Dhirubhai Ambani Institute of Information and Communication Technology

IT – 632 Software Engineering

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Used Goods Buying and Selling Platform
ThriftKart

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ACKNOWLEDGEMENT

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1. INTRODUCTION

The broad definition of e-commerce transactions refers to the selling and buying of products and services over computer-mediated networks while the end process of payment and delivery is managed offline. Electronic Commerce (e-commerce) is defined as the conduct of commerce in goods and services, with the assistance of telecommunications and telecommunications-based tools such as the Internet. E-commerce is often used in a much broader sense, to mean essentially the same as "electronic business" (EB). E-commerce encompasses many areas, which include electronic catalogues that refer to means whereby sellers can communicate their offerings to potential buyers.

ThriftKart is an E-commerce (virtual) store, where customers can browse the catalog and select products of interest. Customers directly buy used goods without any intermediary service over the internet. It allows users to search for products based on different categories, add in cart or save in wish-list. It provides online as well as offline (Cash on Delivery) payment options for registered users. The main idea is to develop a web-based interface for e-commerce of used goods, the user-friendly interface will make the shopping experience pleasant for the users. This project is an attempt to provide the advantages of online shopping to customers of physical stores for buying used goods.

2. OVERALL DESCRIPTION

2.1 PROJECT SCOPE AND DESCRIPTION

This system is designed to provide quality service to the customers and to allow admin a quick and easy means to setup and perform sales and other core business over the internet. It also allows admin to track the e-commerce data on the site, for improving business strategies. The system allows the users to create a free account and update their details as and when required. It also allows users to save products in a wishlist which provides a better experience of searching and buying products at any other time. The current system is confined only to shopping for old products categorically. It allows users to filter products, based on their needs, budget, trend, etc. It can be extended to have an easy to use check out process, with availability of convenient paying options such as UPI, credit, debit, net banking, Cash on delivery, etc. Users can have multiple shipping and billing information saved, which can be updated any time with ease. During the checkout process, users can easily select any of their available shipping options, as well as mode of payment, providing the best buying experience. This system also provides users with records of their previously bought items, tempting them to buy again, thus improving the business in the best way possible. Users can track their orders any time they want and download their order invoice any time, which reduces the risk of losing their billing information, for return/replacement purpose. Feedback is the essence of any system, hence this system comes with contact us features which helps in smooth interaction between a customer and the admin.

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payment, providing the best buying experience. This system also provides users with records of their previously bought items, tempting them to buy again, thus improving the business in the best way possible. Users can track their orders any time they want and download their order invoice any time, which reduces the risk of losing their billing information, for return/replacement purpose. Feedback is the essence of any system, hence this system comes with contact us features which helps in smooth interaction between a customer and the admin.

2.2 USERS AND STAKEHOLDERS
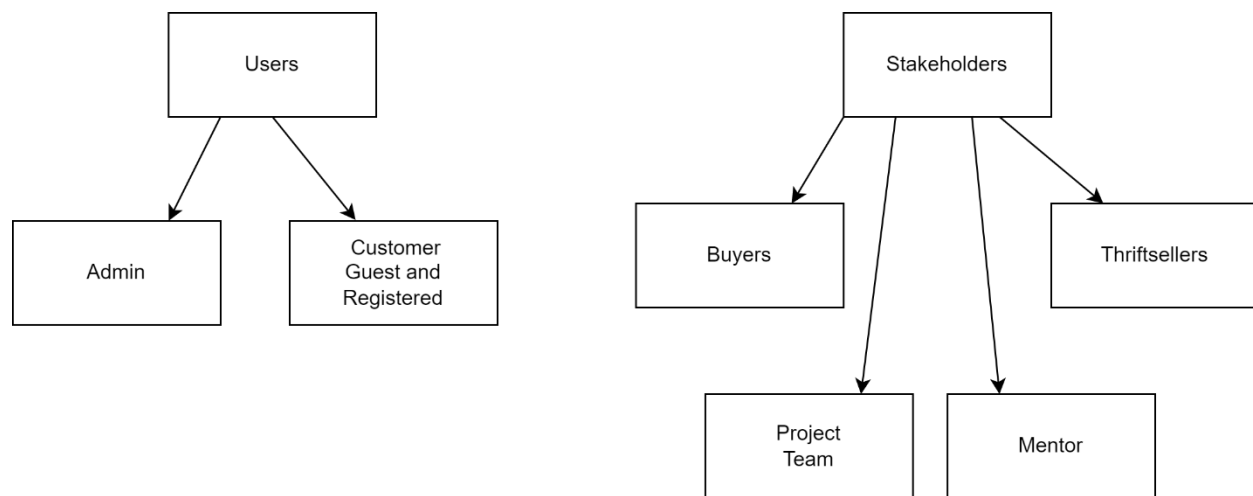
2.3 POSSIBLE FEATURES

2.3.1   SYSTEM FEATURES

The designed application will have an admin view and the public or guest view. The admin view is meant for the administrator to update the products, change prices, remove and add products. The customer view will be accessible to the customers, and they will be able to handle their information such as their name, address, and contact. Also, the customer will be able to order products from the shop. The billing address and shipment details also need to be added.

- Admin can manage the product
- Admin can edit/delete the product
- Admin can see the list of all product
- Customer can see product
- Login for Admin
- Logout Functionality
- Customers can add products to wishlist
- Customers can pay using online transactions

2.3.2 SOFTWARE INTERFACE

The following will be the technology stack used in this application:

Tools	Technologies
UI/UX Design	PhotoShop
Backend	NodeJS , Express,Js, JavaScript
Frontend	HTML, CSS, JavaScript, ReactJs
Database	MongoDB
Version Control System	GitHub
IDE	Visual Studio Code
Category	Web Application

2.4 REQUIREMENT ELICITATION TECHNIQUE

Requirements elicitation is perhaps the most difficult, most error-prone and most communication intensive software development. It can be successful only through an effective customer-developer partnership. It is needed to know what the users really need.

There are number of requirements elicitation methods. Two of them are :
- Brainstorming Sessions
- Questionnaire

2.4.1 Questionnaire

A critical part of preparing for requirements elicitation is identifying a list of questions. Here are the Ecommerce Website Development Questionnaire.

1. What kind of visitors are you expecting to your ecommerce website (income, interests, gender, age, etc.)?

   This first question helps you to start thinking about the potential customers visiting your ecommerce website and therefore helps you to begin to create 'customer personas' that will help your web development company to start to construct a plan for the ecommerce website in the best way to serve your

customers' needs that you get from your 'customer personas'. Obviously, an ecommerce website aimed at teenagers will be very different from an ecommerce website aimed at working mums or an ecommerce website aimed at purely business users. You should aim to supply as much information as you can on your potential and ideal customers, as this will inform on design aspects of your ecommerce website.

2. Name two or more of your competitors, and describe how you differ from them?

   Competition on the internet is high, with everyone vying for customers and profits. That means that the ecommerce website you want and that will be designed and built by your web development company will be compared to a lot of other ecommerce websites in the same marketplace. So, the point here is to make your ecommerce website memorable and stand out from the crowd by serving your customers' needs in the best way possible and marketing your unique selling proposition (USP) or unique selling point. You do not want to copy from your competitors, but use their ecommerce websites to spark your own ideas that you can then discuss with your web development company.

3. What actions do you want visitors to take on your ecommerce website?

   You can create an ecommerce website for selling products, providing information, educating or making a website visitor fill in a form. Depending on your customer's needs the website architecture, functionality and design can vary substantially. Do you need an ecommerce website to sell your products or a content management system (CMS) to run a business blog where you can do all the updates yourself? Your website development company will be able to advise you on all the options available to you based upon the required actions that you want your customers to take on your ecommerce website.

4. What is your budget and your deadline for completing the ecommerce website?

   There are lots of customers out there with very unrealistic expectations. They want an ecommerce website comparable to say Amazon, eBay or Etsy with almost no budget, in a week. You need to be realistic with your budget and the anticipated deadline. The website development company's purpose is to make it clear what a realistic budget and timeline is for your software development project. If your quote seems to be too high, then you probably have unrealistic expectations, so you should either put more money into the project or scale the project back and maybe aim for a minimal viable product (MVP) version of your ecommerce website.

5. What features should your ecommerce website contain (user registration, file upload, contact form, photos, videos, etc.)?

