

The Horizontal Prototype of Online Ordering Book System

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ABSTRACT

This project aims to create the horizontal prototype to show the functionalities of Online Ordering Book System (OBSYS) using Object Oriented approach. Three main phases are involved in this project. They are: defining requirements, analyzing requirement and validating functionalities. The horizontal prototype of Online Ordering Book System consists of use case diagram, use case specification, class diagram, sequence diagram, collaboration diagram, activity diagram and the list of requirements. This prototype provides a guideline in developing the running system of Online Ordering Book based on the user's perspective.

Keywords: *Ordering Book System, functionalities, prototype*

Introduction

Each institution has their own style in managing the ordering book for students. For example, some lecturers at UiTM Pahang directly order books from vendors, and these vendors will send those books to lecturers. The lecturers, then, sell the books to students. All processes start from lecturers ordering the books until the books arrive to the lecturers. This is done manually. Some universities do not allow lecturers to order books directly from the vendors. This task is handled by the university's book vendor. However, the ordering is still done manually. Therefore, it is important for the book vendor to manage their ordering and stock management online in order to enhance the book vendor's effectiveness, as well as the communication between the book vendor and lecturers who make the orders.

Problem Statement

Currently, ordering books for students on any subject is done by the lecturers themselves. The problem is, it will be time consuming from the stage of ordering the books until the arrival of the books. The issue is, the lecturers need to choose the appropriate vendor or publisher. Thus, sometimes, students need to wait for a long period of time for the books to arrive.

The book vendor is now carrying out the process of ordering items manually. They have no experience in making the book ordering and using the computerized ordering system. If the ordering book system is handled manually, there is a high possibility of data loss and handling error.

Based on the survey carried out by the authors, it is time-consuming for the book vendor to handle book ordering manually. Therefore, the development of this horizontal prototype aims to provide solution to these matters.

Scope and Objectives

The objectives of OBSYS are:

- i. To identify the functionalities of Online Ordering Book System (OBSYS) from the perspective of lecturers and book vendor's administrator. The identification of the functionalities will be presented in the use case diagram, activity diagram, sequence diagram, collaboration diagram, class diagram and the list of requirements.
- ii. To validate the functionalities by using a horizontal prototype where it will show the interfaces needed in the system in order to ensure that the requirements listed here are accurate to the expectations of the user.

This project focuses on the analysis phase of the Online Ordering Book System. It will cover the lecturers' registration, stock management, book listing, book ordering by the lecturers, the status of book delivery, the report delivered and lecturers' status of their ordering. This project will only cover the horizontal prototype to show the interfaces and will not cover the working prototype. It involves the book vendor's administrator and lecturers of UiTM Pahang.

Literature Review

Online Ordering Book System is a system that sells books directly to its customers by using secure internet commerce software (www.cup.co.uk/bookshop/faq). The main purpose of this system is to provide immediate feedback to customers. For example, after making an order, the customer may access information of their ordering status.

Scholastic Canada, the leading publisher and distributor of books for children in Canada is using the online ordering book to let teachers place school book club orders over the web. Scholastic's online ordering system makes it easier for teachers to place order and also speeds up the delivery of books. This would reduce the cost per order even further. The system calculates the amount owed, the bonus dollars earned and check the status of previous orders. Once the order is submitted over the web, the process of picking, packing and shipping the books begin automatically. Scholastic's customer service representatives can attend to pressing matters sooner.

Benefits of Online Ordering Book System

According to Shrewsbury-Gee (2003), the benefits of online ordering have already been enthusiastically greeted by a test group of teachers, who can place book club orders when it suits them in real-time, 24 hours a day, seven days a week. Within this system, no actual manual work is involved, thus, saves times and money. The online system brings very specific benefits such as:-

- i. **Performance Assessment:** On-line feedback provides a powerful tool for focused and direct input of an individual's and/or team's performance.
- ii. **Competency Assessment:** Using a role and competency profile as a basis, a company can measure its level of skill at various levels. For example, the degree of customer service at individual, team, department and company level.
- iii. **Leadership assessment and development:** Through the use of leadership questionnaires, the online system produces valuable and cost effective feedback.
- iv. **Change facilitation:** Feedback from staff acts as a barometer of the culture and climate of the company. The short feedback loop aids in

highlighting, motivating and executing changes within the organization while they are still relevant.

