Software Requirements Specification

for

Online Shopping

Table of Contents

1. Introduction

1.1 Purpose

The purpose of this software requirement specification is to provide a clear, documented model of the requirements for the **online shopping system**. This document serves to provide top level use cases for a web customer making purchases online. The system includes the **client subsystem** as well the **seller subsystem.**
The online shopping system provides a platform for conducting sales of a wide variety of goods across the globe. It is implemented as an **internet based enterprise** and has a vast inventory of products from books, houseware, electronics, groceries and much more.
Sellers use this system to easily expand their service to a more global platform. This guarantees better flexibility, larger audience and an improved market.
The appeal of online shopping systems experienced a large boost in the last decade because the customers can browse easily through various options, brands and price ranges with very little hassle. The ability to reap its benefits from the comfort of one's own home has only bolstered its claim as one of the biggest enterprises that dominates the internet.

1.2 Intended Audience

The document describes the scope, functionality and features of an online shopping system which has a large audience. This document finds relevance to people from various different technical and non-technical backgrounds. The document outlines various corporate goals, business strategies and design features that are important from a management point of view and can be used by project managers. It analyzes performance, visibility and brand awareness which is important for marketing and advertising. With detailed analysis of the system design, features, implementation and performance, the document proves highly valuable to developers and testers.
Through the rest of the document, one becomes familiarized with the scope of these online shopping systems- from their purpose, benefits and business strategies. The context and origin of the product as well as its basic functionality are then explained in relevant detail along with an analysis of its different classes, design and implementation. We then detail the interface requirements, build analysis models and examine system features and non functional requirements.

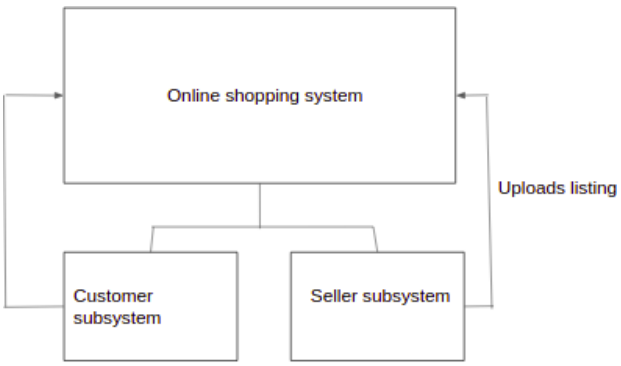
1.3 Product Scope

The online shopping system provides a platform for conducting sales of a wide variety of goods and provides a way of bringing sellers and customers on an online platform to conduct transactions in a secure manner across the globe. It is implemented as an online enterprise. This system provides an avenue for customers to shop from a wide variety of products online. It also provides sellers a platform where they can upload their listing to the system for customers to view and purchase. The biggest advantages of the service is the comfort it brings with remote usage. The ability to compare various price ranges, brands and even customer reviews and experiences provides for a more honest/depthful understanding of the product. It also provides a platform for retailers and sellers to reach a global audience.

2. Overall Description

2.1 Product Perspective

The system includes the user subsystem as well the seller subsystem. The online shopping system provides an outstanding way of bringing sellers and customers on an online platform to sell and make purchases in an efficient and secure manner irrespective of the distance between the two. It is a platform for customers to shop items online without having to visit a store or meet a seller physically, and a platform for vendors to sell their items online without having to meet the customers physically or have a physical store set up for his products. This system is a one stop for customers to shop from millions of products online. The seller uploads his listing to the system and the customers browse from these items and purchase them.



2.2 User Classes and Characteristics

Customer - He/she is a verified user of the system who is intended to buy a product sold by a seller using the platform. The functions used by customer are register, view account, login, browse item, view item, buy item now, add to cart, view cart, proceed to buy, enter delivery address, enter mode of payment, make payment, place order,

view orders, track package, write review, cancel order, return item, logout

Seller - He/she is a verified user of the product who is intended to sell items over the platform. The product functions used by sellers are register, view account, login, upload listing, your sales, deliver the items to customers.

