

ICS 52: Introduction to Software Engineering

Fall 2001

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Assignment 1: Requirements
Issued: Monday, 1st October 2001
Due: Wednesday, 10th October 2001(beginning of class)

CONGO.COM

Project Outline

Congo.com is a bookstore that allows a customer to purchase/order books online as well as over the telephone. There are seven aspects / components to the bookstore:

1. User Interface
2. Publishers/Suppliers
3. Shippers / Shipping Facilities
4. Congo BackOffice
5. Payment Processing
6. Customer History
7. Books Inventory

1. USER INTERFACE

a. Web Interface

The customer can order books online using a **web interface**. The customer enters his personal information through this interface. The web interface also enables the customer to search for books in the **BOOKS INVENTORY** either by the name of the book or the author of the book. Once the customer finds the book that he wants, he selects it and queries the price of the book and its availability. The price of the book and the various shipping / delivery options with the corresponding costs are listed. The user either selects one of the options and puts the book in his shopping cart or cancels the order for this book. The user may continue to purchase more books.

b. Phone (A toll-free number)

The **Phone interface** follows the same set of steps as above except that the choices are conveyed by an operator / agent to the customer.

2. PUBLISHERS / SUPPLIERS

PUBLISHERS / SUPPLIERS respond to queries from **CONGO BACKOFFICE** about the availability of books that have to be replenished in the **BOOKS INVENTORY** and the current price of those books. Accordingly, Congo.com buys the books from the **PUBLISHERS** and sends them to the **BOOKS INVENTORY**.

3. SHIPPERS / SHIPPING FACILITIES

The **SHIPPERS** are responsible for delivering the book/s to the customer. The **CONGO BACKOFFICE** has to query the shipping facilities to acquire information about the costs of shipping based on the mode of delivery like FedEx, USPS etc. In a simple case, the cost of shipping is fixed whereas in a more complicated case, the shipping cost depends on factors like weight, distance etc.

Books are not shipped until customer credit card verification is completed. Once the card verification is completed, the books are shipped to the customer at the address provided and a tracking number may/may not be provided depending on the mode of shipment.

4. CONGO BACKOFFICE

The **CONGO BACKOFFICE** is the heart of "Congo.com". It is responsible for a variety of functions:

- a. Interacting with the **USER INTERFACE**, evaluating the responses of the customer, responding to the queries of the customer and displaying relevant information to the user (**ORDER RECORD DEVELOPMENT PROCESS**)
- b. Querying the **PUBLISHERS** to acquire books and store information about the books and their costs in the **BOOKS INVENTORY**.
- c. Querying the **BOOKS INVENTORY** for information about the books in the inventory and their costs and displaying that information to the customer through the **USER INTERFACE**.
- d. Finding the options and corresponding costs of shipment/delivery from the **SHIPPERS** and presenting that information to the customer for the selection of mode of delivery.
- e. Maintaining and querying a history of customer information, including order history.
- f. Managing the **BOOKS INVENTORY** - updating the **BOOKS INVENTORY** both after a sale as well as on acquiring new books from the **PUBLISHER**, keeping track of the number of books in the **BOOKS INVENTORY** and initiating replenishment of books accordingly when needed.
- g. Fulfilling orders.
- h. Web page design and advertisement

5. PAYMENT PROCESSING

This component basically verifies the credit card (for example, MasterCard, Visa) information provided by the customer and informs the **CONGO BACKOFFICE** about the result of verification. It is also responsible for issuing the charge once the book/s is shipped. An important concern for this component is privacy and security.

6. CUSTOMER HISTORY

This database stores relevant information of the registered customers. This can be for example, credit card information, mailing address of the customers, etc. However, this information can be stored only if the customers agree. This database should be secure and protect customer privacy.

7. BOOKS INVENTORY

The system must maintain a complete list of books that Congo.com has at the current moment in its warehouses along with necessary information like name of the publisher, cost of the books, etc.

Requirements Specification Assignment

In this assignment, students will specify the Congo.com **ORDER RECORD DEVELOPMENT PROCESS**.

