 Advantage and Disadvantage of GSM Modem

Table 2.7 Advantage and disadvantage of GSM Modem

Advantage	Disadvantage
i. GSM easy to setup.	i. Some mobile phone models cannot be used with computer to receive SMS messages.
ii. Maintenance cost is low.	

Advantage	Disadvantage
iii. Low cost without any devices to support on it.	
iv. It can increase the capacity of memory by add more GSM device simultaneously.	
v. Improve communication flowing within and outside of company with able to send and receive thousand of SMS messages per minutes.	
vi. SMS messaging application able to operate 24 hours a day.	

2.6 Web Based Development Tools

2.6.1 Difference between Software Tools (Microsoft FrontPage and Adobe Dreamweaver)

Microsoft FrontPage and Adobe Dreamweaver are both software tools used to develop simple Web site using different web programming. They can design the web page, display function of button and save the record in database. Both of them demonstrate the different feature, advantage and disadvantage.

Table 2.8 Difference between Microsoft FrontPage and Adobe Dreamweaver

	Microsoft FrontPage	Adobe Dreamweaver
Features	<ul style="list-style-type: none"> i. Acquired by Microsoft [14]. ii. Hide the HTML code detail from the user. 	<ul style="list-style-type: none"> i. Acquired Macromedia [14]. ii. Web development tool. iii. Flash and Fireworks software are offer.
Advantage	<ul style="list-style-type: none"> i. Server side includes (SSI) is easy <ul style="list-style-type: none"> - Add customization feature to Web page [13]. ii. Easy <ul style="list-style-type: none"> - Used shared sites, easy to drag and drop files [13]. iii. Save time <ul style="list-style-type: none"> - Share template in different pages. iv. Split view <ul style="list-style-type: none"> - Code and preview can display simultaneously [14]. 	<ul style="list-style-type: none"> i. Useful <ul style="list-style-type: none"> - Support many programming languages [12]. ii. Transfer and synchronization features <ul style="list-style-type: none"> - Find replace text and codes, share template features layouts throughout many sites. iii. Extend core functionality of a web application [14]. iv. Free source [14]. v. Simple web development tasks. vi. Saving time. <ul style="list-style-type: none"> - Edit the code and preview the changes simultaneously in split view [14].

	Microsoft FrontPage	Adobe Dreamweaver
Advantage		vii. Available <ul style="list-style-type: none"> - Windows and Mac OS - Preview web pages in various browsers [14].
Disadvantage	i. Redundancy codes [12]. ii. Create and edit only HTML documents [14]. iii. Work primarily for the Windows line of products.	i. Complex nested templates <ul style="list-style-type: none"> - Pages develop from nested templates and may corrupt when using.

2.6.2 Differences between web server (Internet Information Server (IIS) and Apache)

The client's browser divides the URL into different parts dividing including address, path name and protocol. Domain Name Server translates the domain name into the corresponding IP address the numeric combination represents the site's true address on the internet. The browser now decides which protocol should be used a protocol in common parlance is a language which the client's to communicate with the server. FTP, HTTP is some such protocols. The server sends a GET request to the web server to retrieve the address it has been given. It verifies given address exists, finds necessary files ,runs appropriate scripts exchanges cookies if necessary and returns back to the browser. The browser now converts the data into HTML and displays results to the user. If it does not locate it sends an error message to the browser and to the client. This process is continues for every request sent by the browser and until the client browser leaves the site. Below is an analysis the differences between Internet Information Server (IIS) and Apache.

Table 2.9 Differences between Internet Information Server (IIS) and Apache

	Internet Information Server (IIS)	Apache
Features	<ul style="list-style-type: none"> i. Visual Basic application [16]. ii. Respond the request from the browser. iii. Interface present by using HTML. 	<ul style="list-style-type: none"> i. A web server <ul style="list-style-type: none"> - Stores and delivers information.
Advantage	<ul style="list-style-type: none"> i. Many browsers and operating systems can support <ul style="list-style-type: none"> - Operating system or browser do not need specific. ii. Internet or an intranet can be using. iii. Minimize cost <ul style="list-style-type: none"> - No other software need to install for support it [16]. iv. Reusable components [16]. v. Multiple interactions between clients [16]. vi. Independent Request Handler [18]. 	<ul style="list-style-type: none"> i. Portability <ul style="list-style-type: none"> - Support by almost any OS [15]. ii. Open source software [15]. iii. Many web programming languages are supported <ul style="list-style-type: none"> - Including Perl, Python and PHP. iv. Support <ul style="list-style-type: none"> - Support for Apache [16]. vi. Less complex, reliable and secure, and manageable [17].
Disadvantage	<ul style="list-style-type: none"> i. IIS is obviously designed and available to work only within the Windows environment [18]. 	<ul style="list-style-type: none"> i. Lacks bandwidth throttling [18].

2.6.3 Difference between Web Programming Languages

There is a diversity of programming languages available and suitable for conventional programming tasks. It is used to building Web pages, designing Web page or store record into database management. Then they can make the Web page function smoothly. Table below shows the comparison between PHP&PERL and HTML&XML.

Table 2.10 Difference between PHP and PERL

	PHP	PERL
Advantage	<ul style="list-style-type: none"> i. One type of scripting languages. ii. Free source [19]. iii. More browser support for it [19]. iv. Learn easily [20]. v. Deploy easily and cost effective. vi. Operate well on those platforms [20]. 	<ul style="list-style-type: none"> vii. One type of scripting languages. i. Free source [20]. ii. Easy to learn. iii. Database-independent library [20]. iv. Simple, flexible object model. v. Any platform can support.
Disadvantage	<ul style="list-style-type: none"> i. Poor handling errors qualities [19]. ii. Open to security flaws due to unimplemented or unknown vulnerabilities [20]. 	<ul style="list-style-type: none"> i. Use many memory and slower process. ii. Hard to create a binary image.

Table 2.11 Difference between HTML and XML

	HTML	XML
Advantage	<ul style="list-style-type: none"> i. Plain text is easy to edit [23]. ii. Fast to download because text is compressable [23]. iii. Learn easily [23]. iv. Run on many browsers [23]. v. Able to present any kind of data [23]. vi. Loose syntax [23]. 	<ul style="list-style-type: none"> i. Learn easily. ii. Independent platform [24]. iii. Hierarchical structure is suit for most types of documents [24]. iv. Portable language v. Supports Unicode [24].
Disadvantage	<ul style="list-style-type: none"> i. Case-sensitive for element and attribute name. ii. It is not centralized because all pages need to edit individually [23]. iii. Limited styling capabilities [23]. iv. Unable to produce dynamic output alone [24]. 	<ul style="list-style-type: none"> i. Tags cannot be omitted. ii. Case-sensitive for element and attribute name. iii. Finding information by navigate data is a tedious process. iv. Small amount of information to be handled. v. Redundancy data [24]. vi. No intrinsic data type support [24].

2.6.4 Database (PHPMyAdmin and Microsoft SQL Server 2005)

Database has many functions. It can aggregate function with combine multiple values into one. It also support cryptographic functions which support encryption,

decryption and validate data. Moreover, it can perform mathematical functions. Furthermore, database can operate on or report on various system level options and objects.

Table 2.12 Difference between PHPMyAdmin and Microsoft SQL Server 2005

	PHPMyAdmin	Microsoft SQL Server 2005
Features	<ul style="list-style-type: none"> i. Support for most MySQL features: <ul style="list-style-type: none"> - Create, drop, and edit databases tables - Execute and modify any SQL-statement, even batch queries. - Control MySQL users and privileges. - Manage store procedures and triggers [26]. ii. Administer multiple servers [26]. iii. PDF graphics able to create in database layout [26]. iv. Complex queries can be created by using Query-by-example (QBE) [26]. v. Searching globally and subset in a database [26]. 	<ul style="list-style-type: none"> i. Store and retrieve data. ii. Managing XML data. iii. Import, transform and export data from multiple sources [28]. iv. Database can support by multiple users concurrently.
Advantage	<ul style="list-style-type: none"> i. Open source. ii. Manage administration of MySQL. 	<ul style="list-style-type: none"> i. Edit content is database without dropping [29]. ii. Able to function in many languages [29].

	PHPMyAdmin	Microsoft SQL Server 2005
Advantage	<ul style="list-style-type: none"> iii. User interface operate with SQL. iv. Simple [27]. v. Do not need to memorize line commands [27]. vi. Do not need other software [27]. vii. Backup or restore easily 	<ul style="list-style-type: none"> iii. Other databases can access to table if they are locate in same server. iv. Process natural language queries. v. Send data to multiple systems by using replication [28]. vi. Full-text search to simplify management and improves performance [28]. Compression features enable to improve scalability.
Disadvantage	<ul style="list-style-type: none"> i. Hard to handle if have many databases [27]. ii. Slower than other systems such as Shell. 	<ul style="list-style-type: none"> i. Commercial [29]. ii. Hard in install and maintenance process [29].

2.6 Literature Review Summary

For this chapter, some research had been done to understand the different concept and feature of current system that are available. The existing systems have announcement board to inform the members about the latest news which is a good way to communicate between them. Moreover, more than one language can choose by users is a good optional function should be prepare by a system. On the other hand, sport facility booking system

can be advanced for booking equipment in the same time and create a record page to let users report spoilt facility or equipment. SMS service provided to improve communication to more efficiency.

Web based application is a distributed feature-based design system so it can provide service remotely. Concurrent design of web based application allows multiple user login system simultaneously but stand alone cannot share data with other computer. Moreover, it can function 24 hours a day and 7 days a week and secure keep files updated or organize information.

Rational Unified Process (RUP) is an iterative software development process. It can develop accurate documentation by step of RUP methodology. Moreover, it can change request management by resolve the project risk with user's request and reduce the cost of development. In addition, RUP is an integration process which help to save time for complete the goal. Although it is complex and confusion development process, but user can learn via online training and tutorial with free of charge.

Study about web based development tools through research is to get the knowledge about the latest software, web programming and database management to progress on the system. Adobe Dreamweaver is a web page editor which can supports a large group of programming languages. It can find and replace text or codes, template features such as single source updating of shared codes and layouts throughout sites. Apache is a web server which run on almost any operating system and can support for a wide range of web programming languages. PHP is a free server side scripting language and support by most web hosts. Html language also support by most browsers. Both of the languages are easy to learn and manipulate. PHPMyAdmin is a good database management tools. It support for most MySQL features included browse, drop, create, copy, rename and alter database, tables, fields and indexes. It also helps to execute any SQL statement.

CHAPTER 3

METHODOLOGY

3.1 Introduction

Methodology is analyzing various ways in research collected and making sense of information on chosen topic. The appropriate method will be applied on the system process for designing and implementing the content. This chapter also discuss about the justification of method or approach used and hardware and software requirement.

Software Development Plan such as Rational Unified Process (RUP) is a comprehensive and flexible software project development framework that embodies an iterative approach and other best practices. The Phase Plan provides a high-level, coarse-grained view of the project, showing the total number of planned iterations across the four RUP phases that are Inception, Elaboration, Construction and Transition with its key milestone. The tasks are categorized into nine disciplines that are Business Modeling, Requirements, Analysis and Design, Implementation, Test, Deployment, Configuration and Change Management, Project Management and Environment to support each stage on process development. Sport facility booking system is developed base on the Rational Unified Process (RUP) methodology.

3.2 The Justification of Rational Unified Process Methodology

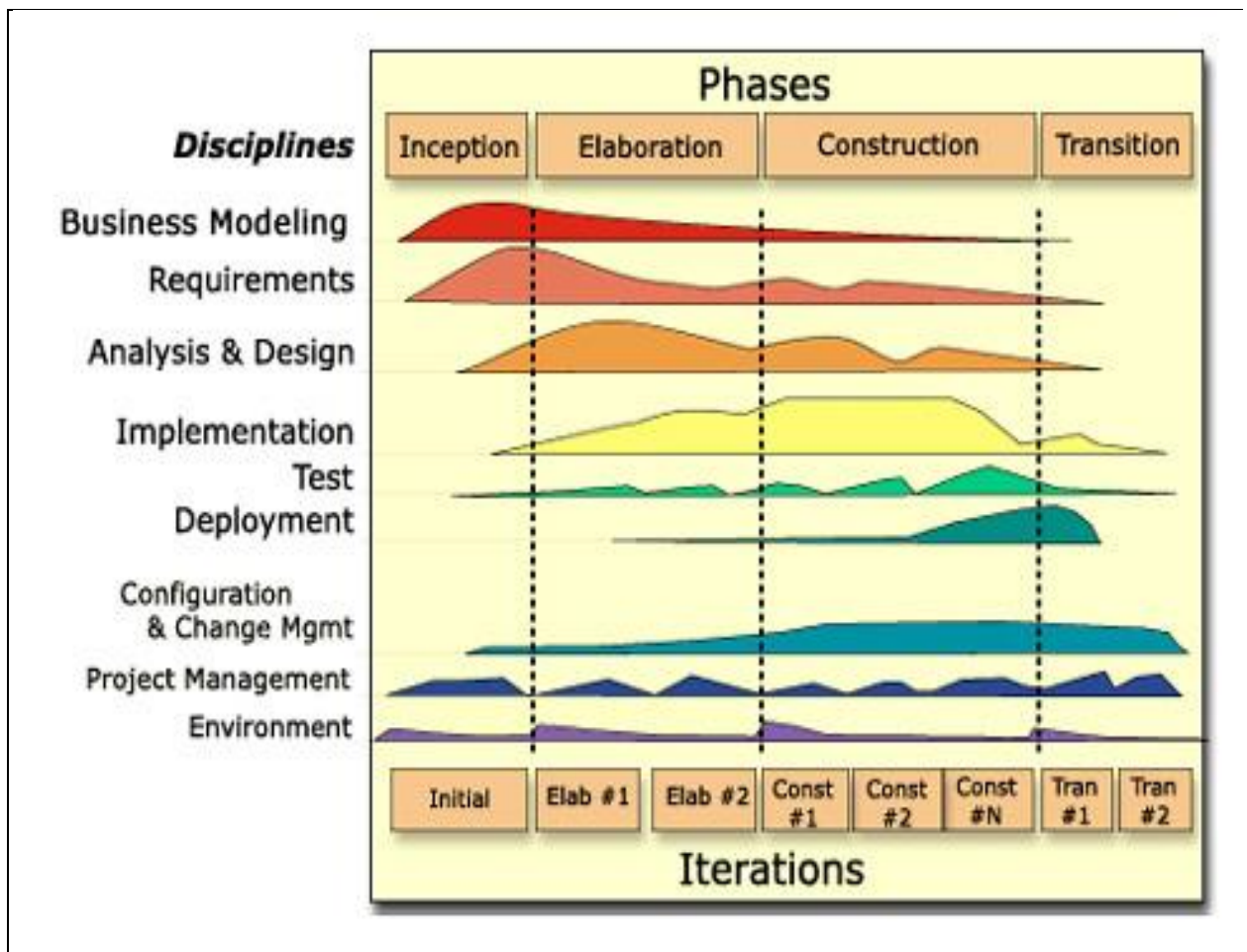


Figure 3.1 The RUP project frameworks

RUP is divided into four phases is to distinguish among the different focuses of activities at different times in the project lifecycle. Inception phase is focus on scope and requirement for system. Next is Elaboration phase is design software architecture to identify feasibility and constraint of requirement whereas construction is focus on functionality of integration artifacts with implementation and testing. Finally is transition which is focus on deliver product.

