HomeDesigner

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Date: [Date of presentation]

Final Approval

This is to certify that we have read the report submitted by ***Malik Muhammad Farhad Ashraf and Usama Hussain (12354, 24878)***, for the partial fulfillment of the requirements for the degree of the Bachelors of Science in Software Engineering (BSSE). It is our judgment that this report is of sufficient standard to warrant its acceptance by Riphah International University, Islamabad for the degree of Bachelors of Science in Software Engineering (BSSE).

Committee:

_____

Mr. Shahzad Ahmed Khan
(Supervisor)

_____

Dr. Musharraf
(Head of Department)

Declaration

We hereby declare that this document "**HomeDesigner**" neither as a whole nor as a part has been copied out from any source. It is further declared that we have done this project with the accompanying report entirely on the basis of our personal efforts, under the proficient guidance of our teachers especially our supervisor **Mr. Shahzad Ahmed Khan**. If any part of the system is proved to be copied out from any source or found to be reproduction of any project from anywhere else, we shall stand by the consequences.

Malik Muhammad Farhad Ashraf and Usama Hussain (12354, 24878),

Malik Muhammad Farhad Ashraf

12354

Usama Hussain

24878

Dedication

We wholeheartedly dedicate this project to the divine presence that has guided us throughout our journey - God Almighty. We are grateful for the unwavering support and encouragement of our parents, whose belief in us has been a constant source of motivation. We would like to express our sincere gratitude to our esteemed supervisor, Mr. Shahzad Ahmed Khan, for his invaluable support, collaboration, and guidance, without which this project would not have come to fruition. Additionally, we extend our appreciation to all those who have provided assistance and support during our academic endeavors. May Almighty Allah (S.W.T) bless us with the strength and wisdom to successfully complete the development of this project as envisioned – Ameen.

Acknowledgement

First of all, we express our gratitude to Allah Almighty, the Merciful and the ultimate source of all knowledge, for granting us the courage and wisdom required to bring this project to fruition..

Our sincere thanks are extended to Mr. Shahzad Ahmed Khan, our supervisor, whose unwavering support, invaluable guidance, and constructive feedback have significantly influenced the trajectory of this project. His expertise and dedication have played a pivotal role in its development.

Special thanks are owed to our friends and classmates, whose steadfast support throughout this journey, coupled with shared experiences, has enriched our understanding and enhanced the project's outcomes.

Additionally, we acknowledge the contributions of our teachers and faculty members, recognizing their knowledge, patience, and willingness to provide assistance whenever needed.

Finally, heartfelt gratitude is extended to all those who, whether directly or indirectly, have contributed to the success of this project. Your support has been truly invaluable.

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Abstract

Home Designer is a user-friendly and enjoyable interior design platform that simplifies the process of planning home. With its 3D room planner, user can easily visualize their ideas without the complexity of other (CAD) design tools. Just input the measurements of the room, and like magic, Home Designer gives a 3D presentation of how it can look. So, it's not just about imagining; it's about seeing your ideas come to life.

The Configurator feature allows user to effortlessly customize the colors and sizes of decor products. The Augmented Reality (AR) integration lets you see how products will look in your actual space before buying. What's more, Home Designer connects you with local vendors through an online store, supporting the community and offering a variety of products. It's not just a design tool; it's a platform that makes designing your home easy, enjoyable, and collaborative, changing the way we approach interior design for everyone.

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Chapter 1:

Introduction

Chapter 1:
Introduction

Welcome to HomeDesigner, an innovative web-based platform that puts the power of interior design directly into the hands of the user. Our mission is to make designing your living space easy, enjoyable, and collaborative. In a world where interior design can often feel complex and overwhelming, HomeDesigner is here to simplify the process, offering a range of user-friendly tools and features.

What is HomeDesigner?

HomeDesigner is a comprehensive interior design platform where users can unleash their creativity and transform their living spaces. Whether you're a homeowner, renter, or someone with a passion for design, our platform provides a fun and accessible way to plan and visualize your home.

Purpose:

The primary purpose of HomeDesigner is to democratize interior design. We believe that designing your home should be an enjoyable experience for every user, regardless of their design expertise. HomeDesigner empowers users to easily input room measurements, visualize designs in 3D, and customize colors and furniture effortlessly.

How it Works:

Using HomeDesigner is a fun. Simply input the measurements of your room, and watch as our 3D room planner brings the user's ideas to life. The Configurator feature allows users to customize decor products' colors and sizes with ease. Want to see how it looks in your space? The Augmented Reality (AR) integration lets users preview products before making decisions.

1.1 Opportunity & Stakeholders:

In today's fast-paced world, especially in a busy country like Pakistan, traditional interior design methods with physical samples and visits to firms can be quite challenging. People don't have enough time to manage their schedules and visit places to plan their living spaces. Particularly in a country like Pakistan, where reliance on physical mockups, material samples, and design booklets can hinder the design process. The limitations in visualization for clients become pronounced, making it challenging to envision the final design clearly.Additionally, creating visual presentations the old-fashioned way can be quite costly, making it a luxury not everyone can afford. Moreover, the learning curve for Computer-Aided Design (CAD) tools, often used in traditional methods, tends to be high. This means that not everyone has the time or expertise to master these complex tools.

1. Traditional methods often involve using Computer-Aided Design (CAD) tools, which have a high learning curve.
2. Creating visual representations in the traditional way demands expensive hardware and software.
3. Customers are required to take time out of their busy schedules to visit design firms for in-person consultations.
4. Some firms offer products on a trial basis, but this approach may not be suitable for all customers.
5. In Pakistan, Local vendors often post their designs on social media platforms but lack a dedicated online marketplace.
6. The process of selecting materials and color schemes through traditional methods can be time-consuming, involving visits to multiple stores.
7. Designing without real-time visualization increases the risk of a mismatch between client expectations and the final design.

1.2 Stakeholders

1. Customer (User)
2. Admin
3. Local Vendors
4. Designer

1.3 Motivations and Challenges:

In today's fast-paced world, where everyone has special dreams for their homes, lots of people still ask their family and friends for advice about design and product selection, and that can take a while. Knowing how hard this can be, our big wish is to make a platform where Pakistanis can design their homes online. It's like a helpful place where you can connect with great local designers and nearby shops.

our website might not grab everyone's attention right away because people are used to regular ads or getting advice from friends. But here's our plan: we're making a platform that's easy to use and looks nice. You can plan your rooms, pick personalized stuff, and even see how it looks in your home using your phone. We're trying to make our website not just useful but also something that feels special for Pakistanis.

It's not just about designing; it's about creating a happy connection and pride as people make their homes better. We want our website to be more than just a tool; we want it to bring joy and make the whole design journey super nice for both people who create designs and those who live in the homes, right here in Pakistan. And the best part? Anyone, can use it to design their home without worrying too much. It's like bringing the joy of designing to everyone in Pakistan.

1.4 Goals and Objectives:

Our project, Home Designer, aims to make interior design easier for everyone through a user-friendly online platform. We have set specific goals and objectives to turn vision into reality:

- **Developing an Effortless Design Exploration Platform for All Users** where anyone, regardless of their design skills, can easily explore and visualize their interior design ideas in 3D.
- **Implementing Simplified Design Processes** Implement a streamlined and efficient design process, enabling users to input measurements seamlessly. This ensures accuracy in their virtual representations, making the design journey simple and enjoyable.
- **Integrating a Configurator Feature for Customization** enable users to effortlessly customize products, from choosing colors and sizes to adding a personal touch to their unique designs.
- **Augmented Reality (AR) functionality Integration** let users use the AR feature, which means they can virtually put and see products in their real living spaces. This helps them make better decisions by giving a realistic preview.
- **E-commerce Integration with Local Vendors** smoothly connect with local vendors' online shops, giving users a wide variety of products. This not only adds more design choices but also helps and strengthens local businesses.
- **Implement a secure user registration and login system**, ensuring the privacy and confidentiality of user information.
- **Enable users to rate and review the services** promoting accountability and helping other users make informed decisions.
- **Incorporate social media sharing features** to allow users to easily share their positive experiences with social media platforms, thereby increasing awareness and user engagement.
- **Develop a comprehensive dashboard for users and professionals,** allowing them to manage their profiles, view different products, and events listed on platform.
- **Implement a reliable and efficient messaging system** to facilitate communication between customer and vendors, ensuring seamless collaboration throughout the service delivery process.

- **Enable vendors to showcase their products on platform**, skills, and qualifications through detailed profiles, including service descriptions, working hours, photos, and other relevant information.
- **FAQs Integration for User Guidance** develop an extensive Frequently Asked Questions (FAQs) section within the platform to provide users with clear and concise information
- **Efficient Final Design File Saving**, create a strong and reliable system that lets users easily save, find, and handle their finished design files.
- **Administrative User Interface Enhancement**, administrative user interface to ensure a user-friendly experience for platform administrators, streamlining the management of user accounts, data, and system settings.
- **Enable users and vendors to manage their profiles** and account settings, allowing them to update personal information, change passwords, and modify service preferences.

These goals and objectives form the foundation of HomeDesigner, aiming to provide a reliable, efficient, and user-friendly platform for planning and designing indoors. It also helps local sellers connect with potential customers, making things better for both users and local sellers in the industry.

1.5 Solution Overview:

The proposed solution is a web-based platform aimed at optimizing and improving the interior planning, product selection, and decision-making processes. It is an intelligent platform that simplifies the planning and visualization of one's dream home, incorporating features such as 3D planning and augmented reality. Beyond serving as a design tool, it facilitates communication with local furniture shops, ensuring efficiency and offering a diverse range of features tailored to meet specific needs. The key components of the solution include:

1.4.2 User-Friendly Web and Mobile Interface

The platform offers a user-friendly interface that can be accessed through web devices. The design is intuitive and visually appealing, creating a smooth experience for both users and local vendors. Navigating through the platform, accessing different features, and choose different tools are all easily achievable for users.

1.4.3 Convenient Vendor Marketplace Module

The Vendor Marketplace Module is like an online shopping mall within our platform. It connects users with local furniture shops so they can easily find and buy the items they need for their dream home. Users can browse through different shops, see what they offer, and make purchases right on the platform. The module also helps the shops by giving them more visibility and customers. It's like bringing the store to the user's fingertips and making the whole process of buying furniture online simple and convenient.

1.4.4 Explore Wide Catalog of Products

This module provides users with a wide range of interior products to pick from, making the selection process easy and enjoyable. Users can browse through various categories, check out detailed product information, and even visualize how the items might look in their space through features like 3D planning and augmented reality. The goal is to simplify the decision-making process and ensure users find the perfect pieces for their home.

1.4.5 Improved Features for Easy Visualization and Decision Making

Our platform offers variety of features: Augmented Reality, Configurator, and 3D Room Planner. With these, users can see how furniture looks in their actual space (using Augmented Reality), customize and personalize items to their liking (using Configurator), and visualize their rooms and floors in a 3D version (3d Room Planner). It's like a fun and easy way for users to plan, customize, and visualize their dream home before making any final decisions.

Overall, the proposed solution aims to help in planning and shopping for your dream home easily and more informed. It simplifies decision-making and visualizing complexities. You can pick furniture from local shops, customize items, and see how everything looks in your space using cool features like Augmented Reality and 3D planning. It's a fun and user-friendly way to make your home exactly how you want it.

