Software Requirements Specification

for

Itwaar Bazaar Database Management System

Version 1.0

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Revision History

Name	Date	Comments/Reason For Changes	Version
IBDMS SRS v1.0	11-10-2020	Initial draft	1.0

1 - Introduction

1.1 – Purpose:

The purpose of this document is to collect and analyze all assorted ideas that have come up to define the web application "Itwaar Bazaar Database Management System" or IBDMS and its requirements with respect to its users. It will be used to sort out how the system will be utilized to gain a better understanding of the user requirements, layout ideas that might be developed later, and document ideas that are being considered and also those that might be discarded as the product develops. In short, the purpose of this SRS document is to give a step by step outline of the IBDMS, its parameters and objectives to aid the developers, the designers, and the maintainers of the web application. It is also intended to serve as a written contractual obligation by the developing team of what they are going to deliver for the project according to the understanding developed amongst the Instructor, the Teaching Assistant, and the team.

1.2 – Project Scope:

IBDMS plans on being a tool to aid customers, vendors, and the local government by making visits to Itwaar Bazaars much more convenient and simpler. Customers and vendors will benefit from a simple and easy way to look for items and attract customers, respectively. The app will also allow government officials to easily manage the Itwaar Bazaar and find statistics to improve the running operations of the itwaar bazaar. In short, the basic purpose of this project is to serve as a hub for all the activities related to an Itwaar Bazaar. Itwaar Bazaars have always been an important part of the economy, however, there is a lot of potential of the use of technology for the better and smooth running of operations for all the concerned parties.

1.3 – Intended Audience:

The intended audience of this document are:

- Professor Dr Naveed Arshad
- Teaching Assistants for the CS340 course in Fall 2020
- Potential future clients who might want to adapt this project into a full-fledged application

1.4 – Document Overview:

The document provides an overall description of the web application, talks about specific requirements and covers other non-functional requirements. Overall, the document covers the perspective and functionality of the product, the users and its characteristics, assumptions, and dependencies in the project. In specific requirements, we have functional requirements, external interface requirements and use case view of the product. The other non-functional requirements include performance requirements, safety and security requirements, and software quality attributes.

1.5 – Definitions, Acronyms and Abbreviations:

In alphabetical order:

Terms	Definition

Customer	A user who visits the Itwaar Bazaar intending to buy item(s).
Database Administrator	A user who has been assignment authority by the government's relevant ministry to look over and administer the database side of the system
Government Official	A user who has been assigned to manage the Itwaar Bazaar by the government's relevant ministry.
IBDMS	Acronym for "Itwaar Bazaar Database Management System".
Item	A product or good that is being bought or sold in the Itwaar Bazaar
Itwaar Bazaar	A physical retail marketplace is prevalent in South Asia. People gather on Sundays to buy and sell items. The local government manages the marketplace and sets the prices.
Stock	The inventory of items that a vendor has for sale.
Vendor	A user who is selling item(s) in the Itwaar Bazaar.

1.6 – References:

The document refers to some tools that are going to be used in the development of this application. Following is a list of web addresses for further information about them (listed in alphabetical order):

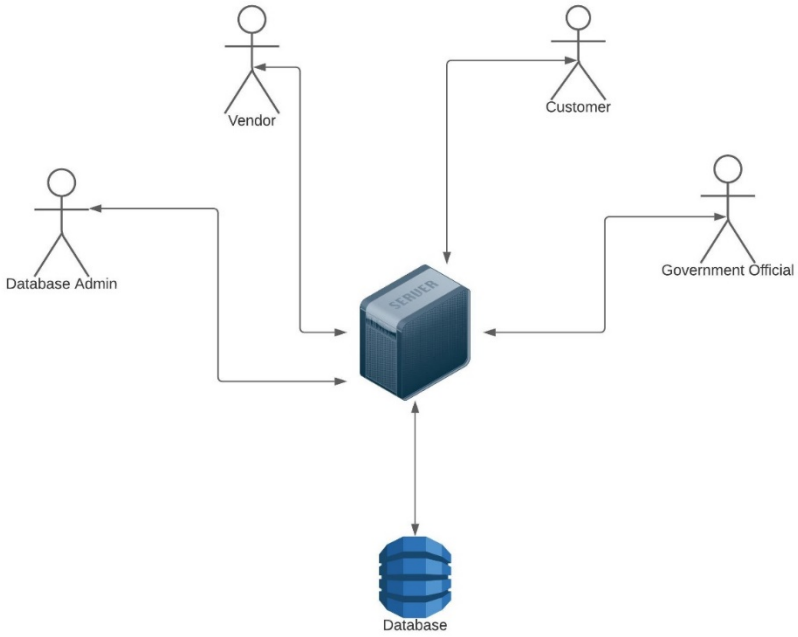
- Apache HTTP Server: https://httpd.apache.org/
- Bootstrap: https://getbootstrap.com/
- Flask: https://flask.palletsprojects.com/en/1.1.x/
- Linux: https://www.linuxfoundation.org/
- Progressive Web Apps: https://web.dev/progressive-web-apps/ and https://developer.mozilla.org/en-US/docs/Web/Progressive_web_apps
- Python: https://www.python.org/
- SQLAlchemy: https://www.sqlalchemy.org/
- SQLite: https://www.sqlite.org/index.html

The document also refers to "Personal Data Protection Bill 2018" in section 2.5 which is available on the website of the Ministry of Information Technology and Telecommunication, Pakistan at: https://moitt.gov.pk/SiteImage/Downloads/Personal%20Data%20Protection%20Bill%20without%20track%20changes.pdf

2 – Overall Description

2.1 – Product Perspective:

This product is a not based on an entirely new idea as there already exist many retail stores and shopping malls that use an application hosted on a web server so that customers may interact with the features provided by that specific store. However, this product brings forward that idea in a whole new perspective i.e. to provide a platform to different stakeholders of Itwaar Bazaar so that all may benefit. The IBDMS makes shopping easier, quicker, and more convenient than ever. Customer can easily view items on sale, compare prices and buy what suits them without having to visit each shop in Itwaar Bazaar. Our database will store all the relevant information at the backend of our web application that would be hosted on a web server. Interactions between the server and different users will be over the web using a web browser. By logging in to the system, a different user can get access rights to different information and features of the system.