RUP also included six disciplines. These are Business Modeling, Requirements Gathering, Analysis and Design, Process of Software Development and Implementation, Software Application Testing and Deployment. Business Modeling is identifying the scope and purpose of business with demonstration of business case. Next, developers collect description of system from user and discuss functionality and constraints of the development in Requirement discipline. In addition, Analysis and Design is transform client requirement into use-case model to analyze requirement and demonstrate the concept of the functional subsystem design. Furthermore, define the code which will implement in component of subsystems process in Software Development and Implementation then testing the integration of code will implement during Software Application Testing stage. Last but not least, if the customer verifies the system is fulfil the requirement and satisfy it, developer will deliver the software to them and provide the training lesson in deployment stage.

3.3 Inception Phase: Project Objective Milestone (project viable or non-viable)

In this phase, it should identify the project software scope and boundary conditions by analyze in research. The software scope included comparison among software tools but also identifies different features of web programming language whereas the boundary conditions embody feasibility requirement and risk taken during the development. Based on the Business Modeling discipline, it shall identify all significant business needs, specification, and architecture which will apply on the process.

On the requirements discipline, the requirement consists of provide optional language on existing system so foreigner can understand the booking system function clearly. Moreover, it is developing viewable timeslot to simplify booking process. Improvement of database to enable admin deletes unnecessary booking record in once time. In addition, the system provides report function on system to record spoilt facility but also provide announcement function for communication way between users and admin.

Next, planning and preparing a use case is to evaluate risk management and balancing user requirement or risk taken. Lastly is initial the environment for the project by select tools. From the consideration, Adobe Dreamweaver as software tool will be chosen for support multiple web programming language to develop web site. Moreover, Apache is a better server to stores information and delivers data when needed. PHPMyAdmin is a good database software tool to store and display data.

3.3.1 Use Case for Sport Facility Booking System

The use case show authorize function can conduct by the user and admin respectively.

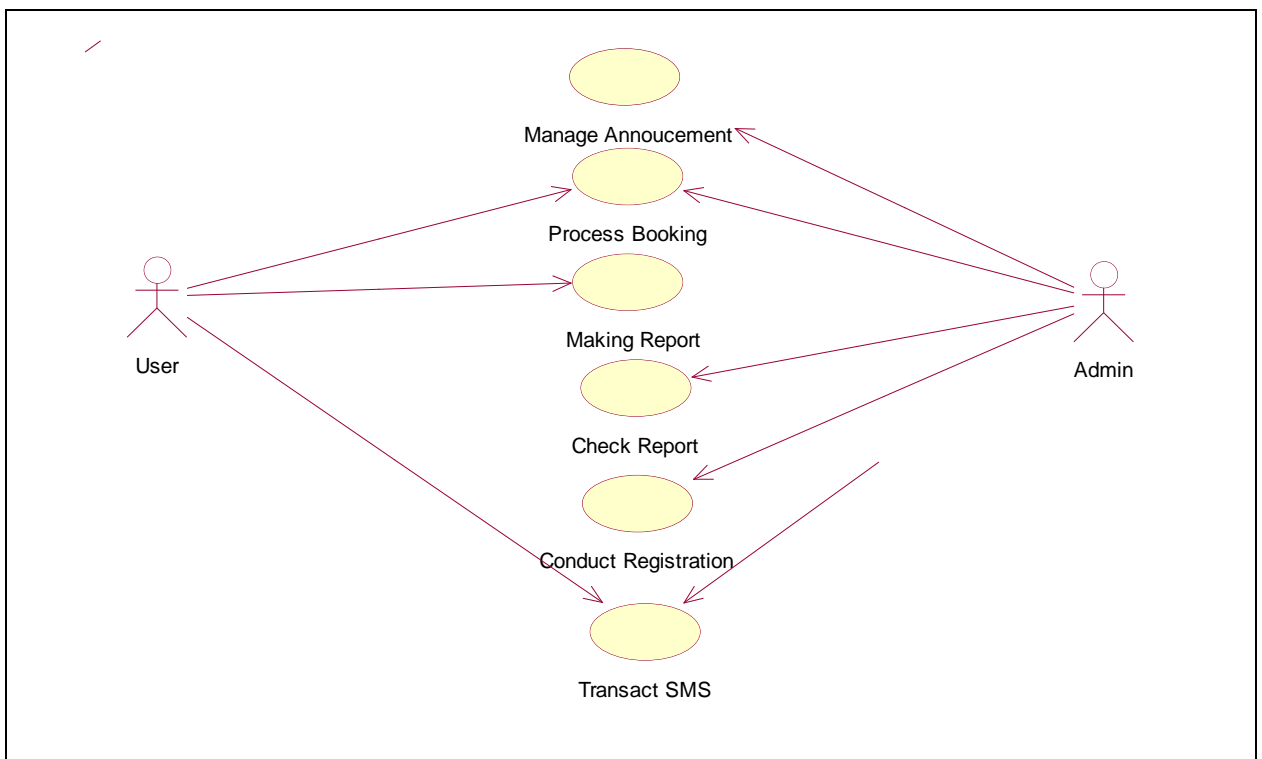


Figure 3.2 Use case for Sport Facility Booking System

3.3.2 Flow chart of Each Module

Flow chart show the process of each module based on requirement.

3.3.2.1 Flow chart for Announcement Module

Admin need to insert username and password to login into announcement interface. If the input is verifies false then admin shall re-enter his input. After the input is verifies true then admin can proceed to post the announcement so member can obtain the announcement updated. The flow chart show that the process of announcement module.

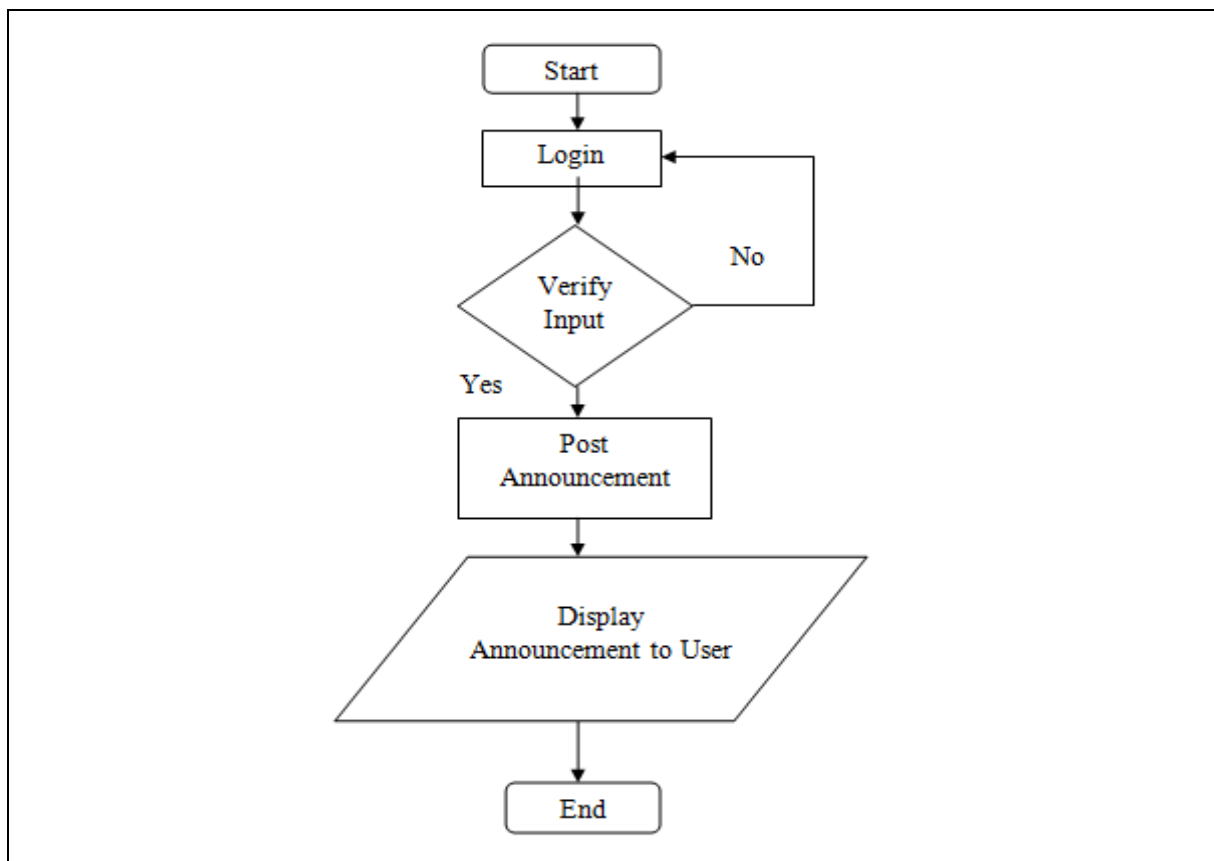


Figure 3.3: Flow chart for Announcement Module

3.3.2.2 Flow chart for Reservation Module

Member shall choose his date and type of facility or equipment for request, if the timeslot is available then the member insert his username and password to book. If verify the input is correct then the member can continue to book facility or equipment. After success on booking process, his name will display on timeslot to enable user checks his record. The flow chart below shows that the process of reservation module.

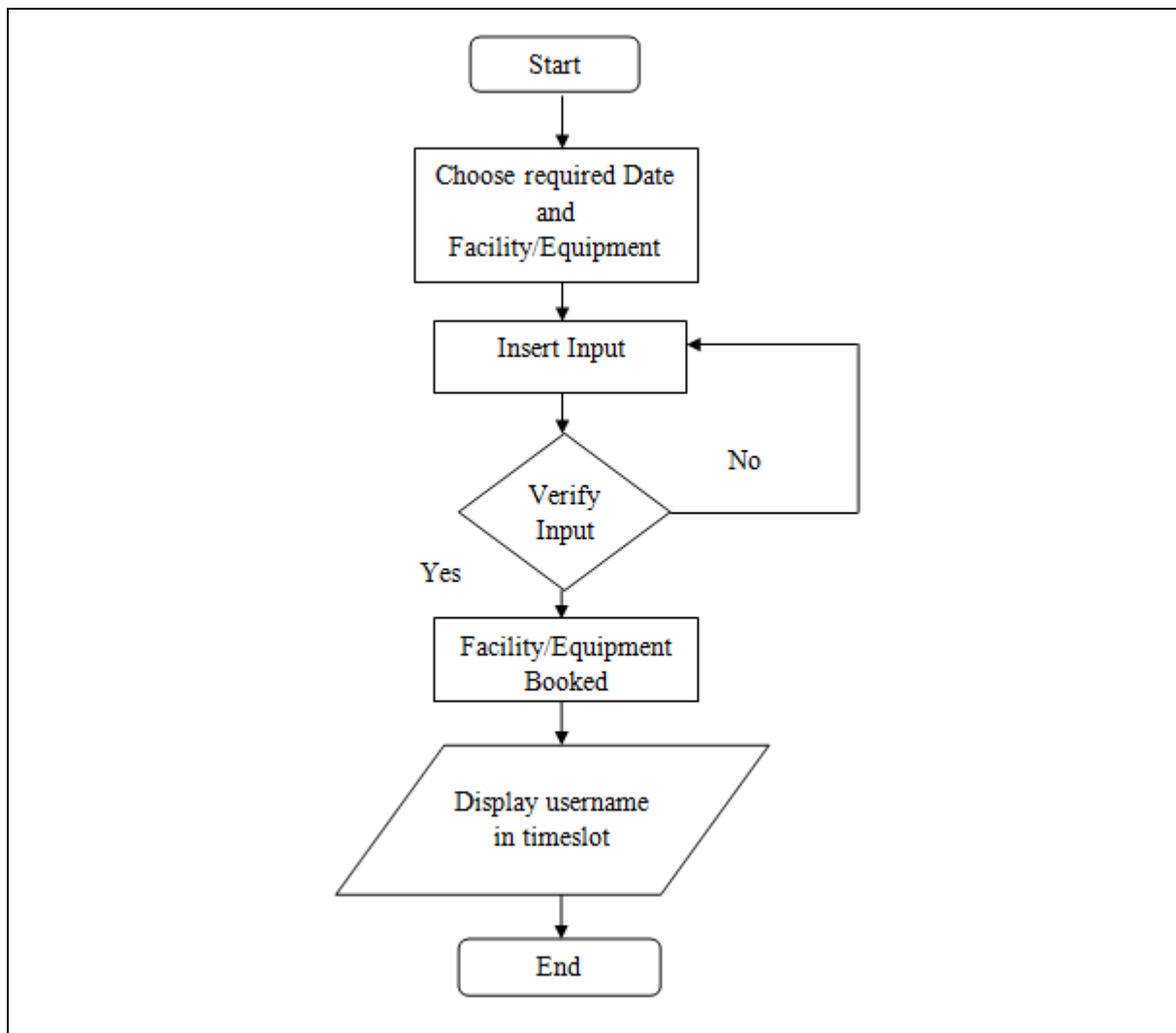


Figure 3.4: Flow chart for Reservation Module

3.3.2.3 Flow chart for Report Module

Firstly, member shall login into report interface. If verify false then member shall re-enter input again whereas if verify is true then he can post the report of spoilt facility or equipment to notify admin so that admin can take action effectively. The flow chart below shows the process of report module.