1.6 Report Outline:

This report covers the detail of all aspects of the system, for understanding and clarity. This report has been divided into seven chapters.

Chapter 1: Introduction

- Overview of the project
- Motivation for undertaking the project
- Contribution to the area of interior designing and visualization
- Project objectives

Chapter 2: Literature / Market Survey

- Summary of existing work in the field of interior designing
- Analysis of the functionality and issues of the current system (if applicable)

Chapter 3: Requirement Elicitation and Analysis

- Documentation of the requirements for the system
- Identifies the system's users and those affected by it.
- Description of functional and nonfunctional requirements

Chapter 4: System Design

- Getting to Know with the system we developing
- Definition of architecture, components, interface, and data
- Making sure the system meets the specified requirements.

Chapter 5: Implementation

- Overview of the System's Environment
- Explanation of the chosen methods implemented for planning and visualizing

Chapter 6: System Testing

- Explanation of the testing process for the system
- Description of test cases and their inputs

Chapter 7: Project Evaluation and Conclusion

- Overall project evaluation
- Discussion of achievements, improvements, and challenges we faced during the project

This report structure establishes an organized framework to showcase essential elements of the project, including the introduction, literature review, requirements, system design, employed methodologies, testing procedures, and project evaluation. This ensures thorough coverage of important areas, offering a comprehensive overview of the project's progression and outcomes.

Chapter 2:

Literature / Market Survey

Chapter 2:

Literature / Market Survey

2.1 Introduction

In this chapter, we present a comprehensive literature and market survey conducted in the area of interior designing and the furniture and decor industry. Our goal is to understand what's already known and happening in the world of interior designing in Pakistan. Reading up on articles and looking at market trends helps us understand the challenges, cool things, and improvements in this field. This knowledge is crucial because it helps us figure out where our Home Designer project fits in and provides a solid foundation to create something new and effective. Through this survey, our aim is to identify gaps, discover new trends, and pinpoint the best ways to do things. Ultimately, our project seeks to contribute valuable additions to the interior design industry in Pakistan.

2.2 Literature Review/Technologies Overview

In this section, we provide a description of the existing systems in the interior designing sector based on the comparison table. We analyze the features and capabilities of each system to understand the present situation and identify areas for improvement. Here is an overview of the existing systems:

2.2.1 Ikea - home furnishings :

IKEA, a Swedish multinational, is a global leader in affordable home furnishings with a distinctive self-assembly model. Known for its functional and stylish products, iconic blue-and-yellow branding, and commitment to sustainability, IKEA has redefined the home shopping experience worldwide.

2.2.2 Houzz :

Houzz, a prominent online platform, revolutionizes home design and renovation. With a vast database of interior inspiration, professional services, and a thriving

community, Houzz simplifies the home improvement process, offering a unique and comprehensive resource for homeowners and design enthusiasts alike.

2.2.3 Homestyler :

Homestyler, an innovative online platform, redefines interior design and home planning. With user-friendly tools, 3D visualization, and a collaborative community, Homestyler empowers users to effortlessly create and share personalized home designs, making it a go-to destination for virtual home planning and inspiration.

2.2.4 Planner 5D :

Planner 5D is a user-friendly online tool for home design and interior planning. Offering an intuitive interface, it enables users to create detailed floor plans, experiment with decor, and visualize their dream spaces in 3D. With a focus on accessibility and creativity, Planner 5D provides an efficient platform for designing and conceptualizing home projects.

2.2.5 Sweet Home 3D :

Sweet Home 3D is an efficient interior design software that enables easy 3D home planning and visualization. With a focus on simplicity and powerful features, it offers a convenient solution for designing and arranging furniture in a user-friendly manner.

2.2.6 HomeByMe :

HomeByMe, an innovative online design tool, empowers users to visualize and plan their living spaces effortlessly. With user-friendly features and a 3D design interface, HomeByMe simplifies home planning, making it an accessible and interactive platform for individuals looking to bring their design ideas to life.

2.2.7 Homify :

Homify, an innovative online platform, is a go-to destination for home inspiration and design solutions. With a diverse range of interior ideas, professional services, and a vibrant community, Homify simplifies the home design journey, providing a dynamic and accessible resource for homeowners.

2.2.8 MagicPlan :

MagicPlan, an innovative app, streamlines the floor planning process. Using augmented reality, it enables users to create accurate floor plans with ease, making it a valuable tool for homeowners, contractors, and real estate professionals. MagicPlan simplifies space visualization and planning, providing a user-friendly solution for various design and construction needs.

2.2.9 Decormatters :

Decormatters, transforms interior design through virtual tools that facilitate personalized home decor planning. With augmented reality visualization and a collaborative design community, Decormatters empowers users to effortlessly visualize and implement their design concepts, making the process of home styling accessible and enjoyable.

When comparing existing systems, we have observed that their features and tools are complex, costly, and lack the ability to connect with local vendors. Furthermore, certain features are not available in the Pakistan region. Our research aims to rectify these issues by developing a solution that is accessible, user-friendly, and seamlessly connected with local vendors for interior designing.

2.2.10 Existing System/ Description of the Current Situation:

Features	Ikea Place	Houzz	Sweet Home	Home Styler
Furniture / Product Catalog:	✓	✓	✓	–
Customization options	–	✓	✓	–
3D / 2D Models	✓	✓	✓	✓
E-commerce Availability	✓	–	–	✓
3D floor planning		✓	✓	✓
Augmented reality (AR) capabilities	✓	–	✓	✓
External product catalogs	✓	✓	✓	✓
Export options for designs	✓	✓	✓	✓
Measurement estimations		✓	✓	✓
Free trial availability	✓	✓	–	–
Mobile application availability	✓	✓	–	–

Features	Dulux Paints	homify	Magic plan	HomeByMe
Furniture / Product Catalog:	–	✓	–	–
Customization options	✓	✓	–	–
3D / 2D Models	–	–	✓	✓
E-commerce Availability	✓	✓	–	✓
3D floor planning	–	✓	✓	✓
Augmented reality (AR) capabilities	✓	–	✓	✓
External product catalogs	✓	–	–	✓

Export options for designs	✓	✓	✓	✓
Measurement estimations	–	✓	✓	✓
Free trial availability	✓	✓	–	–
Mobile application availability	✓	✓	–	–

Table 2.1 Comparison of Existing Systems.

2.3 Summary

This chapter provides an overview of project needs, using information from research, market surveys, and comparisons. We're focusing on the Interior design industry and its challenges, comparing current systems to find ways to make them better. We also share what we found in a market survey to understand what people like. This chapter lays the foundation for creating a solution that is user-friendly and meets the needs of field.

Chapter 3:

Requirement Engineering

Chapter 3:

Requirement Engineering

3.1 Introduction

This chapter provides an overview of the requirement engineering process for the development of HomeDesigner. It highlights the significance of understanding the needs and expectations of different stakeholders involved in the interior design industry.

3.2 Problem Scenarios

In today's digital age, people who own homes face a bunch of frustrating problems when they try to make their living spaces better. When they want to plan and design their homes, they look at different furniture options only to find out there aren't many choices to customize. Not being able to adjust pieces to match personal taste and needs makes them unhappy.

To make things worse, there's no 3D visualization, so it's tough to picture how the chosen furniture will fit into the living space. As they keep looking for furniture, making decisions becomes complex. Since they can't see how the furniture will look in their home and there's no way to try it out first, homeowners have to make decisions without really knowing if it'll be what they want.

Even when they're determined to buy a piece of furniture, people soon see the problems in the process. They realize they need to make many changes, and each time they do, the costs go up. This leads to frustration and it puts a strain on their finances. Unfortunately, the current furniture market in Pakistan doesn't offer any

solutions to these problems. Homeowners really want a platform that gets how important it is to customize, visualize, and make decisions without spending too much money.

3.2.1 Problem Statement 1:

The Problem of	Local interior design vendors often lack a dedicated online marketplace to showcase their products and connect with potential customers. This lack of visibility restricts their reach and opportunities for growth.
Affects	Vendors.
The result of which	The result is missed opportunities for vendors to expand their businesses and for customers to access a variety of design products.
Benefits of	Addressing this vendors-related problem would create a platform for vendors to reach a potential customer base and provide customers with more product options, ultimately benefiting both parties involved in interior design projects.

Table 3.1 Problem Statement 1

3.2.1 Problem Statement 2:

The Problem of	Decision-making in interior design, including material and product selection, can be a complex and time-consuming process.

	Customers often struggle to make informed choices due to limited visualization options and a lack of trial opportunities.
Affects	Vendors.
The result of which	The result is a less streamlined interior design process, potential mismatches, and customer frustration.
Benefits of	Addressing this issue would simplify the decision-making process, improve customer satisfaction, and reduce project timelines through informed choices and trial options.

Table 3.2 Problem Statement 2

3.2.1 Problem Statement 3:

The Problem of	The use of various planning and Computer-Aided Design (CAD) tools in traditional interior design methods presents a significant challenge due to their high learning curve.
Affects	Users,Customers
The result of which	This limits the accessibility of design tools to a select few who can invest the time and effort needed to master these complex tools.

Benefits of	Solving the problem of a hard-to-learn design tool in traditional interior design means making it easier for more people to use these features. The goal is to fill the gap that makes design tools difficult to access. This way, interior design becomes something everyone can do, welcoming everyone to be create and plan their interior spaces easily

Table 3.3 Problem Statement 3

3.2.1 Problem Statement 4:

The Problem of	Traditional interior design methods demand a significant amount of time for tasks such as furniture and color scheme selection, as well as physical visits to design firms. These time-consuming and costly processes can lead to project delays and inconvenience for both customers and designers.
Affects	Customers, Designers.
The result of which	The result is prolonged project timelines, potential missed opportunities, and increased customer frustration.
Benefits of	Addressing this Time-related problem would make interior design services time and cost-effective and accessible, benefiting both customers and professionals.

Table 3.3 Problem Statement 4

3.2.1 Problem Statement 5:

The Problem of	Users experience limitations in customizing products on existing platforms, preventing them from adding personal touches to their product designs
Affects	Customers, Designers.
The result of which	Users are unable to add personal touches to their designs due to restricted customization options.
Benefits of	Increased customization options allow users to personalize their designs, creating unique and meaningful spaces.

Table 3.3 Problem Statement 5

3.3 Functional Requirements:

Functional requirements are articulated based on the various user categories within the system. The system accommodates the following user types:

3.3.1 Customer's Requirements:

FR.01: Customer shall be able to register using his/her first name, last name, password, email and picture.

FR.02: Customer shall be able to sign in (login) by using email address and password.

FR.03: Customer shall be able to logout from the system.

FR.04: Customer shall be able to reset its account password.

FR.05: Customer shall be able to view the Products listings.

FR.06: Users shall be able to to update and manage their profile information.

FR.07: Customer shall be able to search Products from search bar option.

FR.08: Customer shall be able to select products using search bar.

FR.09: Customer shall be able to Upload, update and remove Profile picture from account setting.

FR.10: Customer shall be able to use categories option to filter the required product.

FR.11: Customer shall be able to chat with vendors related to products.

FR.12: Customer shall be able give feed back on products.

