**Solent University**

**SCHOOL OF MEDIA ARTS AND TECHNOLOGY**

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# "A Bartering Website (SWAP)"

**Date of Submission:**

# Acknowledgements

# Acronyms

**ER-Diagram -** Entity Relationship Diagram

# Abstract

Contents

["A Bartering Website (SWAP)" i](file:///D:\xampp\htdocs\websites\Swap%20website\AE2%20report\16120302-M.A.Sajidha-BCC605-AE2.docx#_Toc122091788)

[Acknowledgements ii](#_Toc122091789)

[Acronyms iii](#_Toc122091790)

[Abstract iv](#_Toc122091791)

[Table of figures vii](#_Toc122091792)

[Introduction 1](#_Toc122091793)

[Literature Review 3](#_Toc122091794)

[Specification/ Requirements 8](#_Toc122091795)

[Hardware requirements 8](#_Toc122091796)

[Software requirements 8](#_Toc122091797)

[Methodology 9](#_Toc122091798)

[Professional, Legal and Ethical issues 10](#_Toc122091799)

[Project Management 11](#_Toc122091800)

[Requirement Engineering 12](#_Toc122091801)

[Requirement gathering and elicitation 12](#_Toc122091802)

[Requirement Specification 13](#_Toc122091803)

[Functional Requirements 13](#_Toc122091804)

[Non Functional Requirements 15](#_Toc122091805)

[Requirement analysis and negotiation 15](#_Toc122091806)

[Requirement Verification/ Validation 16](#_Toc122091807)

[ER-Diagram 17](#_Toc122091808)

[Relational Schema 18](#_Toc122091809)

[Activity Diagram 19](#_Toc122091810)

[Implementation 20](#_Toc122091811)

[Results 21](#_Toc122091812)

[Conclusions 22](#_Toc122091813)

[Recommendations 23](#_Toc122091814)

[Reference list 24](#_Toc122091815)

[Bibliography 24](#_Toc122091816)

[Appendices A](#_Toc122091817)

[Appendix A - Wireframes A](#_Toc122091818)

[Appendix B - Activity Diagrams B](#_Toc122091819)

[Appendix C - Questionnaire F](#_Toc122091820)

[Appendix D - Test Plan G](#_Toc122091821)

[Introduction G](#_Toc122091822)

[Scope G](#_Toc122091823)

[In Scope G](#_Toc122091824)

[Out Scope H](#_Toc122091825)

[Quality Objective H](#_Toc122091826)

[Roles and Responsibilities H](#_Toc122091827)

[Test Methodology H](#_Toc122091828)

[Test Levels H](#_Toc122091829)

[Suspension criteria and resumption requirements H](#_Toc122091830)

[Test completeness H](#_Toc122091831)

[Appendix E - Test Cases I](#_Toc122091832)

# Table of figures

[Figure 1/ Rehash Website 3](#_Toc121811408)

[Figure 2/ BookMooch website 4](#_Toc121811409)

[Figure 3/ Home Exchange website 5](#_Toc121811410)

[Figure 4/ Barter Quest 6](#_Toc121811411)

# Introduction

Purchasing products for our need is a common habit one possess. In this modern generation purchasing trendy products due to influential propaganda is highly evident though the purchased product is of use or not. People purchase these products atleast to try using it for once due to excitement and usually put it away. Therefore eventually one unintentionally begins to hoard products or throw away large amount of trash annually.

Increase in excess amount of unused products results in environmental pollution. Thus, reusing of these unused products can be eco friendly and beneficial in many ways. Flea markets provide the opportunity for up cycled products and second hand items. It is often seasonal and people sell their second hand products for reasonable price. This is an efficient way of recycling products but since it is not online, it could be inconvenient to make the purchases easily.

Online shopping comes to spotlight when it comes to convenience. It has become a common trend among the modern generation. Finding products that one need most from around the world through a website has helped people to find products that suits them best, easily and quickly. There are many website available which allows users to purchase product online such as Ebay, Amazon, Alibaba etc. When we consider Sri Lanka, there are websites such as Daraz, Ikman and Riyasewana, which offers online purchasing.

Using the above mentioned websites, products are purchased with money. This method has caused problems to many. Therefore, purchasers are falling into inconvenience. Most common problems reported are products being delivered with damages, delivering of a different product from one that was ordered, delay in delivery, poor quality etc. These problems are not worth spending money on. (Lahiru 2018)

Therefore, people came up with ideas to barter products without involving money. There are websites available in western countries which provide this service. These websites specialize in selling or bartering second-hand products. Some of the websites are *Vinted*, *Gumtree*, *Swapz*, *BookMooch* and *Freecycle.org*. These websites are only popular in western countries. Some of these websites specialize in particular products for example *BookMooch*, it allows users only to exchange books. Most of the above mentioned website target the local groups of people for easy exchange. Though it provides its services across the globe, usually users prefer to swap products with local users.

Considering the above issues SWAP website has been developed as an innovative solution which is mainly targeted at the Sri Lankan audience. It is an online platform which provides '*Bartering services*', that is, it allows customers to conveniently exchange their unused products at home and get products which they need most from another customer. This way helps people to save money, time, get what they want and promote recycling.

Article published by "*The Economic Times*" defines bartering system as,

*"When the goods and services of equal value are exchanged between two or more parties without using any form of monetary exchange, this transaction is called the Barter System."*

(The Economic Times 2022)

Not involving monetary exchange benefits people, because one can get products they want even if they do not have money. They can bargain and exchange products that are of equal value. No wonder this system existed decades earlier as a form of oldest types of commerce, even now the modern generation can make use of it with the intention of recycling products, as the future is threatened due to excess wastage and environmental pollutions.

Initially a primary survey was conducted among 50 participants in Sri Lanka varying from different career backgrounds and age groups, out of which 90% of them are familiar with regular online shopping. According to the survey it was evident that 92.5% of the participants were not aware of bartering websites.

According to the website *Environmental Foundation Limited*,

*"Sri Lanka generates 7000MT of solid waste per day with the Western Province accounting for nearly 60% of waste generation. Each person generates an average of 1 - 0.4kg of waste per day."*

(Environment Foundation (Guarantee) Limited. 2022)

Generating of an average 1 - 0.4 kg of waste per day by an individual can be hazardous if it keeps continuing. Because the current population of Sri Lanka in year 2022 has been increased by 0.27% compared to 2021.(Macro Trends 2022)

According to a report released by *Ministry of Sri Lanka* in year 2021,

*"the lack of municipal capacity for proper waste management and irresponsible and improper disposal by consumers have resulted in Municipal Plastic Waste (MPW) management becoming a national burden for the country."*

(Mr. Nihal Cooray *et al.* 2021, p. 1)

The above report shows how important it is to reuse products as much as possible as long as it is usable. Therefore, SWAP website is introduced to Sri Lankan audience to encourage recycling and reduce throwing away products annually. The website will allow users to post their products so that other users can view those posts and negotiate trade for exchange. Users can register and exchange products for free of charge. This website will be a customer to customer (C2C) business model.

SWAP website is developed for all ages and provides a secure platform to exchange products easily. It provides three categories such as *electronics*, *books* and *furniture*, in which users can post their products. When a user selects a product willing to exchange, user can use the trader's contact details and make an offer to exchange. If the trader and user agrees to exchange their products depending on product's worth, they can arrange a meeting to swap their products.

SWAP provides a simple concept of helping people to post products they want to give away and find users who might actually need it. On the overall this website will eliminate the problems of the existing bartering website and purely for the Sri Lankan community. It helps people greatly impact by the economic crisis to get products without having to worry about spending money.