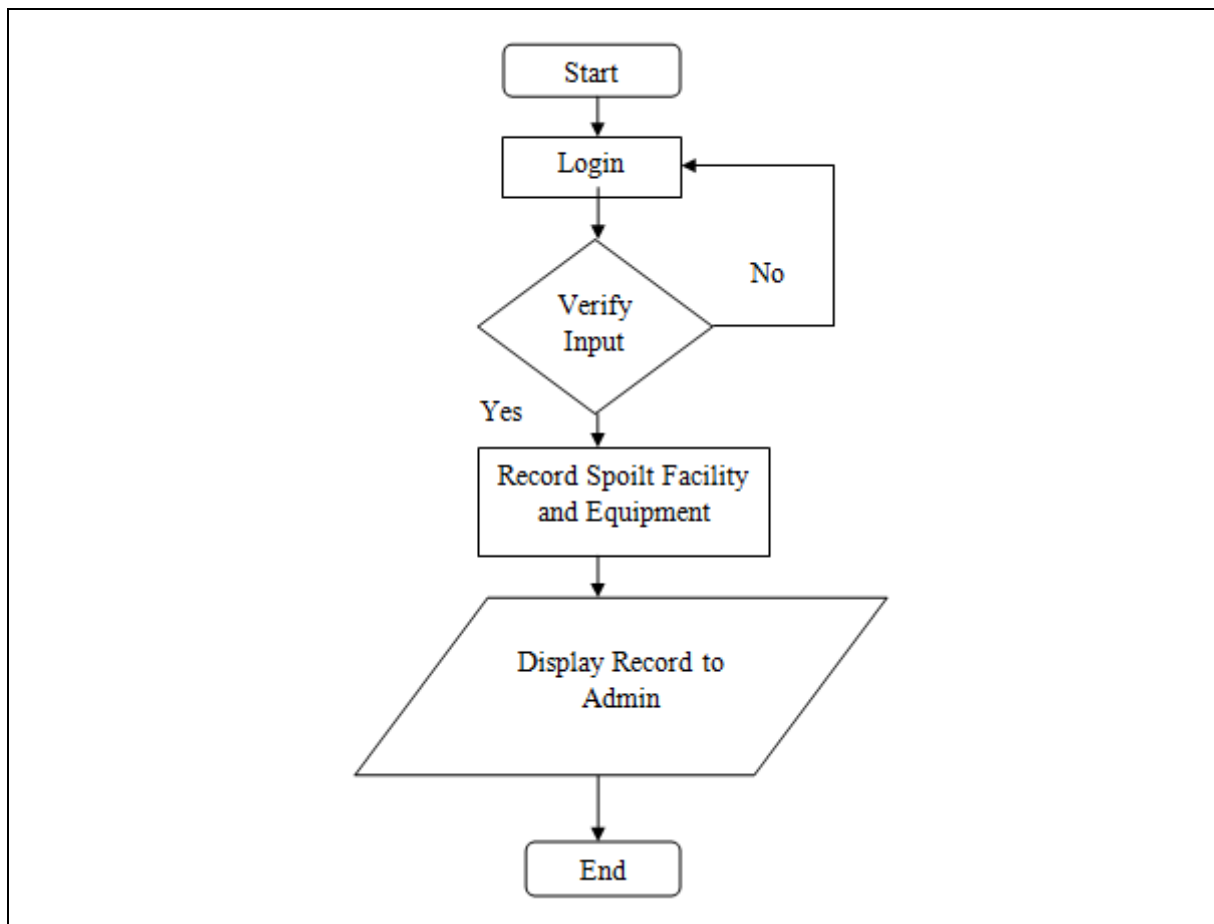


Figure 3.5: Flow chart for Report Module

3.3.2.4 Flow chart for Registration Module

Admin shall login into registration interface with correct username and password. He can register membership for new user if his input is matching. Then the record will update and save to ensure new user can make request on sport facility booking system. The flow chart below shows that the process of registration module.

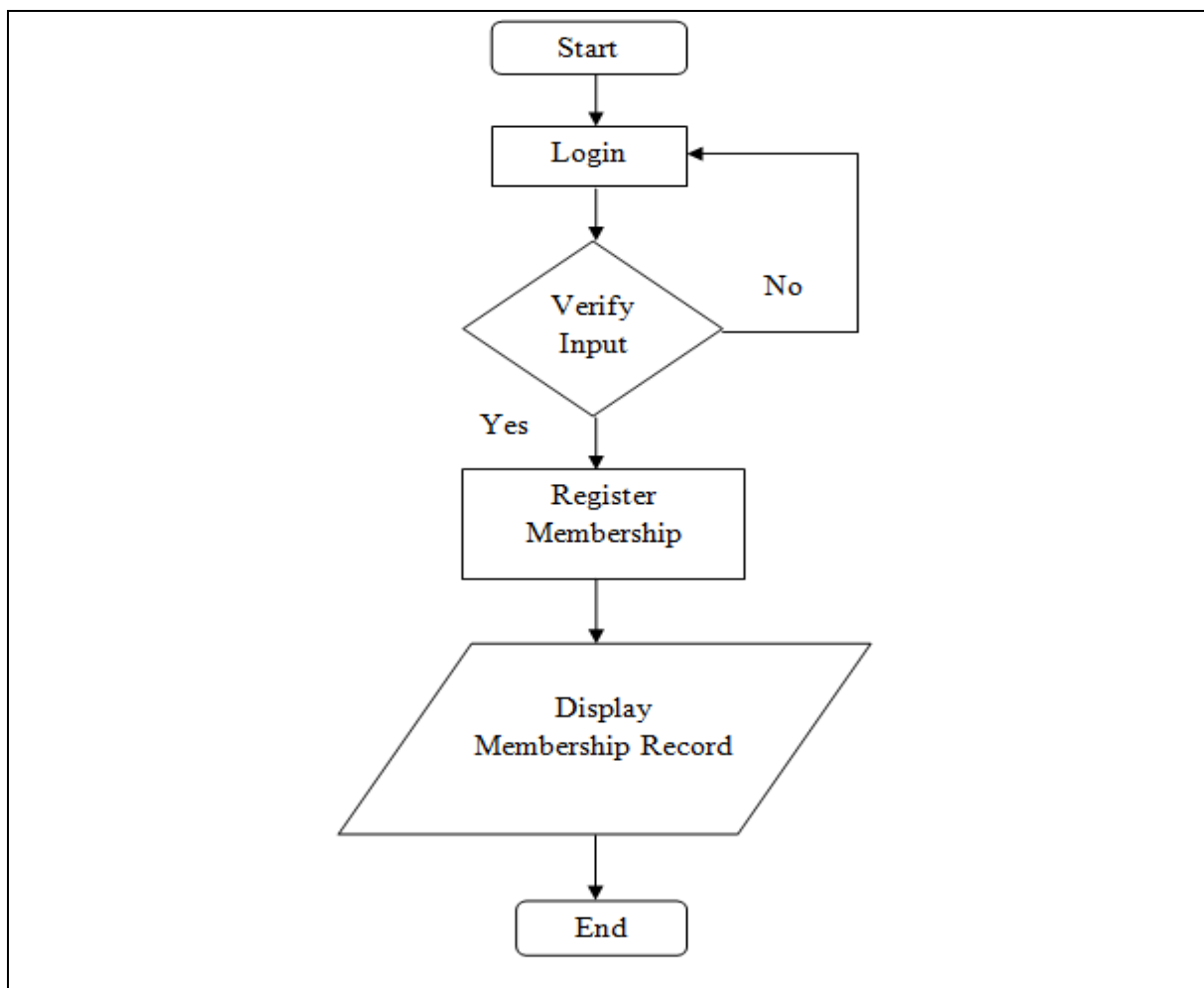


Figure 3.6: Flow chart for Registration Module

3.3.2.5 Flow chart for SMS Module

Firstly, admin should login admin login for to identify his identity. If his username and password is correct, then admin enable to check received SMS and sent SMS, He also able to reply SMS to member for explain problem or describe any information detail. The flow chart below show that the process of registration module.

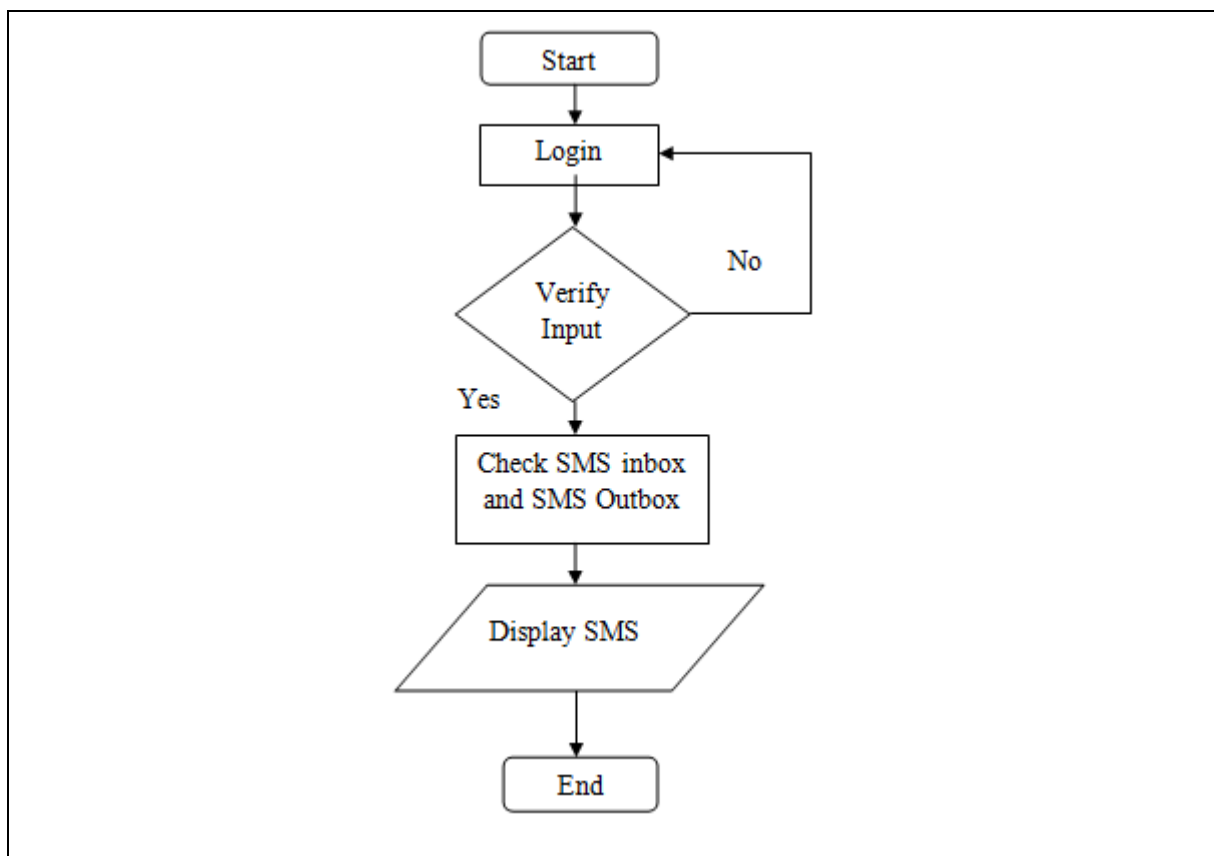


Figure 3.7: Flow chart for SMS Module

3.4 Elaboration: Product Architectural Milestone (architecture is proven)

Elaboration phase is to understand clearly about the requirement and expand more detail on request to convince user. The requirement included provide optional language functional button on system with develop English language and Malay language version to solve the understanding of foreigner. Moreover, develop viewable to show the available timeslot to user for saving time for booking if compare to unreadable timeslot which need to try one by one on timeslot. Furthermore, advance system able to manage database with select all button function on interface for delete all in once time. In addition, the system also provides report module to let user record facility or equipment which is spoilt with online system and also add announcement module for improve communication way through the announcement. SMS function provided to increase efficiency in management of booking cancellation.

Analysis and Design discipline in this phase is to build a specific functional system that describes in the sequence diagram which extends from use case based on client's requirements. Using sequence diagram to describes the behavior of a system and interaction between user and system for suit the functionality and nonfunctional requirements. The elaboration phases activities ensure that the architecture, requirements and plans are stable enough and eliminate the risks are sufficiently to complete the development smoothly.

Software architecture and executable architecture are implemented to identify architectural use cases and interface design among the building blocks. This phase is tested with revise risk list to minimize technical risk so that requirement stable to develop in system.

3.4.1 Sequence Diagram for Announcement Module

Admin select announcement menu from main menu module. After that, admin needs to insert username and password to login into announcement interface. The password is verify with retrieve the password from database, if matching then admin can post the announcement after verify the announcement detail is complete in valid format. Then user can read the announcement updated. When the admin finished his process then it can return to main menu. On the other hand, admin has authorizes to remove announcement from record. The sequence diagram shows the process of announcement module.