The **ORDER RECORD DEVELOPMENT PROCESS** is the process by which Congo.com interacts with a customer over the web. The outcome of this process is a valid purchase order that Congo.com will attempt to fulfill.

The **ORDER RECORD DEVELOPMENT PROCESS** includes

1. Determining the set of web pages that a customer can interact with.
2. Determining the essential content of each of the above pages
 - What Congo.com generates and puts on the page
 - What form-fields the customer has to fill in
 - The appearance of the page
3. Determining the transitions from one web page to another based on customer input and other factors. For example
 - a. What happens if a customer leaves a **necessary required** field on a form empty and submits the form? What is the next form that appears and prompts the customer?
 - b. What happens if an entry on a submitted form is invalid or incorrect? Can an applet running on the browser track it or does it need to be checked by Congo.com?
 - c. If all entries are valid but the book is unavailable in the **BOOKS INVENTORY**, what web page does Congo.com display? What state transition should it execute?
 - d. What web page is displayed if the credit card verification fails?

Students should "interview" the customer (the TA during the discussion sessions) and have him elaborate on the Congo.com **Interface and Transition Rules** that is to be built. They should then write a **Requirements Specification** (using the **structure** below) that resolves the ambiguities and precisely describes what will be the capabilities of the system. The document should also include a graphical representation of the state and transition diagram.

The **Requirements Specification** should specify the criteria that will be used to evaluate whether or not the final product meets the requirements. It should be concise but with sufficient detail to resolve any potential misunderstanding between the students and the customer. It should **not** specify implementation details, such as the data structures and algorithms that will be used to implement; the customer is concerned with what the **ORDER RECORD DEVELOPMENT PROCESS** from the customer's perspective and not how it does it.

Structure of the Requirements Specification

The **Requirements Specification** document should have the following structure:

1. Introduction

- What is this document about?
- Who was it created for?
- Who created it?

2. Application Context

- A Table of Contents with page numbers
- A short introduction
- Describe the situation in which the software will be used
 - How will the situation change as a result of introducing the software?
- Identify all things that the system may or will affect
 - Objects, processes, other software, hardware, and people
- Develop an abstraction for each of those things, characterizing their properties/behavior which are relevant to the software system ("World Model")
- How might this context change?

3. Functional Requirements

- Identify all concepts, functions, features and information that the system provides to its users
- Provide an abstraction for each of those concepts, characterizing their properties and functions that are relevant to the user
 - What is the system supposed to do?
 - What information does the system need?
 - What is supposed to happen when something goes wrong?
- Describe a Finite State Machine (FSM) to specify the transitions from one system state to another. Represent the state-transition diagram using a suitable graphical editor.

4. Environmental Requirements

- Platforms
 - Hardware - Operating systems, types of machines, memory size, hard disk space
 - Software - BlueJ,..
- Programming Language(s)
- Browsers

5. Subsets / Supersets

- Determine the minimal functional, performance and environmental requirements (subset) for the first release
- Determine additional functional, performance and environmental requirements (superset) for future releases

6. Expected changes and fundamental assumptions

7. Acceptance Test Plan

- Organization of tests
- Format of test cases

8. Definitions of Terminology; reference documents

SUBMISSION CRITERIA

The printed copy of your requirements specification that you turn in for credit should include

- A title page using a 20 point font with the following text centered vertically and horizontally

Congo.com Requirements Specification

By

First_name Last_name

{Last four digits of your student ID}

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- Page numbers on each page (preferred at the bottom of the page)
- Font used for the document should be similar to Times New Roman or standard Arial.
- Major section headings in 18 point, other subsection headings in 16 point, and body text in 12 point.
- Stapled once in the upper left hand corner, no binders, no plastic covers.

Grading

The grading of this assignment will be broken down as follows:

- 50% - Accuracy (clarity, precision, completeness, and consistency of the specification)
- 25% - Presentation (organization and consistency of the document)
- 25% - Composition (spelling and usage of English)

The assignment counts 10% towards your final grade for the course.

Note:

- **Do not work in teams to complete this assignment**
- **No late assignments will be accepted**