   You will need to know what features you would like your ecommerce website to have and manage your expectations accordingly. A small company 'brochure' style website doesn't need to have as many features as say a complex ecommerce website connecting to multiple databases and integrated with multiple application programming interfaces (APIs). Again, your website development company can advise you, normally based upon previous work they have done, so it is

important to research web development companies that have done work similar to what you are envisioning for your ecommerce website.

6. Please list the names of three sites that you like and explain what you like about them?

   Very often you already know what you want your ecommerce website to look like or be similar to, so there's no need to reinvent the wheel if you find an ecommerce website design that you really like. You shouldn't (for many reasons including copyright laws) directly copy an ecommerce website, but you can use what you like about a particular ecommerce website to spark ideas for your own ecommerce website. Your web development company will be able to advise you on what they feel are the best design decisions for your website based on your customers' needs and the customer experience (CX) you want your customer to have.

7. Do you have any colour preferences or look and feel for the ecommerce website?

   Similar to the above question, you already have your own preferences on what colours you want on your ecommerce website and its general look and feel. Again, by talking to your website development company they will be best placed to advise you on the colour preferences and their related psychological implications and the general look and feel of your ecommerce website and its effect on the customer experience (CX).

8. Who will be the contact person for this project and what will be the turnaround time?

   Right from the start you'll need to have a contact person for your software project, whether that person is a Project Manager (PM) or a Product Owner. There's nothing wrong if you have a number of people that are responsible for the software project. But to avoid multiple and often conflicting inputs you need to pick a contact person who will be the main contact with the website development company. You will also need to agree with the website development company on the milestones for the project and specify the timeframe for getting replies from your contact person otherwise your project can last a very long time and miss deadlines.

9. What do you NOT want on your ecommerce website in terms of content, colours, graphic elements, etc.?

   Like the question above, you already have an idea on what elements you don't want to include on your ecommerce website, some people can't stand the colour blue or stock photos of office people, while others will like the colour blue or stock photos of office people. Let your website development company know what you don't want on your website, then they will not waste time building a website that you don't like.

10. Who will be responsible for maintaining the ecommerce website and how much time will they have for it?

Say you want a customer forum on your ecommerce website, it will require some time to moderate so the right question is do you have the time and staff available to manage a forum? What is the skill level of the person who will update your website? Can he or she code HTML, CSS, JavaScript, PHP, C#, ASP.NET or do you need a content management system (CMS) so it is easy for your staff to update the website themselves? These are important questions, as a website isn't just a static thing, it is constantly growing and will require updates and maintenance for its lifetime.
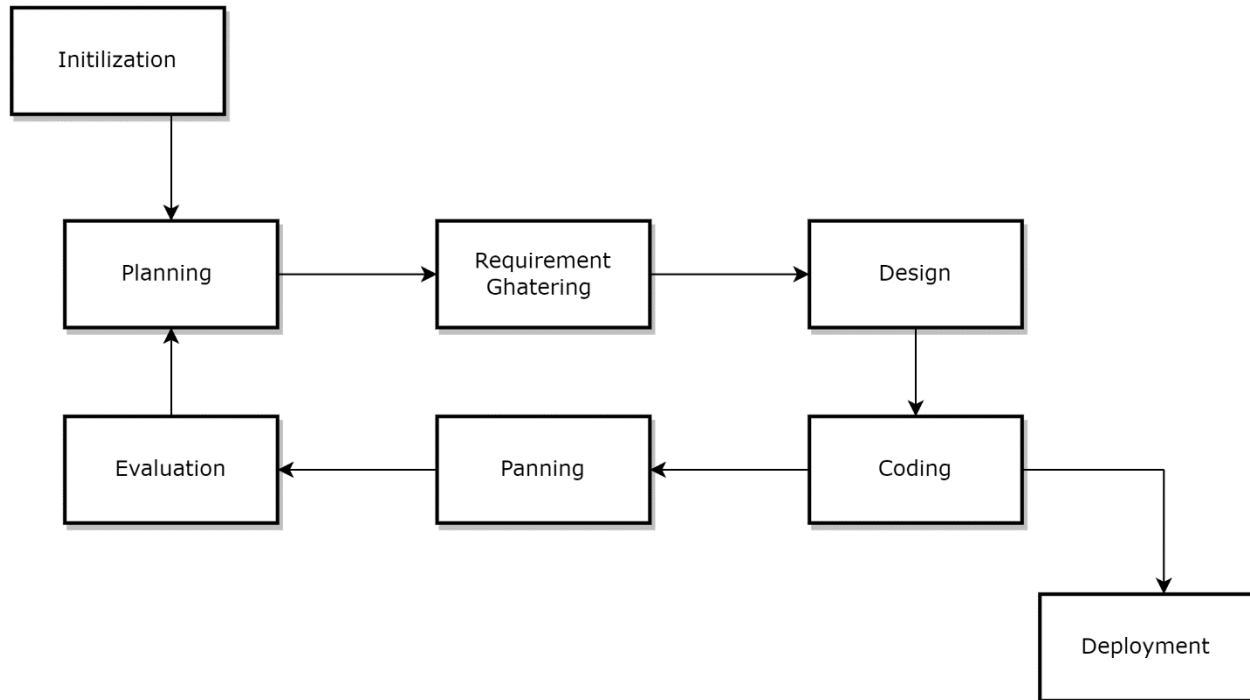
2.4.2   Brainstorming

We have used Brainstorming in requirement gathering to get as many ideas as possible from our group. Generally it's identify possible solutions to problems, and clarify details of opportunities.

After reviewing Questionnaire we used mind mapping technique to explore the ideas. we write down the ideas and in the end we did the evaluation of ideas and decided possible strategies to solve problem

2.5 PROCESS MODEL

ITERATIVE PROCESS MODEL

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┌──────────────┐
│  Initilization│
└──────┬───────┘
       │
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┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│   Planning   │─────▶│ Requirement  │─────▶│    Design    │
│              │      │  Ghatering   │      │              │
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│  Evaluation  │◀─────│   Panning    │◀─────│    Coding    │───┐
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                                                       │  Deployment  │
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1. **Requirement and Planning Stage:**

During this phase, scope of the project is decided and technical requirements are gathered and evaluated for feasibility.

2. **Design Stage:**

In this stage, the project flow and the system design is decided with the help of Use - Case Diagram and the Requirements (Functional and Non - Functional Requirements) followed by UI Design.

3. **Coding Stage:**

All of the requirements, planning, and design plans are executed and coded. During the code development, they must implement a unit test at each level which will followed by the testing stage.

4. **Testing Stage:**

In this stage the developer and the tester has to ensure that any bugs created while coding are fixed and no new bugs are created. We can also check in with the project stakeholders to run some tests and inquire about any feedback they may have.

5. **Evaluation Stage:**

In this stage evaluation for all the previous stages is done. The system is examined by the development team, and other teams responsible for developing the project to see if the outcomes satisfy their expectations.

Reason For Choosing Iterative Process Model:

✓ Requirements of the system are clearly defined and understood for the early stages.

✓ Some functionalities or requested enhancements may evolve with time.

✓ In an iterative model we are building and improving the system step by step. Hence, we can track the defects at the early stages. This avoids the downward flow of the defects.