Information Technology sector and use of Internet is gradually increasing among the modern generation. Therefore, SWAP website will reach the modern generation quickly and be beneficial for the users. Every single user of the website will be an indirect contributor to an eco-friendly future.

# Literature Review

Literature search and review was done in the initially stage of this project. It helped to get a better understanding of the project background and to find the clear path on which this project should head towards. A thorough research was done on every aspect of the project.

SWAP website was developed for Sri Lankan audience in attempt to encourage up cycling products and recycling with the aim of walking towards a greener future. It is an online platform where users find products of their interest and exchange it with products they do not use anymore, without involving any form of monetary exchange. Websites similar to SWAP were researched. It proved that many of the already available websites were not popular among Sri Lankans and most of the websites were specific to their country. Though it would help one to find products that could be exchanged from another country, yet considering Sri Lanka, expecting to exchange products from another country is not very ideal considering various factors like economic crisis, unable to inspect the product etc. Therefore, SWAP play a major role here in helping locals to find people from around Sri Lanka, so they can exchange products conveniently.

SWAP website is entirely based on ***Bartering System***, which is one of the oldest forms of commerce. As defined in website ***Britannica*** barter means,

*"****barter,*** *the direct exchange of goods and services—without an intervening medium of exchange or money—either according to established rates of exchange or by bargaining. It is considered the oldest form of commerce."*

(Encyclopedia Britannica 2006)

Further the ***CFI Team***, states that bartering system differs from the common monetary economy in multiple ways and the primary difference is that goods or services are exchanged instantly and the exchange is reciprocal, that is it can be negotiated and is a fair trade. (CFI Team 2022)

There are many websites that provide bartering services such as *Rehash clothes*, *BookMooch*, *Swapz*, *Home Exchange* and *Barter Quest* etc. **Rehash** is a website dedicated for bartering clothes and related items. It was found in 2007 which allows traders to exchange clothes for clothes as well as the website acts as a social platform for customers to connect with other traders. According to this website an American throws away an average of 67.9 lbs of clothing per year, out of which 95% of it is reusable. Therefore, this website promotes recycling of clothing for greener future.

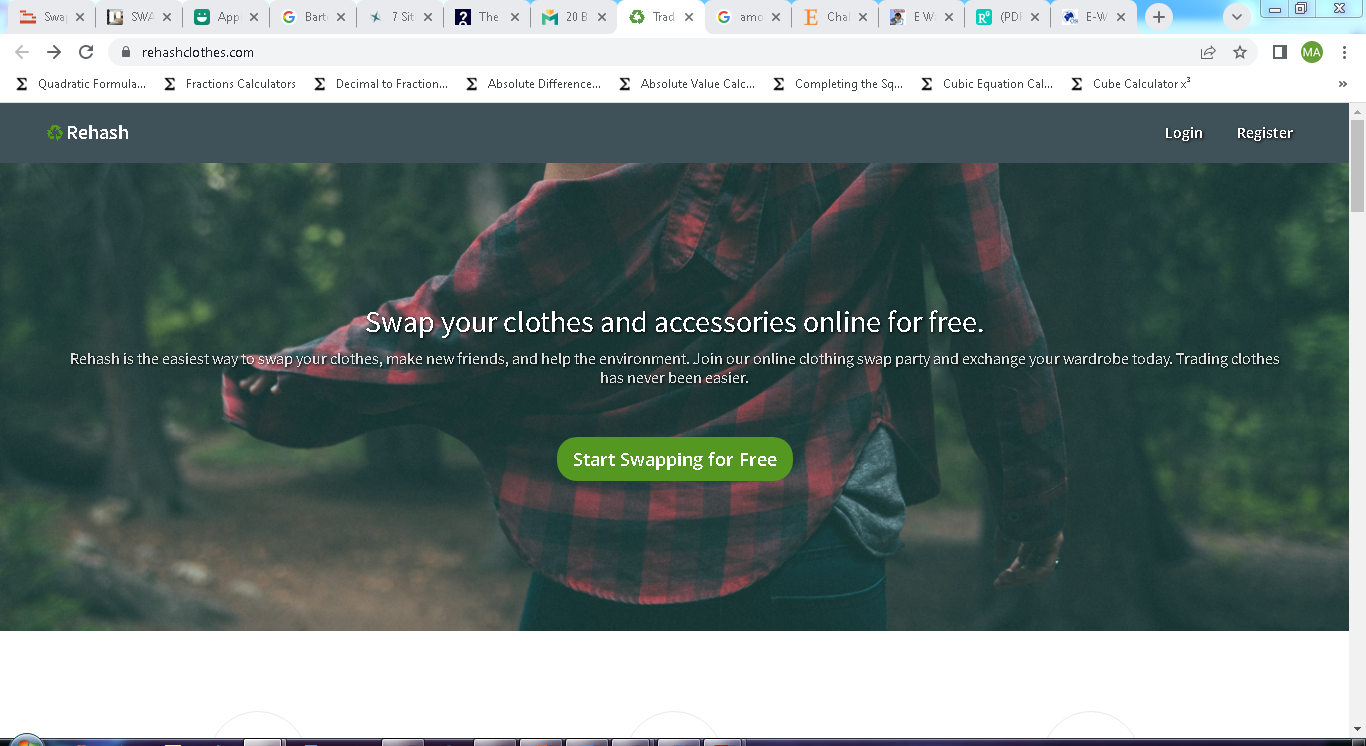
[](https://www.rehashclothes.com/how-to-swap-your-clothes-online)

Figure / Rehash Website

This website enables registered users to post their products for exchange while mentioning what products they expect in return. Once the offer is accepted between both the traders, the exchange or shipping can be done. They website is completely free to use, but the trader may only have to pay shipping fee if applicable. Currently as of December 2022, the website's web server is temporarily down.(Rehash Clothes 2022)

Second website researched was **BookMooch**. This website features bartering system, where users are allowed to exchange books. It was found by John Buckman. The website is a community to exchange used books for books. This website helps people to reach out for books they were unable to get and keeps books in circulation and finds readers for them. It is totally free join or use the website, only cost applicable is when mailing the books to others.