2.2 – Product Features:

IBDMS brings together vendors and customers of Itwaar Bazaar on a common platform while also taking the Government on board to make buying and selling of essential items more convenient, faster as well as transparent. This database-backed web application requires different users to sign up before being able to use the features of IBDMS. Vendors can rent a location on a particular day from different time slot options, put up items to sell along with details such as price, quantity available. Vendors can also give a promotional offer to customers based on various calculation metric. The Customer can view all vendors present at any time, compare prices of similar items being sold by different vendors to help decide where to buy items from. Customers will be able to select specific items that they are looking for, vendors they wish to buy from, maximum price they would want to pay for an item etc. To make sure that prices are regulated the government assigned official can acquire data related to vendors and prices of items they are selling and then make sure that the price falls within the officially set range. IBDMS also helps the government official to keep track of the stock availability of each item.

2.3 – User Classes and Characteristics:

There are going to be four classes of users (in order of technical expertise required for the app use):

Customer:

- Customers are going to the users that are going to use the app most frequently and the number of customer users is expected to be the largest.
- Customers are only going to need enough technical expertise that can help them use their device for the web app. The interface is going to simple and intuitive enough for them to use the features:
  - Customer can search for a particular product of interest.
  - Customer can look up vendors present in Itwaar Bazaar in any time slot.

- Customer can use filters to narrow their search/ be more specific about what they are looking for.
- Customers can compare prices for the same item.
- Customers can look up the shop location of a particular vendor/ or all vendors.

Vendor:

- After customers, the number of vendor users is expected to be the highest. They are also going to be one of the most frequent users of the app but less than customers.
- Vendors are also not expected to be very technically expert and the expertise required would be slightly more than the customers because they are going to have to enter their stock data into the web app as well as select time slots and locations which require some basic strategic knowledge about their field of work. However, the interface would still be very simple for them to use the following major features:
  - The product allows vendors to rent a shop in a particular time slot.
  - The product allows vendors to add items that they wish to sell.
  - The product allows vendors to update information related to a particular item they are selling.
  - The product allows vendors to remove an item from their selling items list.
  - The product allows vendors to view items and prices of items being sold by other vendors.

Government Officials:

After Vendors, Government officials are going to be the next in terms of the frequency and number of users. A handful of government officials are expected to be using the app at a particular time, however, there is no limit on the number of such accounts and the government is expected to decide on the numbers as required. The technical expertise required is expected to be on par with the vendors, however, the expertise required, for functions such as fine imposition, would be slightly higher as they need to be able to understand the problems and the local government ministry is expected to provide basic training to these users.

Government Officials have the primary role of granting locations and time slots to particular vendors. They have the authority to expand or shrink locations accordingly. Also, they play an important role in the economy in price regulation. We understand that Pakistan is a poor country and certain upper and lower bounds must be installed to keep the prices stable for economically disadvantaged people.

Database Admin:

- There is only going to be one account for the database admin. The technical expertise required is not high for the basic functionalities, however, there are options such as to directly query the database which requires significant technical knowledge and therefore, it is expected that a qualified IT professional is hired for this position. If not, then a specially trained person might suffice as well. They are going to be able to perform the following tasks:
  - Database Admin can add users through privileged access.
  - Database Admins can add/remove government officials
  - They will have the master control of everything that happens in the database and can control all the functions other actors have
  - They can also directly query for items

2.4 – Operating Environment:

The Itwaar Bazaar Database Management System is a web application that is going to run on a Linux based Apache HTTP server with SQLite as its base relational database system. The web application's back end will be coded using Python and Flask framework along with SQLAlchemy toolkit. The frontend is expected to be implemented using Bootstrap. The web application will potentially be converted to a

progressive web app in a later version so that users can download and use the application more conveniently on their mobile phones or tablets.

2.5 – Design and Implementation Constraints:

The data that is going to be collected about the users will be constrained according to the terms and conditions that the users will agree to when signing up, or in the case of government officials and database administrator, as specified in the contract that will be signed when they are going to be hired by the local government's ministry. The data is further going to be constrained according to the "Personal Data Protection Bill 2018" by the Ministry of Information Technology and Telecommunication, Pakistan.

As far as the design is concerned, the design will be limited by HTML5 and CSS3 standards along with the features implemented in Bootstrap 4 with Saas.

2.6 – User Documentation:

User documentation is expected to be made available by the time this product is in the beta testing phase. The documentation is going to be available as a "Help and How-to" section in the app. This way the documentation can be limited to the specific user group that has their account opened.

2.7 – Assumptions and Dependencies:

The following points have been assumed about the users:

- Users have internet access to use this product.
- Users can read and type English as the User Interface (UI) will be in the English language. A future version may have an option of Urdu and/or other local languages depending on the required functionality according to the region and government regulation in the area of the Itwaar Bazaar.
- Users have basic knowledge and know-how of using mobile/laptop.
- Users have access to a web browser.

As far as the dependencies of the project are concerned. The tools that will be used have been mentioned in the "Operating Environment" section. These tools are extensively used and have great documentation. These projects are also not expected to be shut down any time soon.

