# Software Requirements Specification (SRS) Book E-Commerce System (BECS)

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1. **Introduction**

The Software Requirements Specification is designed to document and describe the agreement between the customer and the developer regarding the specification of the software product requested [5]. Its primary purpose is to provide a clear and descriptive “statement of user requirements” [5] that can be used as a reference in further development of the software system. This document is broken into a number of sections used to logically separate the software requirements into easily referenced parts.

This Software Requirements Specification aims to describe the Functionality, External Interfaces, Attributes and Design Constraints [4] imposed on Implementation of the software system described throughout the rest of the document. Throughout the description of the software system, the language and terminology used should unambiguous and consistent throughout the document.

## Purpose

Defining and describing the functions and specifications of the Book E-Commerce System (BECS) is the primary goal of this Software Requirements Specification (SRS). This Software Requirements Specification illustrates, in clear terms, the system’s primary uses and required functionality as specified by our customer.

The intended audience of this document is our primary Book E-Commerce System customer: Mr. Borzoo Bonakdarpour, the CSE435 instructor Dr. Betty Cheng, the fall semester 2007 CSE435 Group 4 members, as well as the other students attending CSE435 that will require access to such documentation.

## Scope

The software system being produced is called Book E-Commerce System or BECS. It is being produced for a customer interested in selling books via the Internet. This system is designed to “provide automation support” [2] for the process of placing books for sale on the Internet and facilitating the actual sale. This system is largely cross-platform and is available to anyone using the Computer Science Department’s provided computer resources in the MSU Engineering Building. The system will be run on a central server with each user having a remote user interface through a web browser to interact with it.

The Book E-Commerce System will allow any user to create an account to become a customer. The customer, through the process of account creation, will have the option to become a member of the site. The system will allow customers to browse, search, select, and add books to a shopping cart. Then, provided they have books in their shopping cart, check out books in shopping cart and decrement the stock that the inventory the system maintains. The BECS also allows a manager to manage the inventory with full create, retrieve, update and delete (CRUD) functionality with regards to books in the system. It will also allow, on an inventory wide basis, customers and managers to interact with a promotion system that handles percentage-off promotions that can be applied to member’s orders. This interaction includes the creation (by managers) and the application to orders (by customers) of the promotions. The BECS has full email capabilities; the automated email functionality will be used to send promotions to members of the system as well as provide the managers with low-stock notifications.

The BECS will have numerous constraints on what it can do. The system will not have full credit-card processing capabilities. It will not allow managers to be customers. The manager will be a hard-coded user and only a single manager will exist. There will be no actual book ordering and order completion, however the system will provide the customer with a receipt and it will log the transaction details. The system will not allow multiple promotions to be added to a single shopping cart nor will it allow a customer to add more than one of each item to their cart. The system also will not allow users to retrieve passwords or edit their user details.

## Definitions, acronyms, and abbreviations

|  |  |
| --- | --- |
| BECS | Book E-Commerce System |
| Barcode | A unique identifier assigned to single items |
| Book | An instance of an Item that has these additional attributes: Title, Author |
| Button | A user interface element that allows a User to click and inform the system to take an action |
| Checkbox | A user interface element that allows a User to inform the system that  he/she selected a particular item |
| Checkout | The process a Customer goes through to purchase an Item |
| CRUD | Create, Retrieve, Update, Delete |
| Customer | A person that is a user of the system but has created an account |
| Inventory | An object that holds items available for purchase by the Customer |
| Item | An individual entity in the inventory which has several descriptive attributes: |

|  |  |
| --- | --- |
|  | Barcode, Price, Reorder Threshold, Stock |
| Manager | A single person that has the ability to create, retrieve, update and delete items in the store. This person cannot simultaneously act as a Customer  and Manager. |
| Member | A person that is a customer of the system and has requested to be sent  promotions |
| Promotion | An item-wide percentage-off price discount applied to a Member's  shopping cart |
| Reorder | The system process that automatically orders new stock of an item |
| Reorder Threshold | The numeric value of an item's stock that must be reached before the  system will order additional quantities of the item |
| Session | The time which a User is actively using the system |
| Shopping Cart | An object that lists a Customer's selected Items, their applied promotions and gives them an option to check out |
| SRS | Software Requirements Specification |
| Stock | The quantity of any particular item the inventory has on hand |
| Text Box | A user interface element that allows a User to input text to the system |
| Transaction | The information related to a customer's purchase that is logged |
| User | The person who operate the software product. |