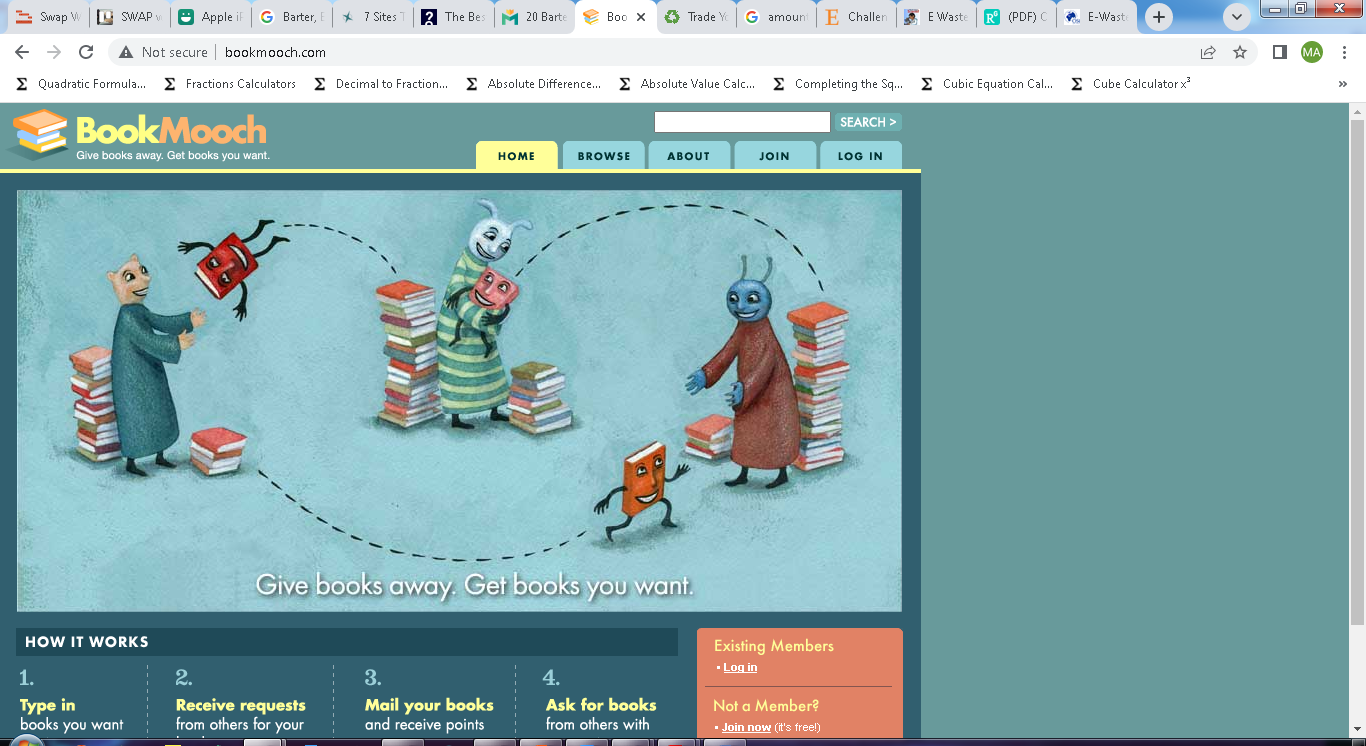
[](http://bookmooch.com/)

Figure / BookMooch website

*"BookMooch is a community for exchanging used books. BookMooch lets you give away books you no longer need in exchange for books you really want."*

It serves as a community for readers to exchange knowledge by exchanging books. According to a broad online survey conducted by the research team of BookMooch website, 76% of the respondents read more than 3 books per month. To exchange books, the users first have to register. When a book is given away, user earns points and get another book in return from anyone else in BookMooch. The user can keep the exchanged book forever or if finished reading can put it back to BookMooch for someone else. (BookMooch 2022)

**HomeExchange** is another website which follow bartering system and it allows exchanging of homes. Initially users can create their profile and promotes the home for exchange. Users can also look for destinations and send exchange requests. Exchange communication can be done via HomeExchange messaging system. But the exchange can be done only after signing up with an annual membership.

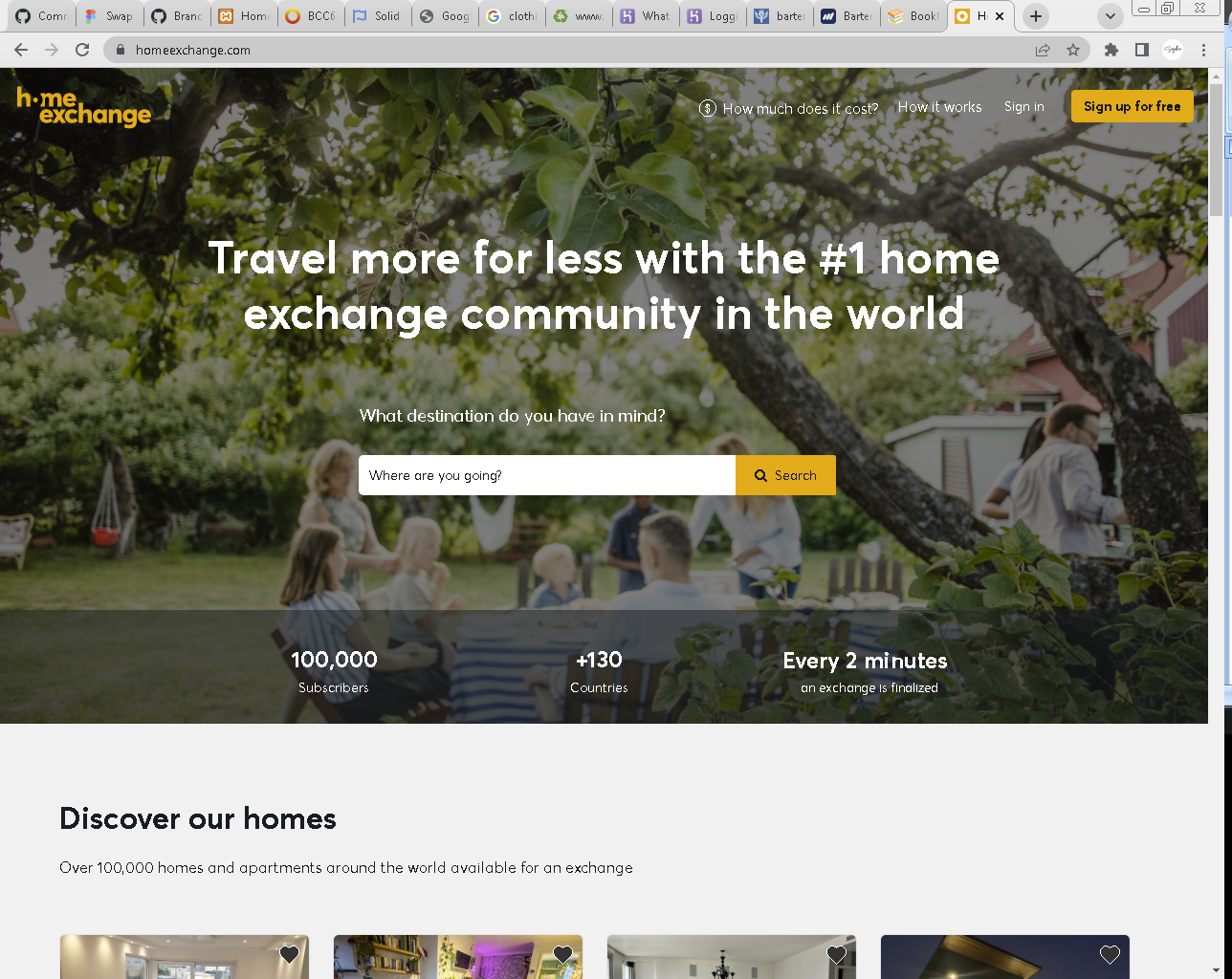
[](https://www.homeexchange.com/)

Figure / Home Exchange website

It allows users from around the world to exchange homes. It offers to exchange home in 159 countries, out of which one can discover affordable, authentic and safe way to travel around the world. This website offer two types of services such as **The classic Exchange** or the 'reciprocal exchange', where two families simultaneously exchange each others' homes or on different dates and the second type is **Exchange with guest points**, the website explains it as,

*"What happens if you find another Member with an available home, but that Member doesn't want to stay at your home in return? You can offer them GuestPoints that they can use to go to another Member's home in the destination of their choosing."*

Therefore the website states that it is not necessarily important to stay at the opposite member's home after exchanging, but also can offer their home and obtain guest points.

Last but not the least, **BarterQuest** is another website which features bartering system that allows exchanging of variety of products. It allows users to barter goods, services and the use of real estate from anyone to anyone around the world. Availability of Internet has made it possible to successfully create a market place with millions of traders who have millions of products to trade. The website features two main sections such as what people have for trading and what people want instead. This helps users to make an easy match for their goods or services and complete their trade.