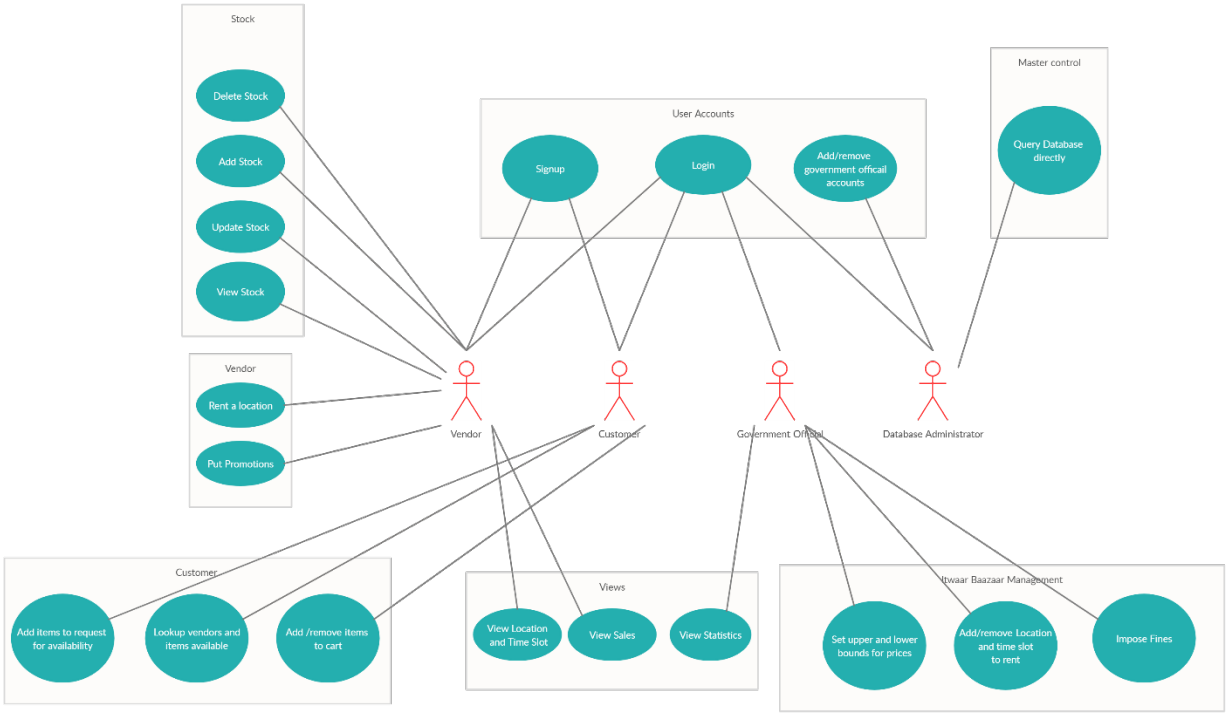
3 – Use Cases and System Features

3.1 – Use Case Table:

Primary Actors	Use Case
Vendor	1. Signup 2. Login 3. Rent a Location 4. Add Stock 5. Update Stock 6. Delete Stock 7. View Sales 8. Put Promotions 9. View Location and time slot

	10. View Stock
Customer	11. Signup 12. Login 13. Look up vendors and items available (sort by and viewing options present) 14. Add item to request for availability 15. Add/remove items to cart
Government Official	16. Login 17. Add or remove locations and time slots to rent 18. View statistics related to Itwaar Bazaar 19. Set upper and lower bounds for prices that vendors must follow 20. Impose fines on vendors for going against set prices and rent agreements.
DB Admin	21. Login 22. Query the database directly 23. Add and remove government official accounts.

3.2 – Use Case Diagram:



3.3 – Use Cases Description:

Use Case ID:	1,11

Use Case Name:	Sign-up		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendors, Customers
Description:	Customer & Vendors need to have an account on the web-based application of Itwaar Bazaar to gain access to content.
Trigger:	Application Started
Preconditions:	1. User has a stable internet connection. 2. User has personal details as required for signing up. 3. User has a web browser to open/access the application.
Postconditions:	1. User has an account that can be used to access specific features of the IBDMS as allowed by the account type.
Normal Flow:	1.0 1. From the application homepage, the user has the option to sign up or log in to an already existing account. 2. The user selects the 'Create an account' option. 3. The user adds in the required data in corresponding fields. 4. Account successfully created.
Alternative Flows:	None
Exceptions:	1.0.E.1 1. Account already exists. 2. When the user is adding details for signing up if there exists a user with same email id the system would return to the homepage.
Includes:	None
Priority:	High
Frequency of Use:	Depends on the number of new users. Once per new user.
Business Rules:	None
Special Requirements:	
Assumptions:	1. User does not have an existing account.
Notes and Issues:	None

Use Case ID:	2,12,16,21		
Use Case Name:	Login		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendors, Customers, Government Official, DB Admin
Description:	Customer & Vendors need to have a login on the web-based application of Itwaar Bazaar to gain access to content.
Trigger:	Application Started
Preconditions:	1. User has a stable internet connection. 2. User knowns email and password used while signing up. 3. User has a web browser to open/access the application.
Postconditions:	1. User successfully enters the IBDMS and can perform various tasks as allowed by user type.
Normal Flow:	2.0 1. From the application homepage, the user has the option to sign up or log in to an already existing account. 2. The user selects 'Login' option. 3. The user adds in the required information in corresponding fields. 4. Login is successful.
Alternative Flows:	None
Exceptions:	2.0.E.1 1. Wrong email/password entered. 2. When the user is adding details for logging into the system, an invalid password or email id would lead the user back to the homepage.
Includes:	None
Priority:	High
Frequency of Use:	Once for every user trying to access the contents of IBDMS.
Business Rules:	None
Special Requirements:	
Assumptions:	1. User has an existing account.
Notes and Issues:	None

Use Case ID:	3		
Use Case Name:	Rent a Location		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	The vendor wants to rent a location in the Itwaar Baazaar so they use this use case
Trigger:	The vendor wants to rent a location to sell their products

Preconditions:	The vendor has an account
Postconditions:	The vendor gets a location in the Itwaar Baazaar
Normal Flow:	1. Vendor enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The vendor chooses to rent a location and time slot in the Itwaar Baazaar 4. The system gives them some locations and time slots, attaches it to Google Maps and tells the vendor to choose from the possible time slots and locations 5. The vendor chooses a time slot and location 6. The system is updated to reflect the changes made by promotion
Alternative Flows:	1. The vendor decides that he/she doesn't prefer this location 2. The vendor clicks on the back button 3. Return to Step 4
Exceptions:	The system informs that no such vendor is registered
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	3-4 times during the day
Business Rules:	None
Special Requirements:	None
Assumptions:	1. The system can find the locations and time slots available in a few seconds 2. The system can log in in a few seconds
Notes and Issues:	None