- v. Quick processing: The online facility enables large numbers of people's assessments to be processed and reported quickly following completion an intervention. This allows for speedy feedback of results to individuals and the company, thus, enabling appropriate and speedy business decisions.
- vi. Cost effective and value for money: The combination of these benefits, particularly speed and flexibility of administration and quality reporting result in significantly lowers unit costs when compared to manual and other forms of manual administration and processing.

Examples of Online Ordering Book System Which Guided the Research

University of Malaya Press

The Online Ordering Book System at the University of Malaya is not handled by the university's book vendor but is handled by the Department of Publication, also known as University of Malaya Press. This department can support the corporate mission of UM which is "to be a premier university seeking excellence in the advancement and dissemination of knowledge to meet the aspirations of the nation". The Press seeks to carry out this mission by disseminating knowledge through the printing and publications of scholarly books, journals and electronic files.

UM Press' mission is to use the Internet to transform book buying into the fastest, easiest, and most enjoyable shopping experience possible. With the implementation of online web based book ordering, UM Press is the place to find and discover anything we want to buy online [www.um.edu.my/umpress/PENGENALAN.HTM]. Figure 1 below shows the main menu of the UM Press. Although it is not handled by the UM book vendor, the basic process in handling an ordering book via internet can be applied.

From the UM Press online ordering book, there are some standard processes that can be used as a guideline in online ordering book system such as:-

- i. Order form – Using this form, buyers must fill in and email to the UM Press or they can print out this order form and post it to UM Press.

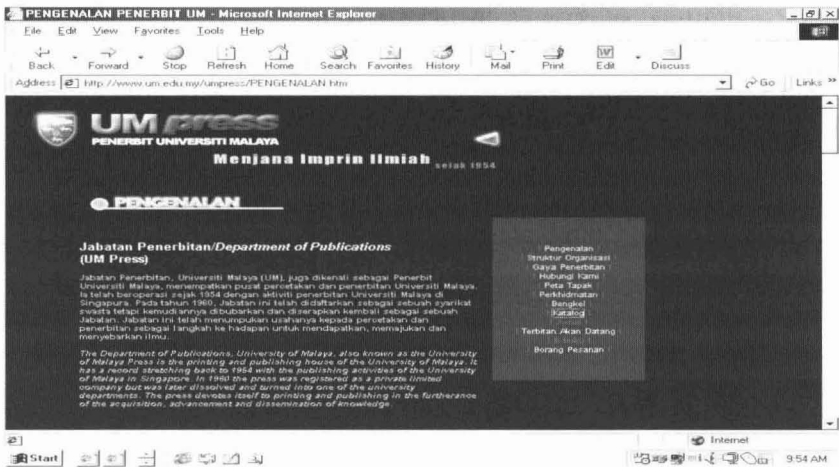


Fig. 1: Main Menu of Online Ordering Book System University of Malaysia

- ii. Catalogue menu – From the menu, buyers can choose the book categories and choose the title of the book that they want to see. It will give a detailed information or content of that book.
- iii. The Future Publication menu – This menu shows the listing of book category and the book title that would be published in the future. When we click the book title, the description of that book will appear.
- iv. Organization Structure – This shows the organization structure of UM Press.
- v. Map – This map shows the location of UM Press.
- vi. Services – Shows the facilities that are provided by the UM Press such as publishing, printing, editorial and workshop.

This system allows print out of the daily ordering book report by the customers. From that report UM Press can take any action such as to deliver the book ordered if it is in stock, or to contact the customers by phone or e-mail to inform if the book is not in stock. Unfortunately with this system, the customers cannot view or browse their status order, however, they can e-mail or call the UM Press regarding their status order.

Ohio State University Press

The Ohio State University Press was established in 1957 and currently publishes 30 new books a year. The Ohio State University also uses

process similar to the University of Malaya Press, where we can browse books first before deciding which book to buy. The main menu of the Ohio State University Press allows customers to browse books, search books using series or catalogue, check the status of their order, and how to return the books ordered, check for any prices and journal order. The university press also concentrates on publication. Figure 2 shows the main menu of the Ohio State University Press.



Fig. 2: The Main Menu of Online Ordering Book System Ohio State University

The following describes the processes in this Online Ordering Book System:-

- i. Book menu – Within this menu, customers can browse the books prior to buying it through by author, title or subject search. After deciding to buy it, customers can click button “add to shopping cart” and customers can also edit the shopping cart before confirming to buy it. Under the book menu, customers’ can give the email address to receive any information of a new book related to customers’ fields.
- ii. Order Here Menu – From this menu, buyers can order books here through the website, telephone, fax or mail. Buyers also can buy journals through telephone, fax or mail.