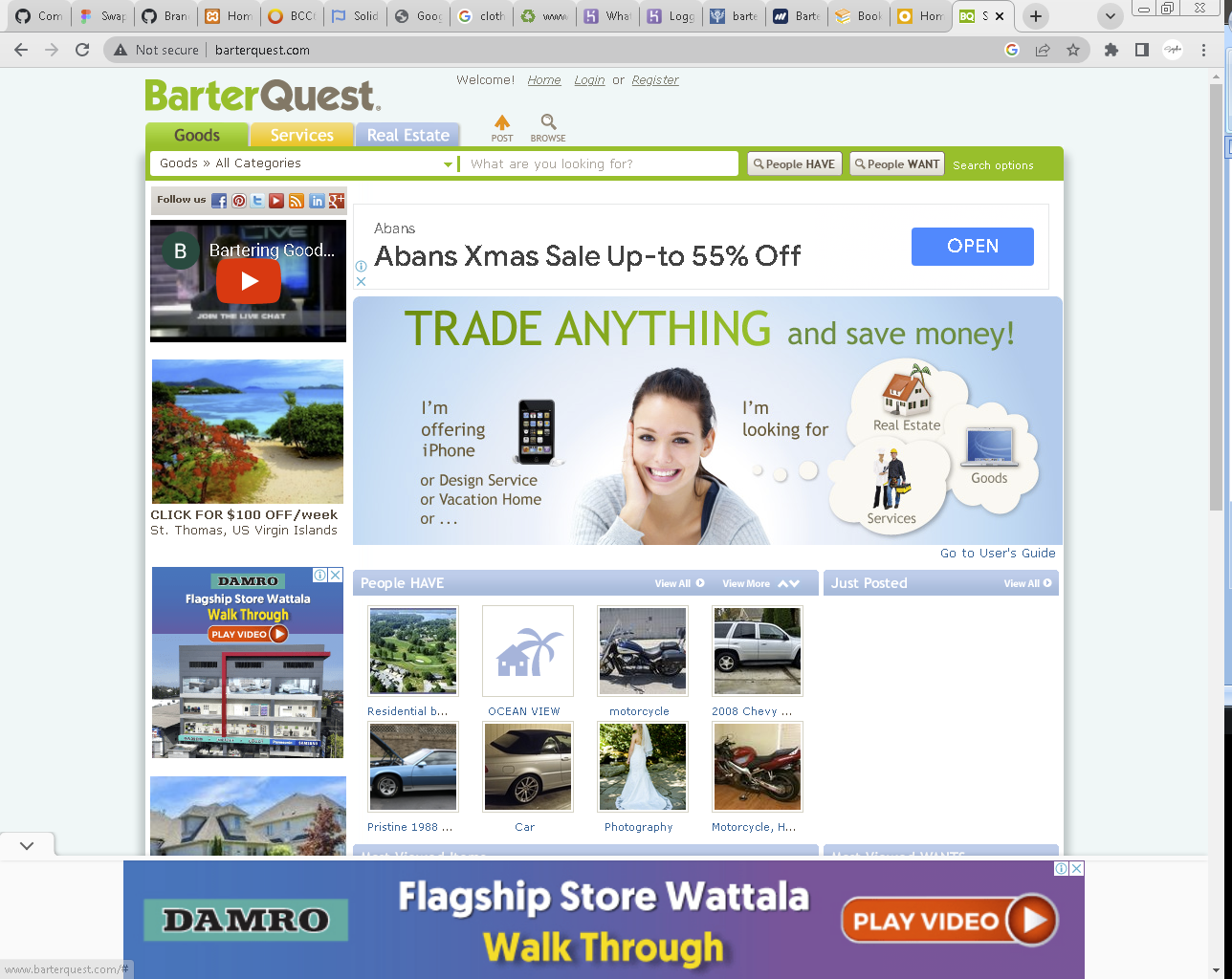
[](http://www.barterquest.com/)

Figure / Barter Quest

The website further state that trading/bartering helps users to lower transaction costs and have significant tax advantages to buying and selling. Also it highlights that bartering contributes to reduce expenditure of resources on manufacture and distribution of new products. This is allows post, contact and trade for free, in a secure platform where members can meet other bartering members to make their trade. The home page seems slightly compact and user interface is not very convenient. This website allows multiple categories of goods and services for trade but not known among the Sri Lankans. Even if using this site to exchange products from other countries, there might be considerable amount of shipping cost. (BarterQuest 2022)

All the above mentioned websites offer bartering system but are specific to one category. For example, **Rehash** specializes in clothing and related products only. While **BookMooch** website allows only to exchange books. Also these website are only popular in Europe and American continents. When we consider Sri Lanka bartering website is a whole new concept which might help people in multiple ways. This concept is only known to very few people and majority of them have not used such as website.

When considering the usage of these websites, there are many advantages such as able to give away unused products and get new products according to ones need, completely cut down the payment for products obtained, manage cluttering of things one own, promote recycling and greener future, create great social connections with people, get products even when no single penny left in pocket etc. Having so many benefits, using such a website in Sri Lanka will be great help for people. The SWAP website will allow to barter not only products from one category but many categories. Therefore, users can exchange many different products from a single website easily.

As a developing country with a struggling economic, being able to reuse products efficiently can positively impact the country. Major benefit is that being able to reuse electronics that would reduce collection of e-waste. Sisira Kumara (Sisira Kumara 2016), mentions in the website ***The Sri Lankan Scientist***, that all electronic products are reusable but only 40% of the e-waste are recycled and the rest of 60% are disposed into the environment.He also states that most of the developed countries export their electronic trash to developing countries, which results in exposure to toxic materials due to lack of awareness among the people about these toxic exposure. Further he states that,

*" According to UNDP Sri Lanka produces around 70 to 75 metric tons of e waste annually. These include Cathode Ray Tubes (CRT), mobile phones, CFL bulbs, batteries, computers, and computer accessories."*

(Sisira Kumara 2016)

The e-waste contain large amount of toxic compounds such as cadmium, arsenic, mercury and lead. Exposure to these toxic compounds can lead to severe health problems. The best and easy way to avoid e-waste is to recycle. Here is where the ***SWAP Bartering Website***  comes in handy to help in recycling products. By recycling one can indirectly contribute for greener future as well as prevent causing of severe health problems caused by toxic compounds.

Furthermore, Jaymi Heimbuch (Jaymi Heimbuch 2022), shares the story of *Kyle MacDonald*, who bartered a paper clip to a house. This incident shows the existence of bartering system and its growing phenomenon over the Internet. Usually people expect to exchange products of equal value. But considering MacDonald's case, it is clearly evident that it does not happen always. One can convince another to exchange products with different values as well. The writer also mentions that bartering system may have been tough in ancient times because it is difficult to find another person who exactly wants what you want to give away. But thanks to Internet, it has made it so much easier to find someone who might be interested in what you have to offer. ***SWAP Bartering website*** is exclusively made for Sri Lankans with the aim of people exchange products without worrying of spending money, contribute to recycling, reduce e-waste, and connect with people easily.

# Specification/ Requirements

SWAP website is a fully functional dynamic website developed using HTML, CSS and JavaScript, PHP, Ajax and MySQL languages. Full stack development has be done therefore, the website includes both front-end and back-end. Since the system contains both front-end and back-end, it is important to identify hardware and software requirements of the system. The system will be developed and tested using local server and final system will be deployed using "***000webhost***" platform. It provides a free tier, but has limited features.