✓ After going through all the stages a new requirement plan is implemented as a part of the next iteration.
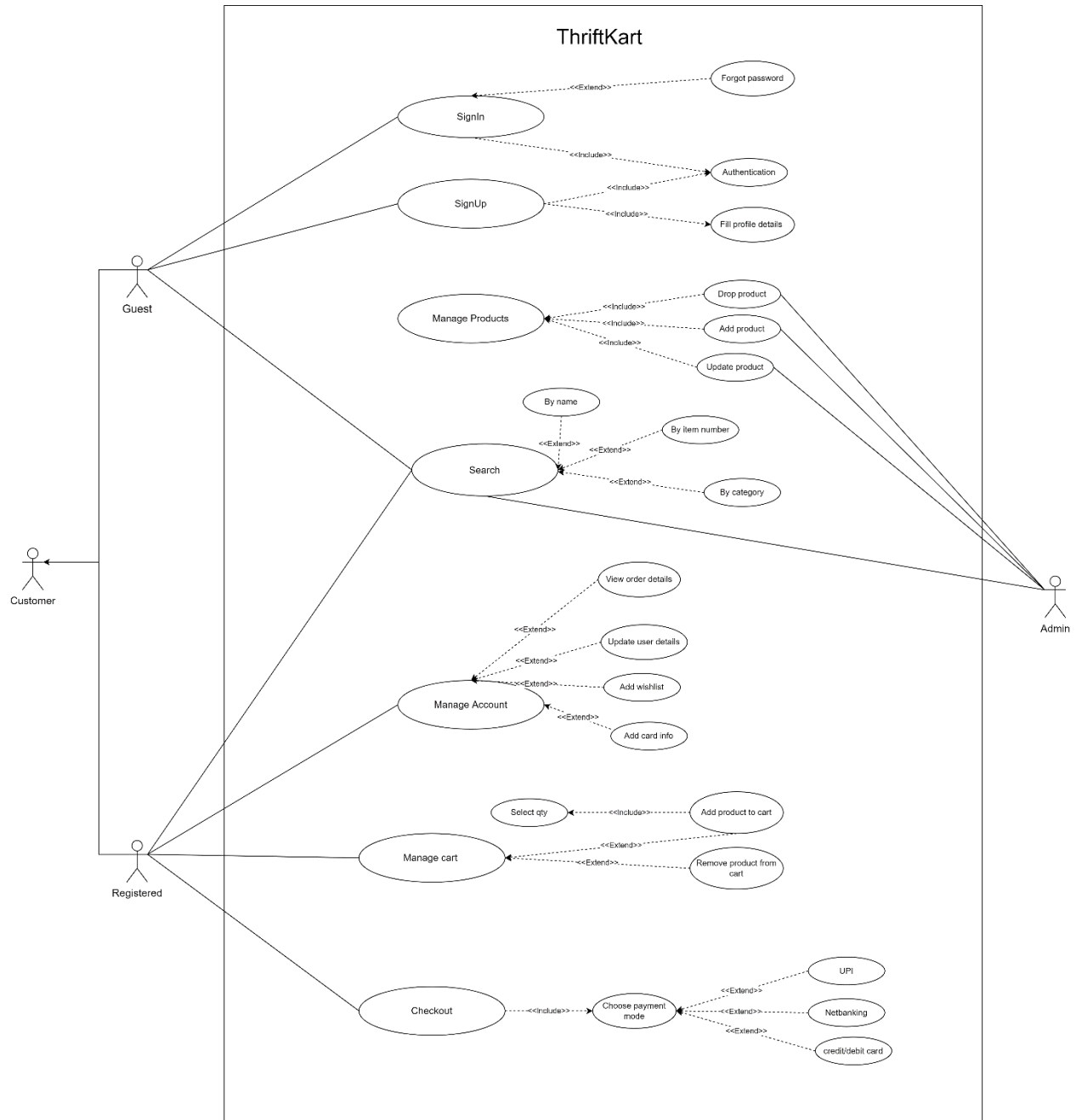
3. **FUNCTIONAL REQUIREMENTS**

3.1 FUNCTIONAL REQUIREMENTS

Identification of functional requirements: The Functional Requirements describes the functionality of a system that how a system should react to a particular set of inputs and what should be the corresponding output. The above problem statement gives a breif description of the proposed system. And after analysing, we might easily identify some of the basic functionality of the system:

RN	DESCRIPTION
FR1	Ability to add/edit all personal information
FR2	Allow customers to set default shipping and billing addresses.
FR3	Provide "remember me next time" auto-login functionality (future scope).
FR4	Ability to view "pre-shipping" order status.
FR5	Provide progress bar for filling out first time registration (future scope).
FR6	Customer authentication using OTP sent on their emails.
FR7	Ability to search on product name, keywords, description text, item number, partial item number and/or category keyword.
FR8	Registration Page allows user to create an account (user get access to login functionality).

FR9	Registering users gives email, fname, lname and password.
FR10	Login Page It allows user to login (user get access to the checkout page and payment functionality).
FR11	Payment can be done online (done while purchasing product) and offline (after receiving the product).
FR12	Payment status and transaction id (online purchase) will be maintained.
FR13	Product will be delivered to the default address, given during registration.
FR14	Customers can select a custom address for the particular delivery.
FR15	Shipping status will be shown to the customers which are updated by the admin.
FR16	Adds details about address and the user's number.
FR17	Adds a product in the shopping cart for a buyer, given the buyer Id.
FR18	Adds a product to the wishlist of a buyer, given the buyer id.

3.2 USE CASE DIAGRAM

3.3 USE CASE DESCRIPTION

3.3.1   Sign Up

Use Case name	Sign Up
Brief Description	A user who wants to purchased something from website, must have to register by filling appropriate details
Actors	Guest User
Pre condition	The user must have fill all the details in form and should have unique email id which should not be already registered
Post condition	If user registered successfully then should be redirected to login, else no change in state
Basic Flow	1. System will request the user to fill out the form 2. Email will be sent to user & system will verify the email 3. Successful registration will be notify
Alternative Flow	1. If email id already registered then it will redirect it to login 2. If any details are not filled accordingly to it was asked then account not created notification will be sent and user may restart the process

3.3.2   Sign In

Use Case name	Sign In
Brief Description	To access the system and features user have to log in into the system by using valid email id and password
Actors	Registered User , Admin
Pre condition	User must have registered
Post condition	If entered credentials are valid details redirect to relevant homepage or else no change in current state
Basic Flow	1. System will ask user to enter credentials 2. System will authenticate the credentials 3. Redirected to relevant homepage
Alternative Flow	1. If credential are not valid or empty than system will notify the user with the error message 2. And user can restart the process

3.3.3 Manage Product

Use Case name	Manage Product
Brief Description	Admin can add the product and their description , update product details and can remove the products
Actors	Admin
Pre condition	User must be admin and logged in to the system
Post condition	If use case successfully ended then Product details should be updated in system
Basic Flow	1. System will display the added product 2. User can select operation (add/update/delete) , according to that will redirected to particular operation page 3. User have to fill appropriate details if asked 4. If all the details or operations are correct then details will be updated
Alternative Flow	1. If user filled wrong details or done invalid operation 2. Then related error message will be shown and data will not be updated

3.3.4 Search

Use Case name	Search
Brief Description	User can search the products and according to that result will be shown
Actors	Registered user,Admin
Pre condition	User must logged in to the system
Post condition	If product is available then it should be show to user
Basic Flow	1. User will choose to search for product 2. User will guided to select required criteria to search for the product 3. According to that criteria if product will available then it must be displayed to user
Alternative Flow	1. If user filled wrong details or products are not available then according to that error message will be shown to the user.

3.3.5 Manage Account

Use Case name	Manage Account
Brief Description	User can update profile details, add account details and can see order details for their account
Actors	Registered user
Pre condition	User must be log in to the system
Post condition	If use case successfully ended then profile details should be updated in system or details should be displayed according to request
Basic Flow	1. System will display the profile details in profile tab 2. User can select operation (update profile or add card details ,view order details) , according to that they will redirected to particular operation page 3. User have to fill appropriate details if asked 4. If all the details or operations are correct then details will be updated or displayed
Alternative Flow	1. If user filled wrong details or done invalid operation 2. Then related error message will be shown and data will not be updated or displayed

3.3.6 Manage Cart

Use Case name	Manage cart
Brief Description	User add or remove products from the cart
Actors	Registered user
Pre condition	User must be log in to the system and product should be available
Post condition	If use case successfully ended then cart will be updated
Basic Flow	1. User will select product or select add cart option 2. Quantity will be asked and added in to the cart 3. If user select remove from cart option then product will removed from the cart
Alternative Flow	1. If product is not available then error message should be display and should not be added into the cart

3.3.7 Checkout

Use Case name	Checkout
Brief Description	User can start the shipping process for the product added into the cart
Actors	Registered user
Pre condition	User must be log in to the system and product should be already added into the cart
Post condition	If use case successfully ended then order will be placed
Basic Flow	1. User will process the checkout 2. Shipping address will be asked or it will select default 3. Payment option should be select 4. according to that if payment was done then order will be placed
Alternative Flow	1. If payment is not done or canceled then user can select other option or redirect to the beginning 2. If product is not available then message should be display and should not be ordered

4. NON FUNCTIONAL REQUIREMENTS

Identification of non-functional requirements: The non-functional requirements are not directly related what functionalities are expected from the system. However, NFRs could typically define how the system should behave under certain situations. It is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. It will define constraints which affect how the system should do it.