FR.13: Customer shall be able to add, remove and edit the multiple products to the cart.

FR.14: Customer shall be able to add, remove and edit the multiple products to the wish list bucket.

FR.15: Customer shall be able to see events in event page and can buy event special deals.

FR.16: Customer shall be able to leave reviews and ratings for products.

FR.17: Customer shall be able to Access to a comprehensive help from Frequently Asked Questions section.

FR.18: Customer shall be able to save and manage multiple shipping addresses and able to select addresses during the checkout process..

FR.19: Customer shall have option subscribe to newsletters or promotional emails

FR.20: Customer shall be able to use product Configurator tool to customize the materials, size, and color of product easily.

FR.21: Customer shall be able to save the configured customized product and export as design file to their local computer.

FR.22: Customer shall be able to use the 3d room planner tool to visualize the room spaces.

FR.23: Customer shall be able to insert the measurements and convert them into 3D visuals.

FR.24: Customer shall be able to draw walls and room spaces in 2D Canvas and convert the drawings to 3D models of designed spaces.

FR.25: Customer shall be able to delete the drawn walls and measurements.

FR.26: Customer shall have multiple payment methods.

FR.27: Customer shall be able to track the order shipment.

FR.28: Customer shall have the option to reset the entire design to scratch,

FR.29: Customer shall be able to export the design as 3D format file and can re-upload it to tool.

FR.30: Customer shall be able to add multiple models to viewpoints in 3d view of planner tool and shall be able drag and drop selected models from product catalog.

FR.31: Customer shall have the option to reset the entire design to scratch,

3.3.2. vendor's Requirement:

FR.32: Vendors shall be able to register himself using his/her first name, last name, password, city, email and picture.

FR.33: Vendors shall be able to sign in (login) by using email address and password.

FR.34: Vendors shall be able to logout from the system.

FR.35: Vendors will be able to recover his/her password if he/she forgets through Email address.

FR.36: Vendors shall be able to Create their shop on platform.

FR.37: Vendors shall be able to upload product and their details to showcase products on platform.

FR.38: Vendors shall be able to answer the communication of client.

FR.39: Vendors shall be able to edit and remove the listed product from the platform.

FR.40: Vendors shall be able to edit the profile and shop details from dashboard,

FR.41: Vendors shall be able to see list of all uploaded products on platform.

FR.42: Vendors shall be able to add events and special discount product offers.

FR.43: Vendors shall have the analysis of total orders, sales, profits,

FR.44: Vendors shall be able to edit/update the product details

FR.45: Vendors shall be able to upload 3d format of model of products.

3.3.2. Admin's Requirement:

FR.56: Admin shall be able to login by using email and password.

FR.57: Admin shall be able to logout from the system.

FR.58: Admin shall be able to create new users.

FR.59: Admin shall be able to delete existing users.

FR.60: Admin shall be able to monitor the roles to users.

FR.61: Admin shall be able to monitor the shops and their status.

FR.62: Admin shall be able to close the events.

FR.63: Admin shall be able add categories of products.

FR.64: Admin shall be able to delete feedback if its inappropriate

3.4 Non-Functional Requirements:

In our Final Year Project (FYP), we're developing a comprehensive platform for home designing and floor planning that connects local vendors with customers. While we've defined the essential tasks the system must perform, known as functional requirements, Now, for non-functional requirements that define how the system should behave and what limits exist on its functionality. we will make sure the platform is safe, easy to use, and works well without explicitly stating these requirements.

2.3 Summary

This requirements chapter of our Home Designer project provides an overview of the project's needs and functional requirements—what our project needs to do. We carefully listed all the important functional requirements by talking to potential users and having creative group discussions. We spoke to people who might use our platform and gathered ideas to make it useful. This way, we have valuable requirements.

Chapter 4:

System Design

Chapter 4:

System Design

4.1 Introduction

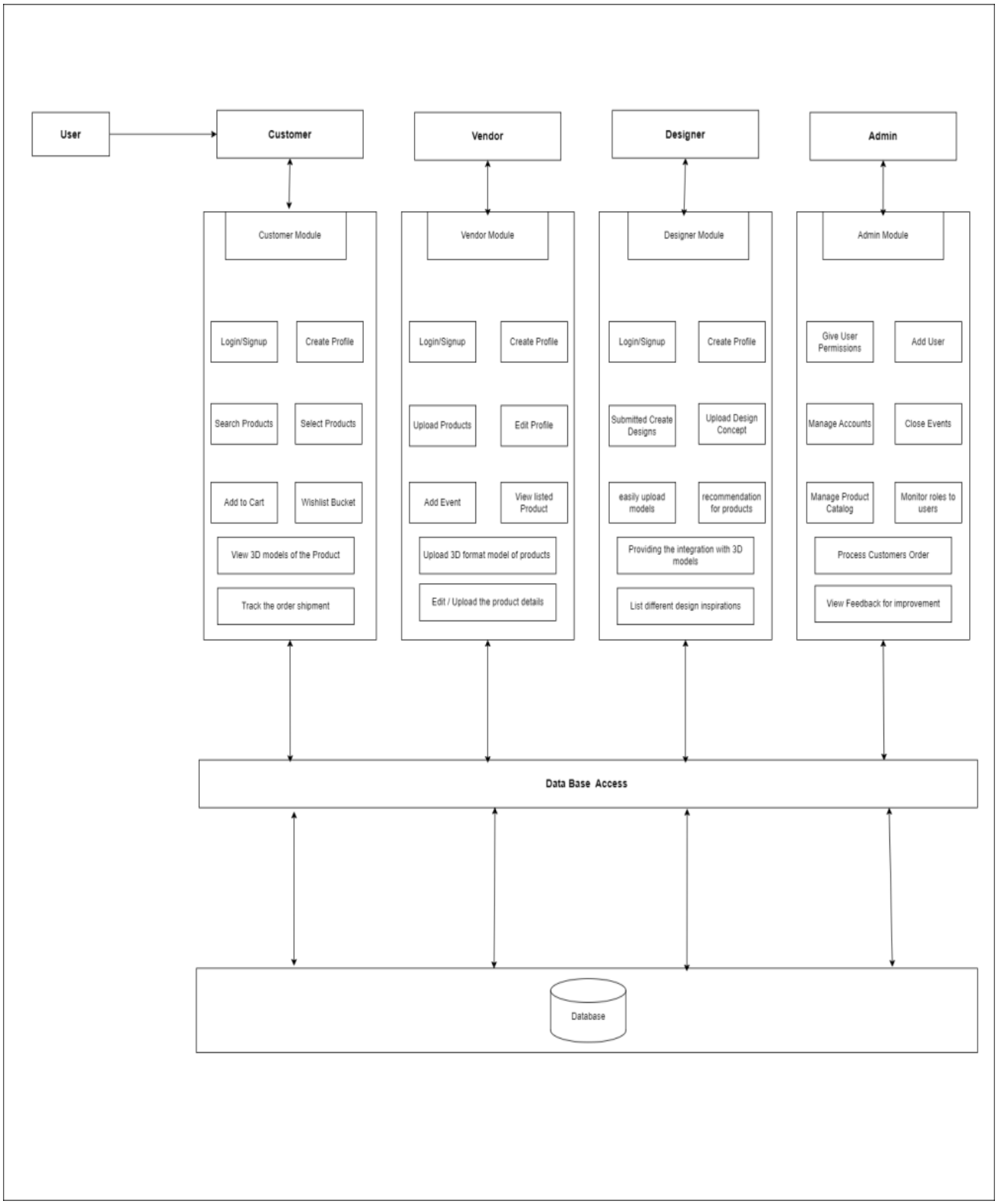
The role of a system designer involves outlining the duties, characteristics, functions, and connections of software components and also, they decide how a component should be adjusted to align with the implementation environment. The design process is guided by the requirements gathered from user input. Throughout this chapter, we will present various design diagrams, including architectural design, use case design, and activity design for our project titled "**Home Designer**." In each of these diagrams, our aim is to visually represent the workflow and technical aspects of the system design.

4.2 Architectural Design

4.3 Detail Design

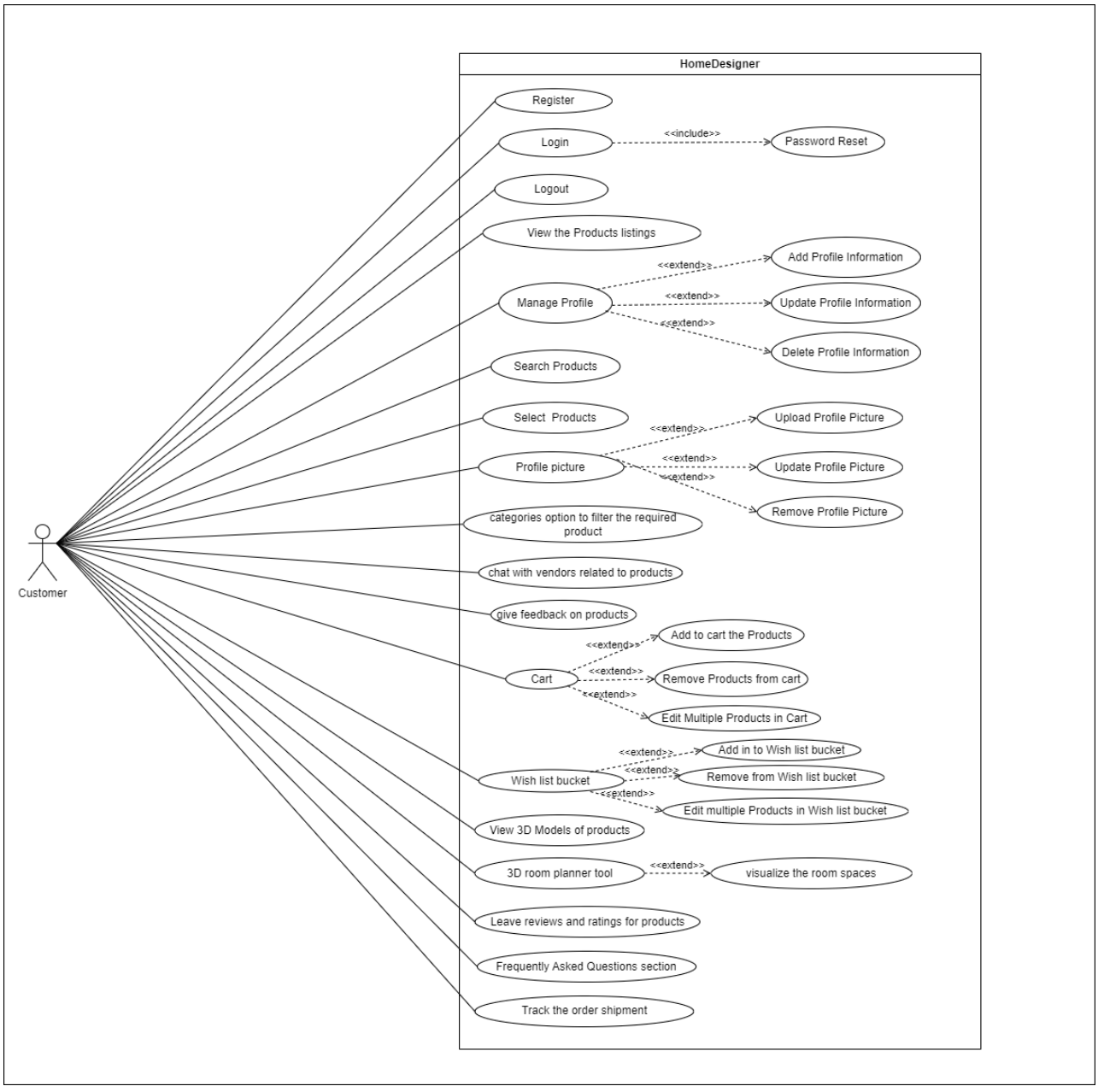
The detailed design phase of HomeDesigner focuses on planning the specific details of how different parts of the program will work together. It includes designing modules, components, and interfaces to ensure the platform's functionality and user-friendly. It's like creating a detailed blueprint for the inner workings of the program.