After studying the University of Malaya Press and Ohio State University Press, there are a few standards that must be followed:

- i. A unique number called the International Standard Book Number (ISBN) must be used to identify all books. This must be included in all book descriptions to ensure re-ordering and the catalogue of books is accurate as there may be more than one book with the same title name.
- ii. All lecturers must supply the following information such as name, IC number, employee number, address, telephone number, e-mail address and other required information.

Methodology

The methodology consists of three distinctive phases, which are:-

- i. Define Requirement.
- ii. Analyze Requirement.
- iii. Validate Functionalities.

Define Requirement

In this phase, two types of fact-finding method are used: 1. Informal interview; 2. Background reading. The informal interviews were carried out with the manager of the book vendor, in order to understand the domain.

From this phase, the target users were identified. For OBSYS, the target users will be the book vendor's administrative and the lecturers. The defined requirements will be transformed into functionalities that focuses on handling book stock and also current ordering system. Based on some of the interviews that have been conducted with the book vendors, some problems were briefly identified where they can help in identifying the functionalities and a few solutions are suggested such as:-

- i. Book vendors need an OBSYS, a person should be appointed as an administrator and from time to time to engage in some form of discussion which will involve the administrator.
- ii. The process in the OBSYS should include:-
 - Stock management
All book arrivals will be keyed in their database including the course related to the books.

- Ordering process

Lecturers who want to make an order will first check the books needed with the book vendor's stock whether it is available or not. Then, they are allowed to make their order according to the course taken. Here, lecturers can also check their order status. This process will benefit both parties, which are the lecturers as well as the book vendor's administration as lecturers will now make their orders via online without having to go to the book vendor.

- List of order report, status of ordering, report delivered.

This module will produce reports such as list of ordered books, order status and delivery report.

- Lecturers' Maintenance

Book vendor can maintain the lecturers' records such as add, update and delete.

Analyze Requirement

In this phase, the requirement of the online ordering book system's functionalities will be analyzed and known as functionalities. The functionalities will be presented using UML diagram and supported document. UML is used to model the user's requirements. It is a language for visualizing, specifying, constructing and documenting the artifacts of a system under development (Booch et al. 1999) and it is used because of the standardized notation. The Rational Rose was used to construct all the UML diagrams below:

- i. Use Case diagram
- ii. Activity diagram
- iii. Sequence diagram
- iv. Collaboration diagram
- v. Class diagram
- vi. A list of requirement or functionalities

All requirements were checked for validity, consistency, completeness, realism and verifiability (Sommervie 2001).

Validate Functionalities

The horizontal prototype is used to validate the functionalities of OBSYS. Therefore, a prototype is built for validation purposes. The horizontal

prototype is a throwaway prototype, which is mainly used to understand and validate the user's requirements. The objective of the throwaway prototyping is to validate or derive the system requirements (Sommerville 2001). Diagrams are converted from Rational Rose to horizontal prototype for validation. Horizontal prototype is used for this project because it is easier, cheaper and faster to revise. The prototype has been developed using Microsoft Frontpage 2000, Apache HTTP Server and PHP. The aim of this validation is to identify and rectify all errors like inconsistency, omissions and incorrect information. There are twenty six (26) functional requirements documented in this project.

Results

The following diagrams and supporting textual information constitute the functionalities:

- i. Use Case diagram – The use case diagram has two (2) actors, which are Administrator and Lecturers. There are six (6) use cases which are Lecturer Registration, Stock Management, Book Status, Make Order, Status Order and Authentication Procedure. The use case diagram is shown in Figure 3.
- ii. Use Case specification – Use case specification is the detailed description on the use case diagrams. Thus, there are six (6) use case specifications. The use cases are prioritized based on their priority.
- iii. Class diagram – The class diagram produced contains fourteen (14) classes. The class diagram was packaged to show the boundary, controller and entity classes as shown in Figure 4.
- iv. Interaction diagram – There are twenty-seven (27) interaction diagrams (sequence diagram and collaboration diagram).
- v. Activity diagram – Eleven (11) activity diagrams have been developed. They are lecturer view the status order, lecturer and administrator login the system, administrator register, update, delete and view lecturer's information, administrator view book stock and category information, administrator add, update, delete the book and category, lastly, administrator view book in stock, book ordered, book delivery and report delivered.