Use Case ID:	4		
Use Case Name:	Add Stock		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	The vendor adds and item and their quantity to their stockpile
Trigger:	The vendor clicks on adding the item

Preconditions:	1. The vendor has been registered in that specific Itwaar Baazaar 2. The vendor has been logged into the portal 3. The vendor has some extra stock that is not yet entered into the system
Postconditions:	1. The Vendor's stock list has been updated to reflect the new items in his/her account
Normal Flow:	1. Vendor enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The vendor chooses to add stock in his/her account 4. The system asks the vendor to tell it the amount, quantity and price of the items to be added 5. The vendor enters the amount and quantity to be added and enters the price of the item 6. The system updates the items to reflect the new number of items in his/her account
Alternative Flows:	1. The vendor decides that he/she doesn't want to add any items 2. The vendor clicks on the back button 3. Return to Step 2 4. The vendor's price is not in the bounds set by government officials. 5. The system displays a message that the price is not in the bounds set by the government 6. Return to Step 4
Exceptions:	The system informs that no such vendor is registered
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	4-5 times during the whole Itwaar Bazaar
Business Rules:	None
Special Requirements:	None
Assumptions:	1. The system can update the items in a few seconds 2. The system can log in in a few seconds
Notes and Issues:	None

Use Case ID:	5		
Use Case Name:	Update Stock		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor

Description:	The vendor adds updates an item in his/her stock. This can be the case when the vendor has less stock than he/she realizes. This can also happen in the case of theft.
Trigger:	The vendor realizes that he/she has less stock that is initially in the database
Preconditions:	1. The vendor has been registered in that specific Itwaar Baazaar 2. The vendor has been logged into the portal 3. The vendor has a difference in the stock he/she has and the one that is entered in the database.
Postconditions:	The Vendor's stock list has been updated to reflect the new items in his/her account
Normal Flow:	1. Vendor realizes that there is a certain discrepancy between the items in the database and his/her actual stock 2. Vendor enters his/her id and password 3. The system displays the current account information and asks how to proceed 4. The vendor chooses to update stock in his/her account 5. The system asks the vendor what he/she wants to update. 6. The vendor enters what he/she wants to update 7. The system asks the new quantity for the item 8. The vendor enters the new quantity 9. The system updates the items to reflect the new number of items in his/her account.
Alternative Flows:	1. The vendor decides that he/she doesn't want to add any items 2. The vendor clicks on the back button 3. Return to Step 2
Exceptions:	The system informs that no such vendor is registered
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	4-5 times during the Itwaar Baazaar
Business Rules:	None
Special Requirements:	None
Assumptions:	1. The system can update the items in a few seconds 2. The system can log in in a few seconds
Notes and Issues:	The vendor may abuse the system especially since there is no check and balance.

Use Case ID:	6

Use Case Name:	Delete Stock		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	The vendor decides to delete certain items from the database. This can happen to say if at the end of the Itwaar Baazaar some items have not been sold and so the vendor decides to wrap things up and delete items from the database. Or, some items (for example food items) have gone stale. In that case, the vendor might also decide to remove such items.
Trigger:	Many possible triggers. Some examples have been given in the description above
Preconditions:	1. The vendor has been registered in that specific Itwaar Baazaar 2. The vendor has been logged into the portal 3. Vendor notices that he/she wants to wrap up or have some reason for deleting items from the database
Postconditions:	The Vendor's stock list has been updated to reflect the new items in his/her account
Normal Flow:	1. The vendor gets a reason to delete a certain item from the database 2. Vendor enters his/her id and password 3. The system displays the current account information and asks how to proceed 4. The vendor chooses to delete stock in his/her account 5. The system asks the vendor items and the quantities that the vendor needs to update. 6. The vendor enters items and quantities to update 7. The system updates the items to reflect the new number of items in his/her account.
Alternative Flows:	1. The vendor decides that he/she doesn't want to add any items 2. The vendor clicks on the back button 3. Return to Step 2 4. The system informs the vendor that the vendor doesn't have that many items in his/her stockpile 5. Return to Step 2
Exceptions:	The system informs that no such vendor is registered The system informs the vendor that the vendor doesn't have that many items in his/her stockpile

Includes:	1. Authenticate user identity 2. Update stock
Priority:	High
Frequency of Use:	2-3 times during the Itwaar Baazaar
Business Rules:	None
Special Requirements:	None
Assumptions:	1. The system can update the items in a few seconds 2. The system can log in in a few seconds
Notes and Issues:	None

Use Case ID:	7		
Use Case Name:	View Sales		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	The vendor views the amount and type of sales he/she has
Trigger:	The vendor wants to run some analysis on his/her sales.
Preconditions:	The vendor has sold anything since the Itwaar Baazar started
Postconditions:	None
Normal Flow:	1. Vendor enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The vendor chooses to view his/her sales 4. The system shows the vendor's sales
Alternative Flows:	1. The vendor did not have any sales 2. Return to Step 2
Exceptions:	The system informs that no such vendor is registered The system informs the vendor that he/she had no sales
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	100's of times during the day
Business Rules:	None
Special Requirements:	None
Assumptions:	1. The system can display the sales in a few seconds 2. The system can log in in a few seconds
Notes and Issues:	None

Use Case ID:	8		
Use Case Name:	Put Promotions		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	The vendor decides to add some promotions to his/her
Trigger:	
Preconditions:	The promotions are not too high such that they lower the price from the bounds set by the government
Postconditions:	
Normal Flow:	1. Vendor enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The vendor chooses to set promotions 4. The system asks the vendor items and their respective promotions to set 5. The vendor enters items and their respective promotions 6. The system is updated to reflect the changes made by promotions
Alternative Flows:	1. The system informs the vendor that the promotion set by the vendor will lower the price from the bound set by the government. It will not allow it to do this 2. Return to Step 4.
Exceptions:	The system informs that no such vendor is registered The system informs the vendor that this price will lower the price from the bound set by the government
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	3-4 times during the day
Business Rules:	None
Special Requirements:	None
Assumptions:	1. The system can set the appropriate prices in a few seconds 2. The system can log in in a few seconds
Notes and Issues:	None