* 1. **Organization**

This Software Requirements Specification document is divided in to multiple subsections. The first section includes explanations of the Purpose, Scope and Organization of the document. The first section also handles the description of project- specific words, acronyms and abbreviations that will be used in the document. The second section of the document is separated into the following five different sections, each detailing specific details of system uses and their corresponding actions: Product Perspective, Product Functions, User Characteristics, Constraints, Assumptions and Dependencies, Apportioning of Requirements. The third section is an enumerated listing of all of the requirements described for this system. The fourth section encompasses all of the Use-case, Sequence, State and Class diagrams that model the system. In the fifth section there exists a Prototype of the system along with a sample scenario that graphically describes the use of the system. The sixth section contains a listing of all related reference materials used in this document. The seventh and final subsection is dedicated to providing a point of contact for any viewer of this document.

## Overall Description

This section includes details about what is and is not expected of the BECS system in addition to which cases are intentionally unsupported and assumptions that will be used in the creation of the BECS system.

## Product Perspective

BECS is an online bookstore website which supports a number of functions for both the consumer and store's management.

The website must be available to anyone using the Computer Science Department’s provided computer resources in the MSU Engineering Building and as such must work correctly in both Internet Explorer and Mozilla Firefox. As stated by the customer, there are no hardware or software requirements beyond these including, but not limited to, memory or specific software packages that need to be utilized nor software packages that need not be utilized.

## Product Functions

BECS will provide a number of functions; each is listed below.

* Maintain data associated with the inventory (a collection of books)
  + A book has a title, author and price
  + The inventory also keep track of the stock/quantity of each book
* Maintain records for many customers
  + A customer can be either a member or non-member.
  + A customer has a username (unique across all users), password (no restrictions), email address (no restrictions), and postal address (unverified.)
  + Anyone may sign up for a customer account.
* Allow any customer to become a member.
* Show a listing of available books
  + Books are to be displayed in ascending alphabetical order by title.
  + Each book will list the following from left to right
    - Title
    - Author
    - Price
* Allow customers and managers to log in and out of the system.
  + Users (both customers and the manager) will be logged out if inactive for 30 minutes.
* Shopping cart
  + Anyone is able to add one or more books to the shopping cart.
    - The shopping cart does not need to allow multiple copies of any book.
* Checkout
  + Checkout is only available to logged-in customers. A user that is not logged in as a customer is given a chance to log in.
  + Member customers may enter a promotion code.
  + Only one promotion code may be used per purchase
    - The promotion is a fixed percentage discount that is to be applied to an entire order.
    - The discount is specified by the manager at the time of the promotion’s creation or most recent update/edit.
  + Collect a 16-digit credit card number from the customer
  + Log/record the transaction
* Allow manager to specify a stop-order for a book
  + Each book has its own stop-order status – either on or off. Details of its use are involved in the following feature.
* Notify manager when books need to be reordered
  + When the quantity a book falls below a threshold, the manager is notified that the book

needs to be reordered.

* + - One exception is if the manager has already specified a stop-order for this book.
      * Every book must either have stop-order enabled or disabled
* Allow manager to update stock quantities
  + Allow manager to change any book's price
  + Allow manager to view transaction logs
* Allow manager to create promotions
  + A promotion is a percentage discount that can be applied to an entire order
    - Promotions may only be used by member customers
    - A promotion has an expiration date specified by the manager

When a promotion is created, it is emailed to all member customers via the email address on record

## User Characteristics

The typical BECS user is simply anyone that has access to the Internet and a web browser in the computer science department at Michigan State University. It is assumed that the user is familiar enough with a computer to operate the browser, keyboard and mouse and is capable of browsing to, from and within simple websites [1].

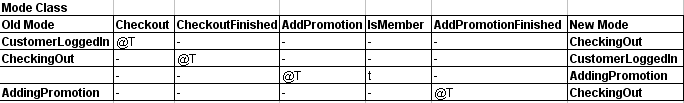
## Constraints

As stated by the customer, security is not a concern for this system. The database may store passwords in plain text and there doesn't need to be a password recovery feature nor lockout after numerous invalid login attempts. As such, the system may not work correctly in cases when security is a concern. These cases include those listed above in addition to lack of an encrypted connection when sending credit card information and forcing users to use “strong” passwords. A strong password is a password that meets a number of conditions that are set in place so that user's passwords cannot be easily guessed by an attacker. Generally, these rules include ensuring that the password contains a sufficient number of characters and contains not only lowercase letters but also capitals, numbers, and in some cases, symbols.