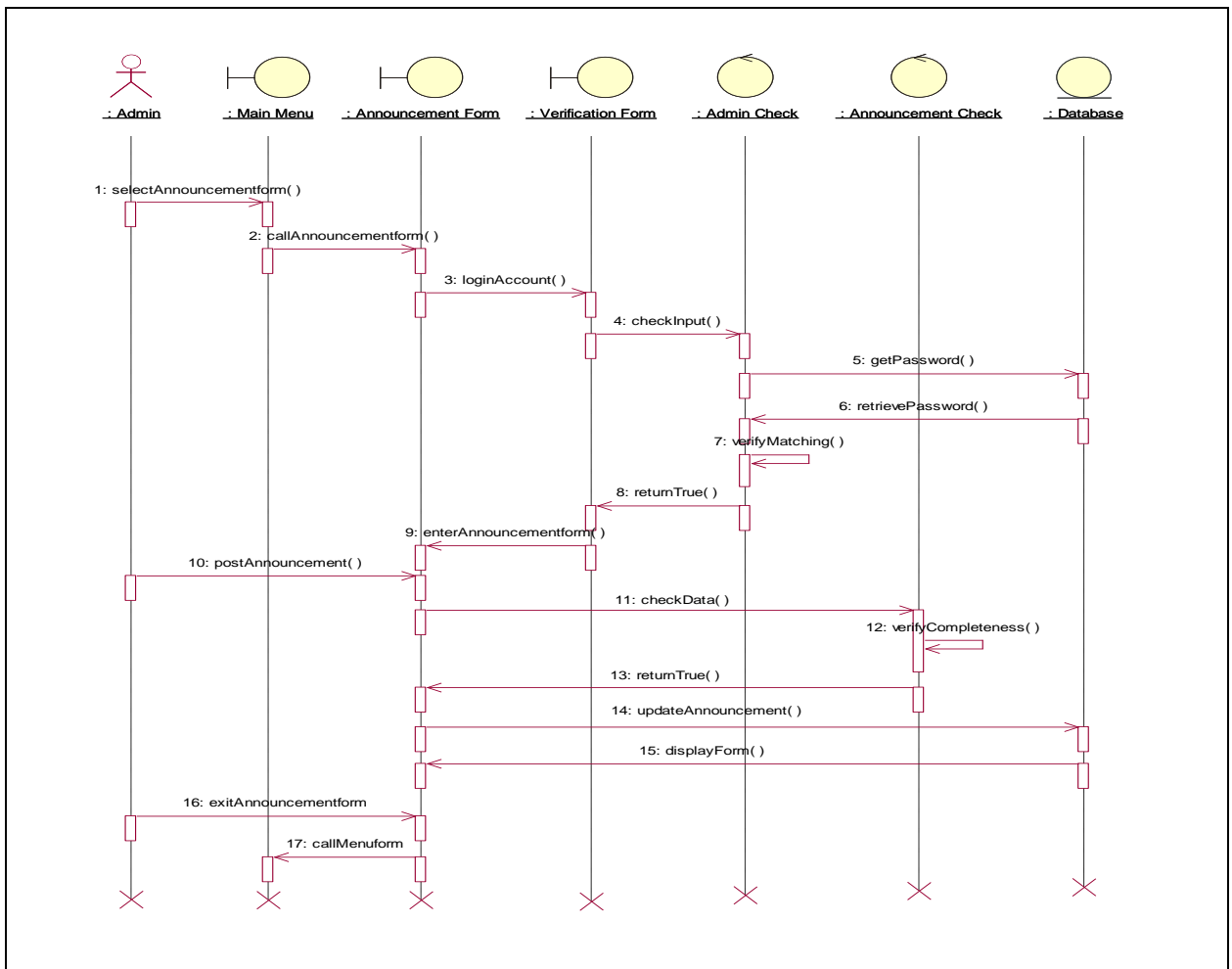


Figure 3.8 Sequence Diagram for Announcement Module

3.4.2 Sequence Diagram for Reservation Module

User selects reservation menu from main menu module. Firstly, he shall select facility type and date. After this insert username and password to verify his identity. The password is verify with retrieve the password from database, if matching then user can book facility and equipment set after complete the booking detail. When the user finished his process then it will return to main menu. However, user can cancel his booking or view his booking via the viewable timeslot. The sequence diagram shows the process of reservation module.

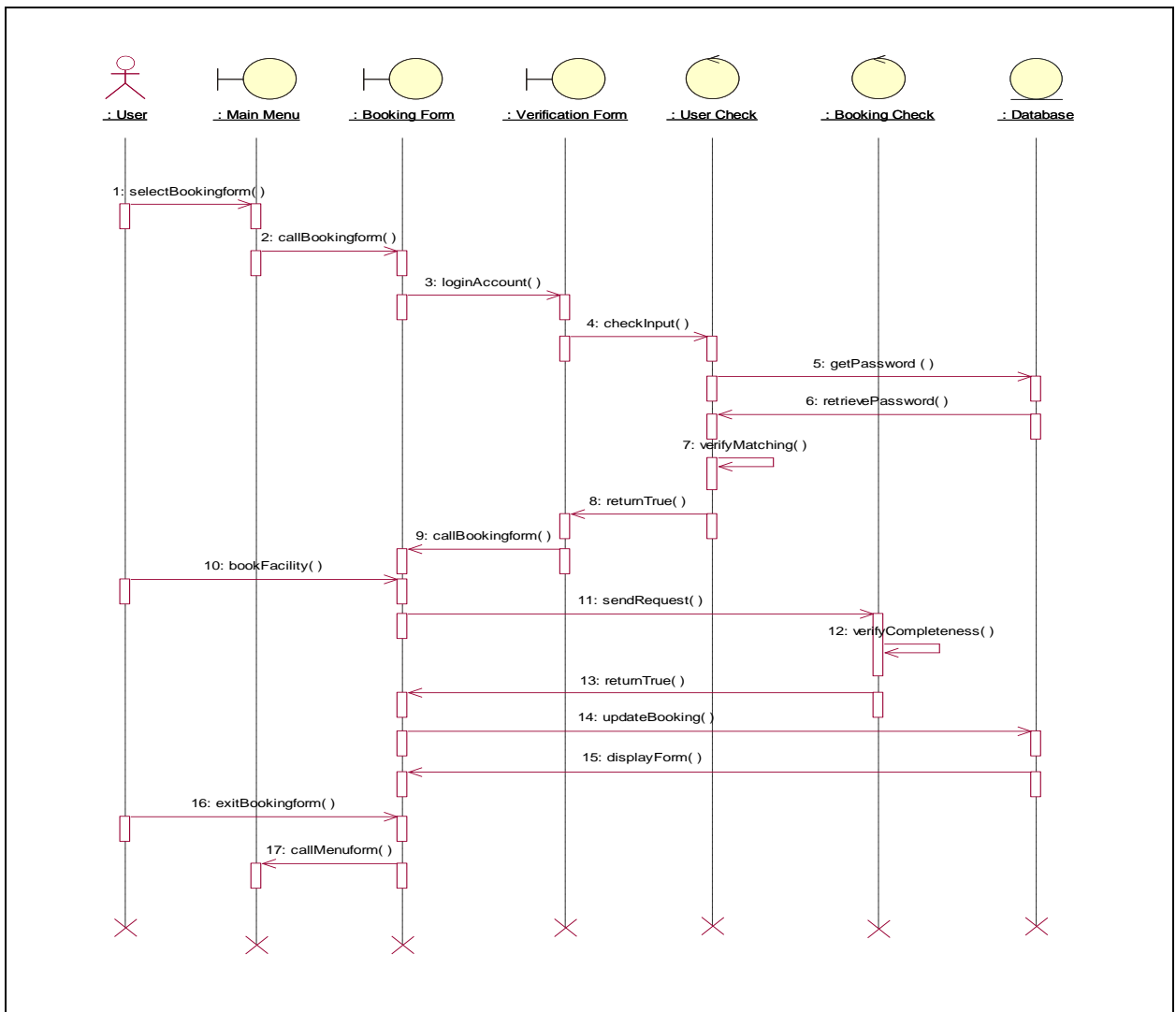


Figure 3.9 Sequence Diagram for Reservation Module

3.4.3 Sequence Diagram for Report Module

User selects report menu from main menu module. Firstly, user shall login into report interface. The password is verify with retrieve the password from database, if matching then user can send record after verify the report is fill in completely so admin can read the report updated. When the user finished his process then it can back to main menu. Moreover, admin can remove the report from record. The sequence diagram shows the process of report module.

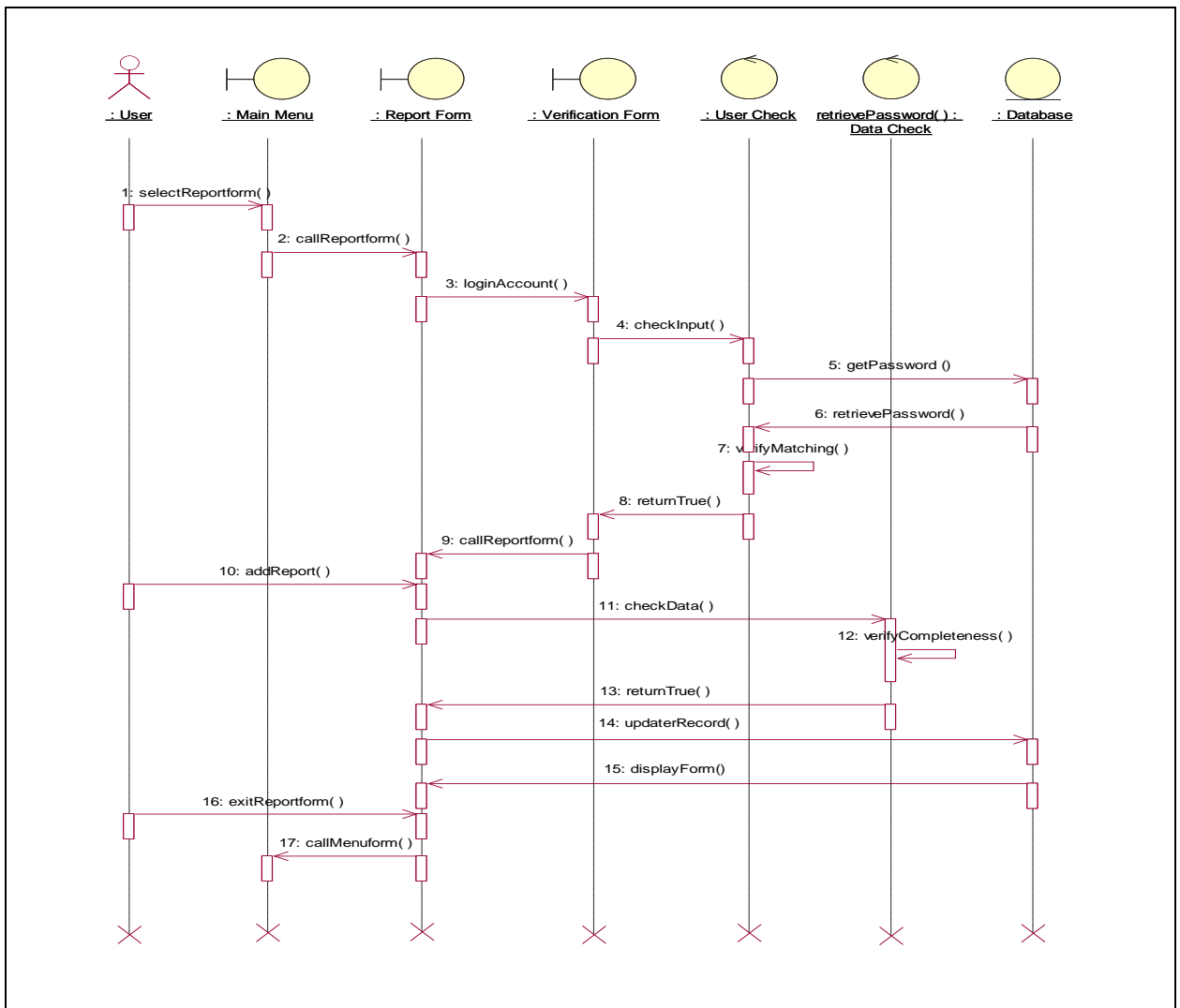


Figure 3.10 Flow chart for Report Module

3.4.4 Sequence diagram for Registration Module

Admin selects registration menu from main menu module. Admin can login into registration interface with correct username and password so he can register membership for new user. Then the record will update and save after success login. However, admin can remove graduated students or staffs who are resigned. Sequence diagram shows that the process of registration module.

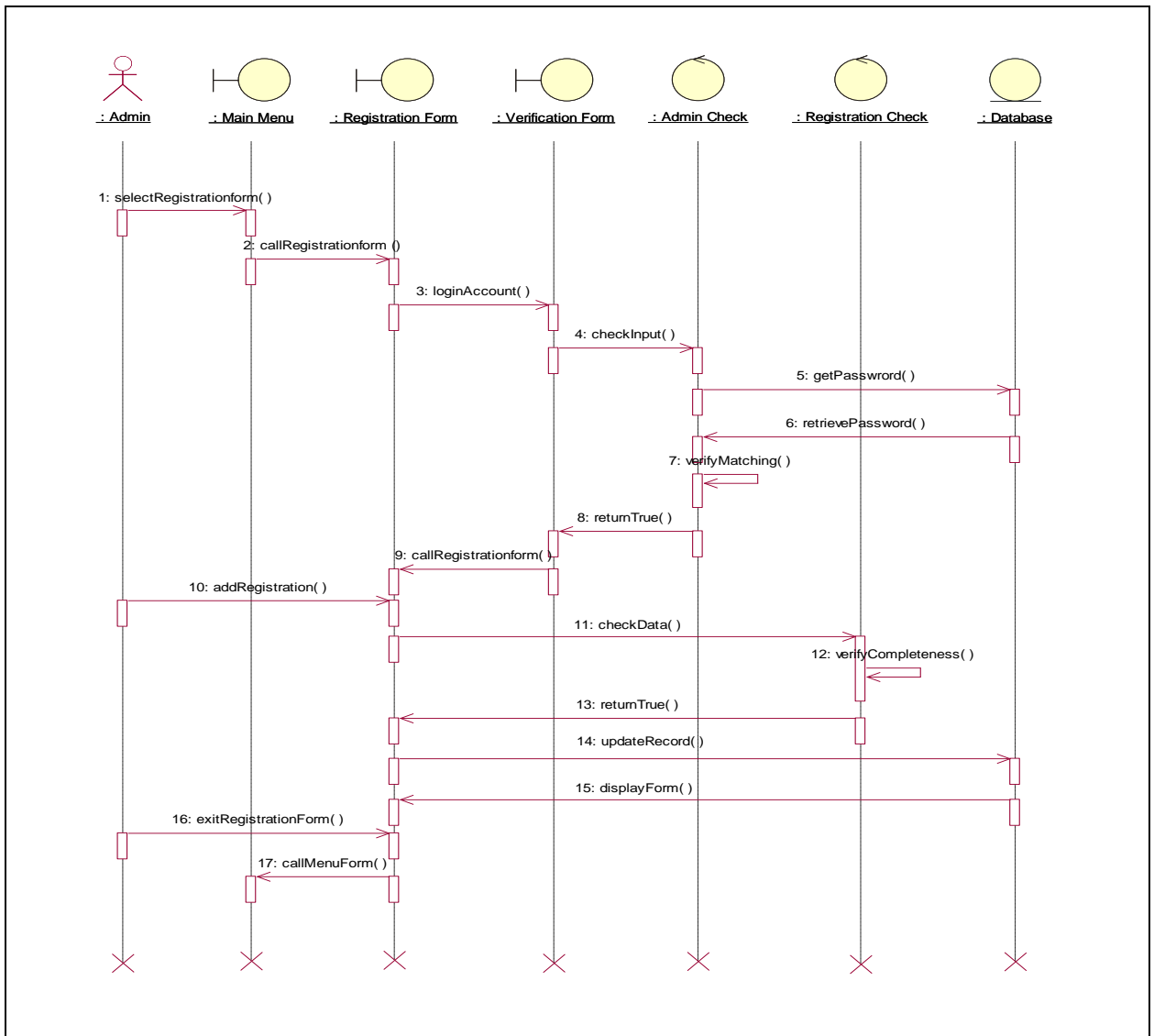


Figure 3.11 Sequence Diagram for Registration Module

3.4.5 Sequence diagram for SMS Module

Admin selects SMS Form from main menu module. Next, admin should login with correct username and password to view received and sent SMS in SMS inbox and SMS outbox respectively. Sequence diagram shows that the process of SMS module.