## Hardware requirements

Hardware requirements for development and deployment of SWAP website are;

|  |  |
| --- | --- |
| **Development platform** | **Deployment platform** |
| * Processor - i5 or i7, a quad core processor with atleast 3GHz speed. * RAM - 4GB or more * Screen resolution - 1920 x 1080 or higher * Internet connection - required | * 300 MB Disk space * Bandwidth (3GB) |

## Software requirements

Minimum software requirements to develop and run the system are;

|  |  |
| --- | --- |
| **Development platform** | **Deployment platform** |
| * Operating system- Windows 7 or later or macOS Sierra 10.12 or later * Web development IDE - Atom (version 1.58.0) or Visual Studio Code (version 1.58) * Database - MySQL database * Editing applications - Adobe Photoshop, Adobe Illustrator * Web browser - Google Chrome/ Mozilla Firefox/ Apple Safari | * Cloudflare protected Nameservers * 99% uptime * FTP account * Cronjob |

# Methodology

SWAP website was developed with an aim of introducing a new concept to Sri Lankans, which is 'bartering products' online via a website. The website will allow users to find people from around Sri Lanka and exchange products for free of cost. This website not only support people financially but also encourage one to reuse products for an Eco-friendly environment in the future.

The website will help people to get products they want even without money as well as give away unused products at home. It not only fulfills a user's expectation of getting products, but also forms a strong social communication among locals. Because when a user finds another person's product and wants to swap, he/she has to contact that particular person to make an offer for exchange. They bargain and come to an agreement on exchanging for a fair trade. This helps one to understand another person's needs.

Since SWAP website is developed based on a new concept for Sri Lankan audience, it was important to know the feasibility of such a website among the audience. Therefore a primary research was conducted using quantitative research methodology, that was used to collect necessary data for the project. This research method was used to obtain quantifiable data, as it would be convenient for analysis. A short survey was conducted and data were received from 40 participants. The participants were from different backgrounds and majority of them have experience of shopping online through e-commerce. This survey helped to obtain in-depth and actionable data. The obtained data was reliable, accurate and also provided a wider scope of data analysis and produced an unbiased result.

# Professional, Legal and Ethical issues

# Project Management

# Requirement Engineering

Requirement engineering was done to find out the absolute requirements necessary to build the website with all necessary features. The four phases of requirement engineering was completed accordingly. It was important to know the requirements of the system before planning and designing the system for implementation.

## Requirement gathering and elicitation

According to the requirement engineering, the initial stage was requirement gathering and elicitation. This phase of requirement engineering includes three steps;

1. **Preparing for elicitation.**

The right elicitation technique has to be selected to obtain the requirements properly. Since the project is completely developed as an individual, survey and questionnaire was used as elicitation techniques. Survey helps to obtain quantitative data which is easier for analysis and it will have closed questions. Questionnaire was used as the second elicitation technique. This was targeted at a smaller audience of 10 participants who are frequent online shoppers.

1. **Conducting the elicitation techniques to collect requirements.**

A primary survey was conducted first. It was a short anonymous survey with 10 questions regarding what kind of requirements user expect from SWAP website. Data was collected with the consent of 50 participants, out of which majority of them have experience of shopping online via e-commerce websites. The aim of the survey was to identify all the essential requirements needed to be added to the website "Swap" in order to be a successful end product. Since the concept of SWAP website is new to Sri Lankans, it was important to know the expectations of the users to provide the exact requirements in the system. Survey also helps to obtain data in large scale that was used to analyze and identify the area of interest, thus it was possible to gather accurate requirements.

The survey form was created using **Google forms**. Google forms was used as a medium for creating the survey form because, it is popular among people, easy to use and the response can be analyzes easily because, it auto generates the summary of the responses. quantitatively.

Requirement gathering survey Google form:- [Link](https://forms.gle/8A3jtoMDrysysqfg6)

The second elicitation technique used was a questionnaire with 10 open ended questions. This was used to obtain requirements in details from users. Also it was aimed to identify the problems faced by users when using the regular online shopping method. Responses from questionnaire helped to identify the actual problems faced by the users when shopping online via e-commerce websites, thus develop SWAP in such a way that it would eliminate all those problems faced. The questionnaire was targeted at a smaller audience of 10.

(Appendix C)

1. **Check the accuracy of the data collected.**

Finally under requirement gathering and elicitation stage, gathered requirements were checked for accuracy and requirement specification was done.

## Requirement Specification

After gathering the requirements, a complete specification was done to decide which requirements were to be implemented in the system. The gathered requirements were specified according to ***functional*** and ***non functional*** requirements.

### Functional Requirements

Functional requirements of a system are important features or description of service that needs to be implemented in the system and is essential for user satisfaction and successful end product.

Functional requirement specified for SWAP website after requirement gathering and elicitation are;

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement ID** | **Requirement Statement** | **Must/ Want** | **Comments** |
| FR001 | The website shall have a ***Home*** page with easy navigation bar, short description about SWAP and quick links in the footer. | Must |  |
| FR002 | The website shall have a ***Electronics*** category page which displays all the electronics products posted by users. | Must |  |
| FR003 | The website shall have a ***Books*** category page which displays all the books posted by users. | Must |  |
| FR004 | The website shall have a ***Furniture*** category page which displays all the furniture products posted by users. | Must |  |
| FR005 | Any visitor shall be able to see full details of each products posted and its owner details. | Must | Product and owner details will be shown in modal. |
| FR006 | The website shall have a ***Help and Support***  to describe details about SWAP process and how to make use of the website correctly and efficiently. | Want |  |
| FR007 | The website shall have a ***Contact Us*** page for any user to send messages or reviews. | Must | Use "***Formspree***" (Anon. 2022) |
| FR008 | The website shall have a ***About Us*** page which briefly states the mission and the vision of SWAP website. | Want |  |
| FR009 | The website shall have a ***Terms and Conditions*** page which describes all the legal terms and conditions regarding the website, user conduct and information. | Must | Without agreeing to 'Terms and Condition' users cannot Sign up |
| FR010 | The website shall have a ***Privacy Policy*** page containing all the policies maintained by the website. | Want |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement ID** | **Requirement Statement** | **Must/ Want** | **Comments** |
| FR011 | **Unregistered users** shall be able visit home page. | Must | Navigation bar has 'Login' option. Footer has 'Sign Up' option. |
| FR012 | **Unregistered users** shall not be allowed to post products without logging in. | Must |  |
| FR013 | New users shall be able ***Sign Up*** | Must |  |
| FR014 | **Registered users** shall be able to login. | Must |  |
| FR015 | After logging in **registered users** shall be able to view ***User Account***. | Must | Navigation bar will have 'My Account' option instead of 'Login'  Footer will not have 'Sign up' option. |
| FR016 | **Registered users** shall be able to view their account details. | Must | Display user account details in modal. |
| FR017 | **Registered users** shall be able to edit their account details. | Must | Edit form is displayed in modal. Account details and password. |
| FR018 | **Registered users** shall be able to post product. | Must |  |
| FR019 | Each user's posts shall be displayed in their user account. | Must |  |
| FR020 | User should shall be able to edit product details they posted. | Must | Edit form is displayed in modal |
| FR021 | User shall be able to delete their post. | Must |  |
| FR022 | Website shall have an admin panel | Must | Show overall details of website |
| FR023 | **Admin** shall be able to login to dashboard. | Must |  |
| FR024 | **Admin**  shall be able to ***Sign Up.*** | Must | Admin has to login to dashboard first to create another admin account. |
| FR025 | Admin shall be able to confirm any new product posted or updated post by user before being displayed in front-end. | Must | If confirmation is given, it is saved in database and displayed in user account and category section. |
| FR026 | If new or updated post is not meeting SWAP terms and conditions, it shall be deleted by the admin. | Must |  |
| FR027 | **Admin** shall be able to edit their account details. | Must | Edit form is displayed in modal. Account details and password. |
| FR028 | Admin shall be able to view all registered users. | Want |  |
| FR029 | View all Admin in dashboard. | Want |  |
| FR030 | Both admin and registered users shall be able to logout. | Must |  |

