

ONLINE BORROWING SYSTEM

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(SOFTWARE ENGINEERING)**

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ABSTRAK

Penggunaan penyimpan rekod secara digital adalah semakin biasa hari ini. Jadi, evolusi daripada penggunaan kertas ke tanpa-kertas juga semakin biasa. Untuk menggantikan cara tradisional dalam penyimpanan rekod ke cara elektronik dan digital, satu SISTEM PEMINJAMAN ONLINE telah pun diperkenalkan dan dihasilkan. Ia dikatakan sangat berguna untuk memudahkan suatu kerja dan menghasilkan satu cara yang cepat dalam penyimpanan and pengurusan rekod. Ia membantu untuk menghasilkan kaedah pengurusan rekod yang lebih sistematik. Laporan ini menerangkan bagaimana sistem ini dianalisa, direkabentuk, dilaksanakan, serta diujikan.

ABSTRACT

Digital storage of records is increasingly common nowadays. Therefore, the evolution from paper-based to paper-less is becoming usual. Hence, in order to replace the traditional way of managing record into an electronic and digital form, an ONLINE BORROWING SYSTEM (OBS) is introduced and delivered. It is said to be very helpful to reduce the complexity of tasks and provide a faster way in keeping and managing records. It helps to produce more systematic record management method. This report described how the system is analyzed, designed, implemented and tested.

CHAPTER 1 INTRODUCTION

1.1 Introduction

Nowadays, people handle large amount records by using computer. Therefore, the use of digital storage is increasingly common. The computerized applications promote a more convenient way in managing large amount of records.

In order to help students in UNIMAS, the S.H.O.P. of Faculty of Computer Science and Information Technology offers a service that allows students to borrow software and electronic equipments for academic purposes. As we are in electronics era today, the evolution from paper-based to paper-less is increasingly common. However, the staff in S.H.O.P. still using papers and books to keep all the records of the inventory and the borrower details. Hence, an online borrowing system is needed to help the staff members in SHOP. It is very helpful to reduce the complexity of tasks and provide a faster way in keeping and managing records.

1.2 Problem Statement

FSKTM allow students to borrow hardware and software from SHOP. The staff members of SHOP will record all the information manually. Therefore, it is troublesome to manage the records. A few problems are obviously found in the current way (paper-oriented method) of managing the records. The most significant problems are spacious, time consuming, laborious, and ease to damage. The details of these problem statements are described in the following sections.

1.2.1 Spacious

In order to record all the information manually, staff members need to do a lot of paperwork. Thus, SHOP needs to find a place to store all the record and this resulted in a waste of space. Furthermore, the records of the hardware, software and the information of the borrowers are documented separately in different files.

1.2.2 Time consuming and laborious

In order to find the records, the staff members of SHOP need to search each of the records one by one. Hence, it takes a long time to complete the task. Furthermore, the staff members have to check everyday whether there are any student who did not return the hardware or software after the due date. Thus, it takes time to search all the records one by one.

1.2.3 Ease to damage

A book is the medium to record the information of the hardware and software, and details of the borrowers. Although books perform a good job in recording the information, but they can be easily damaged and will not last for a long time. The pages of the books can be easily torn off. Furthermore, if the books get into contact with water, the information recorded in the books would be gone.

1.3 Objective

- Develop an online borrowing system.
- The records able to manage faster, systematically and easily.
- Records able to store in digital format.
- Prompt automatic notification of the due date borrowers.
- Able to be accessed online.

1.4 Methodology

Throughout this project, object-oriented system development method was used. The object-oriented software development life cycle (OOSDLC) is used because it encourages faster development, reusability and easier to maintain. Furthermore, it helps to increase the quality of the system.

There are three main phases in OOSDLC:

i. Object-oriented Analysis (OOA)

During this phase, the problem domain will be discovered and identified. Then, the system requirements, classes and their relationship among them will be identified and defined based on the problem domain. Furthermore, reviews on similar system, such as CAIS library system, have been done during this stage. On the other hand, several investigations have been undertaken in order to elicit user and system requirements.

ii. Object-oriented Design (OOD)

Refine and complete the diagrams done in OOA phase. The user interface and the user interface prototype and the database access will be designed. Several

of the simple UML diagrams will be developed, included use case diagram, interaction diagrams, activity diagrams and class diagram. During this phase, the actor in OBS is identified. When creating the interaction diagrams, a detailed sequence on how users interact with the OBS is presented. These diagrams will describe how actor performed their task step by step. Furthermore, the activity diagrams will show how OBS process the input and perform the output. For class diagram, a clear structure of OBS. It describes what entity and objects that OBS should have, and also describes what tasks and functions OBS can provide.