2.3 Operating Environment

There are two modes of using the software - **mobile applications** and **web applications.** Mobile apps can be run on any android, iOS versions. Web applications can be run on Windows 10: Google Chrome (78 and later); Mozilla Firefox (70 and later); Internet Explorer (11 and later); Microsoft Edge (18.18362 and later), Mac OS X: Apple Safari (13.0.1 and later). The Internet is a basic necessity for the system to be accessed.

2.4 Design and Implementation Constraints

For ease of maintenance, the customer will only be able to make payments once items have been added to cart. There is no option to proceed directly to checkout with an empty cart. Brand specific agendas have been excluded from our design. Section showing deals of the day, gifting options and sales have not been included in the design. The wish list option has been merged with the cart as it serves very identical purposes. In an effort to build a community of customers, many sites had experimented with creating friendship communities on shopping platforms however, due to the transparency into costs of products, revealing personal expenditures to people- even within friendship communities could be seen as too transparent and even a breach of user data protection. This puts a limitation to developers. As these systems lean heavily on the ability to make real -time updates, the servers must be capable of handling sufficiently high traffic bursts, which may not always be the case. Logistically, most companies outsource their tasks to a third party organization which costs them more control over their implementation. Due to interfaces with payment methods like google pay or PayPal, the risk for middle attacks is often higher and may require additional safety at payment gateways. The recommendation system is assumed to be a server side feature. Our system is also partial to the needs of the customer more than it is to the seller. Customer functionalities have been more elaborately designed than Seller functionalities.