### Non Functional Requirements

Non functional requirements of a system defines how the system should perform. It relates to the quality of the system and how the system functions in accordance with rules and laws.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement ID** | **Requirement Statement** | **Must/ want** | **Comments** |
| NF001 | Website shall have high performance. | Must |  |
| NF002 | Website shall have good UX (User Experience) | Must |  |
| NF003 | Website shall have good UI (User Interface) | Must |  |
| NF004 | Web contents shall be accurate | Must | No spelling errors. Fetch accurate data from database. |
| NF005 | Website shall be responsive | Want |  |
| NF006 | Website shall be scalable | Want |  |
| NF007 | Website shall be compatible with all web browsers. | Want |  |
| NF008 | Collect data shall be handled securely. | Must |  |
| NF009 | Website shall have high maintainability | Want |  |

(*Documenting Functional Requirements* 2014)

## Requirement analysis and negotiation

After requirement specification was done, requirements were analyzed to identify the dependencies between the requirements and evaluate the value of different requirements. The aim of requirement analysis to encounter problems, incompleteness and inconsistency of the gathered requirements.



Figure / Requirement Analysis

Under the requirement analysis phase, requirement interaction was conducted to identify interactions between each requirements, whether it has negative effect on another requirement (conflict), affect on another but not negatively (overlap) or whether it is independent.

After identifying the set of problematic requirements, it is negotiated and a compromised set of requirements are obtained. On large scale web development requirement engineering process, requirement negotiation phase is completed by conducting negotiation meetings. Requirements were then prioritized under this phase, which helped to focus on which requirements needed to be completed first.



Figure / Requirement Negotiation

## Requirement Verification/ Validation

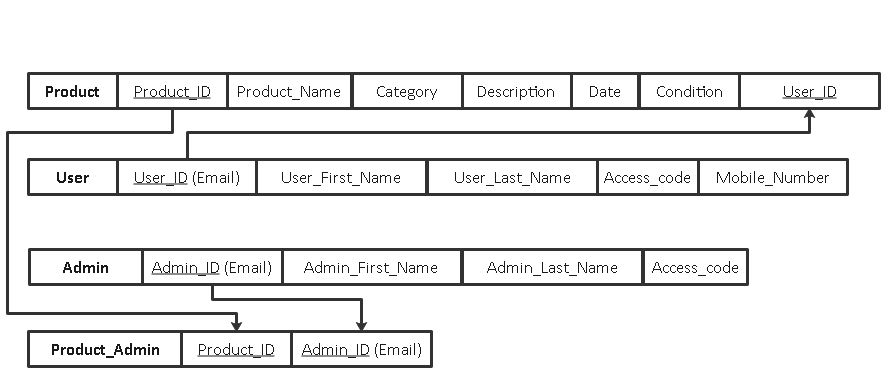
This is the phase where requirements are checked for errors, completeness, conflicts and consistency. Requirements verification/ validation was done to confirm the acceptable set of requirements. Different types of check can be performed during this phase such as validity check, consistency check, completeness check and verifiability. The validation technique used for this system was test cases.

Design

## ER-Diagram

## 

## Relational Schema



## Activity Diagram

# Implementation

# Results

# Conclusions

# Recommendations

# Reference list

ANON., 2022. *Custom Forms with No Server Code | Formspree* [viewed 15 December 2022]. Available from: https://formspree.io/

BARTERQUEST, 2022. *Swap Services and Luxury Items like Cars, Real Estate, Rentals, iPhone, Motorcycles, Collectibles | BarterQuest* [viewed 13 December 2022]. Available from: http://www.barterquest.com/

BOOKMOOCH, 2022. *BookMooch: trade your books with other people* [viewed 13 December 2022]. Available from: http://bookmooch.com/

CFI TEAM, 2022. *Bartering - Definition, Uses, Advantages and Disadvantages* [viewed 13 December 2022]. Available from: https://corporatefinanceinstitute.com/resources/economics/bartering/

DIDACUS ODHIAMBO, 2018. *System Design in Software Development | by Didacus Odhiambo | The Andela Way | Medium* [viewed 14 December 2022]. Available from: https://medium.com/the-andela-way/system-design-in-software-development-f360ce6fcbb9

*Documenting Functional Requirements*, 2014 [film] [viewed 15 December 2022]. Available from: https://www.youtube.com/watch?v=D6R7njeK-qg

ENCYCLOPEDIA BRITANNICA, 2006. *Barter | trade | Britannica* [viewed 13 December 2022]. Available from: https://www.britannica.com/topic/barter-trade

ENVIRONMENT FOUNDATION (GUARANTEE) LIMITED., 2022. *Status of Waste Management in Sri Lanka – Environment Foundation (Guarantee) Limited.* [viewed 9 December 2022]. Available from: https://efl.lk/status-waste-management-sri-lanka/

HSIANG-MING LEE, TSAI CHEN, and MIN-LI HUNG, 2014. Online Bartering Motivations - Hsiang-Ming Lee, Tsai Chen, Min-Li Hung, 2014, Volume 115(Issue 1)

JAYMI HEIMBUCH, 2022. *The Best Online Sites for Bartering | HowStuffWorks* [viewed 13 December 2022]. Available from: https://electronics.howstuffworks.com/family-tech/tech-for-parents/online-bartering-websites-tips.htm

LAHIRU, N., 2018. *Daraz Online Shopping: A Shopper’s Nightmare* [viewed 6 December 2022]. Available from: https://readme.lk/daraz-online-shopping/

MACRO TRENDS, 2022. *Sri Lanka Population Growth Rate 1950-2022 | MacroTrends* [viewed 9 December 2022]. Available from: https://www.macrotrends.net/countries/LKA/sri-lanka/population-growth-rate

MR. NIHAL COORAY *et al.*, 2021. *National Action Plan on Plastic Waste Management 2021–2030*. First.

NICOLA LAVER LLB, 2022. *Creating a Website - Legal Issues - InBrief.co.uk* [viewed 14 December 2022]. Available from: https://www.inbrief.co.uk/regulations/website-creation-legal-issues/

REHASH CLOTHES, 2022. *Www.rehashclothes.com* [viewed 13 December 2022]. Available from: https://www.rehashclothes.com/

SISIRA KUMARA, 2016. *E Waste Management – a Novel Challenge for Sri Lanka | The Sri Lankan Scientist* [viewed 13 December 2022]. Available from: https://scientist.lk/2016/10/26/e-waste-sri-lanka/

THE ECONOMIC TIMES, 2022. *What is Barter? Definition of Barter, Barter Meaning - The Economic Times* [viewed 9 December 2022]. Available from: https://economictimes.indiatimes.com/definition/barter

# Bibliography

HSIANG-MING LEE, TSAI CHEN, and MIN-LI HUNG, 2014. Online Bartering Motivations - Hsiang-Ming Lee, Tsai Chen, Min-Li Hung, 2014, Volume 115(Issue 1)

DIDACUS ODHIAMBO, 2018. *System Design in Software Development | by Didacus Odhiambo | The Andela Way | Medium* [viewed 14 December 2022]. Available from: https://medium.com/the-andela-way/system-design-in-software-development-f360ce6fcbb9

NICOLA LAVER LLB, 2022. *Creating a Website - Legal Issues - InBrief.co.uk* [viewed 14 December 2022]. Available from: https://www.inbrief.co.uk/regulations/website-creation-legal-issues/