Use Case ID:	9		
Use Case Name:	View Location and time slot		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	Vendors are going to use the app to confirm the location and time for their shop in the Itwaar bazaar. Location and time are used to find rent for the vendor's stall/shop.
Trigger:	None
Preconditions:	1. The vendor has been registered in that specific Itwaar Baazaar 2. The vendor has been logged into the portal 3. The vendor has a time and location booked for this particular Itwaar Baazaar
Postconditions:	There are a location and time slot available for the vendor
Normal Flow:	1. Vendor enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. Vendor chooses to view his/her the location and time 4. The system displays the location and time allotted to the vendor
Alternative Flows:	1. The system notifies the vendor that there is no location and time slot available for the vendor 2. Return to step 2
Exceptions:	The system informs that no such vendor is registered
Includes:	Authenticate user identity Set up Google Maps for location services
Priority:	High
Frequency of Use:	Once or twice every Sunday when Itwaaz Bazaar is open.
Business Rules:	None
Special Requirements:	None
Assumptions:	Assume that the system can confirm the validity of a credit card in a few seconds.
Notes and Issues:	None

Use Case ID:	10		
Use Case Name:	View Stock		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Vendor
Description:	Vendors will use the app to list the items that they have in stock along with their prices, quantity, and category.
Trigger:	None
Preconditions:	1. The vendor has been registered in that specific Itwaar Baazaar 2. The vendor has been logged into the portal
Postconditions:	There are items in stock for the vendor
Normal Flow:	1. Vendor enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. Vendor chooses to view the list of items he/she has 4. The system displays the stock along with their prices, quantity and category
Alternative Flows:	1. The system notifies that the vendor doesn't have any items in stock 2. Return to step 2
Exceptions:	1. System informs that no such vendor is registered
Includes:	1. Authenticate user identity
Priority:	High
Frequency of Use:	20-30 times on Sunday (the day the market is being opened)
Business Rules:	
Special Requirements:	
Assumptions:	Assume that the system can confirm the validity of a credit card in a few seconds.
Notes and Issues:	

Use Case ID:	13		
Use Case Name:	Look up vendors and items available (sort by and viewing options present)		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Customer
Description:	Customers can have a complete view of items for sale by different vendors. They can choose specific items or items

	from specific vendors to be made visible. Different sorting and viewing options will be available.s
Trigger:	
Preconditions:	1. Customer logged in.
Postconditions:	1. Results of the requested search will be output to the customer.
Normal Flow:	3.0 1. The customer would want to view the items being sold or a group of vendors selling items. 2. The customer would select items/vendors to search for. 3. The customer selects any “sort-by” options if required. 4. System outputs result as per the requirement.
Alternative Flows:	3.1 1. At step 3 of Normal Flow 3.0, there might be a case that the required search leads to no result. 2. The system will not output a result and the user will be returned to the search screen.
Exceptions:	None
Includes:	-
Priority:	Low
Frequency of Use:	5 times per customer on every visit.
Business Rules:	None
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	14		
Use Case Name:	Add item to request for availability		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Customer
Description:	The customer chooses to add certain requests about a particular item because that item is not available on that vendor. This can happen when there is some shortage of some item.

Trigger:	The vendor doesn't have that particular item and the customer cannot find that item from other vendors.
Preconditions:	The customer wants an unavailable item
Postconditions:	A request has been placed about a particular item and the amount of quantity needed for that item
Normal Flow:	1. The customer enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The customer chooses to add requests 4. The system asks the customer the items and the respective requests to place 5. The customer enters items' requests 6. The system is updated to reflect the changes made by the requests
Alternative Flows:	1. The customer decides that he/she wants to cancel the request 2. Return to Step 2
Exceptions:	The system informs that no such customer is registered
Includes:	Authenticate user identity
Priority:	Medium
Frequency of Use:	100's of times during the day
Business Rules:	None
Special Requirements:	None
Assumptions:	
Notes and Issues:	It is possible that a particular item is available in the Itwaaar Baazaar but the customer must go to the other side of it which is quite far away.

Use Case ID:	15		
Use Case Name:	Add/remove items from cart		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Customer
Description:	The customer decides to add items to his/her cart. This has the exact ideology of online shopping carts. The only difference being is that we envision a better system in which the customer doesn't have to go to each vendor to get his/her stuff. The customer can make his/her shopping cart

	and the app will automatically reroute things for the customer. And perhaps even find the best prices for the customer This are perhaps optional functionality that can be included later for convenience of use.
Trigger:	The customer wants to go to the Itwaar Baazaar and wants a convenient system to handle most things he/she carries
Preconditions:	The customer wants to add/remove items from cart
Postconditions:	The correct items to be added and removed are updated in the cart
Normal Flow:	1. A customer enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The customer chooses to add/remove items from the shopping cart 4. The system asks the customer the items whether to add or remove 5. The customer checks what option he/she wants 6. The system asks what items, and their quantities would you like add/remove 7. The customer tells the items to add/remove 8. The system is updated to reflect the changes made by the requests
Alternative Flows:	1. A particular item is not available in the Baazaar 2. The system informs the customer about that item and doesn't let the customer add that particular item
Exceptions:	The system informs that no such customer is registered
Includes:	Authenticate User Identity
Priority:	Medium
Frequency of Use:	All the time the customer is inside the Baazaar
Business Rules:	The prices by the vendors might be shown
Special Requirements:	None
Assumptions:	1. The system can quickly find whether the items are available in the Itwaar Baazaar 2. The system can log in in a few seconds.
Notes and Issues:	None