The system may not behave correctly when used with Internet browsers other than Firefox and Internet Explorer.

|  |  |
| --- | --- |
| SCR | "Software Cost Reduction (SCR) is a set of techniques for designing software systems developed by David Parnas and researchers from the U.S. Naval Research Laboratory  beginning in the late 1970s." [7] |
| Mode Class | "A mode class is a finite state machine, with states called  system modes" [8] |
| System State | The current state or mode that the system is in. The system  must be in exactly one state at any moment in time. |
| Event | An event is any action that can trigger an action within the  software system. Examples include but are not limited to changing values of variables or user-triggered events. |
| Event Notation | We may need to refer to both the old and new value of a |

|  |  |
| --- | --- |
|  | variable:  Used primed values to denote values after the event @T(c) ≡ ¬c ^ c’ e.g. @T(y=1) ≡ y<>1 ^ y’=1 @F(c) ≡ c ^ ¬c’  A conditioned event is an event with a predicate @T(c) WHEN d ≡ ¬c ^ c’ ^ d [8] |
| Controlled Variable | A variable whose value can change throughout the lifetime of the system and whose value is critical and must be  maintained correctly. |
| Mode Transition | When the mode (state) changes from one mode (described as the old mode) to a new mode. |
| Mode Class Table | Table consisting of a list of modes that the system can be in, modes that can be transitioned to, and the conditions required for the transition to occur. The table if formatted such that the first column lists the current mode (old mode) and the last column lists the new mode. The columns between the first and last columns each describe a  specific event. |
| Event Table | An event table illustrates how an input event can affect a controlled variable. The first column shows modes and the last row shows the values that the controlled variable will  be set to. The remaining cells are conditions required for a mode to affect the value of a controlled variable. |
| Condition Table | A condition table shows the conditions (one of which must be met) in order for a controlled variable to be set to some specified value. The first column lists modes and the last row names the controlled variable and the values it is set  to. |



**Condition Table**

**Mode Conditions** AddPromotion TRUE FALSE **PromotionAdded TRUE FALSE**

**Mode Class**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Old Mode** | **Login** | **IsManager** | **IsCustomer** | **Logout** | **New Mode** |
| **UserLoggedOut** | @T | t | - | - | **ManagerLoggedIn** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | @T | - | t | - | **CustomerLoggedIn** |
| **ManagerLoggedIn** | - | - | - | @T | **UserLoggedOut** |
| **CustomerLoggedIn** | - | - | - | @T | **UserLoggedOut** |

**Event Table**

UserLoggingIn

@T(User::Login() ==

TRUE) never

@T(Logout() ==

UserLoggingOut never TRUE)

**User::LoggedIn TRUE FALSE**

**Condition Table**

**Mode Conditions**

UserLoggedOut FALSE TRUE

ManagerLoggedIn TRUE FALSE

CustomerLoggedIn TRUE FALSE

**UserLoggedIn TRUE FALSE**

## Assumptions and Dependencies

Client:

We have assumed that all of the computer systems in the Engineering building labs are in proper working condition and that the user is capable of operating these system's basic functions including but not limited to being able to power on the system, login and open either Internet Explorer or Mozilla Firefox, and navigate the browser to the address of this BECS website.

Provider:

We have assumed that the BECS will be running on a properly working web server and database system with an Internet connection that allows this system to perform all communications with clients.

Assumptions:

* + - There is no need for anyone to be able to order more than a single copy of a book (or any item) in a single transaction.
    - The manager account’s username and password maybe hard coded.
    - The manager cannot be a customer.
    - Any user cannot edit their account information.

## Approportioning of Requirements

As stated by the customer, security is not a concern of this project. As such, it is beyond the scope of this system to encrypt personal user data, encrypt credit card information, prevent unauthorized login attempts, or any other concern of this nature. Additionally, the system is not responsible for the following:

* + - Verifying that credit card information is valid
    - Verifying the email address provided by a user
    - Storing additional information about a book beyond simply the title, name of author, and price
    - Allowing users to edit their account details (username, password, mailing address,

etc)

* + - Allowing customers to order multiple copies of a book in a single order
    - Providing individual product pages (one page for every item in the inventory)
    - Allowing the manager to update login credentials or other information about the manager

Additionally, the system may need to later be extended to provide additional functions. One such example is added support for visually impaired users. In many cases a screen- reading program is used and ensuring that page-layout reads from top-left to bottom-right in a logical manner would be required.