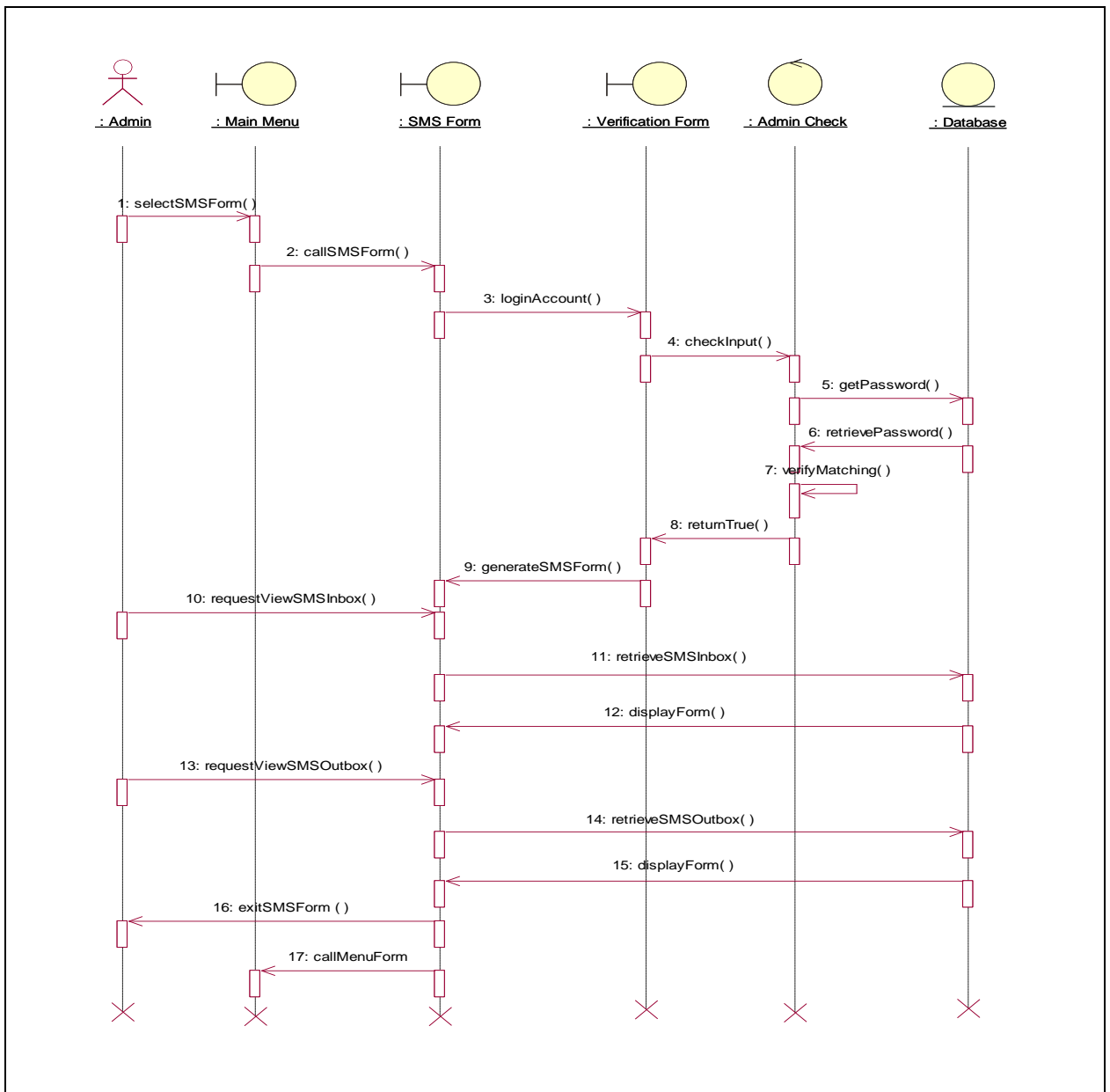


Figure 3.12 Sequence Diagram for SMS Module

3.5 Construction: Operational Capability Milestone (all functionality developed)

Application feature is prioritizes requirement, highlights its feature, analyzes and designs the system to develop and integrate with subsystem then test its function. There are few modules can link to each other after integration code is implement. Admin shall be able to add, updates, deletes and search announcement record on announcement module whereas user able to search and view announcement record. Next is reservation module to let applicant to book their facility and equipment. Admin also can cancel the request if facilities have priority purpose. In record module, user can report all the facility or equipment which is spoilt to admin to take action effectively. Admin enable to reply status, view and search record. On the other hand, registration module let admin can register new students and staffs as member for facility so that they apply their request. Last but not least, SMS module enables admin to view receive and send SMS to increase efficiency in communication way. All modules have different button to control the function but also can store or retrieve its data on database.

Software Development and Implementation discipline is to develop code and implement in subsystem with lower the technical risks. Web programming are used consist of HTML, Javascript, CSS and PHP to create and design web page but also connect to database for store or retrieve data.

Interaction between user and system is tested during Software Application Testing discipline. Testing operates on sport facility booking system with different two stages, there are unit testing and integration testing. Unit testing is done individually by developer in each component of system, extra test will be carry on to improve test results with suitable action. However, integration testing should be plan comprehensive before implemented. During each stage of integration, detect error or problems is necessary for achieve standard and quality product end of complete lifecycle. If problem occur can corrected during testing stage with implement corrective action process after discuss with admin. Development of the balance components and application features are done on Construction phase.

3.6 Transition: Product Release Milestone (product released into production)

The objective of transition is to transit the system from development into production. The system needs to pass through formal and informal beta testing during the inception phase to ensure whether system is met or not user requirements or still want improved by fixing the bugs and defects. Transition phase where the product moves from develop system to release product. However, maintenance the system will be always conducted to ensure the system can function smoothly with reduce database or server load.

3.7 Reason chosen RUP

RUP is a software development methodology. Chosen RUP as software development is due to few practices provided:

- i. Develop software iteratively
 - RUP supports an iterative approach in development process that able to identify the risk at every stage of the lifecycle. Through the frequent progress, iterative approach can solve the risk to ensure process complete within schedule. Therefore, it can ease to solve changing requirements case.
- ii. Manage requirements
 - Identify the feasibility and constraints of the requirements.
- iii. Use Object-Oriented Analysis and Design architectures
 - Reusable elements have saving time for improves system quality and the productivity of systems analysis and design.

- iv. Visually model software
 - Capture the structure and behaviour of architectures and components which help to communicate different aspect of using software at every development stage. Unified Modeling Language (UML) is the foundation for successful visual modeling.
- v. Verify software quality
 - Quality reviewed with respect to the requirements based on reliability, functionality, application performance and system performance.
- vi. Control changes to software
 - Isolate workspaces from changing by control all software artifacts changes.

3.8 Hardware Requirement

The reason for choose Toshiba Satellite L310 because the operating system can support all the software and hardware. Toshiba Hard disk 320GB and Kingston are prefer to use them for backup project because the capacity is enough for store or transfer data. GSM modem is used to send SMS and receive SMS for increase efficiency communication way. The table below shows the list of hardware requirement for develop system:

Table 3.1 List for requirement of hardware for develop the sport facility booking system

Hardware	Purpose
Toshiba Satellite L310	Using software to code, design, implement and test the system. It also using for conduct documentation work.

Hardware	Purpose
Toshiba USB External Hard Disk (320 gigabyte)	To backup project.
Kingston pen drive (4 gigabyte)	To transfer data.
GSM modem	To send and receive SMS.

3.9 Software Requirement

Adobe Dreamweaver CS5 is a web development tool which is useful for support multiple web programming languages. It can share codes and layouts in design of multiple pages. It also convenient with split view. Moreover, Apache is a web server with open source and it can run on any operating system and support by many web programming language. In addition, phpMyAdmin can support MySQL features such as edit, update, delete, save and search function. It is also easy to learn and easier to backup. Furthermore, Microsoft Word 2007 can change layout size and type according to the documentation format. Microsoft Power Point 2007 is choosing for design and slide show presentation features. In addition, Rational Rose can produce different type of diagram to present the process of system. Mean while, Microsoft Project 2007 is using for create Gantt chart. The table below shows the list of software requirement for develop system:

Table 3.2 List for requirement of software for develop the sport facility booking system.

Software	Purpose
Adobe Dreamweaver CS5	As a platform to develop the system. Design web page with HTML and CSS; develop function of system with javascript; design database of system with PHP.
Apache	To store, retrieve and send or "serve" files and data to other computers on its network.
PHPMyAdmin	To store input database and retrieve output when user want display record.
Microsoft Word 2007	To conduct documentation work.
Microsoft Power Point 2007	To conduct for system presentation.
Rational Rose version 7	To produce all diagram design.
Microsoft Project 2007	To create Gantt chart design.

3.10 Summary

In this chapter, process to develop the sport facility system has been discussed. RUP method has been used as a concept to develop this system. Each phase of RUP has different role and functional on progress this system. RUP can get accurate documentation with complete four phases with emphasis on accurate documentation. There are Inception phase, Elaboration phase, Construction phase and Transition phase in RUP. Each phase has its focus on reaching its Lifecycle Milestone. In Inception the focus is mainly on concept, vision, risks, and requirements to accomplish the objective the software project. In Elaboration where consider requirement deeply and design the software's architecture for create concept for develop system. In Construction it is building the software by implement and test the code until no error occur. Meanwhile Transition is concerned with

releasing or roll-out of the final product. These milestones are reached when a predetermined number of artifacts for that phase reach acceptable levels of detail. If admin want to add more requirements or improve system function, it is able to resolve risks and change request management in Inception phase. Developer can reuse code which is easy and faster. It is also taking less time to process of integration in software development life cycle. Moreover, online training or tutorial of using RUP methodology is available so confusion and complexity toward the RUP methodology can solve by learning hard and explore widely. The implement result will been discuss in next chapter.

CHAPTER 4

IMPLEMENTATION

This chapter is discusses about the implementation of the coding and database into interface and function of the system.

4.1 Database Implementation

4.1.1 phpMyAdmin

The Sport Facility Booking System (SFBS) using database to store the system record and retrieve it if need. Database of the management system used is phpMyAdmin. Only one dataset used for this system which included seven tables. Tables of SFBSdb database show in Figure 4.1. There are announcement table, balldb table, bookingdb table, netdb table, racketdb table, report table and userdb table.

Table	Action	Rows	Type	Collation	Size	Overhead
announcement	Browse Structure Search Insert Empty Drop	4	InnoDB	latin1_swedish_ci	16.0 KiB	-
balldb	Browse Structure Search Insert Empty Drop	27	InnoDB	latin1_swedish_ci	16.0 KiB	-
bookingdb	Browse Structure Search Insert Empty Drop	66	InnoDB	latin1_swedish_ci	16.0 KiB	-
netdb	Browse Structure Search Insert Empty Drop	12	InnoDB	latin1_swedish_ci	16.0 KiB	-
racketdb	Browse Structure Search Insert Empty Drop	25	InnoDB	latin1_swedish_ci	32.0 KiB	-
report	Browse Structure Search Insert Empty Drop	7	InnoDB	latin1_swedish_ci	16.0 KiB	-
userdb	Browse Structure Search Insert Empty Drop	7	InnoDB	latin1_swedish_ci	32.0 KiB	-
7 tables	Sum	148	InnoDB	latin1_swedish_ci	144.0 KiB	0 B

Figure 4.1: Table of database SFBSdb

4.1.2 Database Connection

Apache server act as local host and used PHP and MySQL code to host and link to the database so that the system can establish connection to database as shown in Figure 4.2.

```

<?php
define("DB_HOST","localhost");
define("DB_USER","root");
define("DB_PASSWORD","");

//To establish a connection to database.
$conn=mysql_connect(DB_HOST,DB_USER,DB_PASSWORD);

if(!$conn){
    die("Failed to connect to database. Please check again.");
}

//To select the database to be used
mysql_select_db("peichyidb", $conn) or die("Could not select database.
Please check again.");

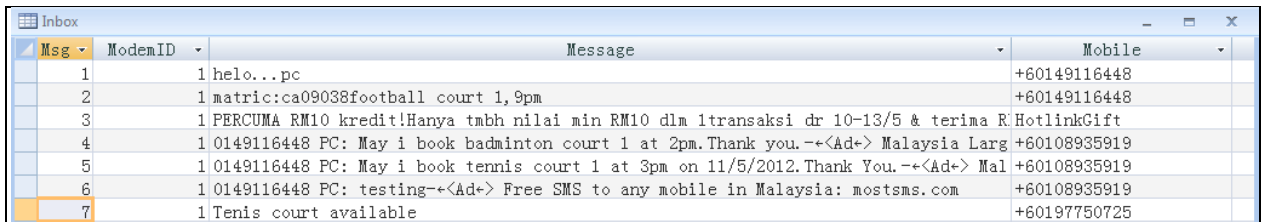
//set the default time zone to use in Malaysia
date_default_timezone_set('Asia/Kuala_Lumpur');
?>

```

Figure 4.2: Database Connection for SFBSdb

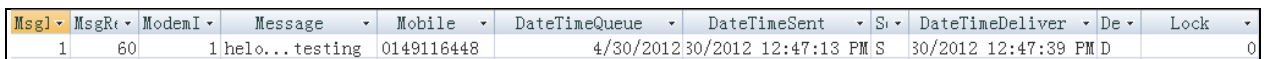
4.1.3 Microsoft Access

By default GSM Modem is using Microsoft Access to store SMS database. It contains two tables which are Inbox table and Outbox table.