Use Case ID:	17		
Use Case Name:	Add or remove locations and time slots to rent		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Government
Description:	The government wants to manage how much space and time is given to this particular Itwaar bazaar and, therefore, manage the amount of space and time to be used.
Trigger:	None
Preconditions:	The government wants to add/remove a particular location and time slot in the Itwaar Baazaar
Postconditions:	The government has successfully edited a particular location and time slot
Normal Flow:	1. The Government Official enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The government chooses to add/remove items a particular location 4. The system asks the government from a map what location to add/remove and the time slots to be added/removed 5. The government official edits the location checks about what option he/she wants 6. The system is updated to reflect the changes made by the requests
Alternative Flows:	1. The location is crowded by some other thing 2. The system will inform that such an expansion cannot happen 3. Return to Step 4
Exceptions:	The system informs that no such government official is registered The system informs that such an expansion cannot be made
Includes:	Authenticate user identity Google Maps
Priority:	High
Frequency of Use:	4-5 times before the Itwaar Baazaar starts
Business Rules:	Not trespassing someone else's property
Special Requirements:	Stamped Approval from government officials
Assumptions:	The government official doesn't use any illegitimate means to do something. The system has appropriate google maps integration The system can log in in a few seconds
Notes and Issues:	None

Use Case ID:	18

Use Case Name:	View statistics related to Itwaar Bazaar		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Government
Description:	Another work of the government is to control demand and supply, that is, to notice when a particular product's demand has gotten too much and there are not enough vendors available for that. This will help government officials allocate resources accordingly. These will include pie charts, graphs etc. Anything that the government officials would like to know about the data. This will also include the requests for particular items so the officials can allocate resources accordingly.
Trigger:	None
Preconditions:	1. There is an Itwaar Baazaar 2. There is sufficient amount of requests that can be displayed in a statistical fashion 3. There are vendors in the market selling stuff
Postconditions:	The statistical analysis is displayed
Normal Flow:	1. The Government Official enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The government official chooses to learn about statistics 4. The system displays Itwaar Baazaar statistics 5. When he/she is done looking at the statistics, he/she presses the back button
Alternative Flows:	None
Exceptions:	None
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	Anytime the official wants to see that. Highly varies depends on market fluctuations. Usually not much.
Business Rules:	None
Special Requirements:	None
Assumptions:	The data we have collected from the database can be easily displayed statistically; in any way the government officials want.
Notes and Issues:	None

Use Case ID:	19		
Use Case Name:	Set upper and lower bounds for prices that vendors must follow		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Government
Description:	The government wants to ensure that there are price regulations in these things. This would mean that there are certain upper bounds and lower bounds to prices. Because, if there are no such bounds, then, unnecessary market competition can be created. It also means that such regulations will help in making things cheaper for the poorer population of Pakistan
Trigger:	None
Preconditions:	The Itwaar Baazaar has not started yet. These price regulations must be done before the Itwaar Baazaar has started The government official has an account to observe the database
Postconditions:	The price regulations have been set
Normal Flow:	1. The Government Official enters his/her id and password 2. The system displays the current account information and asks how to proceed 3. The government official chooses to set certain upper and lower bounds on items. 4. The system displays all the items available on the Itwaar Bazaar by the vendors and their respective upper and lower bounds 5. The government official edits the changes that he/she wants in the Itwaar Baazaar system 6. The system is updated to reflect the changes made by the official
Alternative Flows:	7. Negative lower bounds for prices are not allowed 8. Return to step 3
Exceptions:	The system informs that no such government official is registered The system informs that a negative lower bound cannot be placed
Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	1-2 times before the Itwaar Baazaar starts

Business Rules:	1. The government officials must act with caution as to not set the upper bound too high and not to set it too low. 2. The government official must also show integrity and work for the welfare 3. He/She must also be mindful of the poverty present in Pakistan and act accordingly
Special Requirements:	The government official must be capable and have considerable experience handling such things
Assumptions:	1. The government official has the above qualities 2. The system can set up the lower bounds set by the government official in a few seconds and add such constraints for the vendors
Notes and Issues:	None

Use Case ID:	20		
Use Case Name:	Impose fines on vendors for going against set prices and rent agreements.		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Government Officials
Description:	The government wants to ensure that there are prices and rents are standardized and going against the set prices and agreements must be disincentivized. For this purpose, officials will impose fines on vendors.
Trigger:	None
Preconditions:	1. The government official has an account to observe the database. 2. A vendor is going against prices or rent
Postconditions:	The appropriate fine has been imposed.
Normal Flow:	1. The Government Official enters their username and password 2. The system displays the current account information and asks how to proceed 3. The government official chooses ‘impose fine’ option. 4. The app gives options ‘impose fine due to prices’ and ‘impose fine due to rent issue’ 5. The government official selects the vendor from the list of vendors and enters the appropriate fine which the system records in the database.
Alternative Flows:	None
Exceptions:	None

Includes:	Authenticate user identity
Priority:	High
Frequency of Use:	Highly variable. Depending on the frequency of issues that require fines to be imposed.
Business Rules:	The government official must also show integrity and work for welfare.
Special Requirements:	The government official must be knowledgeable about offences and their respective fines.
Assumptions:	The government official has the above qualities
Notes and Issues:	None

Use Case ID:	22		
Use Case Name:	Query the database directly		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Database Administrators
Description:	This use case is for the programmer's perspective. When the actual programmers want to use SQL scripts to access the database to run programs on it or provide an interface for its other actors. This is also used for maintenance-based purposes
Trigger:	None
Preconditions:	1. The database administrator is logged into the account
Postconditions:	None
Normal Flow:	1. The database administrator logs into his/her account. 2. The database administrator runs whatever SQL scripts he/she wants to run 3. The database administrator logs out of the account
Alternative Flows:	None
Exceptions:	None
Includes:	Authenticate user identity
Priority:	Very High
Frequency of Use:	Depends on when updates are needed. Highly variable.
Business Rules:	1. The database administrators must act with caution so they do no such change that can cause the database to malfunction 2. They must provide better functionalities for other actors
Special Requirements:	Qualified IT professionals must do the job
Assumptions:	1. We have provided enough security for only particular people to access this part

	2. We can provide enough control to database administrators so that they have a high degree of control over the database
Notes and Issues:	None

Use Case ID:	23		
Use Case Name:	Add and remove government official accounts.		
Created By:	Group 3: Project A+	Last Updated By:	
Date Created:	8 October 2020	Date Last Updated:	11th October 2020