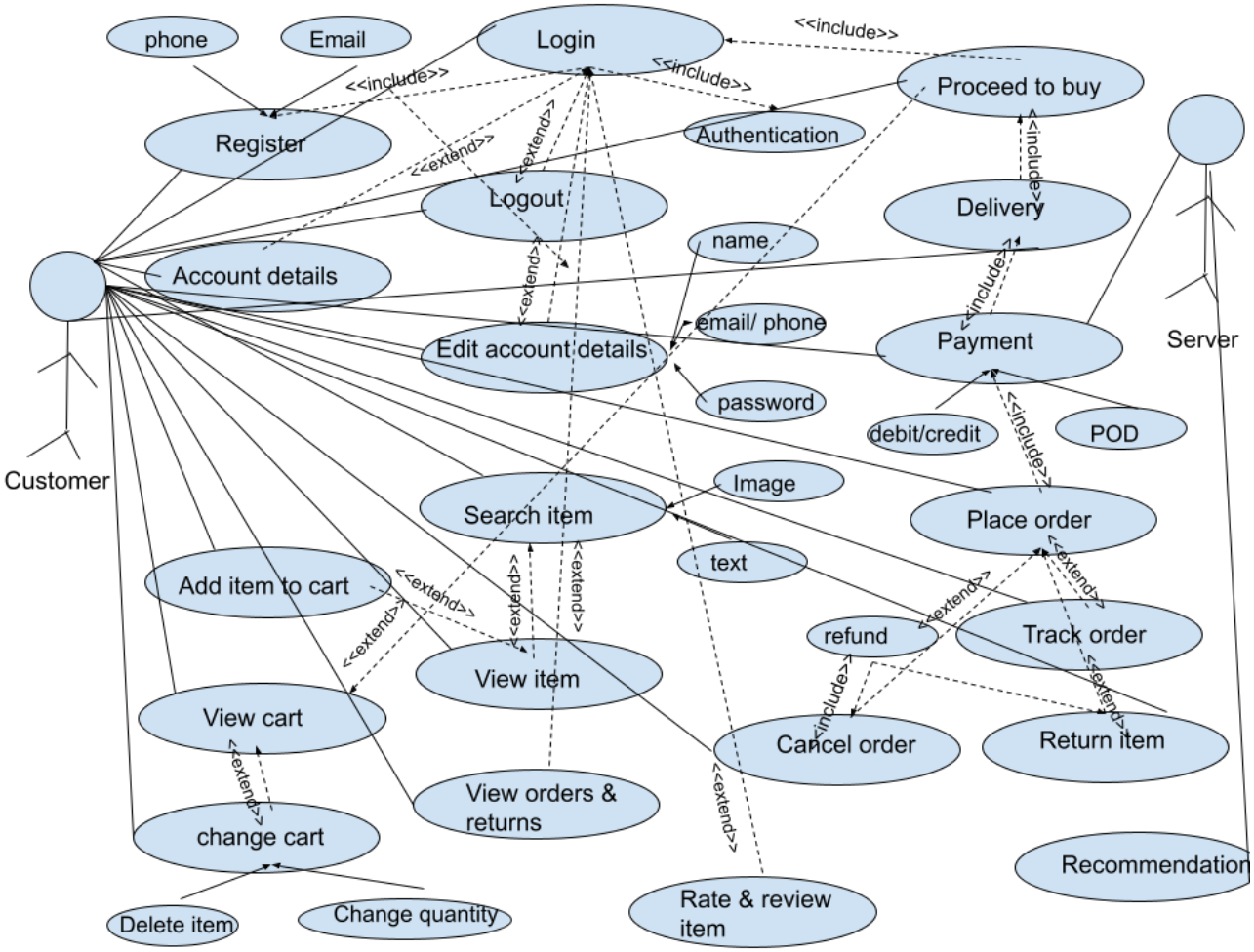
2.5 Assumptions and Dependencies

Under the assumption that a Windows/iOS/ Linux based operating system is available with C++/Python working along with database management software available, designing a modular view of the system is smooth. For a basic tool we are also assuming that only one customer may place an order at a given time, but will attempt

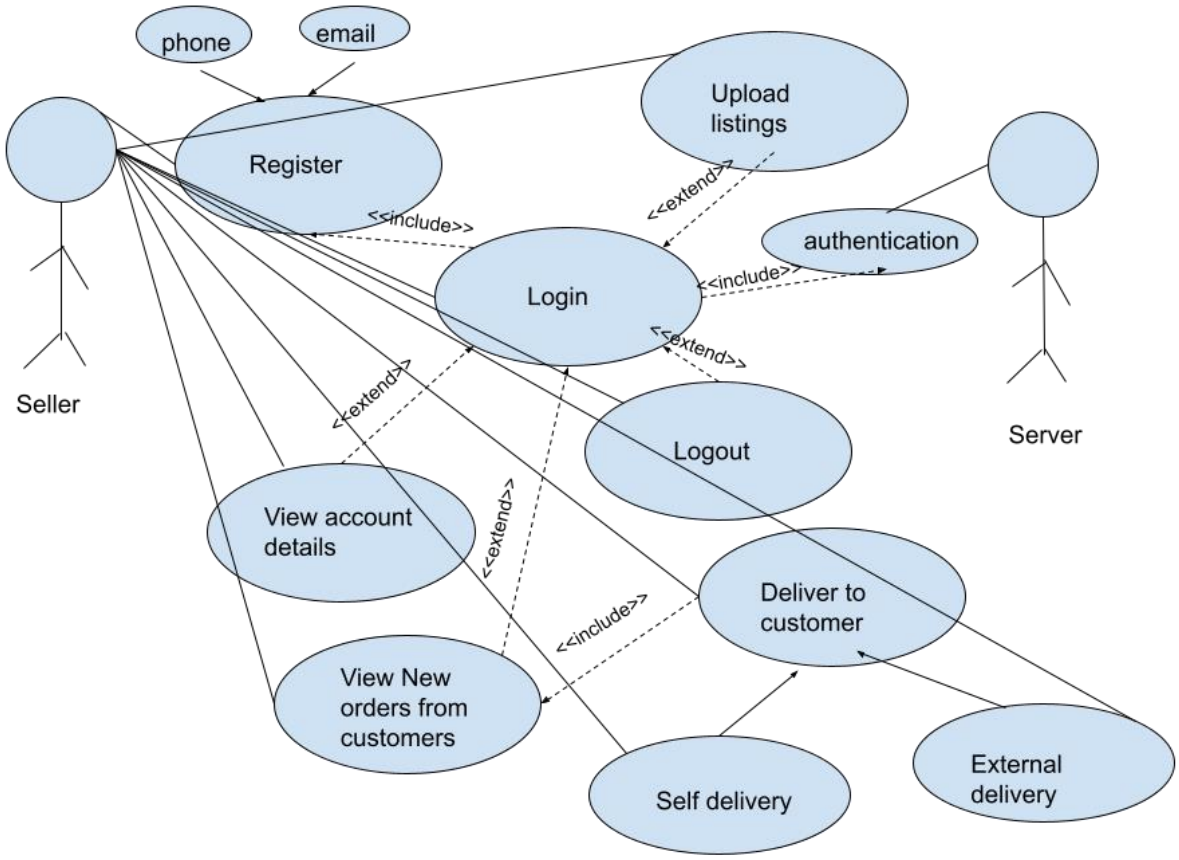
to expand the scope. The recommendation models are assumed to be dependent on the server and its functionalities though relevant to customers will be more clearly defined by the server.