Msg	ModemID	Message	Mobile
1	1	helo...pc	+60149116448
2	1	matric:ca09038football court 1,9pm	+60149116448
3	1	PERCUMA RM10 kredit!Hanya tabh nilai min RM10 dlm 1transaksi dr 10-13/5 & terima R	HotlinkGift
4	1	0149116448 PC: May i book badminton court 1 at 2pm.Thank you.--<Ad> Malaysia Larg	+60108935919
5	1	0149116448 PC: May i book tennis court 1 at 3pm on 11/5/2012.Thank You.--<Ad> Mal	+60108935919
6	1	0149116448 PC: testing--<Ad> Free SMS to any mobile in Malaysia: mostsms.com	+60108935919
7	1	Tennis court available	+60197750725

Figure 4.3: Database of SMS inbox



Msg	MsgR	ModemID	Message	Mobile	DateTimeQueue	DateTimeSent	S	DateTimeDeliver	De	Lock
1	60	1	helo...testing	0149116448	4/30/2012	30/2012 12:47:13 PM	S	30/2012 12:47:39 PM	D	0

Figure 4.4: Database of SMS outbox

4.2 System Interface and Implementation

System interface is interaction between user and system so that user can make his choice on the interface and system will process it. The interface of SFBS design is develop by using Adobe Dreamweaver CS5 with web programming language and also Adobe Photoshop CS3 for design icon.

4.2.1 User Module

4.2.1.1 Main Page

The home page of the system included detail of the sport complex such as type of facilities, operation duration, terms and condition for booking facilities and so on. On this page, it also displays different module button, there are reservation button, announcement button, report button and administration button. Reservation button is used to link to reservation module so that user can make booking on available facility. Moreover,

announcement button links to announcement board where user can views announcement post by admin. Furthermore, report button is links to report board to let user report which facility or equipment damaged. Lastly is administration button is used to link admin module where only admin has authorizes to manage the system data. Figure 4.5 shown main page interface.

The screenshot displays the main page interface of the Sport Facility Booking System. At the top, there is a header with the text "SPORT FACILITY BOOKING" repeated twice. Below the header, there is a navigation menu with buttons for "Main Menu", "Reservation", "Announcement", "Report", and "Administration". The main content area is titled "Sport Facility Booking System" and includes an introduction, type of facilities, duration, booking of facilities, terms and conditions, and priority of use. A contact us section is also present on the left side.

SPORT FACILITY BOOKING **SPORT FACILITY BOOKING**

Wednesday 6/6/2012
21:17:30

Main Menu **Reservation** **Announcement** **Report** **Administration**

Contact Us

If you have any problems, please email us and tell us exactly what happened with your problem, including as many specifics as possible.

Enok Adini
Contact Number: 09-549 3222
Fax Number: 09-549 3223

Introduction:

Type of Facilities:
Squash court, Table tennis, Gymnasium, Badminton court, Football field, Tennis court, Volleyball court, Sepak takraw court, Netball court and Basketball court.

Duration:
Operate from monday to saturday from 8.00am to 10.00pm but may from time to time withdraw use of all or any part of the facilities where and when it is deemed necessary for repair, maintenance, alteration, alternative use or for safety reasons.

Booking of facilities:
The booking is based on a first-come-first-served basis.

Terms and Condition:
Users are required to:

1. Adhere to all safety notices.
2. Respect all equipment.
3. Place all rubbish in the bins provided.
4. Finish all bookings at the stated time.
5. Report any damaged or broken equipment immediately to admin.
6. Do not take food into any of the facilities.

Priority of use:

1. Official university management.
2. Educational functions like examination.
3. Activities organized by student organizations.

Contact:
Email: urife.2212@hotmail.com
Contact Number: [6014-4800214](tel:6014-4800214)-1234567

Copyright: PC TAN

Figure 4.5 Main page Interface

4.2.1.2 Reservation Module

In this module, viewable timeslot display the status of facilities or equipment to let user to book on available courts and equipment. User should insert his userID and password to verify his identity. After booking is made, user name will display on timeslot for user to retrieve back his booking time and court location. User can cancel booking after inserts correct password. Reservation module interface shown as Figure 4.6 and Figure 4.8.

Reservation Courts Schedule

Selected Sports: Badminton

Click to select a date: 05/11/2012

	Court 1	Court 2	Court 3	Court 4	Court 5	Court 6	Court 7	Court 8	Court 9
8.00am	Available	Available	Available	PeiChvi.T	Available	Available	Available	Available	Available
9.00am	Available	Available	Available	Available	Available	Available	Available	Available	Available
10.00am	Available	Available	Available	Available	Available	Available	Available	Available	Available
11.00am	Available	Available	Available	Available	Available	Available	Available	Available	Available
12.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
1.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
2.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
3.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
4.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
5.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
6.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
7.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
8.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
9.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available
10.00pm	Available	Available	Available	Available	Available	Available	Available	Available	Available

Equipment >>>

Figure 4.6 Reservation Court Module Interface

```

//To check if the court is booked or not.
$checkQuery="SELECT * FROM $tblBooking WHERE bookingDate=$bookingDate AND
courtType=$courtType AND timeSlot=$timeSlot";
$checkResult=mysql_query($checkQuery);

if(mysql_num_rows($checkResult)==0){//If the query returns 0, it means,
the database has record of other booking, but no record for the selected
court, date and type.
$insertQuery="INSERT INTO $tblBooking VALUES(' ', $bookingDate,
$courtType, $timeSlot, $userMatric, ' )";
$insertResult=mysql_query($insertQuery);

```

Figure 4.7 Insert Booking Record Command

Reservation Balls Schedule

Selected Sports: Basketball

Click to select a date: 05/11/2012

	Ball 1	Ball 2	Ball 3	Ball 4	Ball 5	Ball 6
8.00am	Available	Available	Available	Available	Available	Available
9.00am	Available	Available	Available	Available	Available	Available
10.00am	Available	Available	Available	Available	Available	Available
11.00am	Available	Available	Available	Available	Available	Available
12.00pm	Available	Available	Available	PeiChyi.T	Available	Available
1.00pm	Available	Available	Available	Available	Available	Available
2.00pm	Available	Available	Available	Available	Available	Available
3.00pm	Available	Available	Available	Available	Available	Available
4.00pm	Available	Available	Available	Available	Available	Available
5.00pm	Available	Available	Available	Available	Available	Available
6.00pm	Available	Available	Available	Available	Available	Available
7.00pm	Available	Available	Available	Available	Available	Available
8.00pm	Available	Available	Available	Available	Available	Available
9.00pm	Available	Available	Available	Available	Available	Available
10.00pm	Available	Available	Available	Available	Available	Available

<<< Facility

Figure 4.8 Reservation Ball Module Interface


```

if($count==1){//Pass password check. If 0, ID or password wrong.
    $deleteQuery="DELETE FROM $tblBooking WHERE bookingDate=$bookingDate AND
courtType=$courtType AND timeSlot=$timeSlot";
    $deleteResult=mysql_query($deleteQuery);
}

```

Figure 4.9 Delete Booking Record Command

4.2.1.3 Announcement Module

Announcement Board displays readable announcement without writeable which the announcement will pop up after clicks the view button. User can get new information and notification from here. For instance, closing of sport facility will be announces on announcement board to notify user about booking cancellation. Announcement module interface shown as Figure 4.10.

Date/Time	Title	View
10-05-2012 / 00:25:53	Football Court Close today	View More
10-05-2012 / 10:48:17	fsdf	View More
10-05-2012 / 14:43:35	Badminton Court Closing	View More
10-05-2012 / 14:46:23	Badminton Court Closing	View More
10-05-2012 / 14:48:54	Badminton Court Closing	View More
10-05-2012 / 21:05:03	Gelanggang Bola Baling 2 Tutup	View More

Announcement Details:

Title: Football Court Close today

Announcement Details: Football court close today because want to repair.

Post By: Mr Arzizi

Figure 4.10 Announcement Module Interface

```

        <tr><td align="center"><strong>Title:</strong></td><td><input type
="text" name="Title" id="Title" size="48" value="<?php echo $Title;?> " /></td>
</tr>
        <tr><td align="center"><strong>Announcement Details:</strong></td>
<td><textarea name="Info" id="Info" cols="36" rows="8"><?php echo $Info;?> </
textarea></td></tr>
        <tr><td align="center"><strong>Post By:</strong></td><td><input
type="text" name="Name" id="Name" size="48" value="<?php echo $Name;?>" /></td>
</tr>

```

4.11 Retrieve Data From Database Command

4.2.1.4 Report Module

In this module, user should be verifies as member just has authorize to record damaged facility or equipment to admin so that the admin can take action effectively. User login form shown as Figure 4.12. User should be fills in the title and report detail so that admin can understand the problem clearly. Create new report interface shown as Figure 4.13. If user clicks on save button, then the report will save in record whereas if user clicks on view button to view the status of the damaged facility or equipment whether is available or not to play on booking time. Search button is enable user to search his record efficiently. Figure 4.14 has shown the report record interface.

Figure 4.12 User Login Form Interface




Title:

Information:

Name of member:

Figure 4.13 New Report Interface



Date/Time	Title	Post By	Status
23-05-2012 / 10:22:20	Badminton Net Damaged	PCTAN	Done repair .
23-05-2012 / 10:42:49	Raket Tennis (3) Rosak	PCTAN	
10-05-2012 / 00:37:17	Basketball Net Damage	Miss Tan	Done repair
10-05-2012 / 14:42:53	Tennis Net Spoilt	Miss Tan	

Figure 4.14 View Report Interface

4.2.1.5 Administrative Module

Administrative Module is an admin login form. After system verify as admin, he has authorizes to manage booking record and other task such as post announcement and view report or cancel booking record. Admin login form interface show as Figure 4.15.



Figure 4.15 Admin Login Form Interface

4.3 Admin Module

4.3.1 Reservation Module

On Reservation Module, admin can view the records or cancel the booking if the facility is used for priority purpose such as exam hall or event organization after send SMS to notify member for cancellation of the sport facility and equipment. Moreover, admin also can cancel all booking by select all checkbox and delete all record. Reservation Module interface has shown as Figure 4.16.

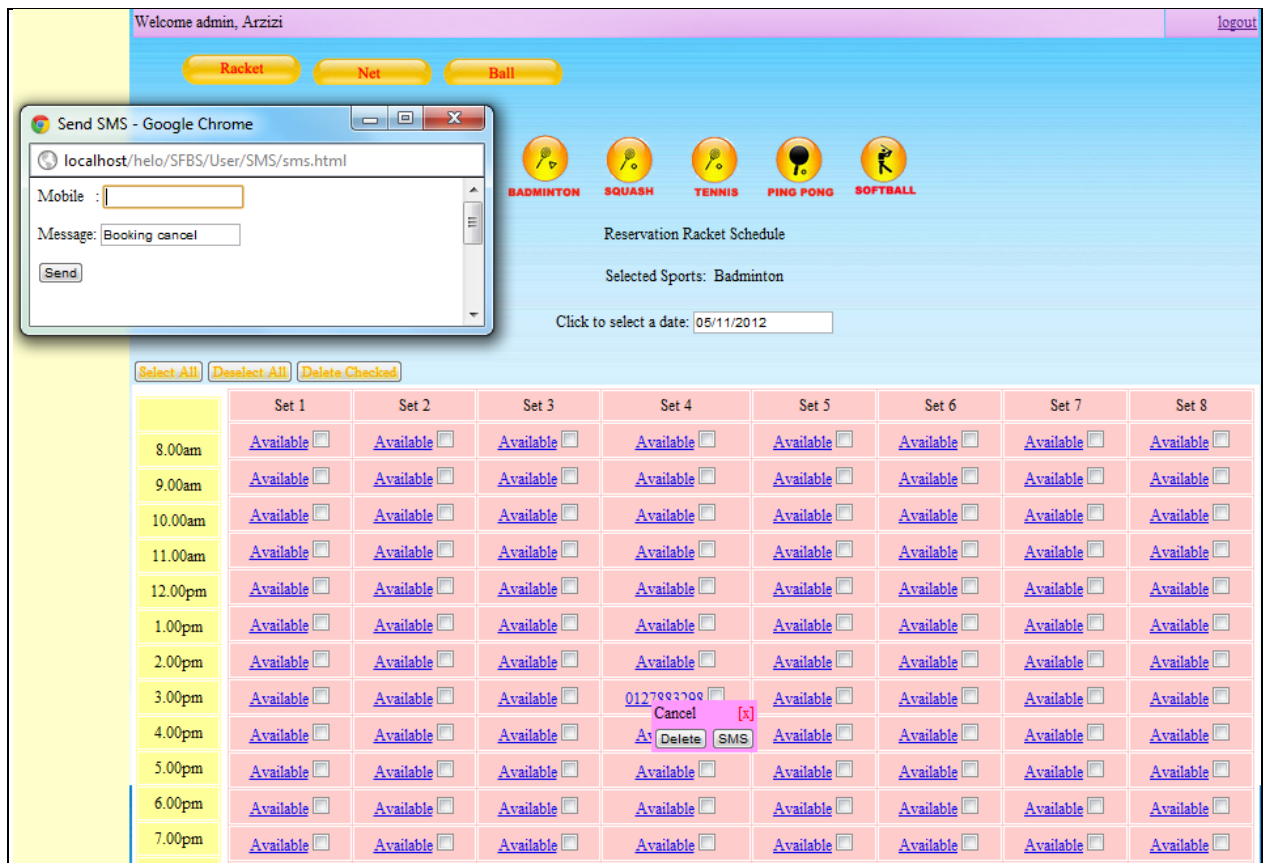


Figure 4.16 Reservation Module Interface

```

$conn = odbc_connect('SMSEngine5', '', '');
if (!$conn)
    {exit("Connection Failed: " . $conn);}
//queue outgoing SMS into Outbox table
$sql="INSERT INTO Outbox (Message, Mobile, DateTimeQueue, SentStatus)
VALUES ('$_POST[Message]', '$_POST[Mobile]', date(), 'P')";

```

Figure 4.17 Save SMS To SMS Inbox Command

4.3.2 Announcement Module

Announcement Module enables admin to post new information or notification to notify user if the sport complex is closing or facility damaged and forced to cancel booking. After

admin click the save button, the announcement will post on announcement board. New announcement interface shown as Figure 4.18. However, if admin want view back the record then he can click view button or delete it by click delete icon. He also can search back old announcement and edit on it by click search button. The view announcement record has shown in figure 4.19. Figure 4.20 shown search result of announcement.