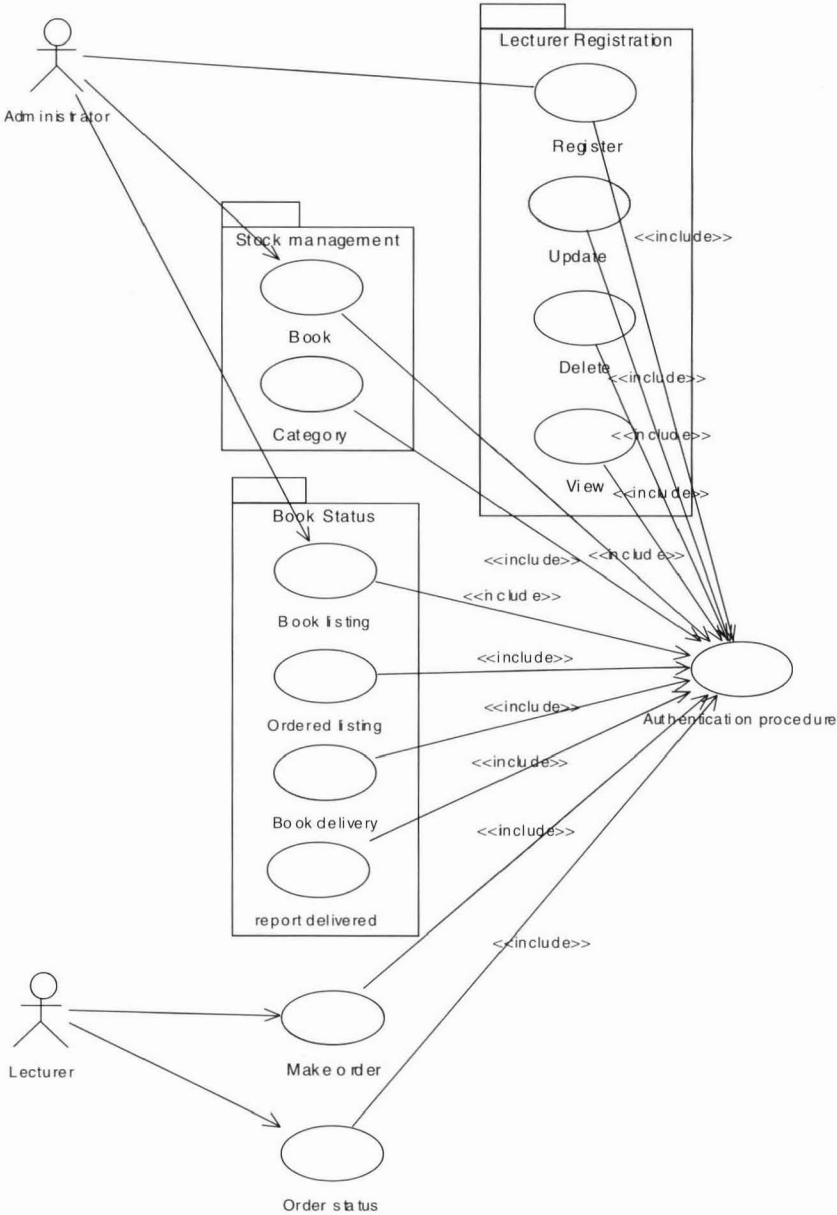


Fig. 3: Use Case Diagram for OBSYS

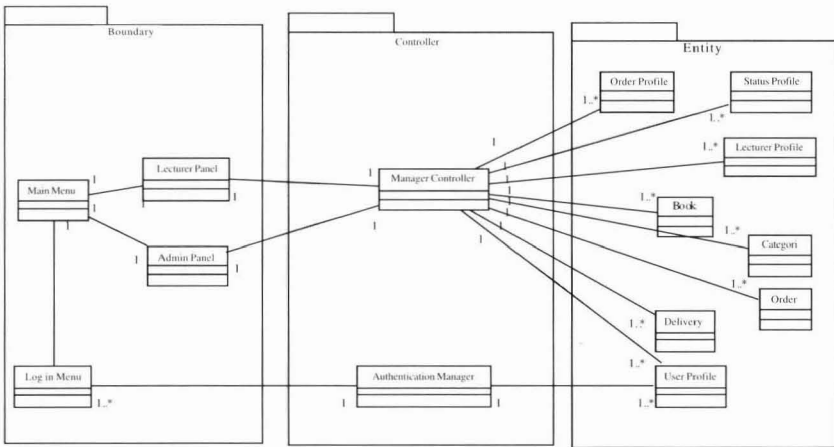


Fig. 4: Class Diagram for OBSYS

A set of requirement list was produced in this project as shown in Table 1.