3. Analysis Models

3.1 CUSTOMER USE CASE DIAGRAM:



3.2SELLER USE CASE DIAGRAM:



4. System Features

4.1 User Accounts

4.1.1 Description and Priority

Users from both subsystems- customers and sellers must have an account to conduct transactions on the shopping system. Users without system accounts will only have browsing permissions from the home page and do not have options to purchase or list goods on the system. Customers accounts will hold information about their name, email id or phone number, password. Both users can view and login to their accounts and even edit account details in the future. Seller accounts hold information relevant to the selling organization or individual including name, contact, gst number, pan, licenses and address.

Priority level: High

4.1.2 Stimulus/Response Sequences

In the home page, users can select the signup or login button and type in their credentials for registration or for login respectively. Upon matching the required criteria, the account will either get created and the login page is displayed or the user is logged in to his/her account and the home page is displayed. To edit or view account details, the edit or view buttons may be clicked respectively. To edit details, the user may type in the new details and click on save changes. Upon validating the changes, the edited details are successfully updated.

4.1.3 Functional Requirements

REQ-1: Register

- User: Customers and sellers
- Input: In sign up page
  - Customer - enters name, email-id/phone number and password
  - Seller - enters name, email-id/phone number, gst no,
- Output: Successfully registered, the login page is displayed
- Alternative flow(s):
  - Incase of repeated/invalid email id or phone number, ask user to re-enter a valid choice

REQ-2: View account details

- User: Customers and sellers
- Input: Click ‘view account details’ button in home page
- Output: Displays account details that were filled by the user at the time of creating account
- Alternative flow(s) :

none REQ-3: Login

- User: Customers and sellers
- Input: In login page
  - Customer - enters registered email-id/phone number and password
  - Seller - enters registered email-id/phone number and password
- Output: Successfully logged in, the home page is displayed
- Alternative flow(s):
  - Incase of invalid email id/phone number or a mismatch between user id and password, ask the user to re-enter a valid credential.

REQ-4: Logout

- User: Customers and sellers
- Input: Click ‘logout’ button in home page
- Output: User is logged out of the account, Login page will be displayed
- Alternative flow(s) :

none REQ-5: Edit account details

- User: Customers and sellers
- Input: In home page
    - Click button to edit account details
    - Select the detail whose value has to be edited
    - Enter the new details
    - Click on save changes
- Output: Successfully updated
- Alternative flow(s):
    - Incase of invalid details, ask the user to re-enter a valid credential

4.2 The search facility

4.2.1 Description and Priority

Customers can search for an item from the large catalogue of items in the shopping system by two methods. They can either search for a product using keywords related to the product or search for the product by image. Relevant options are listed in a dropdown of the search bar which upon selection, lists the products related to the keyword searched for
Priority: High

4.2.2 Stimulus/Response Sequences

To search for the product, the customer types in keywords into a search box or pastes an image of the product. This action immediately shows a drop down with the most likely products. The user then clicks on the product he/she wants to view.

4.2.3 Functional Requirements

REQ-1: Search item

- User: Customers
- Input: In the home page
    - click on the browse button
    - type in the keywords related to the item like item name/ brand etc.
- Output: List of products related to the item searched for
- Alternative flow(s):
    - Displays:
        - No results for the searched term/keyword
        - Try checking your spelling or use more general terms

REQ-2: View Item

- User: Customers
- Input: From the list of items click on an item to view its details
- Output: Details of the selected item like - price, brand, size, material, quantity, delivery date, images of the item will be displayed, along with the ratings and reviews for that item, and add to cart button