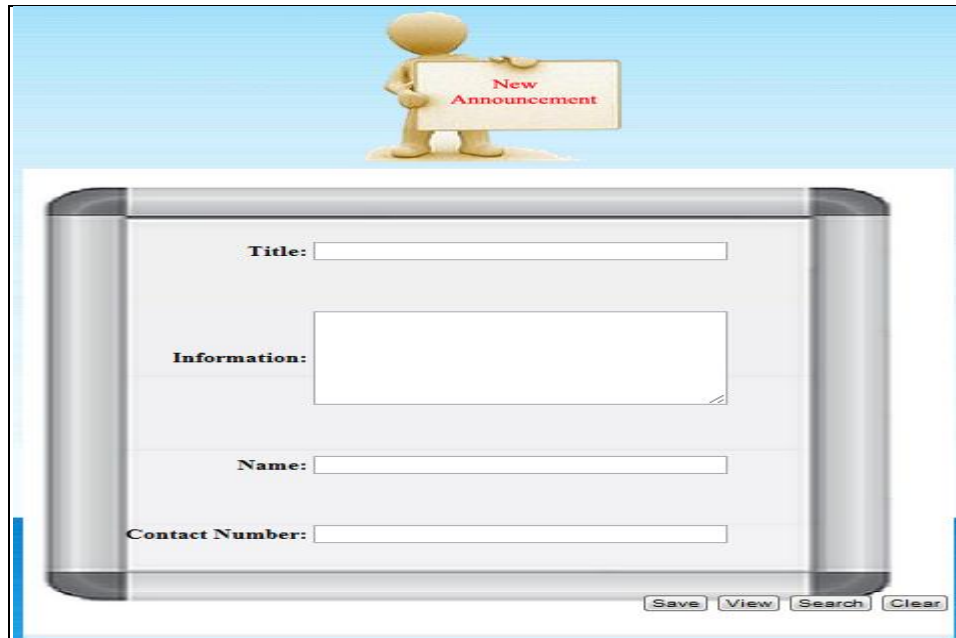
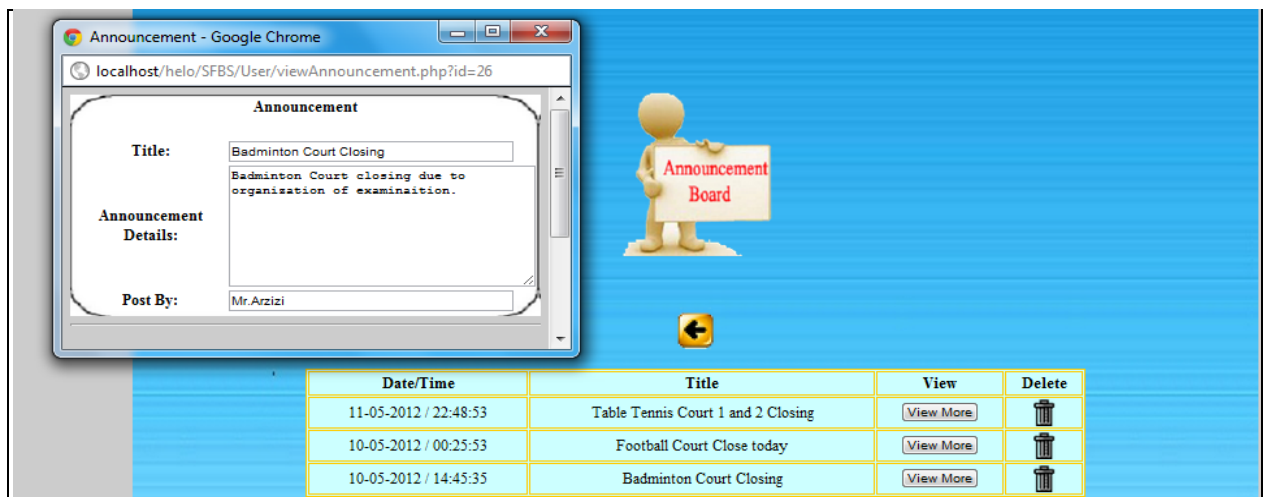


Figure 4.18 New Announcement Interface



Date/Time	Title	View	Delete
11-05-2012 / 22:48:53	Table Tennis Court 1 and 2 Closing	View More	
10-05-2012 / 00:25:53	Football Court Close today	View More	
10-05-2012 / 14:45:35	Badminton Court Closing	View More	

Figure 4.19 View Announcement Interface

Search Announcement

Name:

Title:

Result

Name	Title	Information	Update
Mr.Arzizi	Badminton Court 2 Closing asad vdvd	Badminton Court closing due to organization of examination.	<input type="button" value="Update"/>
Mr.Arzizi	Table Tennis Court 1 and 2 Closing	Due to the court is under maintenance therefore table tennis court 1 and 2 are closing.	<input type="button" value="Update"/>
asad	Badminton Court	qwe asd asd	<input type="button" value="Update"/>

Figure 4.20 Search Announcement Interface

4.3.3 Report Module

Admin can view the record of report on Report Board by click view button. Therefore, he can save his time to check the facility one by one. Then he also can take action effectively to ensure user always use the facility in safety environment. Admin has authorizes to reply status of the latest situation of the sport facility and equipment with reply status button or remove the record by click delete icon. Figure 4.21 shows report module interface with popup window of view report record and reply status.

The screenshot displays the 'Report Board' interface. At the top, there are navigation buttons for 'Reservation', 'Announcement', 'Report', 'Registration', and 'SMS'. A central graphic shows a 3D character holding a sign that says 'Report Board'. Below this is a table listing reports:

Date/Time	Title	Post By	Status	View	Delete
10-05-2012 / 00:37:17	Basketball Net Damage	Miss Tan	<input type="button" value="Reply Status"/>	<input type="button" value="View"/>	<input type="button" value="Delete"/>
10-05-2012 / 14:42:53	Tennis Net Spoilt	Miss Tan	<input type="button" value="Reply Status"/>	<input type="button" value="View"/>	<input type="button" value="Delete"/>
11-05-2012 / 20:19:02	Badminton Court Closing	Miss Ng	<input type="button" value="Reply Status"/>	<input type="button" value="View"/>	<input type="button" value="Delete"/>

Two popup windows are shown:

- View Report Record - Google Chrome:** Shows details for 'Basketball Net Damage' with 'Report Details: Basketball net damage in court 1' and 'Status: Done repair'.
- Reply Status - Google Chrome:** Shows the same report details and a 'Reply Status' button.


Figure 4.21 Report Module Interface

4.3.4 Registration Module

Registration Module where admin help new staffs and students to register as new members so that they have authorize to book the facility. Admin should specify their user group either is student or admin so that student do not has authorizes do as admin. However, admin also can remove membership of member. Registration Module interfaces shown as Figure 4.22 whereas Figure 4.23 shows about membership record. Moreover, admin can click search button for search membership record and edit on record.



Figure 4.22 Registration Module Interface






Matric ID/Staff ID	UserGroup	Username	Password	Contact Number	Remove
ca09038	0	PeiChyi.T	123	0127883298	
sa12345	1	Arzizi	12345	0129576930	
cd09038	0	YeeShian	1234	0149239818	

Figure 4.23 View Membership Record Interface

4.3.5 SMS Module

SMS Module enables admin to receive SMS from user who has any question on announcement or want book any available facility and equipment. Figure 4.24 show that SMS inbox interface. Moreover, SMS also allow admin to view sent SMS record as shown as Figure 4.25.



Message	Mobile	DateTime	Status	SMS
helo...pc	+60149116448	2012-05-02 10:24:44	Read	<input type="button" value="SMS"/>
matric:ca09038 football court 1,9pm	+60149116448	2012-05-10 14:22:36	Read	<input type="button" value="SMS"/>
0149116448 PC: May i book badminton court 1 at 2pm.Thank you. - Malaysia Largest Free SMS site: mostsms.com	+60108935919	2012-05-10 21:21:58	Read	<input type="button" value="SMS"/>
0149116448 PC: May i book tennis court 1 at 3pm on 11/5/2012.Thank You. - Malaysia Largest Free SMS site: mostsms.com	+60108935919	2012-05-10 21:23:59	Read	<input type="button" value="SMS"/>
Tennis court available	+60197750725	2012-05-11 11:56:19	Read	<input type="button" value="SMS"/>

Figure 4.24 Inbox SMS Interface



Welcome admin, Arzizi [Logout](#)

Message	Mobile	DateTimeSent	SentStatus	DateTimeDeiver	DeliveryStatus
helo...testing	0149116448	2012-04-30 12:47:13	S	2012-04-30 12:47:39	D
helo testing	0149116448	2012-05-02 10:23:15	S	2012-05-02 10:23:43	D
testing	0149116448	2012-05-10 14:10:43	S	2012-05-10 14:11:13	D
testing	0174741378	2012-05-10 14:14:12	S	2012-05-10 14:14:40	D
testing haha...kacau a while	0174741378	2012-05-10 20:46:59	S	2012-05-10 20:47:45	D
Booking cancel	0149116448	2012-05-11 11:52:38	S	2012-05-11 11:53:08	D

Figure 4.25 Outbox SMS Interface

CHAPTER 5

RESULT AND DISCUSSION

Discussion is discussed on the result output obtain from the Sport Facility Booking System. The testing part is to ensure system function with zero error based on the inputs users made and ensure improvement is success apply on the error. Testing case has been stated in Appendix A. They are several advantages and disadvantages of this system will be discussed. Constraints when using this system had been stated.

5.1 Analysis Results

Sport Facility Booking System has developed using web based concept which is meet all the objective of this project, there are:

- i. To develop a viewable timeslot to display status of the sport facility or equipment and provide announcement board and report board for communication way for raise the efficiency in management of the urgent case.

- ii. To develop a booking system to simplify the process for applies sport facility and improves the weakness of currently system so that it can become user friendly.
- iii. Integration SMS service with SFBS to increase efficiency management in urgent case by using GSM modem.

The first objective successfully achieve by develop booking module, announcement module, report module and SMS function. Booking module includes viewable timeslot which are showing status of sport facility and equipment to users on selected date and time. Moreover, announcement module provides communication way between users and admin with post the announcement to notify users in conveniently. Report module is let user to notify admin about the spoilt facility and equipment so that admin can take action effectively. SMS function is an efficiency way to give respond in urgent case.

The second objective successfully achieve by using viewable timeslot to simplify users in booking process if compare to not viewable timeslot should try on timeslot to get the status of sport facility. In addition, equipment booking process via online is better than manual system because it can save time of users and more conveniently by just click a few buttons. The announcement board helps to notify users about latest information or urgent case for raise the efficiency in management . Furthermore, report board enable to reduce admin burden for checking facility and equipment frequently. On the other hand, select all function to delete all booking facility or equipment function in once time ease admin to manage booking cancellation.

The third objective successfully achieve by receive and send SMS between SFBS and member's mobile. SMS function can raise the efficiency on responding in urgent case within few minutes.

5.2 Discussion

Sport Facility Booking System (SFBS) is using Dreamweaver to develop a web-based system with first come first serve concept. Due to the internet service has provide

fast and convenient in manage all the booking process but also save resource cost if compare with manual system. Rational Unified Process (RUP) method is use to develop the system start with inception phase, elaboration phase, construction and transition phase. In inception phase, developer shall collect requirement from users and study in some research. Next, elaboration is discusses the design of system which fulfill to the client requirement. Then construction is focus on testing and integration all the subsystem with ensures no error occurs. Lastly is transition where to deliver completed product to clients.

5.2.1 Advantage and Disadvantage

Advantages and disadvantages of advanced sport facility booking system will be discussed which will help to enhance the system for future.

5.2.1.1 Advantages

Advantages of this system are:

- a. Booking Module displays viewable timeslot for users to make booking which based on first come first serve concept. Viewable timeslot is to simplify the booking process with show its status (available or booked). After users book on available timeslot, admin can cancel on it if the sport complex closed for priority purpose by notify with SMS.
- b. Announcement Module shows latest information or urgent post to inform members about the sport facility might use for priority purpose. This is a good communication way between users and admin.
- c. Report Module shall be able to record spoilt sport facility by users to notify admin so that admin can take action efficiency. It also reduces burden of admin to check facility or equipment frequently.

- d. SMS function is prepared for admin to notify user for cancellation or reply urgent requirement. Moreover, member able to ask any question via SMS if needed.

5.2.2.2 Disadvantages

- a. Unattractive interface design.
- b. Users can make booking on future date without restrict booking date.
- c. Only admin can register member to prevent private data disclosure to others.

5.3 Constraint

SFBS is subjected to several constraints if user wishes to operate the system optimally:

- a. SFBS only performs well design in specific browser (Chrome) because different web browsers have different setting.
- b. GSM modem and web-based system have its own database which hard to integrate in one database.

5.4 Enhancement and Further Research

SFBS can be enhance to improve with more features such as online payment, online comment as Facebook or using free broadcasting station to deliver free SMS. Interface of SFBS may be able to improve with more animated icon or attractive image.

5.5 Conclusion

Firstly, main menu module is an introduction part about sport complex. Moreover, this system eases reservation process with viewable timeslot to member on reservation module. In addition, announcement board provide good communication between user and admin. Furthermore, report part is used for member to notify admin about the spoilt equipment in short time. Moreover, admin who registers new membership on registration module to verify who has authorizes to book the facility. Lastly, SMS function increases efficiency of the response of urgent case. Each system interface shall play its function on different module when interaction occurs between user and system. The expected result of interface can be shown by connected to database to add new data or retrieve record. User can edit the record when necessary.

CHAPTER 6

CONCLUSION

Information and Communication Technology in Malaysia has developed to more advance from day to day, most of the organization has recommend integration of SMS service with web-based system to increase efficiency in respond to client. Web-based system is provided the interaction between the user and system to simplify the management process which can operate wherever and whenever. However, SMS function can improves effective on action by send and receive information within few minutes.

Sport Facility Booking System has recommenced viewable timeslot to simplify the booking process and also provided optional language to user for making reservation. Moreover, announcement board and report board enable admin and member to exchange the information to improve the communication way and raise the convenience for them to acknowledge each other needed. Furthermore, SMS function increase the efficiency respond in urgent case such as to notify user for cancellation of booking but also reply their problem or question within few minutes. In conclusion, integration SMS with web-based system is a good way to handle effectively in urgent case but also improves interaction between member and admin.