Architectural Design

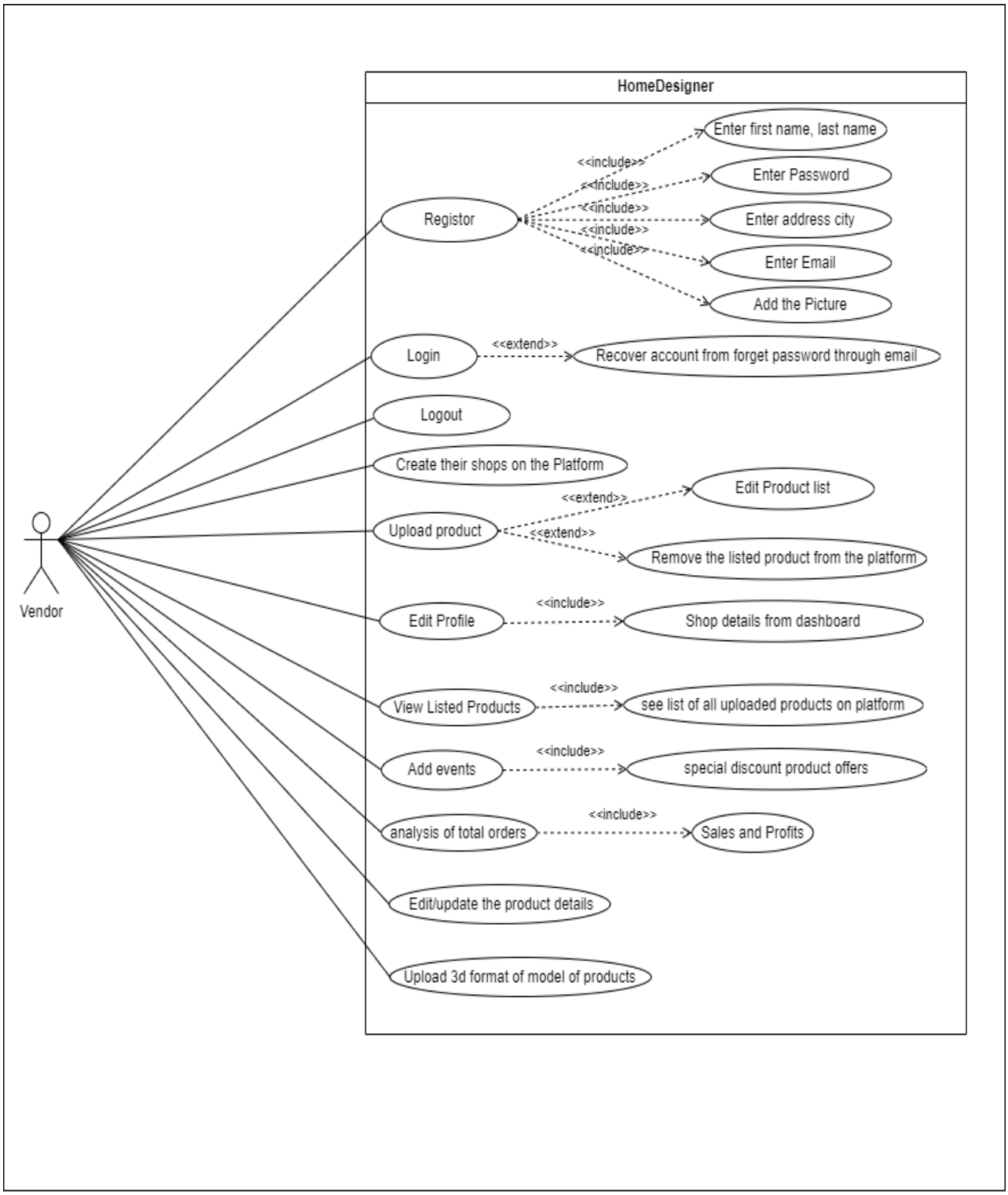


4.3.1 Use Case Diagram

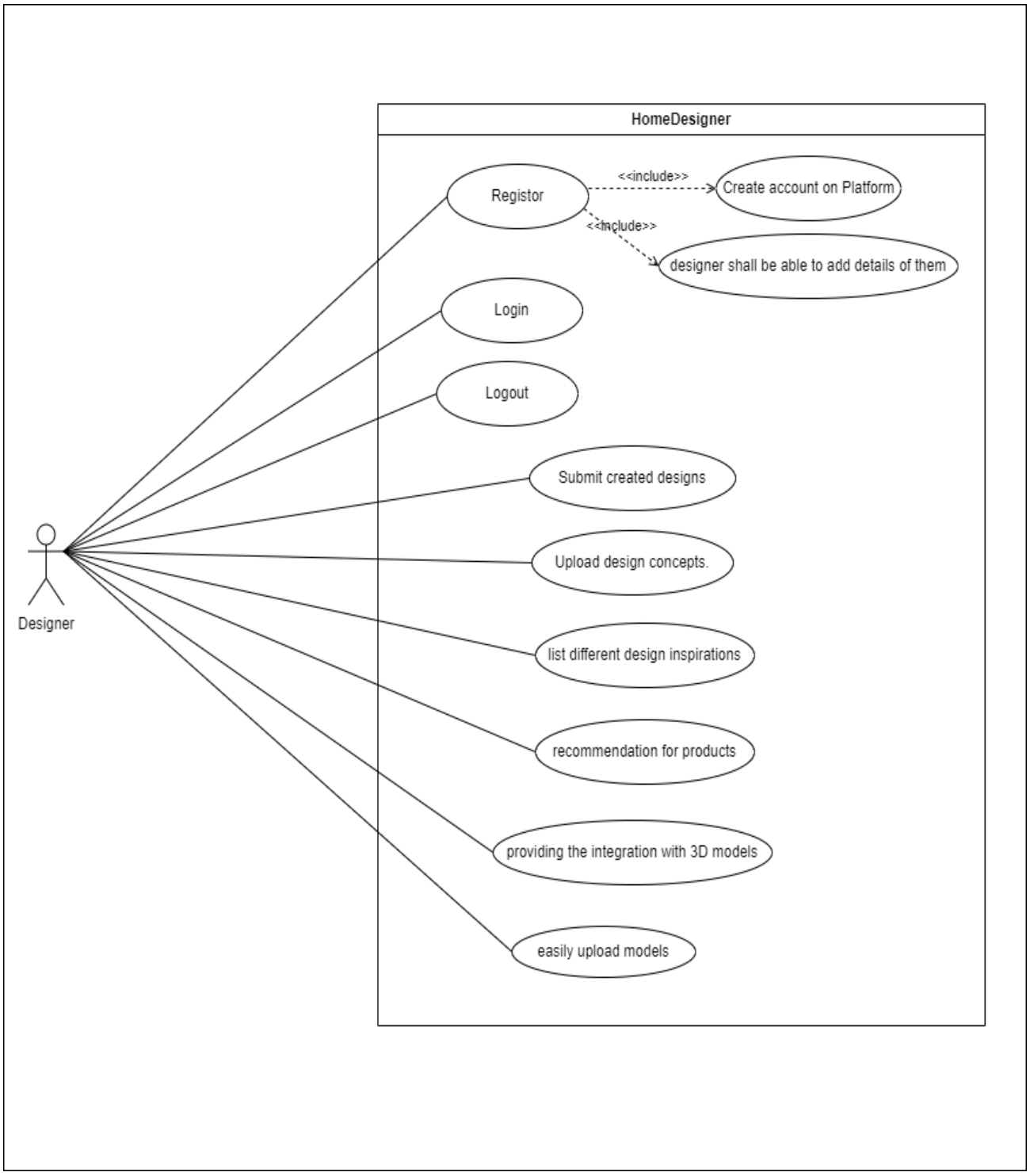
Use Case for Customer:



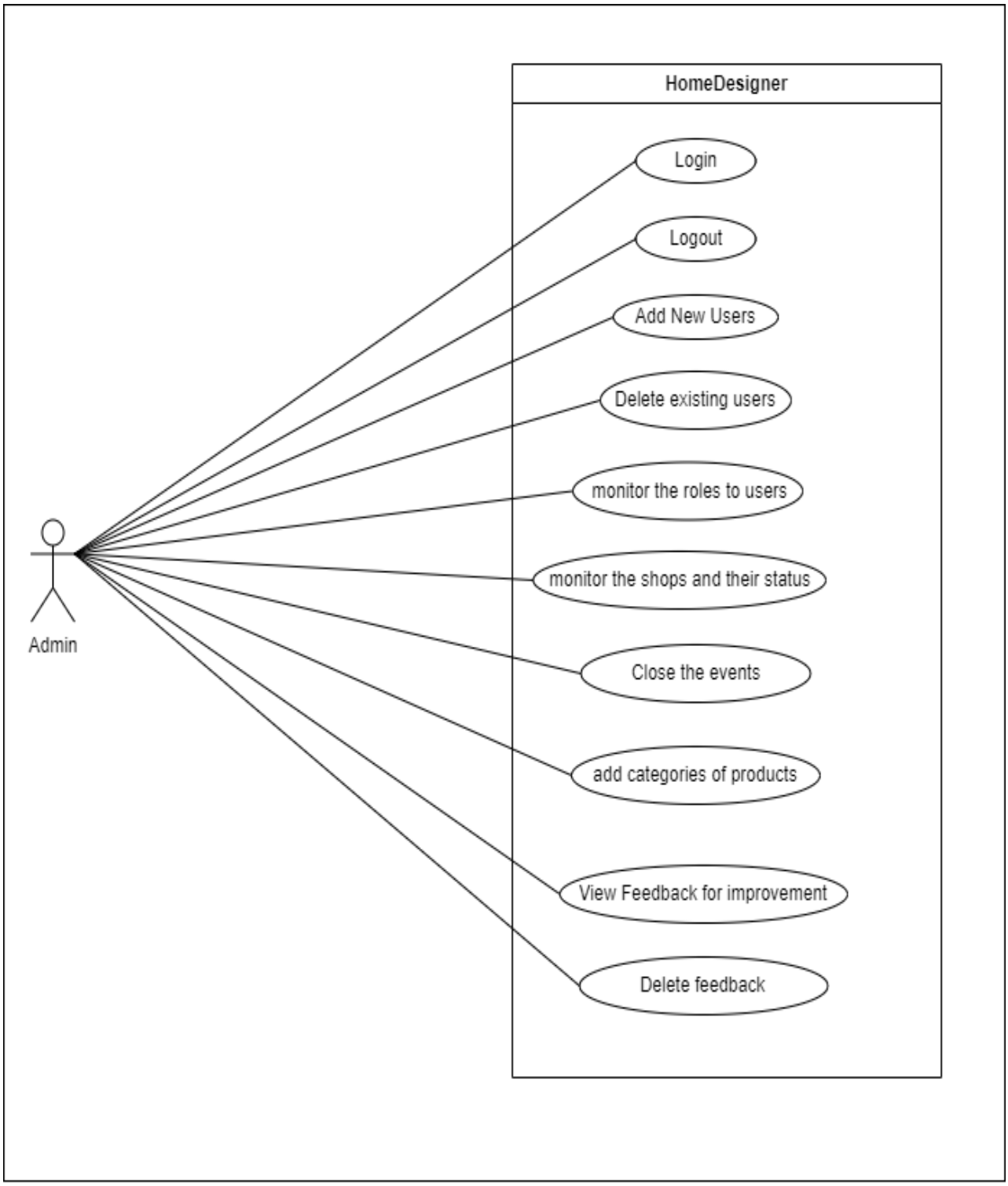
Use Case for Vendor:



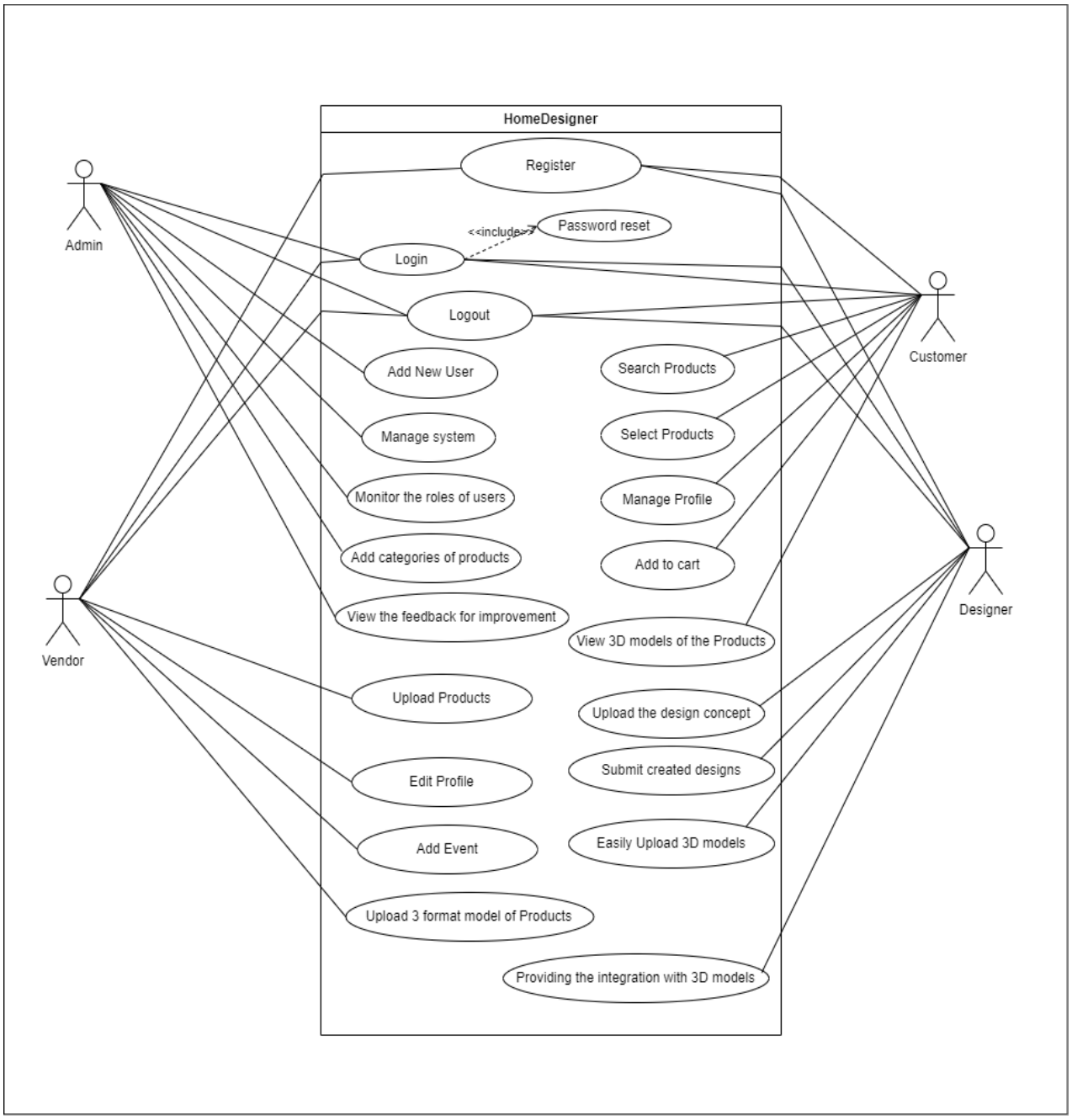
Use Case for Designer:



Use case for Admin:



Common Use diagram:



4.3.5 Use Case Fully Dressed Format

4.3.5.1 Admin login

Use case ID:	UC-001
Use case:	Admin login
Description	Admin authenticates to access the admin panel.
Actors:	Admin
Preconditions:	Admin account is created
Basic Flow:	1. Admin navigates to the admin login page. 2. Admin enters the username and password. 3. Admin clicks the “Login” button.
Post Condition:	Admin is logged into the admin panel.

4.3.5.2 User login

Use case ID:	UC-002
Use case:	User Login
Description	Users authenticate themselves to access the system.
Actors:	User
Preconditions:	none
Basic Flow:	1. User navigates to the login page. 2. User enters their username and password. 3. User clicks the "Login" button.
Post Condition:	User is logged in.

4.3.5.3 Vendor Login

Use case ID:	UC-003
Use case:	Vendor Login
Description	Vendor authenticates to access the vendor portal.
Actors:	Vender
Preconditions:	Vendor account is created.
Basic Flow:	1. Vendor navigates to the vendor login page. 2. Vendor enters the username and password.

	3. Vendor clicks the "Login" button.
Post Condition:	Vendor is logged into the vendor portal.

4.3.5.4 Designer Login

Use case ID:	UC-004
Use case:	Designer Login
Description	Designer authenticates to access the designer portal.
Actors:	Designer
Preconditions:	Designer account is created.
Basic Flow:	1. Designer navigates to the designer login page. 2. Designer enters the username and password. 3. Designer clicks the "Login" button.
Post Condition:	Designer is logged into the designer portal.

4.3.5.5 Vender Registration

Use case ID:	UC-005
Use case:	Vendor Registration
Description	Vendor registers to become a seller on the platform.
Actors:	Vender
Preconditions:	none
Basic Flow:	1. Vendor accesses the registration page. 2. Vendor fills out registration details. 3. Vendor submits the registration form.
Post Condition:	Vendor account is created.

4.3.5.6 Manage Product Catalog

Use case ID:	UC-006
Use case:	Manage Product Catalog
Description	Admin adds, edits, or removes products from the catalog.
Actors:	Admin
Preconditions:	Admin is logged in
Basic Flow:	1. Admin navigates to the product management section. 2. Admin adds/edit/removes a product in the catalog.
Alternative Flow:	2a. If the product already exists, update its information. 2b. If removing, prompt for confirmation.
Post Condition:	Product catalog is updated.

4.3.5.7 Process Customer Orders

Use case ID:	UC-007
Use case:	Process Customer Orders
Description	Admin views and manages customer orders.
Actors:	Admin
Preconditions:	Admin is logged in.
Basic Flow:	1. Admin navigates to the order management section. 2. Admin views and processes customer orders.
Alternative Flow:	2a. Admin can update order status, shipping information, etc.
Post Condition:	Order status is updated, and shipping is processed.

4.3.5.8 Manage User Accounts

Use case ID:	UC-008
Use case:	Manage User Accounts
Description	Admin adds, edits, or removes user accounts.
Actors:	Admin

Preconditions:	Admin is logged in.
Basic Flow:	1. Admin navigates to the user management section. 2. Admin adds, edits, or removes user accounts.
Alternative Flow:	2a. Admin can assign roles, reset passwords, or deactivate accounts.
Post Condition:	User accounts are updated.

4.3.5.10 Manage Promotions and Discounts

Use case ID:	UC-10
Use case:	Manage Promotions and Discounts
Description	Admin creates, edits, or removes promotional offers.
Actors:	Admin
Preconditions:	Admin is logged in.
Basic Flow:	1. Admin navigates to the promotions section. 2. Admin creates, edits, or removes promotional offers.
Post Condition:	Promotions are updated.

4.3.5.12 Create Marketing Materials

Use case ID:	UC-012
Use case:	Create Marketing Materials
Description	Designer develops marketing materials such as banners and ads.
Actors:	Designer
Preconditions:	Designer is logged in.
Basic Flow:	1. Designer navigates to the marketing materials section. 2. Designer creates banners or ads for promotions.
Alternative Flow:	2a. Designer selects target audience and specifies promotion details.
Post Condition:	Marketing materials are created.

4.3.5.13 Customize Email Templates

Use case ID:	UC-013
Use case:	Customize Email Templates
Description	Designer customizes email templates for promotional campaigns.
Actors:	Designer
Preconditions:	Designer is logged in.
Basic Flow:	1. Designer accesses the email template customization section. 2. Designer customizes email templates.
Alternative Flow:	2a. Designer adds promotional content, images, and sets the template style.
Post Condition:	Email templates are customized.

4.3.5.14 Collaborate with Developers

Use case ID:	UC-014
Use case:	Collaborate with Developers
Description	Designer collaborates with developers to implement design changes.
Actors:	Designer , Developer
Preconditions:	Designer and developer is logged in.
Basic Flow:	1. Designer communicates design changes to developers. 2. Designer and developers collaborate to implement changes.
Alternative Flow:	2a. Designer provides design specifications and assets to developers.
Post Condition:	Design changes are implemented successfully.

4.3.5.15 Review User Feedback

Use case ID:	UC-015
Use case:	Review User Feedback
Description	Designer reviews user feedback on design elements.

Actors:	Designer
Preconditions:	Designer is logged in.
Basic Flow:	1. Designer accesses the user feedback section. 2. Designer reviews user comments and suggestions.
Post Condition:	Design improvements are identified.

4.3.5.16 Browse Product Catalog

Use case ID:	UC-016
Use case:	Browse Product Catalog
Description	Customer explores the product catalog.
Actors:	Customer
Basic Flow:	1. Customer navigates to the product catalog. 2. Customer browses and filters products.
Post Condition:	Customer finds products of interest.

4.3.5.17 Search for a Product

Use case ID:	UC-017
Use case:	Search for a Product
Description:	Customer searches for a specific product.
Actors:	Customer
Basic Flow:	1. Customer uses the search bar to enter a product name. 2. Customer reviews search results.
Alternative Flow:	2a. If the desired product is found, customer proceeds to view details.
Post Condition:	Customer finds and views the desired product.