# Appendices

## Appendix A - Wireframes

## Appendix B - Activity Diagrams

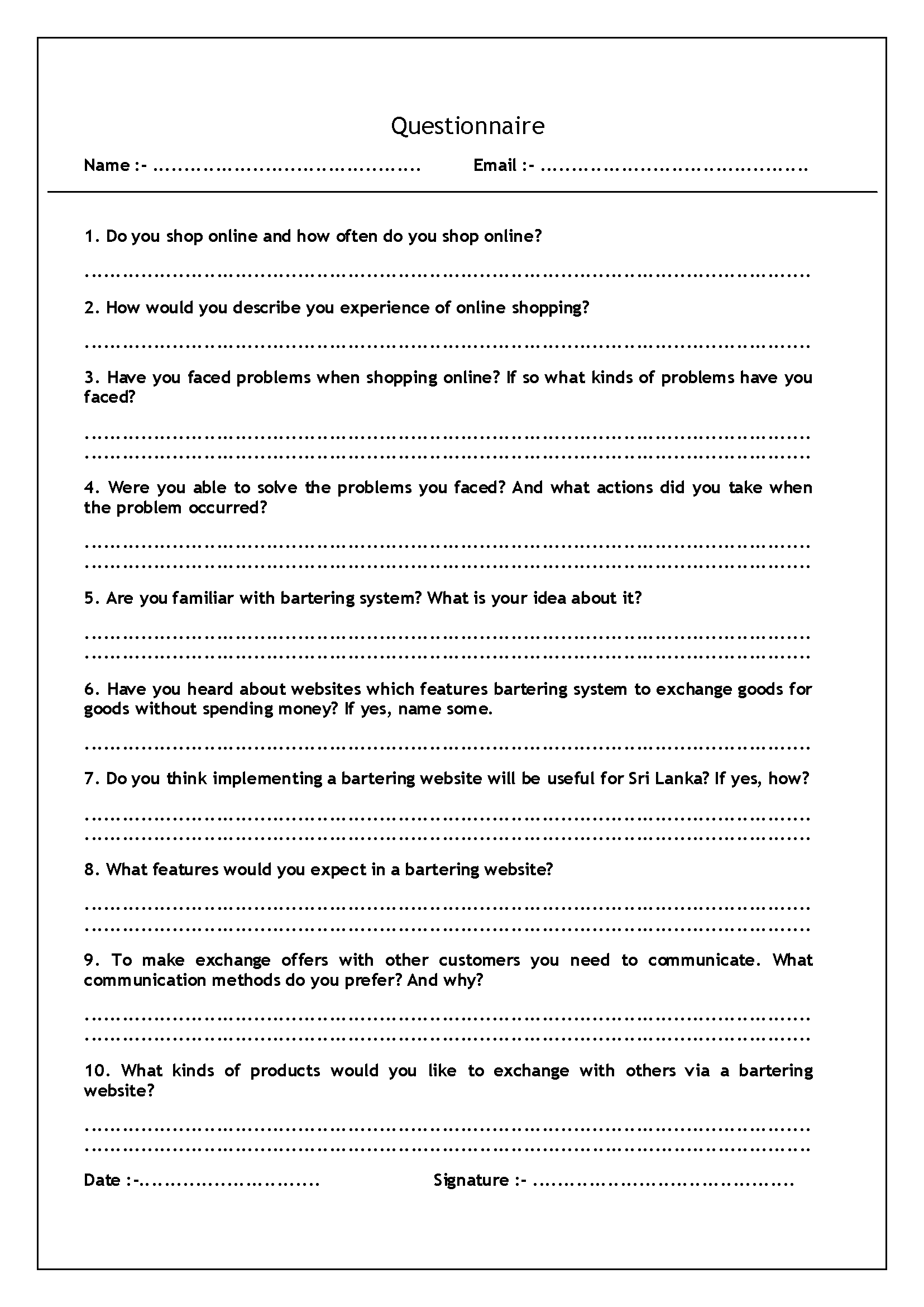
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## Appendix C - Questionnaire



## Appendix D - Test Plan

Test Plan for SWAP website

## Introduction

This test plan is design to define all the test activities of the scope, approach, resources and schedule of the SWAP website. In this plan, the features to be tested, types of testings conducted, person incharge of the testing, the resources and time allocation required for testing and risks involved in the tests are identified.

## Scope

### In Scope

This includes all the functional requirements of SWAP website that needs to be tested.

|  |  |  |
| --- | --- | --- |
| **Module Name** | **Applicable Role** | **Description** |
| View Product Details | Customer | Both registered and unregistered users can view product details from categories page. |
| Admin | Admin can view all product details from categories page. |
| Sign Up | Customer | A customer can sign up to post a product. |
| Admin | An already existing admin has to give permission to sign up for a new admin. |
| View account details | Registered Customer | Can view their only account details using a button on their user profile. |
| Admin | Can view the only their account details and certain details of the registered customers. |
| Edit account details | Registered Customer | Can edit only their account details. |
| Admin | Can edit only their account details. |
| Change password | Registered Customer | Can change only their account password. |
| Admin | Can change only their account password. |
| Post products | Registered Customer | Can post a product |
| Confirm posts | Admin | Can confirm new and updated posts to be added to front-end pages. |
| Reject posts | Admin | Can reject a new or updated post added by customer to not be added to front-end |
| Edit post details | Registered Customer | Can edit details of posts only they posted. |
| Delete Post | Registered Customer | Can delete a post only they posted which is confirmed. |
| Log Out | Registered Customer | Can log out from user account. |
| Admin | Can log out from dashboard. |
| Send message | Customer | Can send message. |

### Out Scope

These features, functional and non function requirements of the system will not be tested.

* User interfaces
* Security and performance
* Responsiveness
* Browser compatibility

## Quality Objective

The objective is to test and verify all the functionality of SWAP website. The functionalities of SWAP website in order to work without errors in real world application.

## Roles and Responsibilities

|  |  |  |
| --- | --- | --- |
| **No.** | **Member** | **Tasks** |
| 01. | Test manager | Manage the test plan.  Identify and allocate proper resources. |
| 02. | Test | Identify test techniques/tools.  Execute the test plans and report errors. |

## Test Methodology

### Test Levels

The types of tests that will performed for SWAP website are;

1. **Functional testing-** To check whether the interfaces works smoothly with the rest of the system and its users. Black box testing will be performed.
2. **API testing**
3. **Database testing**

### Suspension criteria and resumption requirements

If 40% of the test cases failed, all the ongoing and future tests will be suspended until the failed test cases are fixed.

### Test completeness

* Successful completion of test phase is specified.
* Run rate for each test will be 100%.
* Mandatory pass rate will be 80%.