APPENDIX A
MINUTE MEETING

The Minutes of Meeting

Date: 21/10/2011

Time: 3.00 pm

Venue: Sport complex UMP

Attendee:

1. Tan Pei Chyi
2. Encik Adzizi

Agenda:

1. Interview Encik Adzizi

Interview

This is an interview to discuss about problems appear on sport facility booking system UMP. Discussion was aimed to draw out the inconvenient part of system.

No	Item	Details
1	Add English version into system	Due to international students and staffs increasing, they are facing some problems on existing system because they cannot understand well in Malay version. So recommend English version to improve their difficulties.
2	Improve sport facility booking weakness	Develop schedule to show timeslot and type of court to simplify the process of booking.
3	Add report function on system	Sport facility or equipment which is spoil can report to admin so that they can take action effectively but also reduce burden of admin to check the facility and equipment frequently.
4	Add announcement function on system	Announcement function can spread new information to applicants and also inform them about cancel their application in convenient way.

Minutes prepared by: Tan Pei Chyi

APPENDIX B

TEST CASE

Reservation Module Testing

Making reservation and cancel reservation has been tested.

Make Reservation Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
Making Reservation	Test the making reservation with correct user input in available timeslot of the sport facility or equipment.	<ol style="list-style-type: none"> 1. Select required booking date. 2. Select required type of booking sport facility and equipment. 3. Enter valid user id in “user id text field”. 4. Enter valid password’ in “password’ text field”. 5. Click confirm button. 	The booking process is done successful.	“Booking successful” message box pop out. The booking process is done successful.
	Test the making reservation with invalid user id in available timeslot of the sport facility or equipment.	<ol style="list-style-type: none"> 1. Select required booking date. 2. Select required type of booking sport facility and equipment. 3. Enter invalid user id in “user id text field”. 4. Enter valid password’ in “password’ text field”. 5. Click confirm button. 	The booking process is fail.	“Invalid user id or password.” error message pop up. The booking process is fail.

Test Case	Description	Test Steps	Expected Results	Actual Result
	Test the making reservation with invalid password in available timeslot of the sport facility or equipment.	<ol style="list-style-type: none"> 1. Select required booking date. 2. Select required type of booking sport facility and equipment. 3. Enter valid user id in “user id text field”. 4. Enter invalid password in “password’ text field”. 5. Click confirm button. 	The booking process is fail.	“Invalid user id or password.” error message pop up. The booking process is fail.
	Test the making reservation without insert input in available timeslot of the sport facility or equipment.	<ol style="list-style-type: none"> 1. Select required booking date. 2. Select required type of booking sport facility and equipment. 3. Do not enter user id in “user id text field”. 4. Do not enter valid password’ in “password text field”. 5. Click confirm button. 	The booking process is fail.	“Invalid user id or password.” error message pop up. The booking process is fail.

Cancel Reservation Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
Cancel Reservation	Test the cancellation of the reservation .	<ol style="list-style-type: none"> 1. Select required booking date. 2. Select required type of booking sport facility or equipment. 3. Then click delete button on the cancellation box after insert valid password. 	The cancellation process is success.	“Booking is cancelled” message box pop up. Cancellation process is success.

Announcement Module Testing

New announcement, view announcement and delete announcement record has been tested.

New Announcement Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
Creation of New Announcement	Test to create a new announcement with correct input.	<ol style="list-style-type: none"> 1. Insert title of announcement in “title text field”. 2. Insert detail of announcement in “detail text field”. 		

Test Case	Description	Test Steps	Expected Results	Actual Result
		<ol style="list-style-type: none"> 3. Insert name of admin in “name text field”. 4. Insert contact number in “contact number text field”. 	New announcement is success to create.	“Your announcement has been save.” message is pop out. Create new announcement is success to process.
	Test to create a new announcement without insert announcement title.	<ol style="list-style-type: none"> 1. Do not insert title of announcement in “title text field”. 2. Insert detail of announcement in “detail text field”. 3. Insert name of admin in “name text field”. 4. Insert contact number in “contact number text field”. 	New announcement is fails to create.	“Please fill in the title of announcement.” message is pop out. New announcement is fails to create.

Test Case	Description	Test Steps	Expected Results	Actual Result
	Test to create a new announcement without insert announcement detail.	<ol style="list-style-type: none"> 1. Insert title of announcement in “title text field”. 2. Do not insert detail of announcement in “detail text field”. 3. Insert name of admin in “name text field”. 4. Insert contact number in “contact number text field”. 	New announcement is fails to create.	“Please fill in the detail of announcement.” message is pop out. New announcement is fails to create.
	Test to create a new announcement without insert name of admin.	<ol style="list-style-type: none"> 1. Insert title of announcement in “title text field”. 2. Insert detail of announcement in “detail text field”. 		

Test Case	Description	Test Steps	Expected Results	Actual Result
		<ol style="list-style-type: none"> 3. Do not insert name of admin in “name text field”. 4. Insert contact number in “contact number text field”. 	New announcement is fails to create.	“Please fill in your name.” message is pop out. New announcement is fails to create.
	Test to create a new announcement without insert contact number.	<ol style="list-style-type: none"> 1. Insert title of announcement in “title text field”. 2. Insert detail of announcement in “detail text field”. 3. Insert name of admin in “name text field”. 4. Do not insert contact number in “contact number text field”. 	New announcement is fails to create.	“Please fill in the contact number.” message is pop out. New announcement is fails to create.

View Announcement Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
View Announcement	Test view button can pop out detail of announcement.	1. Click on “view more button”.	Detail of announcement will be pop out.	Detail of announcement pop out.
Delete Announcement	Test delete function of announcement record.	1. Click on delete icon to delete record.	Announcement record has been deleted.	“The record has been deleted” message box has pop out. Announcement record has been deleted.

Report Module Record

Create new report record and view report record has been tested.

New Report Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
New Report	Test to create a new report with valid detail.	<ol style="list-style-type: none"> 1. Insert title of report in "title text field". 2. Insert detail of report in "detail text field". 3. Insert name of member in "name text field". 	New report is success to create.	"Your report has been save." message is pop out. New report is success to create.
	Test to create a new report without insert report title.	<ol style="list-style-type: none"> 1. Do not insert title of report in "title text field". 2. Insert detail of report in "detail text field". 3. Insert name of member in "name text field". 	New report is fails to create.	"Please fill in the title of report." message is pop out. New report is fails to create.
	Test to create a new report without insert report detail.	<ol style="list-style-type: none"> 1. Insert title of report in "title text field". 2. Do not insert detail of report in "detail text field". 3. Insert name of member in "name text field". 	New report is fails to create.	"Please fill in the information of report." message is pop out. New report is fails to create.

Test Case	Description	Test Steps	Expected Results	Actual Result
	Test to create a new report without insert member name.	<ol style="list-style-type: none"> 1. Insert title of report in “title text field”. 2. Insert detail of report in “detail text field”. 3. Do not insert name of member in “name text field”. 	New report is fails to create.	“Please fill in your name.” message is pop out. New report is fails to create.

View Report Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
View report	Test view more button can pop out detail of report	<ol style="list-style-type: none"> 1. Click on “view more button”. 	Detail of report will be pop out.	Detail of report pop out.
Reply status currently of booking facility and equipment	Test replies status function.	<ol style="list-style-type: none"> 1. Click on “reply status button”. 	Reply status has been saved in report record.	“The status has been saved” message box has pop out. Reply status has been saved in report record.

Test Case	Description	Test Steps	Expected Results	Actual Result
Delete Report Record	Test deletes function of report record.	1. Click on delete icon to delete report record.	Report record has been deleted.	“The record has been deleted” message box has pop out. Report record has been deleted.

5.1.4 Membership Module Record

Create new membership and view membership record has been tested.

Create New Membership Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
New Membership	Test adds function of membership with correct input.	<ol style="list-style-type: none"> 1. Insert user ID in “user ID text field”. 2. Insert user group in “detail text field”. 3. Insert username in “name text field”. 		

Test Case	Description	Test Steps	Expected Results	Actual Result
		<ol style="list-style-type: none"> 4. Insert password in “password text field”. 5. Insert contact number in “contact number text field”. 	New membership is success to create.	“Your record has been save.” message box is pop out. New membership is success to create.
	Test add function of membership without insert user ID.	<ol style="list-style-type: none"> 1. Do not insert user ID in “user ID text field”. 2. Insert user group in “detail text field”. 3. Insert username in “name text field”. 4. Insert password in “password text field”. 5. Insert contact number in “contact number text field”. 	New membership is fails to create.	“Please fill in the staff ID or user ID” message box is pop out. New membership is fails to create.

Test Case	Description	Test Steps	Expected Results	Actual Result
	Test add function of membership with empty user group	<ol style="list-style-type: none"> 1. Insert user ID in “user ID text field”. 2. Do not insert user group in “detail text field”. 3. Insert username in “name text field”. 4. Insert password in “password text field”. 5. Insert contact number in “contact number text field”. 	New membership is fails to create.	“Please fill in the category of member.” message box is pop out. New membership is fails to create.
	Test add function of membership with empty username.	<ol style="list-style-type: none"> 1. Insert user ID in “user ID text field”. 2. Insert user group in “detail text field”. 3. Do not insert username in “name text field”. 4. Insert password in “password text field”. 		

Test Case	Description	Test Steps	Expected Results	Actual Result
		5. Insert contact number in “contact number text field”.	New membership is fails to create.	“Please fill in the username.” message box is pop out. New membership is fails to create.
	Test adds function of membership with empty password.	<ol style="list-style-type: none"> 1. Insert user ID in “user ID text field”. 2. Insert user group in “detail text field”. 3. Insert username in “name text field”. 4. Do not insert password in “password text field”. 5. Insert contact number in “contact number text field”. 	New membership is fails to create.	“Please fill in password.” message box is pop out. New membership is fails to create.

Test Case	Description	Test Steps	Expected Results	Actual Result
	Test adds function of membership with empty contact number.	<ol style="list-style-type: none"> 1. Insert user ID in “user ID text field”. 2. Insert user group in “detail text field”. 3. Insert username in “name text field”. 4. Insert password in “password text field”. 5. Do not insert contact number in “contact number text field”. 	New membership is fails to create.	<p>“Please fill in member contact number.”</p> <p>Message box is pop out.</p> <p>New membership is fails to create.</p>

View Membership Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
View membership record	Test view button to view membership record.	<ol style="list-style-type: none"> 1. Click on “view button”. 	Detail of membership will be display.	Detail of membership will be display.

Test Case	Description	Test Steps	Expected Results	Actual Result
Delete membership record	Test deletes function of membership record.	1. Click on delete icon to delete membership record.	Membership record has been deleted.	“The record has been deleted” message box has pop out. Membership record has been deleted.

SMS Module

Sent SMS and Receive SMS function has been tested.

Sent SMS Record Test Case

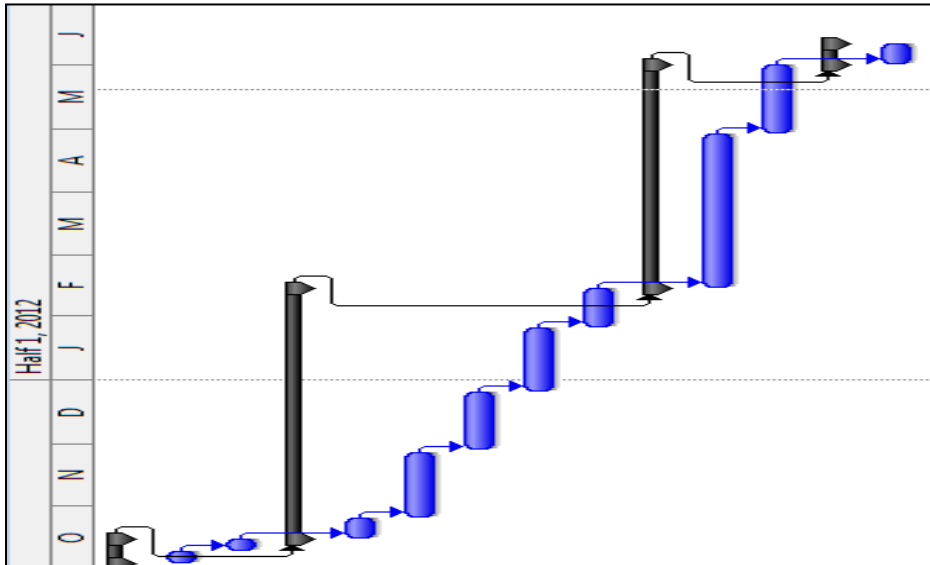
Test Case	Description	Test Steps	Expected Results	Actual Result
Sent SMS	Test send SMS function from SFBS to handphone	1. Click send button to send SMS to handphone.	SMS sent process success to process.	SMS sent process success to process.

Receive SMS Record Test Case

Test Case	Description	Test Steps	Expected Results	Actual Result
Receive SMS	Test receive SMS from handphone to SFBS	1. Click “View All Receive SMS” button to view SMS record.	SMS receive process success to process.	SMS receive process success to process.

APPENDIX C
GANTT CHART

Task Name	Duration	Start	Finish
1 <input type="checkbox"/> Phase 1: Inception	12 days	Tue 10/4/11	Sat 10/15/11
2 Business Modelling	6 days	Tue 10/4/11	Sun 10/9/11
3 Requirement (Minute Meeting)	6 days	Mon 10/10/11	Sat 10/15/11
4 <input type="checkbox"/> Phase 2: Elaboration	119 days?	Sun 10/16/11	Mon 2/13/12
5 Analyze Requirement	10 days?	Sun 10/16/11	Tue 10/25/11
6 Design System Interface and System Function	31 days	Wed 10/26/11	Sat 11/26/11
7 Design Database	28 days	Mon 11/28/11	Sun 12/25/11
8 Analyze Specific Requirement (Product Feature)	30 days	Mon 12/26/11	Wed 1/25/12
9 Analyze Constraint And Feasibility	19 days?	Thu 1/26/12	Mon 2/13/12
10 <input type="checkbox"/> Phase 3: Construction	108 days?	Tue 2/14/12	Thu 5/31/12
11 Implementation Code	75 days	Tue 2/14/12	Sat 4/28/12
12 Integration Code	33 days?	Sun 4/29/12	Thu 5/31/12
13 <input type="checkbox"/> Phase 4: Transition	10 days?	Fri 6/1/12	Sun 6/10/12
14 Test	10 days?	Fri 6/1/12	Sun 6/10/12



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