4.3.5.18 View Product Details

Use case ID:	UC-018
Use case:	View Product Details

Description:	Customer looks at the details of a product.
Actors:	Customer
Preconditions:	Product is visible in the catalog or search results.
Basic Flow:	1. Customer clicks on a product to view details. 2. Customer reviews product specifications and images.
Post Condition:	Customer gathers information about the product.

4.3.5.19 Add Product to Cart

Use case ID:	UC-019
Use case:	Add Product to Cart
Description:	Customer adds a product to the shopping cart.
Actors:	Customer
Preconditions:	Product details are visible, and customer is logged in.
Basic Flow:	1. Customer clicks the "Add to Cart" button. 2. Customer selects quantity and options.
Alternative Flow:	2a. If the product has options (size, color), customer selects preferences.
Post Condition:	Product is added to the shopping cart.

4.3.5.20 Proceed to Checkout

Use case ID:	UC-020
Use case:	Proceed to Checkout
Description:	Customer initiates the checkout process.
Actors:	Customer
Preconditions:	Products are added to the shopping cart.
Basic Flow:	1. Customer clicks the "Proceed to Checkout" button. 2. Customer enters shipping and billing information.
Alternative Flow:	2a. Customer selects shipping method and payment option.

Post Condition:	Order details are confirmed before payment.

4.3.5.21 Make a Purchase

Use case ID:	UC-0017
Use case:	Make a Purchase
Description:	Customer completes the purchase transaction.
Actors:	Customer
Preconditions:	Checkout process is initiated.
Basic Flow:	1. Customer reviews the order summary. 2. Customer confirms the purchase. 3. Customer enters payment details and completes the transaction.
Post Condition:	Order confirmation is displayed.

4.3.5.22 Track Order

Use case ID:	UC-022
Use case:	Track Order
Description:	Customer tracks the status of a placed order.
Actors:	Customer
Preconditions:	A purchase has been made.
Basic Flow:	1. Customer navigates to the order tracking section. 2. Customer enters the order number or uses account history.
Post Condition:	Order status and tracking information are viewed.

4.3.5.23 Provide Product Feedback

Use case ID:	UC-023
Use case:	Provide Product Feedback
Description:	Customer provides feedback on purchased products.
Actors:	Customer
Preconditions:	A purchase has been made.

Basic Flow:	1. Customer navigates to the product feedback section. 2. Customer submits a review or rating for purchased products.
Post Condition:	Feedback is recorded for the purchased products.

4.3.5.24 Manage Product Listings

Use case ID:	UC-024
Use case:	Manage Product Listings
Description:	Vendor adds, edits, or removes products from their catalog.
Actors:	Vendor
Preconditions:	Vendor is logged in.
Basic Flow:	1. Vendor navigates to the product management section. 2. Vendor adds, edits, or removes products from their catalog.
Alternative Flow:	2a. Vendor updates product information, pricing, or availability.
Post Condition:	Product catalog is updated.

4.3.5.25 Process Orders

Use case ID:	UC-025
Use case:	Process Orders
Description:	Vendor views and manages customer orders for their products.
Actors:	Vendor
Preconditions:	Vendor is logged in.
Basic Flow:	1. Vendor accesses the order management section. 2. Vendor views and processes customer orders for their products.
Alternative Flow:	2a. Vendor confirms order details, packs products, and updates order status.

4.3.5.26 Manage Inventory

Use case ID:	UC-026
Use case:	Manage Inventory
Description:	Vendor monitors and updates product inventory levels.
Actors:	Vendor
Preconditions:	Vendor is logged in.
Basic Flow:	1. Vendor navigates to the inventory management section. 2. Vendor reviews current inventory levels and updates them.
Alternative Flow:	2a. Vendor adds new stock, adjusts quantities, or marks items as out of stock.
Post Condition:	Inventory levels are updated.

4.3.5.27 Monitor Sales Performance

Use case ID:	UC-027
Use case:	Monitor Sales Performance
Description:	Vendor analyzes sales data and performance metrics.
Actors:	Vendor
Preconditions:	Vendor is logged in.
Basic Flow:	1. Vendor accesses the sales analytics dashboard. 2. Vendor reviews sales data, trends, and customer feedback.
Post Condition:	Vendor gains insights into sales performance.

4.3.5.28 Communicate with Customers

Use case ID:	UC-028
Use case:	Communicate with Customers
Description:	Vendor communicates with customers regarding products.
Actors:	Vendor
Preconditions:	Vendor is logged in.

Basic Flow:	1. Vendor accesses the customer communication section. 2. Vendor responds to customer inquiries or issues.
Post Condition:	Vendor communicates effectively with customers.

4.3.5.29 Set Promotions and Discounts

Use case ID:	UC-029
Use case:	Set Promotions and Discounts
Description:	Vendor creates, edits, or removes promotional offers.
Actors:	Vendor
Preconditions:	Vendor is logged in.
Basic Flow:	1. Vendor navigates to the promotions section. 2. Vendor sets up, edits, or removes promotional offers for their products.
Alternative Flow:	2a. Vendor specifies discount percentages, promotion duration, and eligible items.
Post Condition:	Promotions are applied to the products.

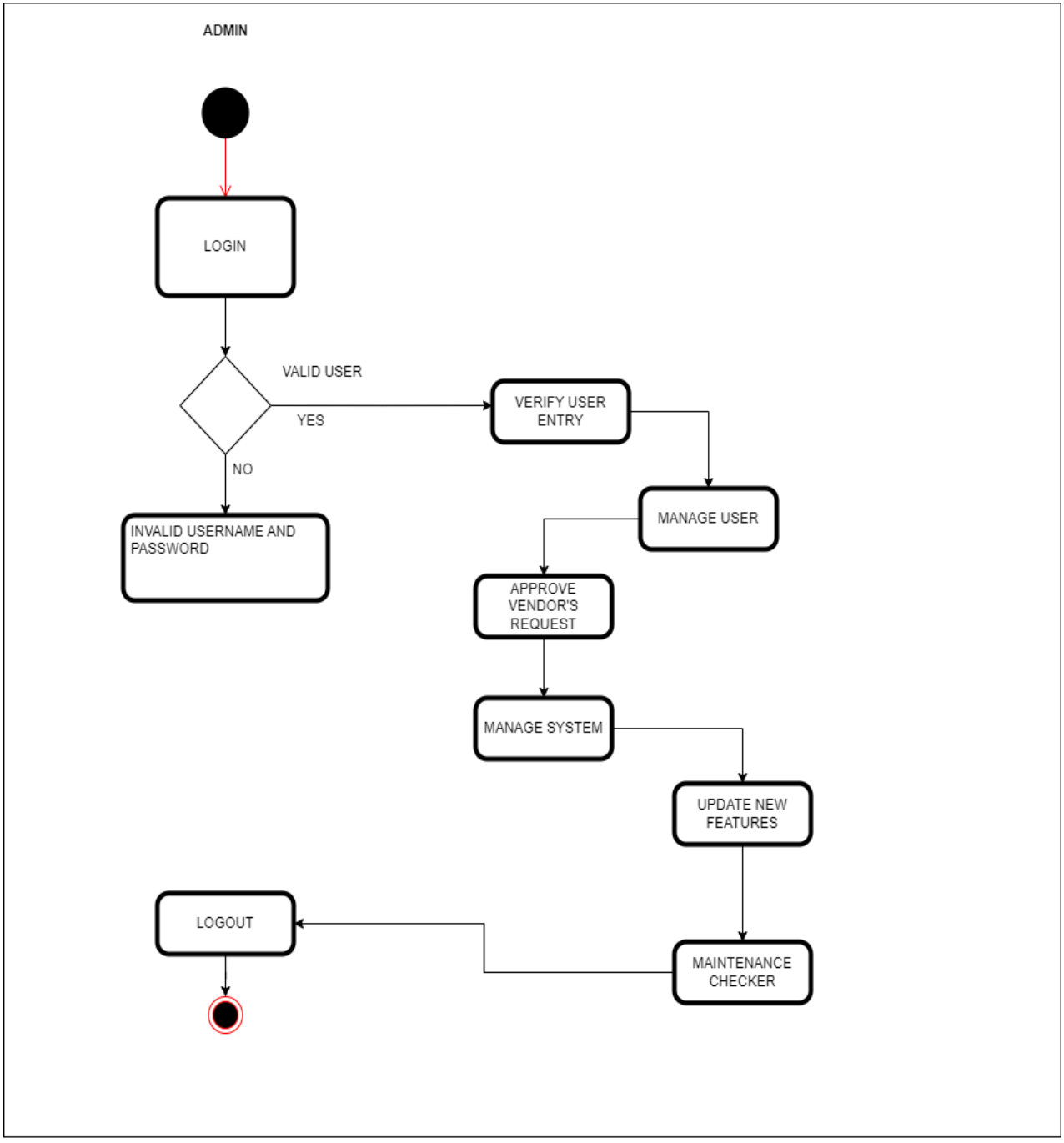
4.3.5.30 Event order placed

Use case ID:	UC-030
Use case:	Event order placed
Description	Vender can create custom event
Actors:	Vender
Preconditions:	Customer initiates the order placement
Basic Flow:	1. Customer places an order. 2. System receives the order. 3. System triggers the "Order Placed" event. 4. System processes the order (payment, inventory). 5. System sends a confirmation email to the customer.
Post Condition:	1. Order information is recorded. 2. Notifications are sent to relevant parties.

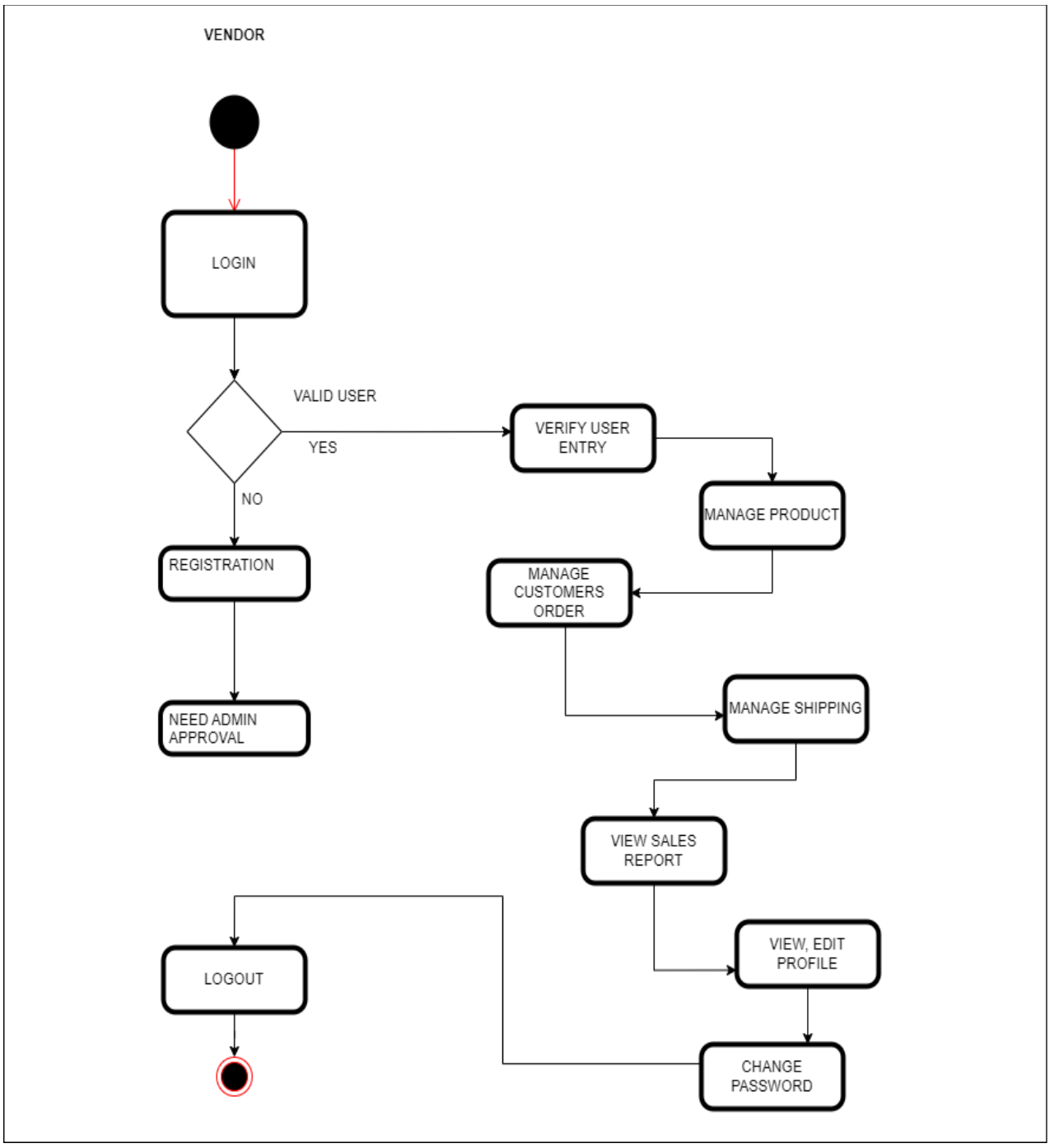
	3. Inventory is updated. Payment is processed. 4. Customer receives order confirmation email.