## Appendix E - Test Cases

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test ID** | **Test condition** | **Test Steps** | **Test Input** | **Test Expected result** | **Actual result** |
| 001 | Display product details when 'view' button is clicked. | 1. Open a category page (Electronics, Books or Furniture).  2. Click 'View' button | None | View product details. Successful |  |
| 002 | New users should be able to Sign up using 'Sign Up' form. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: Maxim  Last\_name: Doe  Email: maxim@gmail.com  Password: maxim123  Mobile: 0763983856 | Sign Up Successful |  |
| 003 | Check if user can enter more than 20 characters for first name and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: Maximiliano Evangeline  Last\_name: Doe  Email: maxim@gmail.com  Password: maxim123  Mobile: 0763983856 | Show error message |  |
| 004 | Check if user can enter more than 20 characters for last name and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: Maxim  Last\_name: Doe Christopher Francisco  Email: maxim@gmail.com  Password: maxim123  Mobile: 0763983856 | Show error message |  |
| 005 | Check if user can enter incorrect email format and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: Maxim  Last\_name: Doe  Email: maxim.com  Password: maxim123  Mobile: 0763983856 | Show error message |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test ID** | **Test condition** | **Test Steps** | **Test Input** | **Test Expected result** | **Actual result** |
| 006 | Check if user can enter less than 8 characters for password and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: Maxim  Last\_name: Doe  Email: maxim@gmail.com  Password: max  Mobile: 0763983856 | Show error message |  |
| 007 | Check if user can enter more than 10 characters for mobile number and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: Maxim  Last\_name: Doe  Email: maxim@gmail.com  Password: maxim123  Mobile: 0763983856345333 | Show error message |  |
| 008 | User should be able to edit their account. | 1. Open user account.  2. Click 'Edit Account' button.  3. Edit first name.  4. Edit last name.  5. Edit mobile number.  6. Click 'Save changes' button. | First\_name: Maxim  Last\_name: Doe  Email: maxim@gmail.com  Mobile: 0764443333 | Update Successful |  |
| 009 | Check if user is able to edit the first name with more than 20 characters. | 1. Open user account.  2. Click 'Edit Account' button.  3. Edit first name.  4. Edit last name.  5. Edit mobile number.  6. Click 'Save changes' button. | First\_name: Maximiliano Evangeline  Last\_name: Doe  Email: maxim@gmail.com  Mobile: 0764443333 | Show error message |  |
| 010 | User should be able to change their password. | 1. Open user account  2. Click 'Change Password'.  3. Enter new password.  4. Click 'Save changes' button. | New password: maxim@123 | Password changed Successful |  |

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| --- | --- | --- | --- | --- | --- |
| **Test ID** | **Test condition** | **Test Steps** | **Test Input** | **Test Expected result** | **Actual result** |
| 011 | Check if user is able to change the password with less than 8 characters. | 1. Open user account  2. Click 'Change Password'.  3. Enter new password.  4. Click 'Save changes' button. | New password: max | Show error message |  |
| 012 | Post a product | 1. Click 'Post a product' button.  2. Enter product name.  3. Select condition.  4. Enter product description.  5. Add product image.  6. Select category.  7. Click 'Post product' button. | Product Name: Table lamp  Condition: Good  Description: Black in color, paint has been slightly scratched on the stand.  Image: choose a image file.  Category: Electronics | Post added for verification  Successful |  |
| 013 | Post a product with empty fields. | 1. Click 'Post a product' button.  2. Enter product name.  3. Select condition.  4. Enter product description.  5. Add product image.  6. Select category.  7. Click 'Post product' button. | Product Name:  Condition:  Description:  Image:  Category: | Show error message |  |
| 014 | Check if user is able to delete post which has been posted ;p | 1. Open user account.  2. Click 'Edit' button on post.  3. Click 'Delete' button. | None | Delete post Successful |  |
| 015 | Check if user is able to login with correct username and password. | 1. Enter email.  2. Enter password.  3. Click 'Login'. | Email: maxim@gmail.com  Password: maxim@123 | Login Successful |  |
| 016 | Check if user is able to login with incorrect username and password. | 1. Enter email.  2. Enter password.  3. Click 'Login'. | Email: maxim@gmail.com  Password: maxim123 | Login Failed |  |
| 017 | View account details after login. | 1. Open user account.  2. Click 'Account details' button. | None | View account details  Successful |  |
| 018 | Check if user is able to logout from their account. | 1. Click on 'Log Out' button in profile page. | None | Log out successful. |  |
| **Test ID** | | **Test condition** | **Test Steps** | **Test Input** | **Test Expected result** | **Actual result** |
| 019 | | Check if user is able to delete their account. | 1. Login to the account.  2. Click 'Delete account' button.  3. Confirm delete account. | None | Account deleted successfully |  |
| 020 | | Check if admin is able to login to dashboard with correct email and password. | 1. Open admin login page  2. Enter email.  3. Enter password.  4. Click 'Login'. | Email: admin@admin.com  Password: admin@12345 | Login  Successful |  |
| 021 | | Check if admin is able to login to dashboard with incorrect email and password. | 1. Open admin login page  2. Enter email.  3. Enter password.  4. Click 'Login'. | Email: admin@gmail.com  Password: admin@12345 | Login  Failed |  |
| 022 | | A new admin should be able to sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: John  Last\_name: Doe  Email: admin@admin.com  Password: admin@12345  Mobile: 0765847385 | Sign Up  Successful |  |
| 023 | | Check if admin can enter more than 20 characters for first name and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: John Francisco Christopher  Last\_name: Doe  Email: admin@admin.com  Password: admin@12345  Mobile: 0765847385 | Show error  message |  |
| 024 | | Check if admin can enter more than 20 characters for last name and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: John  Last\_name: Doe Remington Jonathon  Email: admin@admin.com Password: admin@12345  Mobile: 0765847385 | Show error  message |  |

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| --- | --- | --- | --- | --- | --- |
| **Test ID** | **Test Condition** | **Test Steps** | **Test Input** | **Test Expected result** | **Actual result** |
| 025 | Check if admin can enter incorrect email format and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: John  Last\_name: Doe  Email: admin.com  Password: admin@12345  Mobile: 0763983856 | Show error message |  |
| 026 | Check if admin can enter less than 10 characters for password and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: John  Last\_name: Doe  Email: admin@admin.com Password: admin  Mobile: 0763983856 | Show error message |  |
| 027 | Check if admin can enter more than 10 characters for mobile number and sign up. | 1. Enter first name.  2. Enter last name.  3. Enter email.  4. Enter password.  5. Enter mobile number.  6. Click 'Sign Up' button. | First\_name: John  Last\_name: Doe  Email: admin@admin.com  Password: admin@12345  Mobile: 0763983856345333 | Show error message |  |
| 028 | Check if admin is able to confirm new or updated posts by users. | 1. Click on 'Confirm post' option from menus.  2. Click ' Save' button in post. | None | Confirm successful |  |
| 029 | Check if admin is able to delete a post without verifying it. | 1. Click on 'Confirm post' in menus.  2. Click 'Delete' button. | None | Delete successful |  |
| 030 | Check if admin is able to edit their account details. | 1. Open 'Settings' from menus.  2. Click 'Edit Account' button.  3. Edit first name.  4. Edit last name.  5. Edit mobile number.  6. Click 'Save changes' button. | First\_name: John  Last\_name: Doe  Email: admin@admin.com  Mobile: 0764235555 | Update Successful |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test ID** | **Test Condition** | **Test Steps** | **Test Input** | **Test Expected result** | **Actual result** |
| 031 | Check if admin is able to edit the first name with more than 20 characters. | 1. Open 'Settings' from menus.  2. Click 'Edit' button.  3. Edit first name.  4. Edit last name.  5. Edit mobile number.  6. Click 'Save changes' button. | First\_name: John Francisco Christopher  Last\_name: Doe  Email: admin@admin.com  Mobile: 0764443333 | Show error message |  |
| 032 | Admin should be able to change their password. | 1. Open 'Settings' option from menus.  2. Click 'Change Password'.  3. Enter new password.  4. Click 'Save changes' button. | New password: admin@123Admin | Password changed Successful |  |
| 033 | Check if admin is able to delete their account. | 1. Click 'Settings' option from menus.  2. Click 'Delete account' button.  3. Confirm delete account. | None | Account deleted successfully |  |
| 034 | Check if admin is able to logout from their account. | 1. Click on 'Log Out' button in menus. | None | Log out successful. |  |