RN	Comments	Description
NR1	Security	System should be able to provide authenticity and permissible access to data and operation.
NR2	Integrity	Integrity of data will be provided and operation can be done 24 * 7.
NR3	Performance	System should be able to handle multiple user requests parallely.
NR4	Scalability	Server should be able to handle a large number of requests without performance degradation.
NR5	Portability	System shall be independent of any operating system and will work on any browser.
NR6	Maintainability	Maintenance/Operations costs should be minimal for the website.
NR7	Reliability Requirement	The system should provide a reliable environment to both customers and owners.

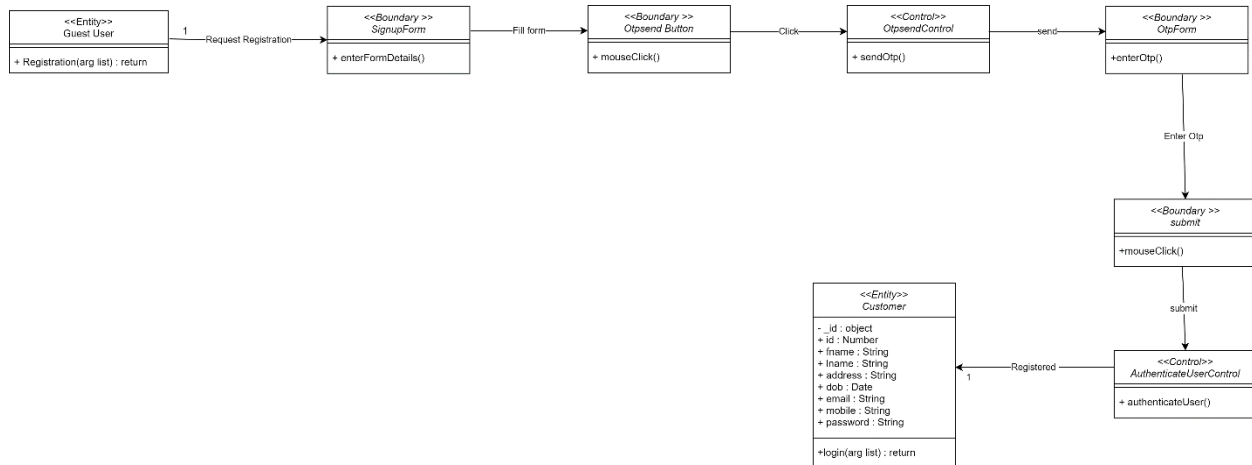|		All orders should be reached at the admin without any errors.
NR8	Usability	Website should be easy to use, even for a non-technical person.

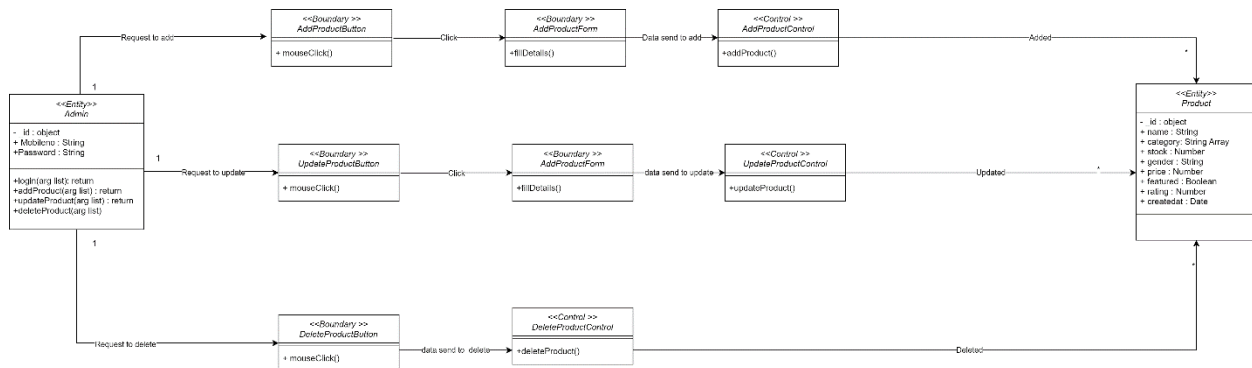## 5. ANALYSIS DESIGN DOCUMENT
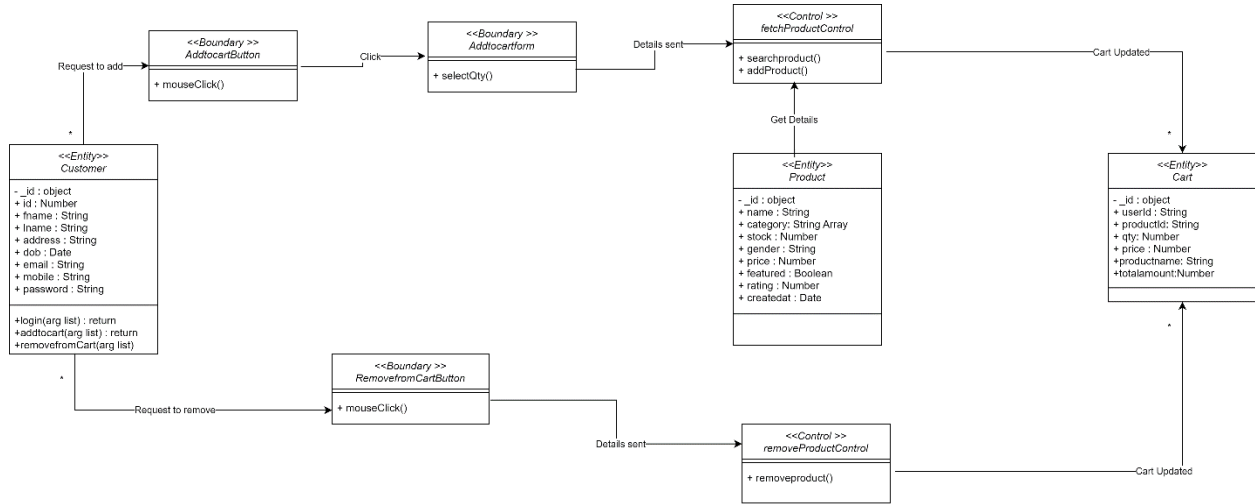
5.1 ANALYSIS CLASS DIAGRAM

