

# **Software Engineering and Mobile App development (Group) Assignment 1**



Group Name: Amazon

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# 1. Introduction

Amazon E-Commerce Site is a global platform that serves as a well-known online marketplace, providing a vast selection of products and services for millions of customers. Amazon, with its advanced logistics, secure payment processing, and personalized shopping experience, ranks among the best online shopping marketplaces.

This report presents the architectural design, requirements specification, and key charts and diagrams for the Amazon E-Commerce System, which was developed as part of a Software Engineering Course. The primary aim is to analyze and design an E-Commerce platform that improves the online shopping experience by providing a secure, efficient, and user-friendly digital interface.

It addresses the needs of different stakeholders (Internal, external, and environmental ) like customers, administrators, sellers, payment processors, ecological organizations, and laborers that align with Amazon's mission to be "Earth's most customer-centric company" (Amazon, 2024). Through requirements methods including interviews and surveys, this research identifies key user requirements and system capabilities to support core e-commerce functionalities.

The document outlines a comprehensive list of detailed functional and non-functional requirements for the system. By specifying the requirements, this document ensures that all the subsequent designs, including Use Case Diagram, Use Case Descriptions, Activity diagrams, Class diagram, Entity Relationship Diagram, Sequence Diagrams, and State Machines Diagram, are all aligned with the defined business requirements and goals, minimizing the risks and ensuring the system's professional standard communication.

## 2. Stakeholder of Amazon

A stakeholder is any individual, group, or organization that is affected by or has an interest in a system. In Amazon, the list of stakeholders includes the internal, external, and Environmental stakeholders who are influenced by the system's operations and outcomes.

<b>Internal Stakeholder</b>	
<b>Stakeholder</b>	<b>Description / Role</b>
<b>Founders &amp; Executive Leadership</b>	Includes Jeff Bezos (Founder) and the current executive team, such as Andy Jassy (CEO), Brian T. Olsavsky, Douglas J. Herrington, Matt Garman, and David A. Zapolsky
<b>Employees</b>	Full-time, part-time, and contract workers in areas such as engineering, logistics, retail, AWS, marketing, and customer service.
<b>Managers &amp; Department Heads</b>	Oversee teams, ensure productivity, and align department goals with corporate objectives.
<b>Board of Directors</b>	Provide governance, oversight, and ensure accountability to shareholders.

<b>External Stakeholder</b>	
<b>Stakeholder</b>	<b>Description / Role</b>
<b>Customers</b>	The primary users of Amazon's e-commerce platform, AWS, include Prime Video and other services. Their satisfaction drives business success.
<b>Suppliers &amp; Vendors</b>	Provide products, materials, and services for Amazon's retail and logistics operations.
<b>Third-Party Sellers</b>	Independent merchants who sell through Amazon Marketplace; their performance and satisfaction impact the platform's reputation.
<b>Delivery Partners</b>	Includes Amazon Logistics (Amazon Flex, Delivery Service Partners) and

<b>External Stakeholder</b>	
	external couriers who handle the shipment of goods.
<b>Investors &amp; Shareholders</b>	Provide financial capital and expect profitable returns and sustainable growth.
<b>Business Partners</b>	Collaborators such as manufacturers, software developers, content creators, and cloud service clients.
<b>Regulatory Authorities &amp; Government Agencies</b>	Ensure Amazon's compliance with tax laws, data privacy, labor regulations, and antitrust laws.
<b>Financial Institutions</b>	Banks, credit agencies, and payment processors facilitate Amazon's transactions and investments.
<b>Competitors</b>	Other e-commerce and tech giants like Walmart, Alibaba, Microsoft, and Google influence Amazon's strategic decisions.
<b>Media &amp; Analysts</b>	Report on Amazon's operations, financial performance, and social impact, shaping public perception
<b>Local Communities</b>	Populations where Amazon operates warehouses, data centers, and offices are affected by employment, environment, and infrastructure use.
<b>Non-Governmental Organizations (NGOs)</b>	Monitor Amazon's environmental, labor, and ethical practices.
<b>Academic &amp; Research Institutions</b>	Collaborate with Amazon on AI, machine learning, logistics, and innovation research.