- Alternative flow(s): none

4.3 The shopping cart facility

4.3.1 Description and Priority

Once the customer views and selects an item that he/she wishes to purchase, one must add the item to cart using the add to cart button. The shopping cart contains all the items that the customer intends to buy, there is one shopping cart associated with one user account. The user can browse for an item, add it to cart and continue his/her shopping gracefully and purchase all of them at once.
Priority: high

4.3.2 Stimulus/Response Sequences

To add an item to the shopping cart, the user must click on the add item to cart button in the view item page, and the customer can continue shopping other items. The customer can view all the items in his cart by clicking on the view cart button, upon which a list of all items along with price of individual item, quantity and total cost of the cart is displayed. In this page the customer has the option to remove items from the cart or change the quantity of the products by clicking on the delete item button next to the item or 'plus' or 'minus' symbols respectively.
From here the customer can proceed to buy all the items in the cart, by clicking on the proceed to buy button or can further continue shopping by going back to the home page by clicking on the continue shopping button.

4.3.3 Functional Requirements

REQ-1: Add item to cart

- User: Customers
- Input: In view item page
  - click on the add item to cart button
- Output: Added item to cart, will remain in the same page
- Alternative flow(s):
  - Incase of adding an item that is already in the cart, the quantity of that item will be increased by 1 in the cart.

REQ-2: View shopping cart

- User: Customers
- Input: present in all pages
  - click on the view cart button
- Output: List of items that were added to cart is displayed

along with item details and total cost
- Alternative flow(s): Incase the cart is empty, ‘cart empty’ is displayed and the customer has the option to return to home page by clicking on continue shopping

REQ-3: Change items in cart
- User: Customers
- Input: In shopping cart page
  - click on delete item button present next to the item to delete the item from the cart
  - to change the quantity of items click on ‘+’ to increase quantity by 1, or ‘-’ to decrease quantity by 1
- Output: Changes reflected in the shopping cart page based on activity performed, the item will be removed from the page if it is deleted
- Alternative flow(s):

none REQ-4: Proceed to buy
- User: Customers
- Input: In shopping cart page
  - click on proceed to buy button
- Output: Payment page is displayed
- Alternative flow(s):

none REQ-5: Continue shopping
- User: Customers
- Input: In shopping cart page
  - click on continue shopping button
- Output: home page is displayed
- Alternative flow(s): none

5. Nonfunctional Requirements

5.1 Performance Requirements

An online shopping service has many levels of organization and its overall performance is a confluence of factors that affect all these different levels

- Information system: The infrastructure and organization of the information system can crucially affect performance in the following ways
  - average response time of web page
  - failure rate
  - average web page creation time
  - site maintenance costs

In order to maintain an acceptable speed at the maximum number of requests allowed from a particular customer, any number of users must be able to access the

system at any time. A smooth UI/UX is a necessity for all ecommerce applications. While a visually appealing design is essential, image optimization and other techniques can be implemented to ensure that the site is not very heavy. Real-time technologies equip online retailers with tools to keep up with the ever-evolving search ecosystem. Flexible goal setting, third-party data integration and real-time optimization offers a systematic solution to many ongoing challenges.

- Logistics:
  - product availability
  - average delivery time
  - quality of delivery
  - liability failure rate
  - inventory turnover

To overcome issues related to the logistics, the service has to ensure that the right product should be available at the right time and adequate quality. Some services may hire a 3PL to ensure this. A 3PL is a third party logistics service. Many online shopping services outsource their logistic operations and choose to invest their resources in other areas. However, many e-stores prefer to employ their own resources in logistic planning and implementation for better control over distribution.

- Sales activity:
  - acquisition cost
  - acquisition cost per first customer
  - brand awareness

There are various measures that can be taken to ensure that sales activity is improved.

- Build engagement
- limit spending
- develop partnerships

The above points illustrate some of the important performance criteria in terms of profitability analysis

- Market and customer
  - number of unique customers
  - average visit frequency
  - number of first buyers
  - average order value
- Sales process
  - fulfilment cost
  - personnel cost
  - marketing cost
  - return on sales
  - total turnover

The above points illustrate key performance criterias in terms of structural analysis. On analyzing the current or immediate state of the service, some important criteria to consider while evaluating performance is:

- sales growth
- order number growth

- visit frequency growth
- market share growth
- complaint rate

On a non-technical front, the customer satisfaction with the service itself is intrinsically linked with general satisfaction with products, delivery and website experiences. All sellers have a sellers account where they can monitor their account health. sellers are liable for product quality and are measured based on order of

- **customer feedback rating (target: 3.5 stars or more)**
- **negative feedback rate (target: 1% or less)**
- **cancellation rate (target: 5% or less)**
- **reschedule rate (target: 5% or less)**

It is essential for sellers to maintain acceptable service levels to be able to continue their market on the online service.