5.1.1   SIGN IN
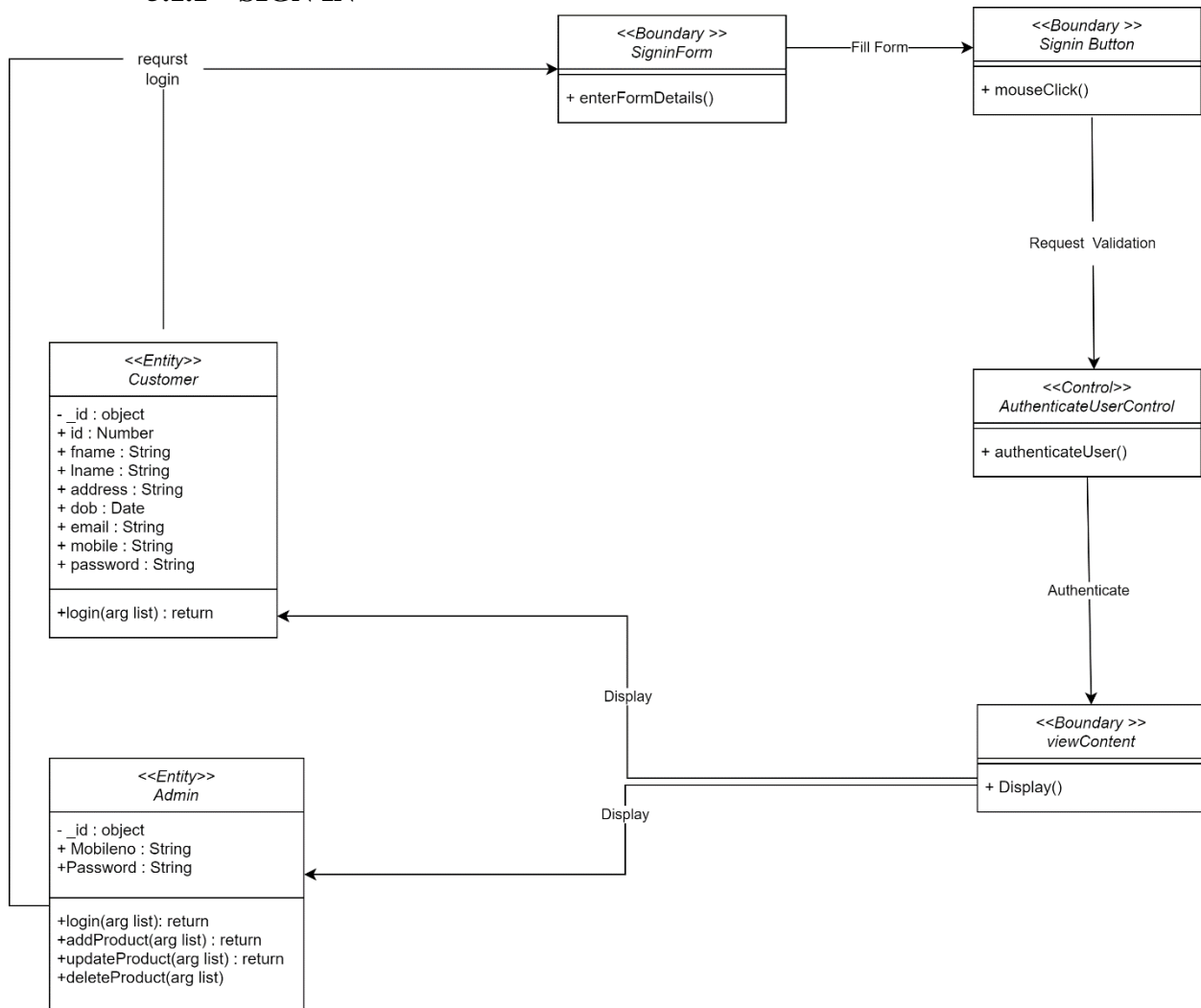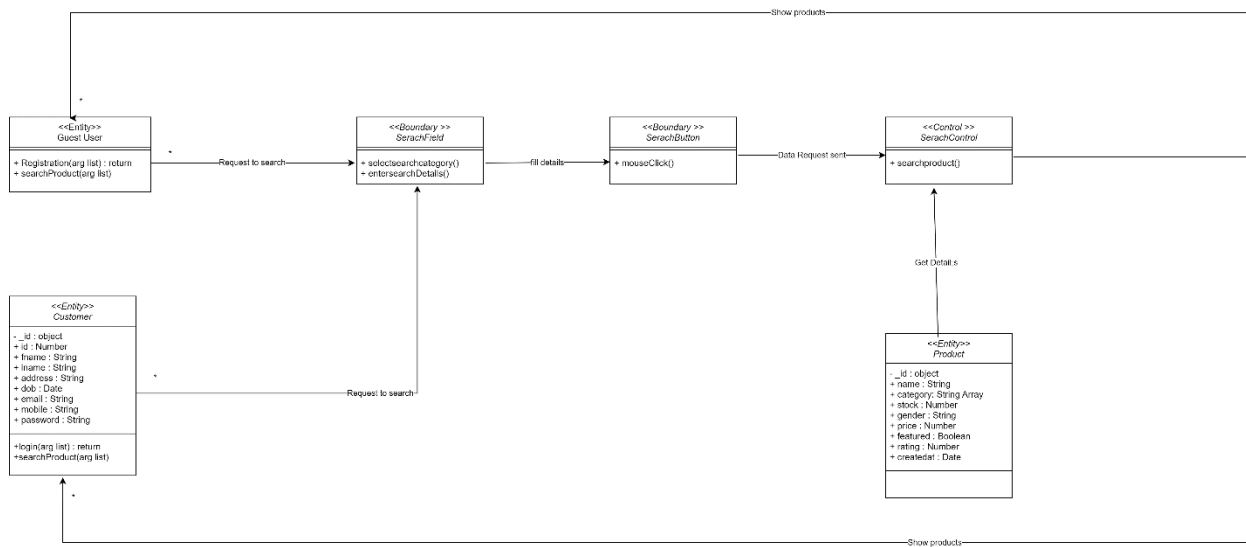
5.1.2   SIGN UP

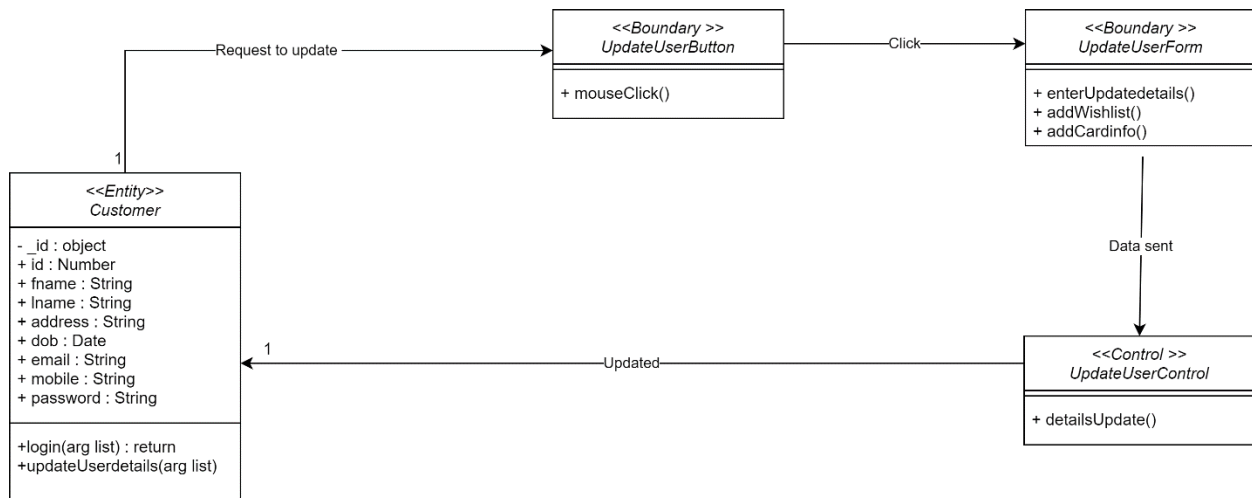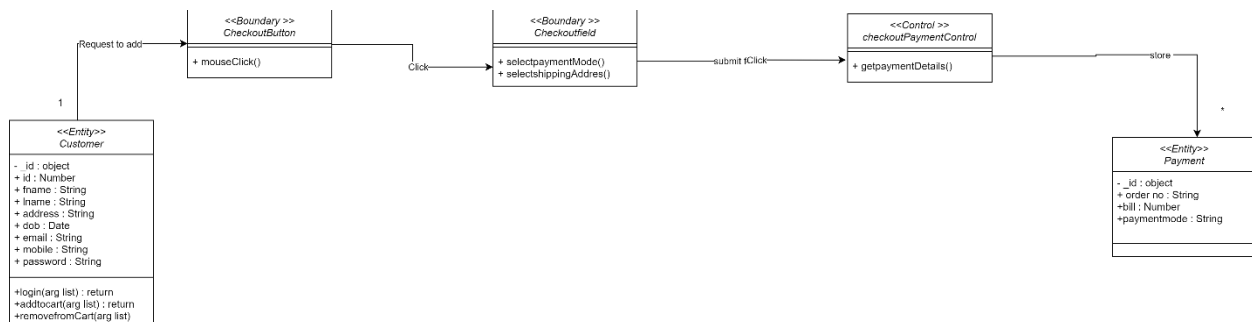### 5.1.3   MANAGE PRODUCT
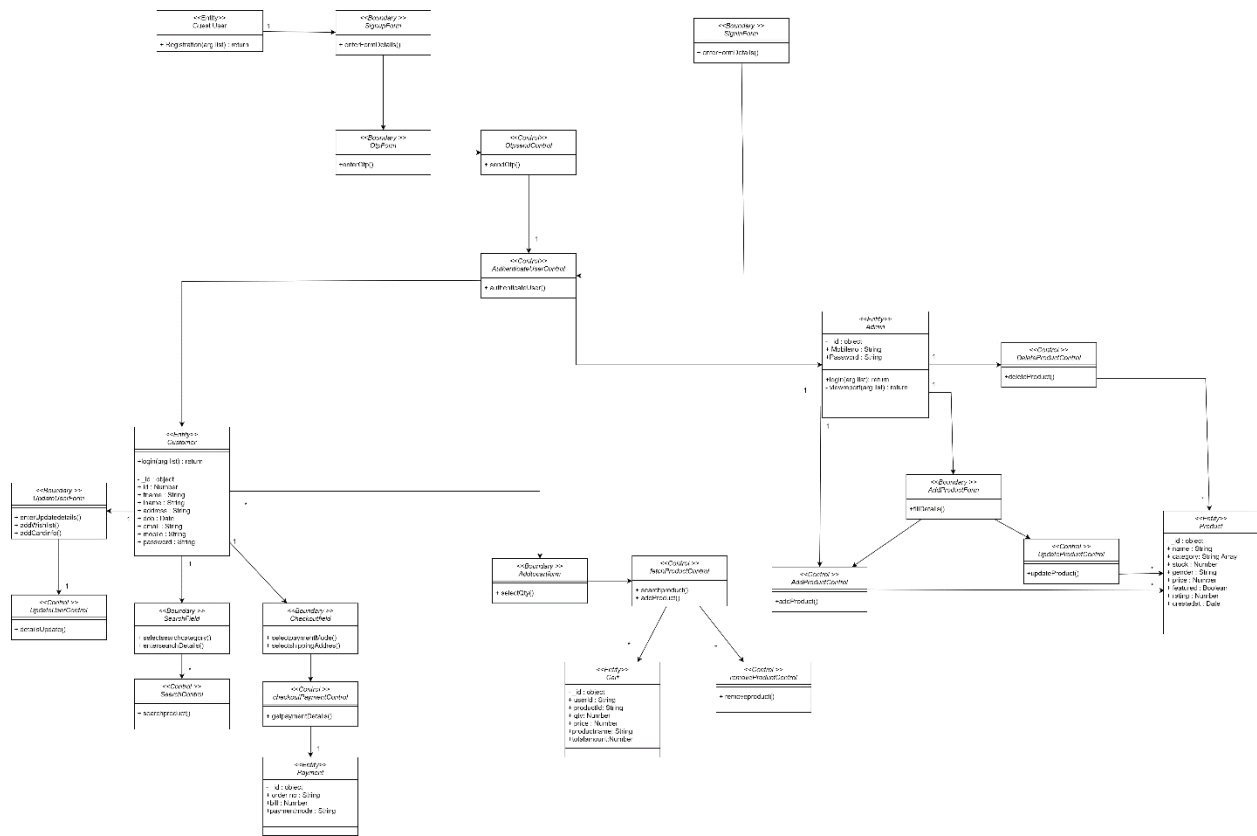
5.1.4   MANAGE CART
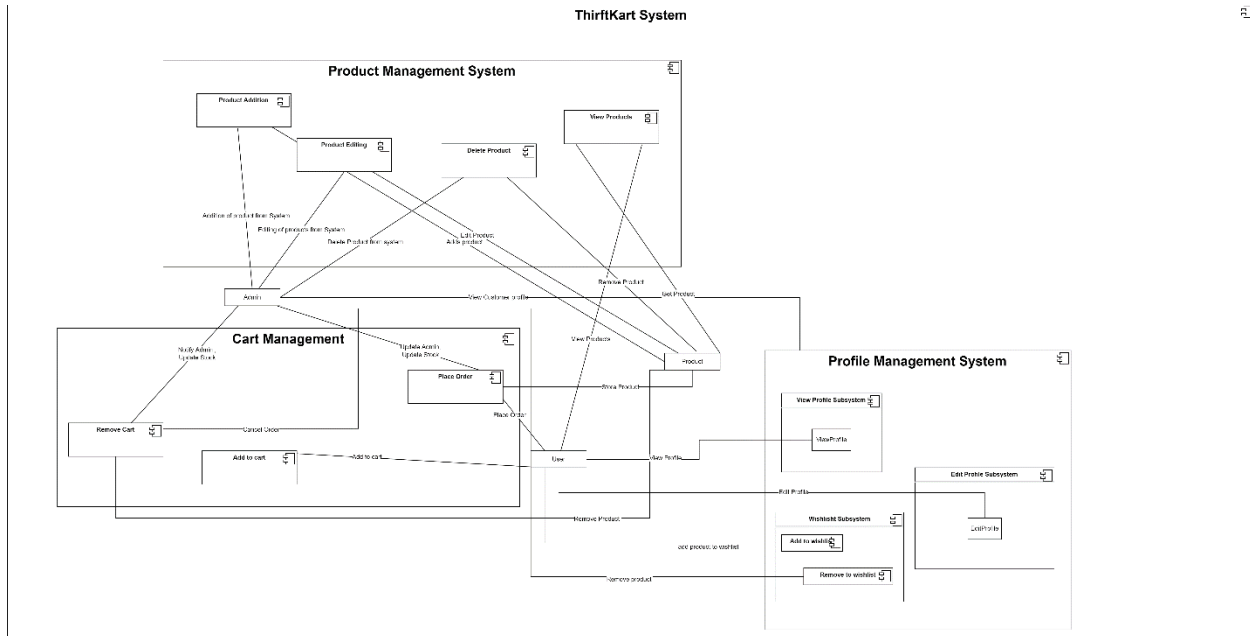

5.1.5   SEARCH

5.1.6 MANAGE ACCOUNT