iii. Object-oriented implementation

In the final phase, the implementation diagram will be developed. It shows the source code of OBS and the interface design of OBS. The interfaces of OBS will be divided into two categories, which are the interface for administrator and users. The administrators will be able to view all the features of OBS, while the other users are only allowed to view the information of the hardware and software. As a result, the design of both interfaces is not the same. Furthermore, the usability and user satisfaction of the system will be tested. Each phase allow iteration to refine the system development.

1.5 Scope

The scope this project is to propose a method and prototype application that will be,

- use within Faculty of Computer Science and Information Technology,
- access by every one within the local area network,
- create five levels of authentication, and
- provide printable functionality

1.6 Significant of project

Generally, this prototype application is a contribution to the staff members in SHOP. With the existence of OBS, they are allowed to manage records faster, systematically and easily. It also helps the SHOP staff members in UNIMAS to record all significant information into the database. At the same time, they are able to search records in a shorter time. Furthermore, it performs automatic notification and reminder of due date borrowers. It is web based application and therefore can be accessed online. Hence, users can use the application anytime and anywhere, which means that this application can tolerate geographical and time constraint.

1.7 Project schedule

This project will be accomplished in 113 days. It is divided into phases and sub-phases to accomplish the milestone of the project. Refer to **APPENDIX A** for detail project schedule.

1.8 Expected outcome

An expected outcome upon completion of implementation of this project is an online borrowing system.

1.9 Outline of Project Report

This report contains five chapters that are briefly described as in Table 1.1.

Chapter	Description
Chapter 1 Introduction	<ul style="list-style-type: none">• Outlines of proposed system's objective, scope and significance
Chapter 2 Literature Review	<ul style="list-style-type: none">• Review on the methodology used in the project.• Review and comparisons on existing systems• Review on the web technologies
Chapter 3 Requirement Analysis and Design	<ul style="list-style-type: none">• Established requirements specification based on the problem statements• Discussed the method of investigate and gather the requirements.• Designing OBS architecture using UML.
Chapter 4 System Implementation and Testing	<ul style="list-style-type: none">• Described the implementation module of OBS.• Discuss on the unit testing, usability testing, and acceptance testing of OBS in users' perspective.
Chapter 5 Conclusions and Further Work	<ul style="list-style-type: none">• Conclusion of OBS and recommendation on future work to enhance OBS.

Table 1.1: Project Report Outline

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

Nowadays, evolutions of managerial systems can obviously be seen. The change from paper-oriented documentation to a paperless computerized system can be easily found. This literature review will show the differences between the traditional borrowing methods and an online borrowing system.

As a deliverable of this project, an online borrowing system (OBS) will be implemented. The reason to build this OBS is to provide a systematic, organized and protected online borrowing system for SHOP of FSKTM. It will create an easier working environment for the staff members of SHOP. It helps to organize, record, update hardware and software's database in a more efficient and effective way. It will also provide an automatic notification of due date borrowers.

The target users of OBS are pointed to the administrators in FSKTM. They are allowed to view, update, add and delete the hardware and software inventory, and borrower's list. OBS also allows administrator to email the borrowers. Since OBS is a web-based application, it is not constrained to office hours. It can be accessed anytime and anywhere.

2.2 Review of Current Borrowing Method (Paper-oriented)

Until today, staff members in SHOP are still using the traditional way to keep and update all the details of the hardware and software, which is using books. If the staff members need to browse the details of the borrower, they need to search through the records line by line in order to get the particular information.

Furthermore, the availability of the hardware and software are only known by the staff members in SHOP. If any of the borrowers need to check the availability of hardware or software, he or she is required to ask the staff members to check the records during office hours.

On the other hand, checking for due date borrowers is their daily job and without fail. Similarly, the staff members again need to check through the records line by line in order to get the particular information.

Hence, they are duplicating their work. Thus, it is very laborious and time-consuming.

2.3 Review of Existing Similar System

2.3.1 CAIS library system

The Centre for Academic Information Services (CAIS) of Universiti Malaysia Sarawak was established in early 1993 and began its operation in May 1993. It has actively acquired library materials including CD-ROM databases to build its collection. The library system is developed by VTLS inc. CAIS acquired Micro-VTLS (Virginia Tech Library System) in August 1994. It serves as an online catalog in July 1995. Users are able to have access to the system through internet.