<b><i>Environmental and Social Stakeholder</i></b>	
<b>Stakeholder</b>	<b>Description / Role</b>
<b>Environmental Organizations</b>	Evaluate and influence Amazon's sustainability initiatives, carbon footprint, and renewable energy use.
<b>Society at Large</b>	Consumers and citizens are affected by Amazon's impact on local economies, employment, and digital ecosystems.
<b>Labour Unions &amp; Worker Advocacy Groups</b>	Represent warehouse workers and delivery drivers regarding fair pay, working conditions, and rights.

### 3. Requirements Gathering Methods

To figure out what users and stakeholders expect from the new Amazon system, we used two methods for requirements elicitation. Methods: **interviews** and **questionnaires (surveys)**. The reasons that we chose an interview are that Interviews are "well-suited for exploratory studies and for gaining insights into the social and collaborative aspects" (Hove & Anda, 2005, p. 2). The survey is also "especially strong for collecting data on attitudes, beliefs, and self-reported behaviors in a standardized way" (Pinsonneault & Kraemer, 1993, p. 80). By using these, we gathered both detailed qualitative and quantitative data from different Amazon users.

#### Method 1: Interviews

**Description and Justification:** We conducted structured interviews with 3 Amazon users and people who may use Amazon in the future. We used this method for open discussion and a deeper understanding of user challenges and experiences. We asked follow-up questions to clarify some unclear points and get specific details about system needs

**Findings (Based on Appendix 1):** Findings from the interview method identify main issues like not accessing smart search engines that filter irrelevant products, absence of authorized products and sellers for the user, no personalized recommendations system is provided, and users are in demand of faster delivery. Moreover, the users are asking for adding the feature of receiving notifications for price-drop deals or great discounts on the products.

In contrast, there are multiple advantages of the system that users are interested in, including a wide variety of products, easy buying, and great deals during popular holidays.

## Method 2: Questionnaires (Surveys)

**Description and Justification:** Because of limited feedback and reaching a wider audience, we created an online survey distributed to Amazon users, and in total, 10 responses were gathered. Surveys are efficient for common trends. We were also able to compare user opinions easily, especially on usability and satisfaction. The questions were designed to rate, be short and simple. It focused more on user satisfaction, checkout process, delivery, and upcoming features.

**Findings (Based on Appendix 2):** The response to the survey shows that most users were satisfied with the speed of the page loading, while some suggested a minor optimization of the page performance during heavy load periods. Next, although the checkout process was mostly clear for the users, they are in demand of a faster and more user-friendly process. Moreover, the trust in product authenticity was another issue for the users, indicating demand for authorized products and sellers. Additionally, real-time delivery tracking is strongly valued by the users and noted as an essential feature. Also, the shop together feature was widely supported and well-received.

## 4. Functional and Non-functional Requirements

Finding a clear set of requirements is an important step in any software engineering project. As Pavlenko (2023) explains, "well-defined functional requirements serve as a foundation for the entire software development lifecycle, guiding design, development, testing, and project management" (para.4). Therefore, for our project Amazon application, we study, ask users, talk to people who might use the system in the future, and look at other e-commerce sites and finalise the requirement that aligns with user needs and business aims.

<i>Functional Requirements</i>	
Requirement	Description
User Registration and Login	The system must allow customers, sellers, and delivery partners to register and log in securely.

<i>Functional Requirements</i>	
<b>Product Search and Filtering</b>	Users must be able to search for products using keywords, categories, and filters (price, rating, etc.).
<b>Order Management</b>	Customers should be able to place, track, and cancel orders. Sellers must update stock and delivery status.
<b>Payment Integration</b>	The system must integrate multiple payment gateways (credit card, PayPal)
<b>Delivery Tracking</b>	Real-time tracking of delivery status for both customers and delivery partners.
<b>Feedback and Rating System</b>	Users can rate products, services, and delivery performance.
<b>Admin Dashboard</b>	Administrators can view reports, manage users, and monitor transactions.

<i>Non-functional Requirements</i>	
<b>Requirement</b>	<b>Description</b>
<b>Performance</b>	The system should respond within 2 seconds to any user query or page load.
<b>Scalability</b>	The architecture must support growth in users, products, and transactions.
<b>Security</b>	Data must be encrypted; users must be authenticated before accessing their accounts.

<i>Non-functional Requirements</i>	
<b>Usability</b>	The interface should be user-friendly, with simple navigation and clear instructions.
<b>Availability</b>	The system must maintain 99% uptime to ensure constant access.
<b>Maintainability</b>	The system should allow easy updates and bug fixes without downtime.
<b>Data Privacy</b>	User data must comply with GDPR and other relevant privacy laws.