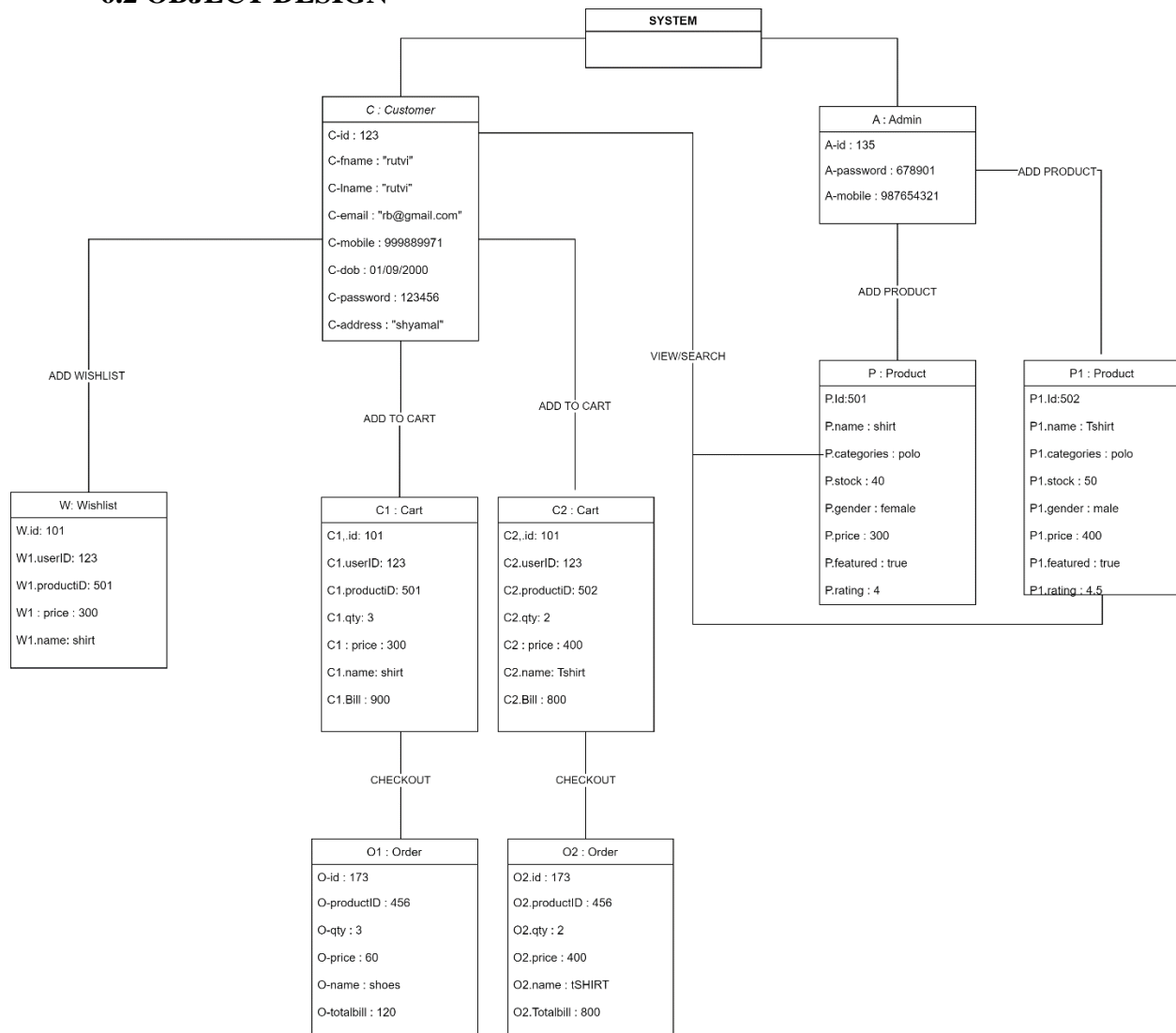

5.1.7 CHECKOUT

5.2 COMPLETE ANALYSIS CLASS DIAGRAM

6. SYSTEM DESIGN

6.1 SUB SYSTEM DESIGN

6.2 OBJECT DESIGN

7. TESTING PLAN

White Box Testing:-
Unit Testing
Each unit test is tested by the thunder client.
This process is done by testing each module of our software project. Through unit testing, we have confirmed the performance of each unit component.