5.2 Safety Requirements

There are a wide range of concerns that arise wherever online transactions are performed- especially with money transactions and address records. One of the most common risks of online shopping is online shopping. Stealing one's personal information to make illegitimate purchases, phishing and keylogging are common ways used to steal identity.

Another common risk is credit card frauds. Customer's may be redirected to the malicious user's site during payment- that is made to look similar to the legitimate payment gateway and cost them money and may even have their credit card numbers stolen.

Malwares and Adwares commonly plague many websites. The risk is even higher with online shopping websites as scammers may easily acquire sensitive information entered by the user. Simply visiting the website makes the malware attack the user system.

To ensure user safety, measures must be taken from both the user side as well as the shopping system's side. From the user side, the user must never divulge any personal information except during bill payment. Users must be careful not to fall prey to phishing by verifying that mails being sent from the service are in fact, authentic. Users must be wary of ads and ensure that appropriate antivirus softwares has been installed in one's system.

The shopping system itself has to take concrete measures to ensure that customer;s can trust the service being provided to them. SIte seals on web sites are visual indicators that the website is safe and secure. Acquiring SSLs certificates are mandatory as this ensures the user that the communication channel is encrypted.

5.3 Security Requirements

To ensure secure transfer of data, the system must use secure sockets in all transactions that include any confidential customer information. The system may

choose to automatically log out all customers after a period of inactivity and verify by confirmation all the transactions with the customer's web browser. The system will ensure that cookies and all temporary storage do not hold any sensitive information. The customer's web browser must never display a customer's password or credit card details. The system's back-end servers must never display a customer's password and these servers must only be accessible to authenticated administrators. These databases must be encrypted and within the company's perimeter.
The service can ensure user identity authentication using two-step verification procedures. Further, the system can ensure that any additional security risks experienced by the users can be reported to the system immediately.

5.4 Software Quality Attributes

Adaptability is of primary importance to both types of users of the system. It should be able to easily cater to the needs of sellers and customers and be able to add additional features and provide support as demanded- especially in case of system vulnerability. As an online shopping system, it must define product availability by defining the targeted audience be it global users or a more restricted user space. It is also important to ensure that sellers are able to deliver products to the regions promised by the service. Due to user sensitive information being required, ensuring that money transactions are not error prone is vital. Utmost correctness is to be expected in ensuring that money is refund money in case of returns, offers on products are appropriately deducted from the selling price, delivery services have minimal error and that warehouses function properly. The system should also be highly flexible with servers that are equipped to be able to accommodate large flow of traffic. The system must be interoperable and must work without any compromise in performance and quality in both mobile applications as well as web applications. should be built with modularity so that additional features can be added and removed easily without changing too much of the original structure- this also allows reusability. The reliability of the overall program depends on the reliability of the separate components. The main pillar of reliability of the system is the backup of the database which needs to be continuously maintained and updated to reflect the most recent changes. Testing the system can be done on various fronts. Unit testing can be done by taking atomic components of the system, isolating it from the remainder of the code, and determining whether it behaves as expected. Program units are combined and tested as groups in multiple ways. Integration testing can expose problems with the interfaces among program components before trouble occurs in real- world program execution. Validation testing focuses on user visible actions and user recognizable output from the system and is said to be successful when software functions in a manner that can be reasonably expected by the customer.

5.5 Business Rules

Given the presence of two subsystems for the customers and sellers, the two types of users have different levels of privileges - including functionalities.
Some of the functionalities common to the two subsystems are- registration, login, viewing account details and editing account details. Some functionalities specific to Seller subsystems are seller's sales details, and uploading items to the inventory. Customers also have browsing features, cart features, delivery details, payment options, cancellation, review options and many more.