## 5. Entity Relationship Diagram

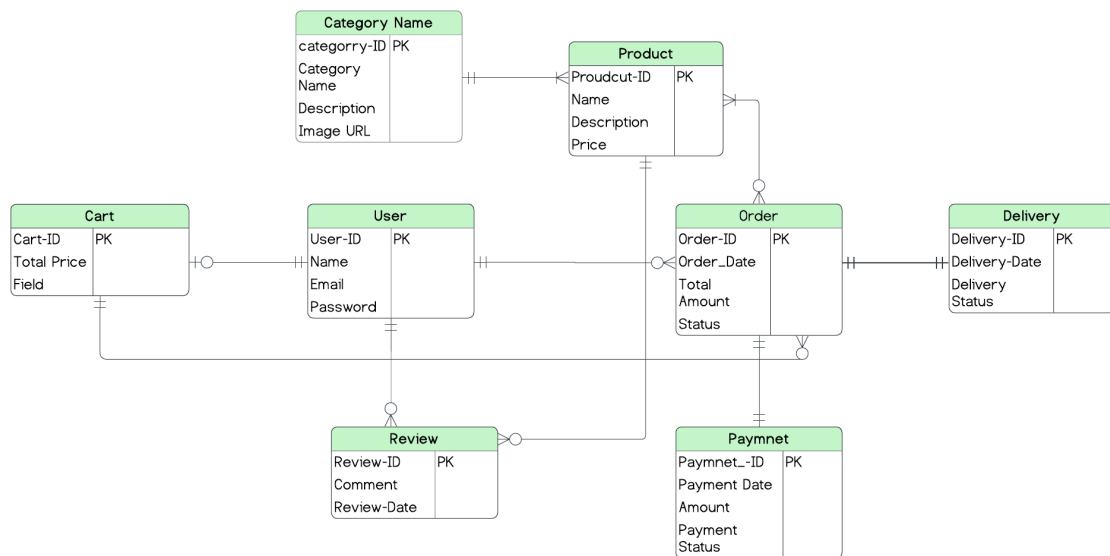


Fig1. Entity Diagram Relationship

## 6. Use Case Diagram

Order-Use Care Diagram

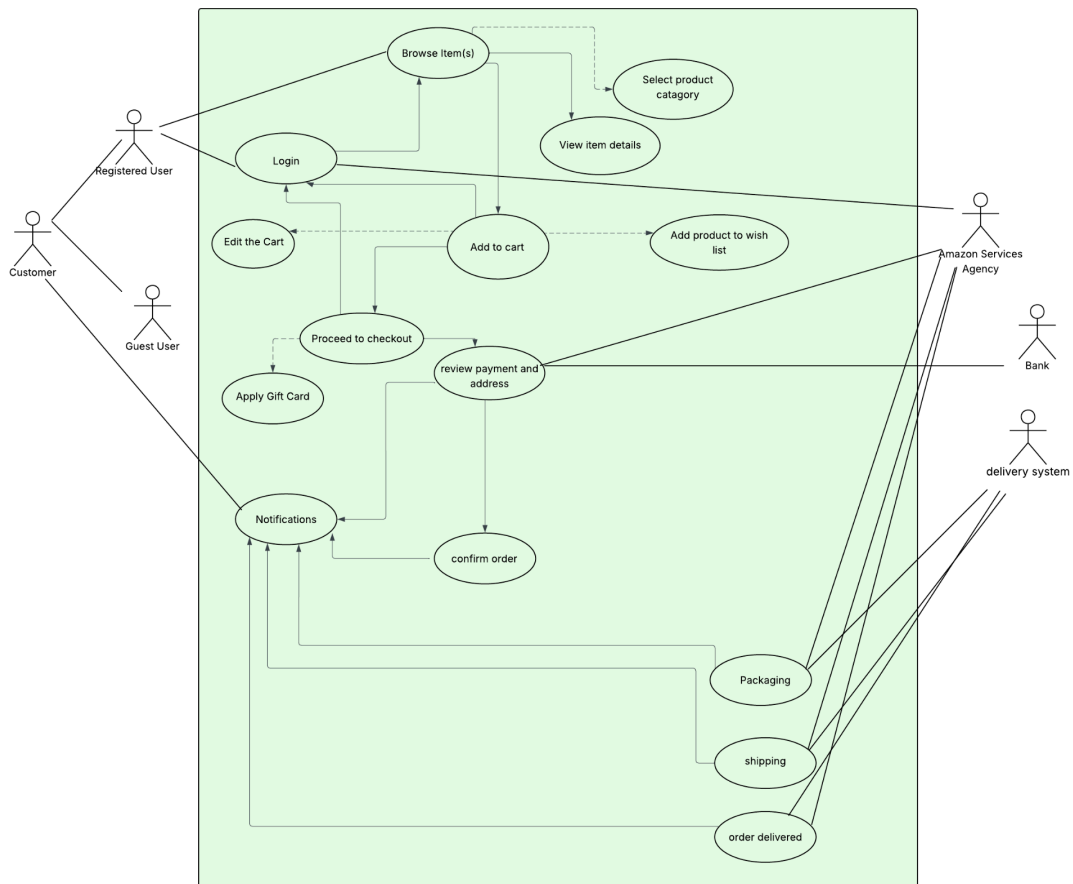


Fig2. Use Case Diagram

## 7. Cases Descriptions

<b>Use Case Description 1: Proceed to Checkout</b>		
Use Case #1 Date 29/10/25	Proceed to Checkout	
Goal in Context	This use case describes the process where a customer finalises their purchase by providing shipping and payment information, reviewing the order, and formally submitting it.	
Preconditions	1. The Customer is logged into the system. 2. The Customer's shopping cart contains at least one item.	
Postconditions	1. A new order is created with status "Review payment and address". 2. The system redirects the user to an order confirmation page. 3. The customer receives an order confirmation notification.	
Primary, Secondary Actor(s)	Primary: Customer, Amazon Service agency Secondary: Bank.	
Trigger	The Customer clicks on the "Proceed to checkout" button.	
Description	Steps	Action
	1.	The Customer selects "Proceed to Checkout".
	2.	The system displays the "Shipping Address" page.
	3.	The Customer selects a saved shipping address or enters a new one, then clicks "Continue to Shipping".
	4.	The system displays the "Shipping Method" page with available options (e.g., Standard, Express).
	5.	The customer chooses the shipping method and

<b>Use Case Description 1: Proceed to Checkout</b>		
		clicks “Continue to Payment”.
	6.	The system displays the “Payment Method” page
	7.	The Customer chooses the payment method and enters the payment information, and clicks “Review Order”.
	8.	The system displays the “Review Order” page with all information, including the total price.
	9.	The customer reviews all the information and clicks on “Place Your Order”.
Extensions	Step	Branching Action
	1a	If the Customer has a Gift Card, they can use it and then proceed with the payment.
Special Requirement	The user can click on “Buy Now” on the Item page information or The user must add items to the card to enable them to check out.	