## Specific Requirements

1. Restrictions
   1. User Side 1.1.1.Software

1.1.1.1. Internet Explorer or Mozilla Firefox 1.1.2.Hardware

1.1.2.1. Computer Science Department Laboratory Terminal

* 1. System Side 1.2.1.Software
     + 1. Web-based application
       2. Database information storage system

1. Data Structure
   1. Book has these attributes
      1. Unique ID (auto-increment starting at 1) 2.1.2.Title

2.1.3.Author 2.1.4.Price

2.1.5.Reorder Threshold 2.1.6.Stop-order Boolean value 2.1.7.Stock

* 1. Customer has these attributes 2.2.1.Unique Username 2.2.2.Password

2.2.3.Name 2.2.4.Email Address 2.2.5.Postal Address

2.2.6.Member/Not Member Boolean value

* 1. Manager has these attributes 2.3.1.Username 2.3.2.Password

2.3.3.Email address

* 1. Order log entries have these attributes: 2.4.1.Unique ID (auto generated)

2.4.2.Time transaction took place 2.4.3.Date transaction took place 2.4.4.Username of customer

2.4.5.Listing of the contents in customer’s shopping cart

1. System
   1. Browse Inventory 3.1.1.Organization
      * 1. Items Listed on single page
        2. Items shown in tabular format
        3. Each Item listing contains
           1. Title
           2. Name of Author
           3. Price
        4. Listing sorted by Ascending item Title
        5. No individual Item pages 3.1.2.Interaction
        6. Each Item has checkbox to mark selection
        7. Single button to add all selected items to Shopping Cart
   2. Search Inventory
      1. Search available only by Title of book 3.2.2.Search is exact-match only
   3. Create, Update and Destroy (CRUD) Functionality 3.3.1.Only managers are allowed to modify inventory 3.3.2.Managers have an interface to:
      * 1. Create a book entry
        2. Update a book entry
        3. Update the stock/quantity of a particular book
        4. Create a new promotion
        5. Review current inventory
           1. Using the same interface to browse inventory as described in section 3.1, the manager has an additional “Edit Item” option for each book.

Manager has full CRUD capabilities on each book.

3.3.3.Managers may delete items from the inventory

* 1. Shopping Cart 3.4.1.Logged In
     + 1. Can add items to cart
          1. If Item is not in stock, message displayed informing user to try again later
          2. Customer can only purchase one of each item (no quantities associated with orders)
       2. If shopping cart not empty, a user may begin Checkout procedure 3.4.2.Not Logged In
       3. Can add items to cart
       4. User required to login before they may begin Checkout procedure
  2. Checkout procedure
     1. User must successfully use shopping cart before beginning this procedure 3.5.2.Checkout page consists of
        1. A text box for promotion entering
        2. An overview of the purchase
        3. A text box to hold the credit card number
        4. A button to complete the order
     2. Order details sent via email after the checkout has completed
     3. On order completion the inventory is decremented based on items purchased by user
  3. Authentication System 3.6.1.User Levels
     + 1. Manager (single, hardcoded user, no orders)
       2. Customer (unlimited, open creation, unlimited orders) 3.6.2.Account Creation
       3. Everyone is allowed to create an account
       4. Required Information
          1. Listed in section **2.2**
     1. Account Modification
        1. Users are not able to modify any aspect of their account after creation (“it would be nice but not needed”)
     2. Login and Logout
        1. There is no lost-password recovery
        2. Logging in allows one to logout
        3. Logging in allows checkout
        4. There is a 30-minute session time out after which a logged in user will be logged out automatically.
  4. Promotions 3.7.1.Specifications
     + 1. Applies to entire order
       2. Percentage-off type promotion (x% off entire order)
       3. Expiration occurs at manager specified date
       4. Multiple coupons cannot be applied to same order
       5. Non-member users cannot apply promotions to order 3.7.2.Creation
       6. Promotion created by manager
       7. Each promotion has a unique identifying number (can be auto generated)
       8. Email containing promotion sent to all member users of the BECS system
     1. Deletion
        1. Promotions are auto-deleted when the expiration date has passed
  5. Automated Reorder 3.8.1.Specifications
     + 1. Manager sets reorder threshold on a per-item basis
       2. If item reaches the reorder threshold, an email is sent informing the manager of the item’s status and the system automatically reorders the item
          1. If the item has a stop-order applied to it, it will not automatically reorder until the manager removes it.
       3. A manager may increase the stock of an item using the manager’s account
  6. Order Logging 3.9.1.Specifications
     + 1. Required Information:
          1. Listed in section **2.4**
       2. A manager can view all past transactions from all users