Integration Testing:-
In integration testing, the testing is done on combined unit test cases.Through integration testing, we have obtained the results about whether the modules work in combination or not.

Black box testing:-

In black-box testing, the input is taken from the frontend part and tested whether it fulfills the required requirements. This is done by taking the input from the tester and checking the conditions and based on that some output is generated. If the input satisfies the required requirements then the data flow will not be affected. If the input does not satisfy the required requirements then due to validations the data flow is affected and an alert message is displayed stating the corresponding message.

8. **TESTING STRATEGIES AND FRAMEWORK (WHITE BOX TESTING AND BLACK BOX TESTING)**

8.1 White Box Testing

White Box Testing is software testing technique in which internal structure, design and coding of software are tested to verify flow of input-output and to improve design, usability and security. In white box testing, code is visible to testers so it is also called Clear box testing, Open box testing, Transparent box testing, Code-based testing and Glass box testing.

TestCase	Description	E-mail	Password	ExpectedOutput
1	Valid email and password	18bmit019@gmail.com	123	Status 200 (login authurized)
2	Null email , Valid Password	NULL	123	Status 404(user not found)
3	Invalid email,valid password	18bmit@gmail.com	123	Status 404 (user not found)
4	Valid email,unvalid password	18bmit019@gmail.com	1234	Status 401 (invalid password)
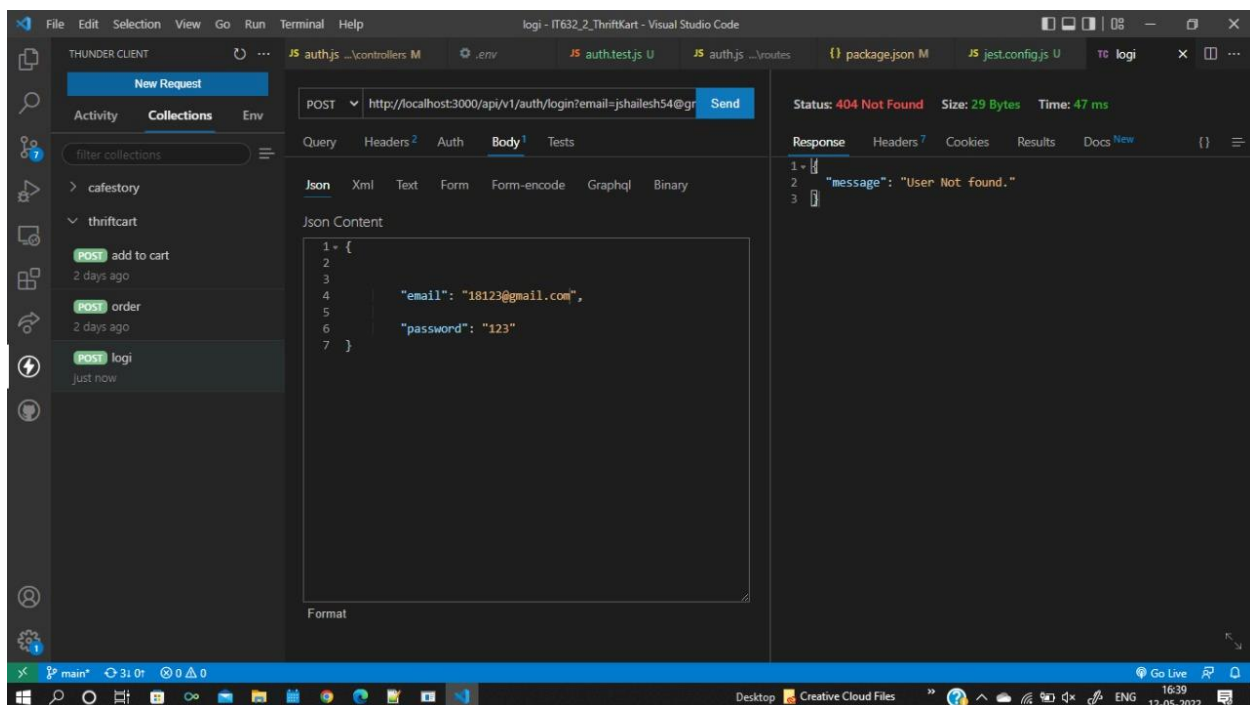
TestCase	Description	Product Id	Quantity	ExpectedOutput
1	Valid product id and quantity	62762c8171839b524c5cc04b	1	Status 200 (login authurized)
2	Null product id , Valid quantity	NULL	1	Status 404(user not found)
3	Invalid product id,valid quantity	62762c8171849b524c5cc04b	0	Status 404 (user not found)
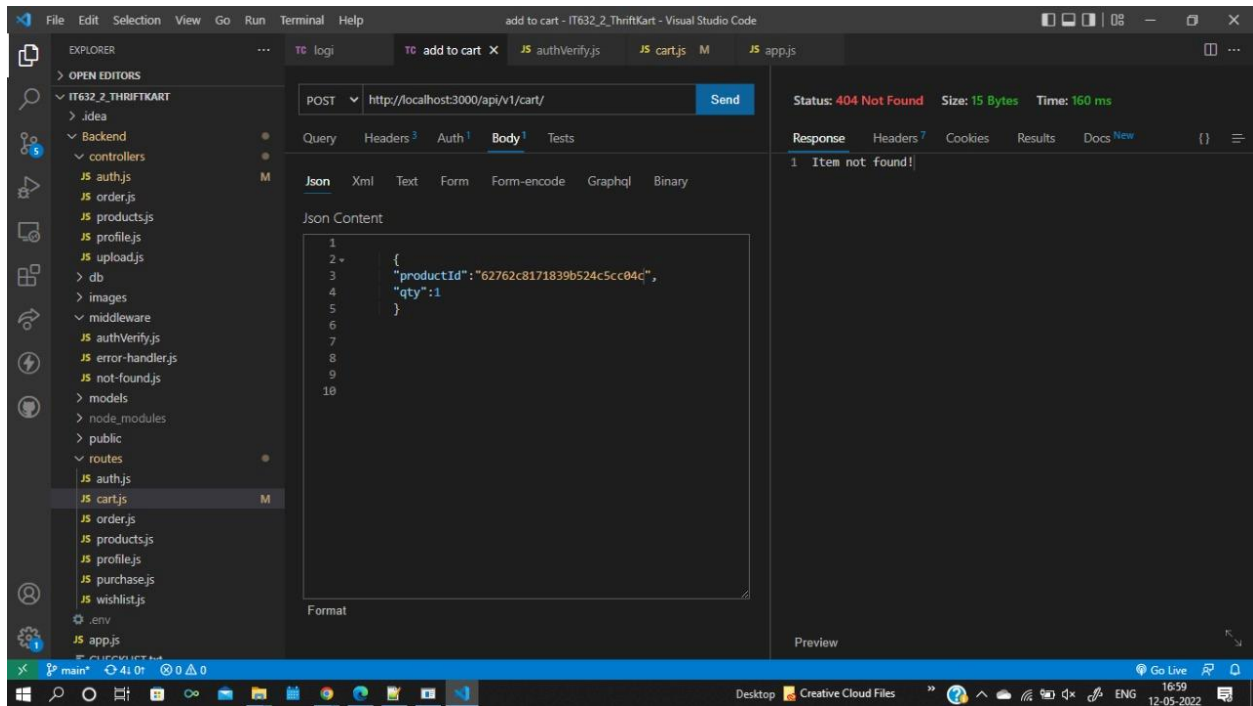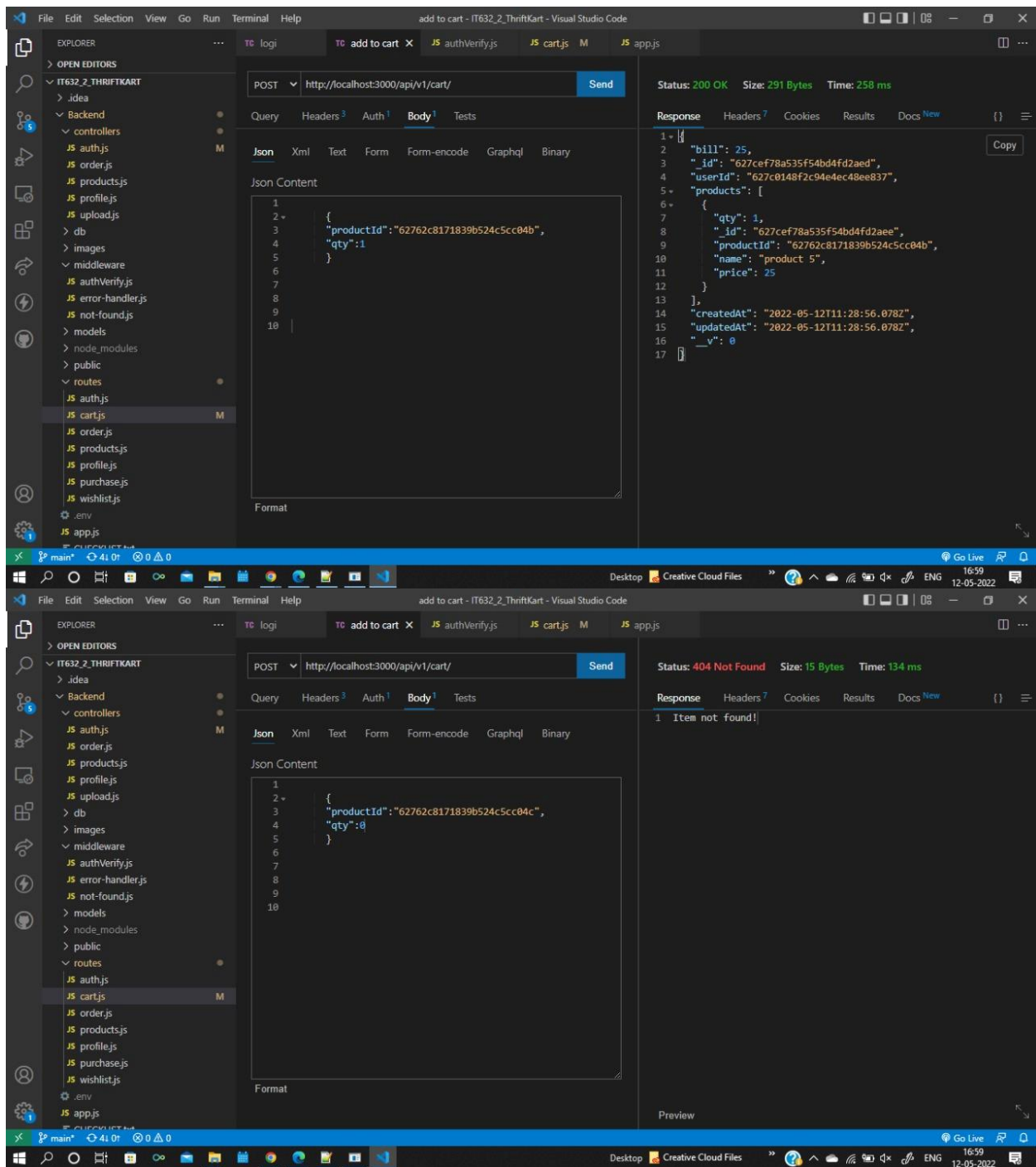
8.2 Black Box Testing