The functionalities of OBSYS have been validated using horizontal prototype to ensure its validity, consistency, completeness, realism and verifiability. The requirements were revisited, and changes were made and added to the prototype. The prototype has been modified based on the requirement and validation to correspond to the users' expectation.

Three (3) modules of OBSYS have been designed based on the scopes of administrative Book vendor such as:-

- i. **Lecturer Maintenance**
This module is to maintain the lecturer's record. Here the administrator can add, update, view and delete the lecturers record.
- ii. **Stock Management**
This module enables administrator to control the book stock. All the books information will be key-in into the database. Administrator can add, update, view and delete of the book stock.
- iii. **Status of ordering**
This module enables administrator to check the status of the book available in the stock and the status of order book by the lecturers.

Two (2) modules of OBSYS have been designed based on the scopes of the lecturer such as:-

- i. **Placing Order**
Lecturer will place their order via the web browser without having any trouble. Before ordering book, lecturer can browse for any book

Table 1: The Requirement for OBSYS

No	Use Case Name	Requirement Description	Requirement Type
1	Authentication procedure	To authenticate the user	Functional
2		To validate username or password	Functional
3	Lecturer maintenance	To register of lecturer information	Functional
4		To update lecturer record	Functional
5		To delete lecturer record	Functional
6		To view lecturer record	Functional
7	Book	To register the book record	Functional
8		To update the book record	Functional
9		To delete the book record	Functional
10		To view the book record	Functional
11	Category	To register the book category	Functional
12		To update the book category	Functional
13		To delete the book category	Functional
14		To view the book category	Functional
15	Book Listing	To view the book available by title	Functional
16		To view the all book available	Functional
17	Ordered Listing	To view book ordered by publisher	Functional
18		To view book ordered by date	Functional
19	Book delivery	To set the book ordered to deliver	Functional
20	Report delivered	To view the book that already delivered	Functional
21	Make order	To order book	Functional
22		To add quantity ordered	Functional
23		To cancel quantity ordered	Functional
24		To cancel all quantity ordered	Functional
25		To order other book	Functional
26	Status order	To view the status order	Functional

through various means (e.g. title, author, ISBN number and etc) and they can see in real-time how many books are available for sales in the book stock. After keying the number of books to order, lecturer will be asked by the system to key in the employee number in order to confirm the order.

- ii. To see the status of the book ordered.

This module enables lecturer to view the status of his/her order. OBSYS will generate the report on order made by the lecturers according to employee number.

Based on the discussion with the users, a few non-functional requirements have been formulated. They are:-

- i. The OBSYS must provide real-time inventory of all book to the book catalogue on the system.
- ii. There should be no capacity limit for the number of books that can be listed on OBSYS.

Significance

The study of OBSYS is to carry out the aspect of the functionalities of online system amongst book vendor and lecturers. This study needs to validate the identified functionalities of OBSYS, the horizontal prototype is easier, faster and cheaper to reuse. Based on the listed requirements, the framework of analyzing information system is produced in order to give some suggestions to improve the book vendor's activities. It is also to minimize the inconsistency and improve the integration of operational data and to maintain, save time and money in the process of book ordering and checking the status of book orders. Therefore, this horizontal prototype helps to decrease work in the system development process and to increase the quality of the system developed. It can also serve as a guideline for book vendor's administrator to enhance the ability of this system to other users such as for other buyers.

Conclusion

Having discussed the significance of the system, it can be said that, the objective of this project has been achieved which is to create the horizontal prototype for OBSYS as a starting point to develop OBSYS. OBSYS is a pioneer system for book vendors as a guideline to develop another system and the designing of information system is needed especially for a dynamic organization like UiTM Pahang Koperasi Sdn. Bhd. This project uses UML, a standard technology for modeling; therefore, the requirement model can be understood and referred to by

other researchers. It is recommended that the future research should include stock management for all items such as stationery, not just on ordering books and it should involve other users to capture the requirement.

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