4.3.6 Activity Diagrams

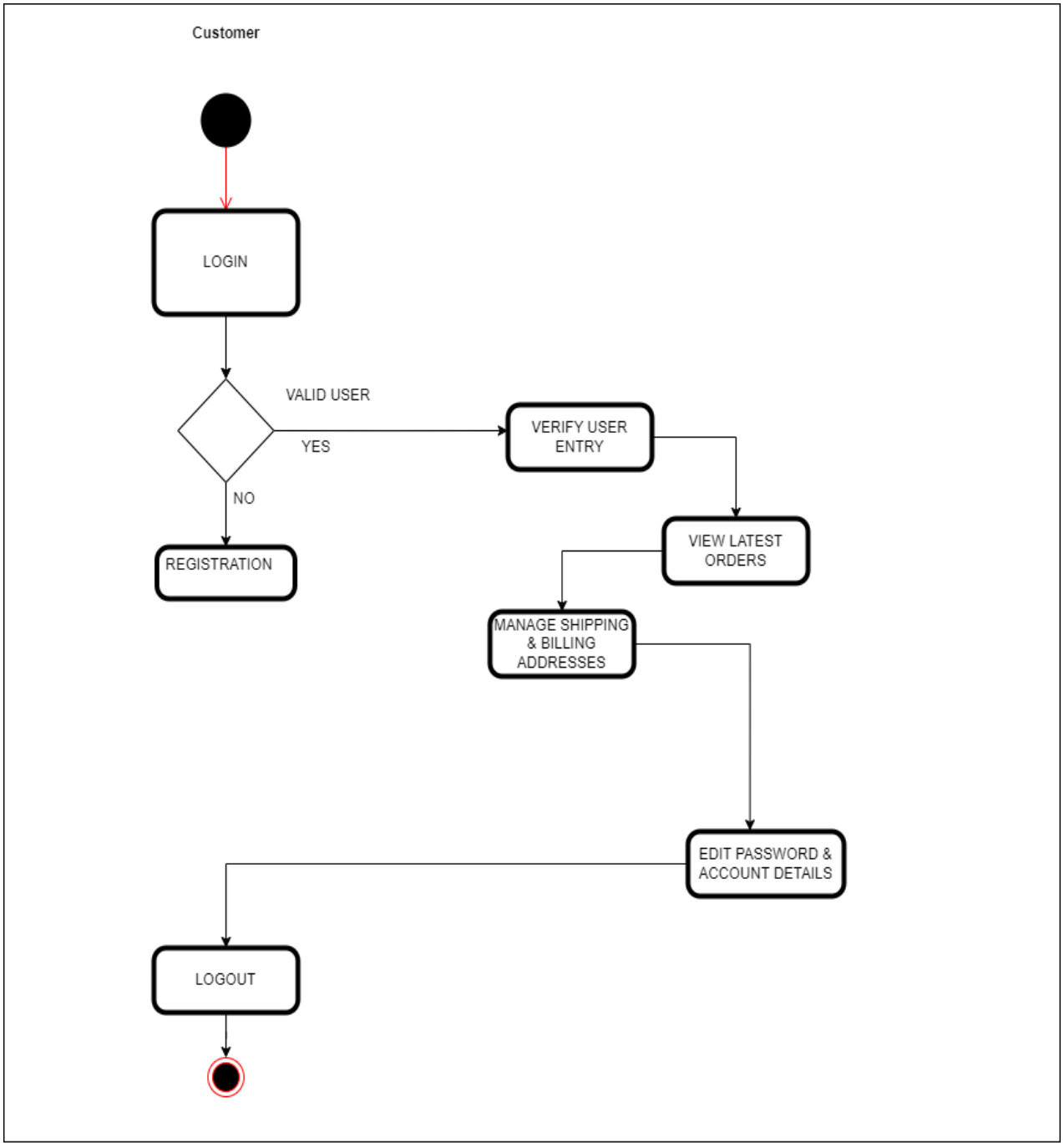
Admin



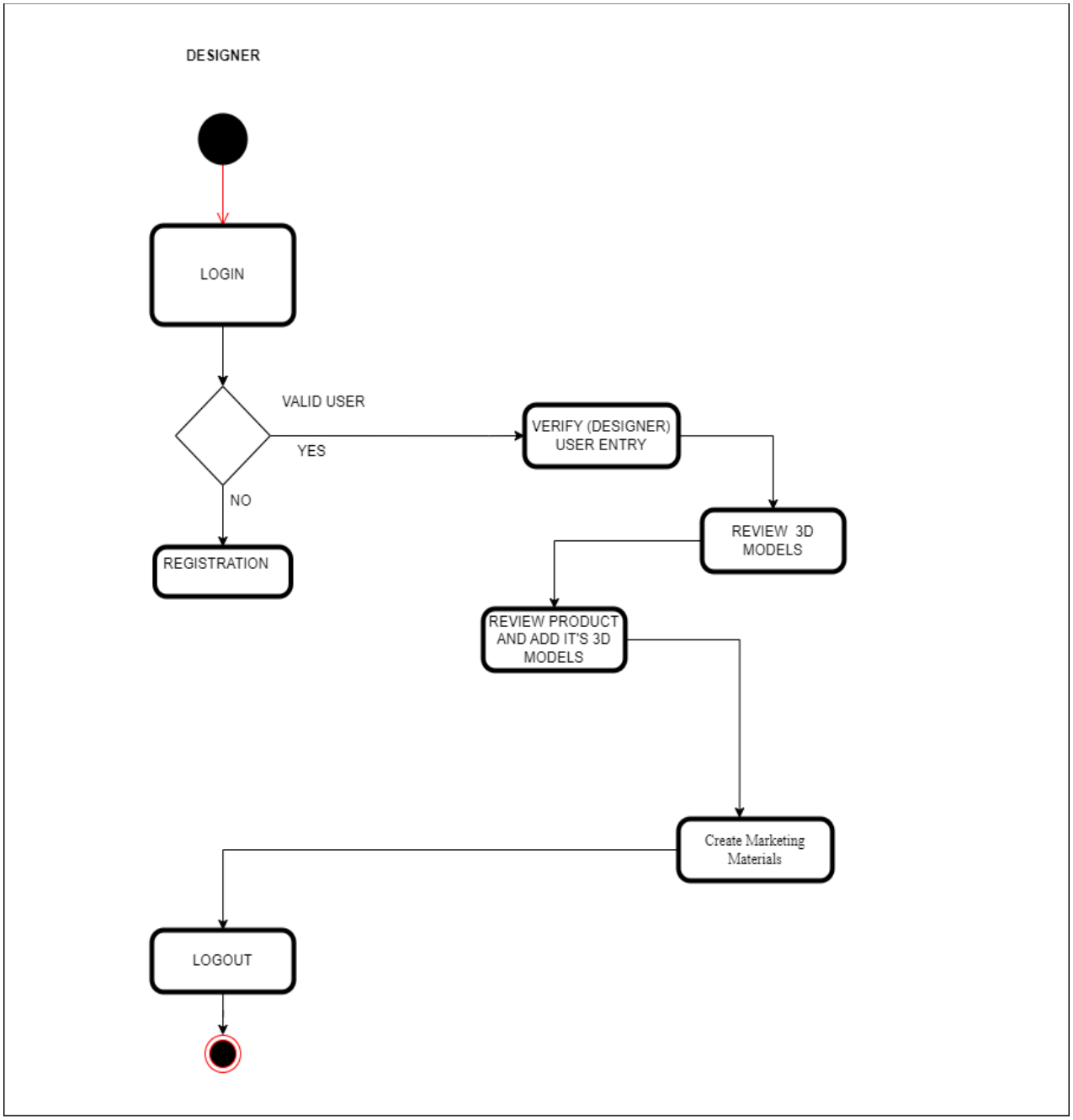
Vendor


VENDOR
LOGIN
VALID USER
YES
NO
VERIFY USER ENTRY
MANAGE PRODUCT
MANAGE CUSTOMERS ORDER
MANAGE SHIPPING
VIEW SALES REPORT
VIEW, EDIT PROFILE
CHANGE PASSWORD
REGISTRATION
NEED ADMIN APPROVAL
LOGOUT