It enables students and academicians have easier and faster view of library directories through VTLS EasyPAC and it enables CAIS to function as an integrated user-oriented Centre for the acquisition, processing and dissemination of information and knowledge. With the availability of the Campus Wide-Area Network, users can access the system anywhere and anytime. In an effort to fulfill the ever increasing and challenging information needs of users, it is supported by Online and CD-ROM databases. It also allows users to print material

and e-books and e-journals. CAIS library system provides a security system in order to reduce loss of materials while increasing the efficiency and productivity of the librarians.



Figure 2.1: Interface - The main page of CAIS Library System

2.3.2 Review of CAIS Library System's Basic Software Implementation

2.3.2.1 Hypertext Markup Language (HTML)

HTML is a simple markup language. It is used to create hypertext documents which are portable from one platform to another. HTML files are simple ASCII text files with codes embedded in order to denote formatting and hypertext links.

2.3.2.2 Internet Information Services (IIS)

Internet Information Services (IIS) is the Windows component. It allows users to publish information easily and bring business applications onto the Web. IIS helps the users to create a strong platform for network applications and communications as well.

2.3.3 Conceptual Design

The conceptual design of CAIS library system was illustrated by Figure 2.2. The targeted users of the system are the student, lecturers, academics, librarian and the administrative representatives.