Actors:	Database Administrator
Description:	Unlike customers and vendors, government officials cannot sign up directly from the app as this position is for authorized personnel only who have been given the job by the relevant ministry of the local government. The government ministry, after selecting individuals for this job, will ask the database administrator to made accounts for government officials. Likewise, if an individual no longer works as a government official then the account should have to be removed by the database administrator.
Trigger:	None
Preconditions:	The database administrator is logged into the account
Postconditions:	The government official's account would be created or deleted.
Normal Flow:	1. The database administrator logs into their account. 2. They select manage government officials' accounts. 3. They select add or remove account option depending on what must be done. 4. They input the required information to identify the government official account. 5. They select save.
Alternative Flows:	None
Exceptions:	None
Includes:	Authenticate user identity
Priority:	Very High
Frequency of Use:	Depends on when updates are needed. Highly variable.
Business Rules:	1. The database administrators must act with caution, so they only add authorized personnel as government officials and do not remove accounts without prior permission from the government.
Special Requirements:	Qualified professionals must do the job
Assumptions:	1. The local government ministry is responsible for hiring and firing government officials.
Notes and Issues:	None

4 – External Interface Requirements:

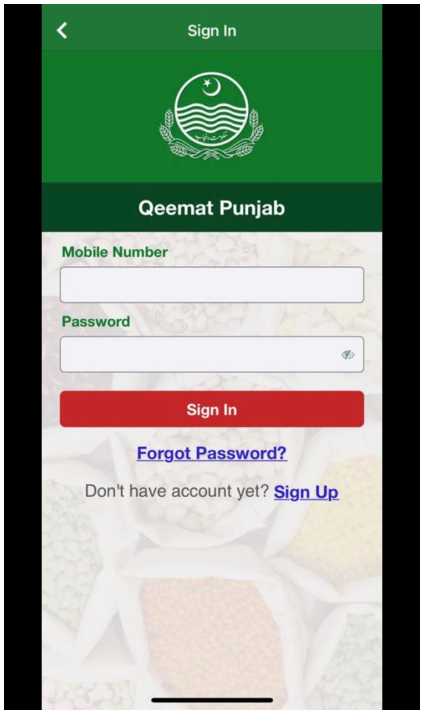
4.1 – User Interfaces:

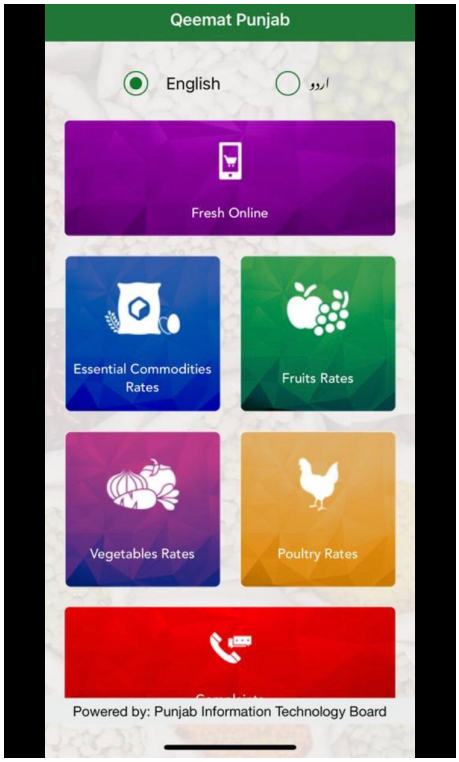
The user interface is a simple GUI design that has a few screens for each user. It is very intuitive and simple.

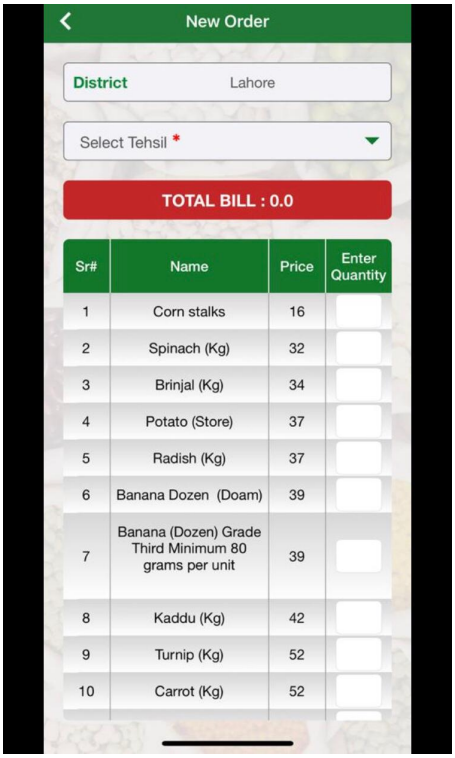
There will be 5 one all-encompassing screen that will be responsible for signup for customers and vendors and login for customers, vendors, government officials and database administrators. Now, customers and vendors will be signing up using their email account. On the other hand, government officials will be contacting database administrators directly on phone or by meeting to add people to the database. They will be given a separate secret user ID and password to log in and update the database.

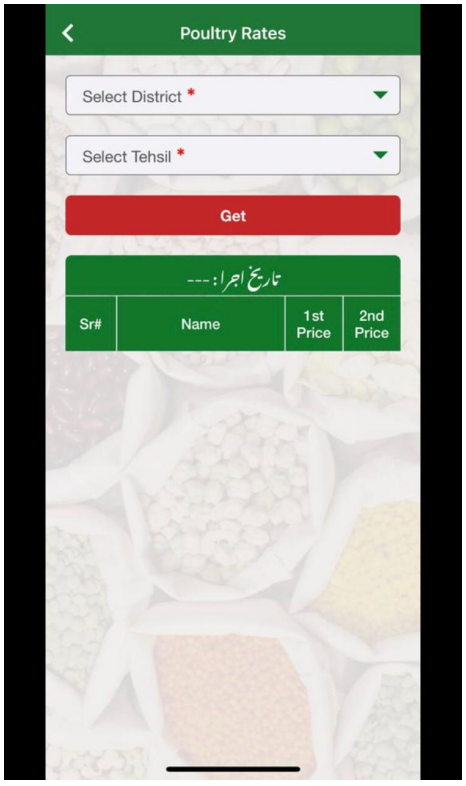
(These images are taken from an app Qeemat Mart. It is an app made by the government with a concept like Itwaar Bazaar)

We feel that this GUI reflects the nature of Itwaar Baazaar and so we aim to make a better but similar GUI. We feel that this app is inadequate and lacks many features and so we also aim to build an improved version consistent with the specifications given by the document.