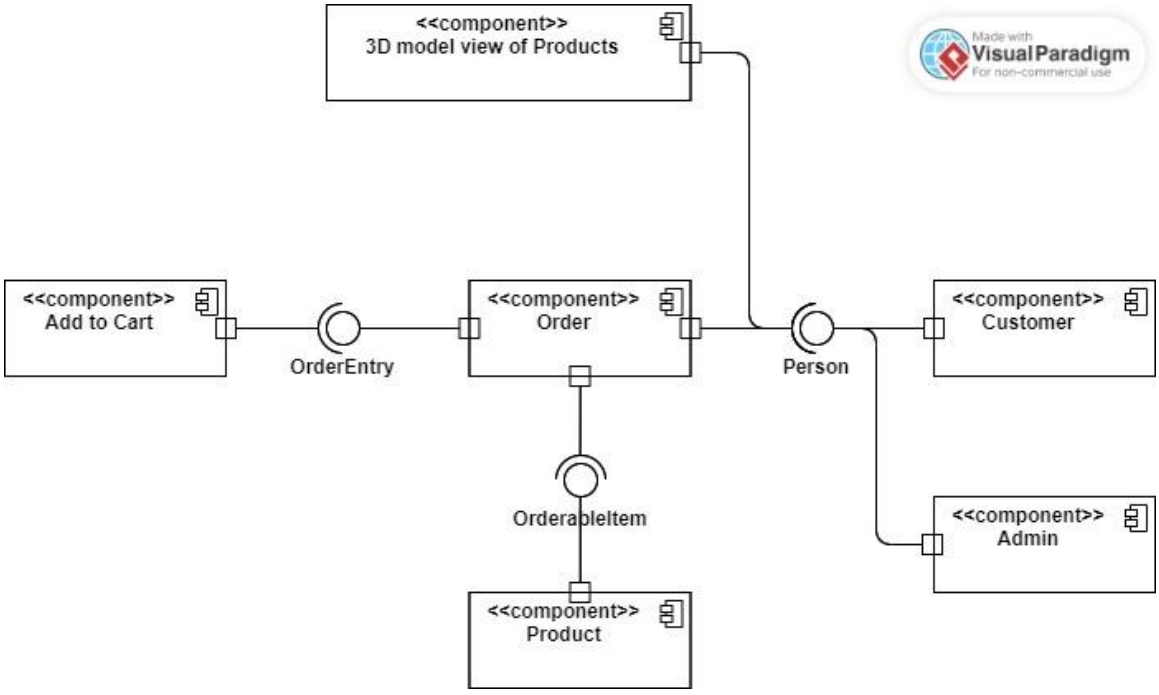
Customer


Customer
LOGIN
VALID USER
YES
NO
VERIFY USER ENTRY
REGISTRATION
VIEW LATEST ORDERS
MANAGE SHIPPING & BILLING ADDRESSES
EDIT PASSWORD & ACCOUNT DETAILS
LOGOUT

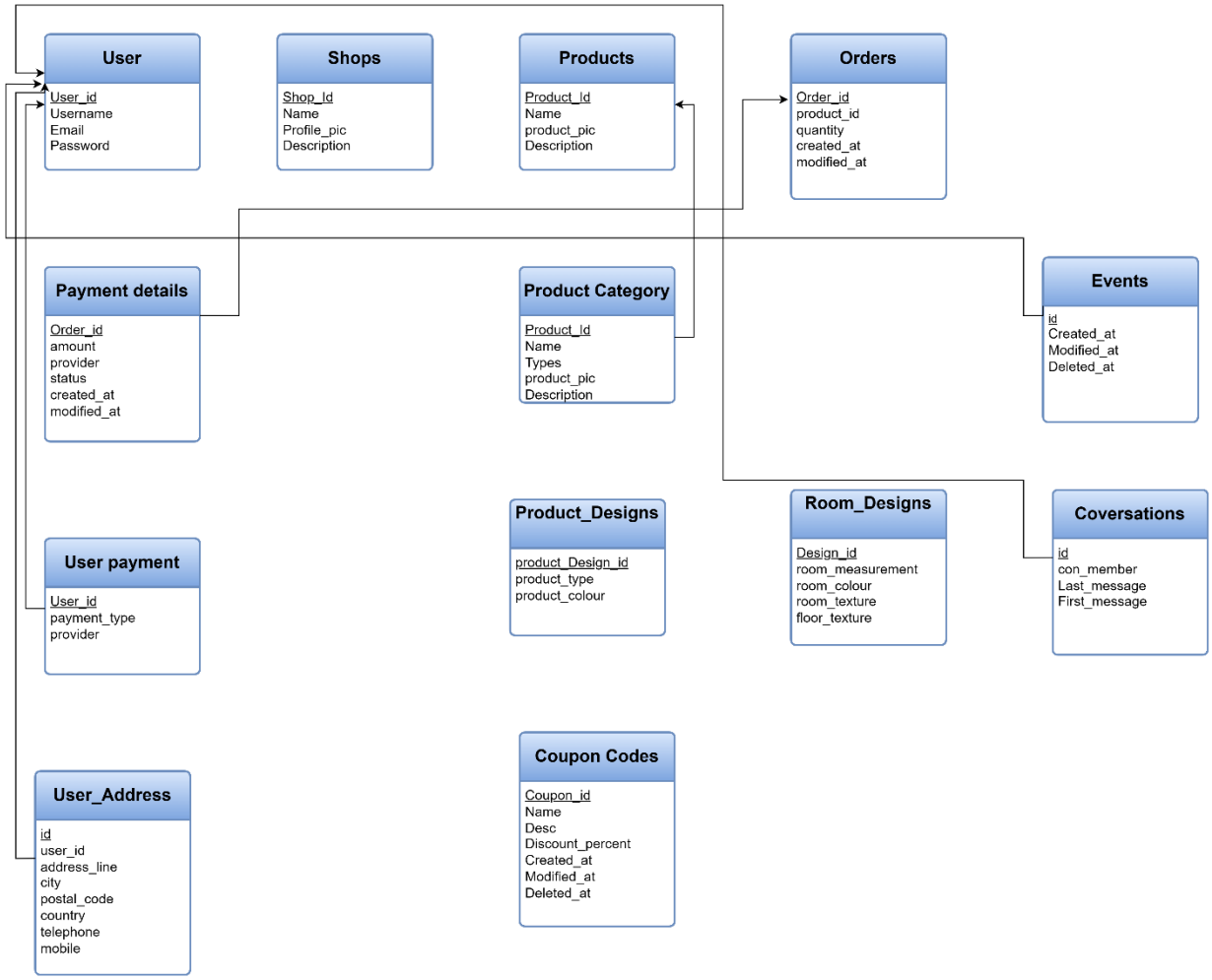
Designer


DESIGNER
LOGIN
VALID USER
YES
NO
REGISTRATION
VERIFY (DESIGNER) USER ENTRY
REVIEW 3D MODELS
REVIEW PRODUCT AND ADD IT'S 3D MODELS
Create Marketing Materials
LOGOUT

4.3.7 Component Diagram



4.3.8 Data Base schema design



4.3.9 Summary

In this chapter, we presented design diagrams, including architectural design, use case design, activity design, and sequence diagrams for our project "Home Designer." Throughout these diagrams, we aimed to illustrate the workflow and technical structure of our "Home Designer" system. The comprehensive system design facilitated a thorough exploration and comprehension of the nuanced elements of our project.

Chapter 5:

Implementation

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Implementation

5.1 Endeavour

Team Members	Responsibilities
Usama Hussain	**Documentation** ➢ Comparison of existing systems Functional and Non-Functional requirements ➢ Database Schema diagram **Implementation** ➢ Frontend ➢ Backend
Malik Muhammad Farhad Asharaf	**Documentation** ➢ Problem scenarios ➢ Use case diagrams and fully addressed format ➢ Architecture diagram ➢ Activity diagram ➢ Test cases **Implementation** ➢ Backend ➢ Front end

5.2 Components, Libraries, Web Services and stubs

Front-end :

Front-end:	
React.js:	primary front-end library for building user interfaces
Axios	Promise-based HTTP client for making server requests.
Tailwind CSS	CSS style Framework for styling the frontend element.
React Icons	Library of popular icons for use in React applications.
React Toastify	Notification library for displaying messages to users.
React Lottie	Library for adding Lottie animations to the user interface.
Three.js	Implemented to facilitate 3D visualization and rendering.

Back-end :

Front-end:	
Express.js	Utilized to create a back-end server-side
Node.js	Run-time environment to execute server-side code.
Node-mailer	For sending emails using Node.js.
Bcrypt.js	JavaScript implementation of bcrypt for hashing passwords.
Jsonwebtoken	Library for generating and verifying JSON Web Tokens (JWT).
Three.js	Implemented to facilitate 3D visualization

Database :

Database:	
MongoDB	For storing the data

Version Control :

Database:	
Git, GitHub	For version control

5.3 IDE, Tools and Technologies

- Visual Studio Code [IDE]
- Blender [Design Editor]
- JavaScript[Backend]
- Node.js+ Express.js [JavaScript Framework]
- React.js + Three.js [Frontend Framework]
- Socket.IO Framework [For Real Time Messaging]

5.4 Best Practices / Coding Standards

Coding standards is important to make sure our code is of good quality. These rules include things like how the code looks, what names we give to different parts, and other technical settings. Following these standards helps us create code that is easy to read and keep in good shape.

5.4.1 Development Practices & Standards:

MERN Best Practices:

Code Structure:

Organize the project structure with a modular approach, separating concerns like routes, controllers, models, and views.

Enhance scalability and maintainability through a well-structured codebase.

Error Handling: Implement proper error handling and exception handling. Utilize try-catch blocks and middleware to catch and handle errors effectively.

Documentation:

well-structured documentation is a valuable asset for our project. It serves as a guide for developers, and for future extensions, and contributes to the overall sustainability and success of the project.

Design Patterns:

Model-View-Controller (MVC) pattern :

Implemented Model-View-Controller (MVC) pattern stands as a fundamental strategy. MVC separates the concerns of data management, user interface, and application logic.

Key Components:

Model (M):

The Model represents the data and business logic of the application.

Implement data structures, logic for data manipulation, and interactions with the database within the Model.

View (V):

The View is responsible for presenting data to the user and receiving user inputs.

Create separate views for different parts of the application, ensuring a clear separation of concerns.

Controller (C):

The Controller acts as an intermediary between the Model and View, handling user inputs and updating the Model accordingly.

React Best Practices:

Functional Components and Hooks:

Utilize functional components with hooks for state management.due to the simplicity and reusability offered by functional components.

State Management:

Utilize Redux toolkit which is state management libraries for managing the state requirements. Instead unnecessary use of the React context API for simple state management.

Components loading:

Implement code splitting to load only the necessary components for a given route.Utilize React lazy loading mechanism for efficient loading of components.

React Fragments:

Use React Fragments (<> </>) to avoid unnecessary wrapper elements in the DOM. To Keep the DOM structure clean and concise.

API best practices:

RESTful Design:

Adhere to the principles of Representational State Transfer (REST) for designing API. Use clear and consistent URLs, HTTP verbs, and response codes to make your API intuitive and easy to use.

Authentication and Authorization:

Implement secure authentication and authorization mechanisms, such as token-based authentication or OAuth, to protect your API endpoints and restrict access to authorized users.

Express Middleware for Validation:

Employ middleware functions in Express.js to validate and sanitize user inputs before processing requests.

Three.js Best Practices::

Optimize Render Performance:

Utilize the WebGLRenderer for optimal GPU performance.

Efficient Geometry Handling:

Prefer BufferGeometry over Geometry for improved performance, especially with large datasets. Use indexed BufferGeometry for memory efficiency.

Texture Optimization:

Compress textures and use appropriate formats (e.g., DDS) to minimize loading times. Implement mipmapping for improved texture quality at various distances.

5.5 Development Environment:

Installation:

- React.js [version 18.2.0]
- Three.js[version 5.1.0]
- Node.js [version 18.10.0]
- NPM [version 8.1]

- Express.js [version 4.18.2]
- Mongoose [version 7.0.0]
- Visual Studio Code
- Blender

5.6 Summary:

In this chapter, we explain the essential libraries, components, and web services integrated into our software to fulfill the Easy Development and Installation requirements. We follow the standard coding practices and prioritize the use of established rules to ensure the long-term maintainability and availability of future developments for our system.