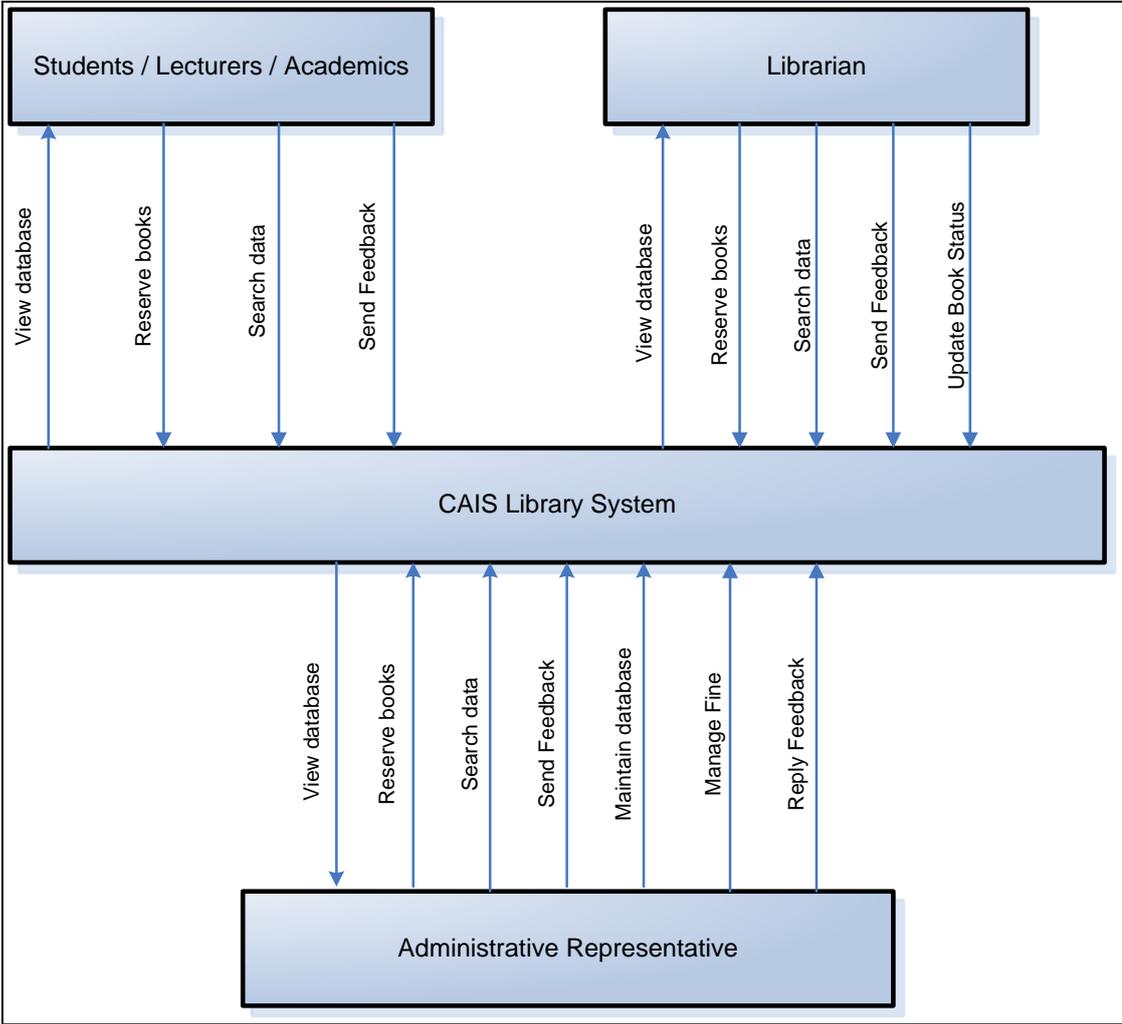


Figure 2.2: Design concept of CAIS Library system

2.4 Proposed System

To lighten the burden of the staff members in SHOP, an online borrowing system (OBS) should be developed and implemented. It will replace the traditional paper-oriented method.

The main purpose of this OBS is to provide more systematic, organized and protected online borrowing system for SHOP of FSKTM in UNIMAS. It is used to create an easier working environment for the staff members of SHOP. It helps to organize, record, update hardware and software's database in a more efficient and effective way. It will also provide an automatic notification of due date borrowers. With OBS, the staff members no longer need to search for the information line by line.

Furthermore, OBS allows users to print out the requirement and documentation of the hardware and software. Hence, it is very convenient to users in terms of time saving.

The target users of OBS are the administrators in FSKTM. They are allowed to view, update, add and delete the hardware and software inventory, and borrower's list. OBS also allows administrator to email the borrowers. Since OBS is a web-based application, it is not constrained to office hours. It provides a flexible location and flexible time concept, which mean that users can access OBS anytime and anywhere.

2.5 Comparison

Comparison between the traditional used method, CAIS library system and proposed system had done to compare the features, as showed in Table 2.1.

	Traditional Used Method	CAIS Library System	Online Borrowing System (OBS)
Storage	Using papers and books	Digital storage, computer hard disk.	Digital storage, computer hard disk.
Geographical	SHOP in FSKTM	Anywhere	Anywhere
Access time	Office hours	Anytime	Anytime
Price	Affordable	Expensive	Affordable
Effort used	High	Low	Low
Security	Low	High	High
Lifeline	Easily damage	Permanent	Permanent
Speed	Variable	Fast	Fast
Interface	Null	GUI	GUI
Maintain data	Manually	Computerized	Computerized
Track data	Search manually line by line, time consuming	Computerized, fast	Computerized, fast
User	Single user at a time	Multiple users at a time	Multiple users at a time
Notification	Search manually line by line, time consuming and laborious	Computerized and fast	Computerized, fast and automatic
Documentation and paperwork	Manually	Computerized	Computerized
Graphics	Null	Implemented	Implemented
Features	Do every thing manually	<ul style="list-style-type: none"> - Search data - view data - keep records - update records -add records -delete records - Organize data systematically - Calculate and manage fine - reserve book 	<ul style="list-style-type: none"> - Search data - view data - keep records - update records -add records -delete records - Organize data systematically - Send email - Automatic notification

Table 2.2 Comparison

2.6 Review of Development Tools

In order to successfully build an online system, appropriate development tools should be choosing carefully. For developing OBS, several languages are used, such as VB.NET, ASP.NET, HTML and jscript. The languages and database tool, which is Microsoft Access 2003, are discussed in following sections. Beside, the comparison of the development tools was discussed in following sections as well.

2.6.1 Visual Basic .NET

Visual Basic .NET (VB .NET) is an Object-Oriented programming language. It supports all the object-oriented programming features, such as polymorphism, inheritance, abstraction and encapsulation.

In VB .NET, data is treated as a critical element and does not allow it to flow freely. It bounds the data closely to the functions that operate on it. Furthermore, it protects it from accidental modification from the outside functions. A major advantage of OOP is code reusability.

2.6.2 ASP .NET

ASP .NET is the latest incarnation of ASP (Active Server Page). ASP .NET is not completely backward-compatible with ASP. ASP .NET is a complete rewrite of the software.

ASP.NET is able to work with many scripted languages, such as VBScript, JScript, Perlscript, and Python. Furthermore, it also works well with compiled languages, such as VB, C#, C, Cobol, Smalltalk, and Lisp.