Black Box Testing is a software testing method in which the functionalities of software applications are tested without having knowledge of internal code structure, implementation details and internal paths. Black Box Testing mainly focuses on input and output of software applications

and it is entirely based on software requirements and specifications. It is also known as Behavioral Testing.

9. CHALLENGES FACED

9.1 OPEN ISSUES

Future Scope :

- Customers can view the product in a categorized way.
- Top-selling / Top rated products will be shown on the homepage of the customer.
- Customers can give the rating to the purchased products, and can also add some comments about the product.
- Average of all the ratings will be shown with all the comments / feedback.
- Add card information like card number, expiry_date.
- A user can add multiple card details and can set a single card_info to be used by default.
- Reports of top selling products, total purchase , and category – wise product selling can be viewed by the admin.
- Admin can also able to view custom date range report**.**

10. LESSONS LEARNED

In conclusion we can say that there is no end to product improvement. Even when there seems to room for improvement there always is. Just like google was once just a search engine, but provided additional related features , similarly our goal is other features to our ecommerce system.

The objective from this course was to learn to build a product using formal methods such as information gathering, benchmarking , various diagrams Use Case diagram , Analysis class diagram, System Design, Sub System Design , Object Design etc. We applied these tools we learned into our own project. These formal methods has given a structure to our project and necessary documentation for future upgrade.

CONTRIBUTIONS

(GitHub link of contributors : https://github.com/Khush24Shah/IT632_2_ThriftKart/graphs/contributors)

NAME	ID	WORK (Mid Evaluation)	WORK (After Mid Evaluation)
BHATT RUTVI SAMIR	202112068	Documentation Design, Introduction, Scope, Functional, Non – Functional Requirements, User Stake Holders, Use Case Diagram, Process Model, Schema Structure, Backend, PPT	Backend : wishlist schema and model , cart CRUD, Wishlist CRUD, Order and Checkout , Order Schema , Fetch API : Product Add , Routes : Order and Schema, Product Update API Frontend : Product Add page, Product Add Integration Testing : Backend Sub System Diagram Final Documentation Design
EKANSH GUPTA	202112023	Introduction, Scope, Functional, Non – Functional Requirements, User Stake Holders, Use Case Diagram, Process Model, Backend	Backend **:** login token , product CRUD, Fetch API : User , Product , Wishlist , Fetch API : get cart items , logout, registration, user profile Frontend : Cart Integration ,User profile page, Wishlist Integration Mongo DB : Product Schema
JADHAV SHAILESH SUNILBHAI	202112051	Introduction, Scope, Functional, Non – Functional Requirements, User Stake Holders, Use Case Diagram, Process Model, Schema Structure, Backend, PPT	Backend : email send and otp , sign up , cart CRUD, Profile CRUD, Order and Checkout , Order Schema , Customer Schema , Fetch API : Email send. Frontend **:** Product Add page, Product Add Integration Testing : Backend Sub System Diagram Class Analysis Diagram

KHUSH SHAH	202012033	Use Case Diagram, UI UX Design, Process Model, Schema Structure, PPT	Complete analysis class diagram Mongo DB Database
SHAH NAJU MANISH	202112062	Use Case Diagram, Frontend, Process Model	Analysis class diagram Frontend **:** User Profile page , Product Page Testing
KUNAL SINGH KAPOOR	202112012	Use Case Diagram, Process Model, Schema Structure	Mongo DB DataBase
ANANNYASHREE SHARMA	202112011	Use Case Diagram, UI UX Design, Process Model, Backend	Complete analysis class diagram , Analysis Class Diagram Frontend : Changes in homepage
SAKSHAM JAIN	202112029	Use Case Diagram, Process Model	Routing of all pages , Mongo DB Database, Complete Analysis Class Diagram
KHATRI MOHAMADSULTAN GULAMABBAS	202112044	Use Case Diagram, Frontend, Process Model, Schema Structure	Routing of all pages
SANJEEV SINGH BHADOURIA	202112095	Use Case Diagram, Frontend, Process Model	Fronted : Made all Pages Responsive
SHAH GATHA DILIP	202112116	Use Case Diagram, Frontend, Process Model, Schema Structure	Analysis Class Diagram Frontend : Homepage , Login , Product , Register , Wishlist , productlist , Order History page Testing : Frontend