Vendors

The vendors will have 14 screens. These will include everything: signup, promotions, add, delete, update.

Government Officials

The government official will have 5 screens. These will include everything related to set upper and lower bound on prices, viewing statistics, adding locations and time slots.

Customers

Customers will have 5 screens. These will include adding/deleting from cart, making requests for unavailable items and seeing which vendors have which items and routing for finding vendors.

Database Administrators

The database administrators will be working on an API for the system. These might include 2-3 screens.

4.2 – Hardware Interfaces:

The hardware interface includes any device capable of running a web app. The web app will potentially be converted to a progressive web app in a later version which would then be also available on application stores on smartphones and tablets.

4.3 – Software Interfaces:

The system will be using Google Maps for routing-based purposes.

4.4 – Communications Interfaces:

The main communication will be about updating the database. Other than that only socket interfaces would be used on a higher level by the server of the web app.

5– Other Non-Functional Requirements:

5.1 – Performance Requirements:

- The login for each actor should not take more than 5 seconds
- The system is expected to process around 10000-20000 transactions on that day. The system must hold on to such requirements
- The system is expected to handle at least 50 concurrent requests at the same time
- The portal is expected to accommodate around 100 simultaneous sessions with each session of an average duration of 3 hours
- Each query of update/add/delete/setting price bounds must not take more than 5 seconds

5.2 – Safety Requirements:

- Since we going to have user data, we need to make sure the privacy of users is respected.

5.3 – Security Requirements:

- The privacy should be ensured in the sense that no vendor should have access to any other vendor's item list and is unable to update/add/delete their item list.
- We must also ensure that government officials data should not be able to directly influence the vendor's items. However, they should have certain quotas and all vendors should respect that.
- Users will be required to log in to the system to use it.
- Government officials are unable to see the specific data that is used by particular vendors for privacy's sake.

5.4 – Software Quality Attributes:

- Adaptability – in the sense that whatever a particular government official wants to see in the data is available but also privacy in the sense that the government officials are still unable to see the specific data of the vendors
- Availability – the app should always be available to everyone
- Correctness – the information entered the app should be correct
- Maintainability – the database administrators should be able to maintain the app
- Portability – the app is easy to carry around since it will be available on both IOS and Android. Anyone can carry it around in a smartphone.
- Usability – The app will have a simple GUI design that will help users easily learn and use it. It will not have a steep learning curve since it involves a few screens.
- We think that we haven't made any tradeoffs. One possible tradeoff that can occur is when many users are using it. Then, we may encounter certain issues.
- Additionally, there is also the problem of internet connectivity and updating the database regularly
- The app is easy to learn as it has only a few screens as of now

6 – Other Requirements:

Reuse objectives:

The project is going to be open-source and hosted on GitHub. Anyone can reuse the code base for their projects.

Appendix A – Complexity Analysis:

Use Case Points Calculation Sheet

Unadjusted Use Case Points

Item	Item Description	Complexity	Count	Weight	Weighted Count
1	Number of Actors	Simple	1	1	1
		Average		2	
		Complex	3	3	9
2	Number of Use Cases	Simple	5	5	25
		Average	3	10	30
		Complex	11	15	165
Unadjusted Use Case Points (UUCP)					**230**

Complexity Factor

Factor	Description	Rating 0=Irrelevant 5=Essential	Weight	Weighted Rating
T1	Distributed system	3	2	6
T2	Response performance objectives	4	1	4
T3	End-user efficiency	4	1	4
T4	Complex internal processing	3	1	3
T5	Code must be reusable	3	1	3
T6	Easy to install	4	0.5	2
T7	Easy to use	5	0.5	2.5
T8	Portable	3	2	6
T9	Easy to change	3	1	3
T10	Concurrent	4	1	4
T11	Secure	5	1	5
T12	Access to 3rd parties	2	1	2
T13	User training facilities	3	1	3
Technical Factor (TF) = sum of weighted ratings				**47.5**
Technical Complexity Factor (TCF) = 0.6 + (0.01 x TF)				**1.075**

Environmental Factor

Factor	Description	Rating 0=Lowest 5=Highest	Weight	Weighted Rating
F1	Familiar with Rational UP	2	1.5	3
F2	Application experience	2	0.5	1
F3	Object-oriented experience	3	1	3
F4	Lead analyst capability	2	0.5	1
F5	Motivation	4	1	4
F6	Stable requirements	4	2	8
F7	Part-time workers	0	-1	0
F8	Difficult programming language	2	-1	-2
Environmental Factor (EF) = sum of weighted ratings				**18**
Environmental Value (EV) = 1.4 - (0.03 * EF)				**0.86**

Use Case Points

Use Case Points (UCP) = UUCP * TCF * EV	**212.635**

Appendix B – Contribution Statement:

Group member name (alphabetical order)	Contribution in this document
Huzaifah Nadeem	• Collecting and assorting of use cases from group meetings and discussions • Approximately 10% of use cases description work • Most of the work on “1-Introduction” portion of the document • Review and revision of the document • Appendices
Khawaja Saad Munir	• Approximately 40% of use cases description work • Most of the work on “2-Overall Description” portion of the document • Review and revision of the document
Muhammad Mahen Mughal	• Approximately 50% of use cases description work • Most of the work on “4-External Interface Requirements” and “5-Other Non-functional Requirements” portions of the document • Review and revision of the document

It seems that there was a roughly equal amount of contribution from each member.