Unresolved Issues	Num	Solutions
Missing or Invalid Shipping Address in step 5	1.	Validate address fields; display inline error messages; prevent moving to the next step until corrected.

<b>Use Case Description 2: Add to Cart</b>	
Use Case#2 Date 29/10/25	Add to Cart
Goal in context	This use case describes the process where a customer adds a selected item to their virtual shopping cart for potential future purchase.
Pre-Condition	1. The customer should be logged in. 2. The Customer has viewed the product details of a

<b>Use Case Description 2: Add to Cart</b>		
	valid, in-stock item.	
Post-Condition	The selected item and quantity are added to the Customer's shopping cart.	
Primary, Secondary actor	Customer, System	
Trigger	The customer clicks the “Add to Cart” button on a product page.	
Description	Step	Action
	1.	The Customer, while on a product details page, selects a desired quantity (default is 1).
	2.	The Customer clicks the "Add to Cart" button.
	3.	The system validates that the item is in stock and the quantity is available.
	4.	The system adds the item and the specified quantity to the Customer's persistent shopping cart.
	5.	The system updates the cart icon in the header to reflect the new total number of items.
	6.	The system displays a confirmation overlay or message ("Added to Cart") with an option to "View Cart" or "Proceed to Checkout".
Extensions	Step	Branching Action
	1a	Edit the Cart.
	2a	Add product to the Wish list.
Special Requirement	Must handle real-time price changes.	
Unresolved Issues	Num	Solution
Quantity exceeds stock	1.	At step 3, if the selected quantity is greater than

### ***Use Case Description 2: Add to Cart***

		the available stock, the system displays a message: "Only [X] left in stock," and does not add the item to the cart. The use case returns to step 1, allowing the user to adjust the quantity.
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## 8. Activity Diagrams

Checkout Activity diagram

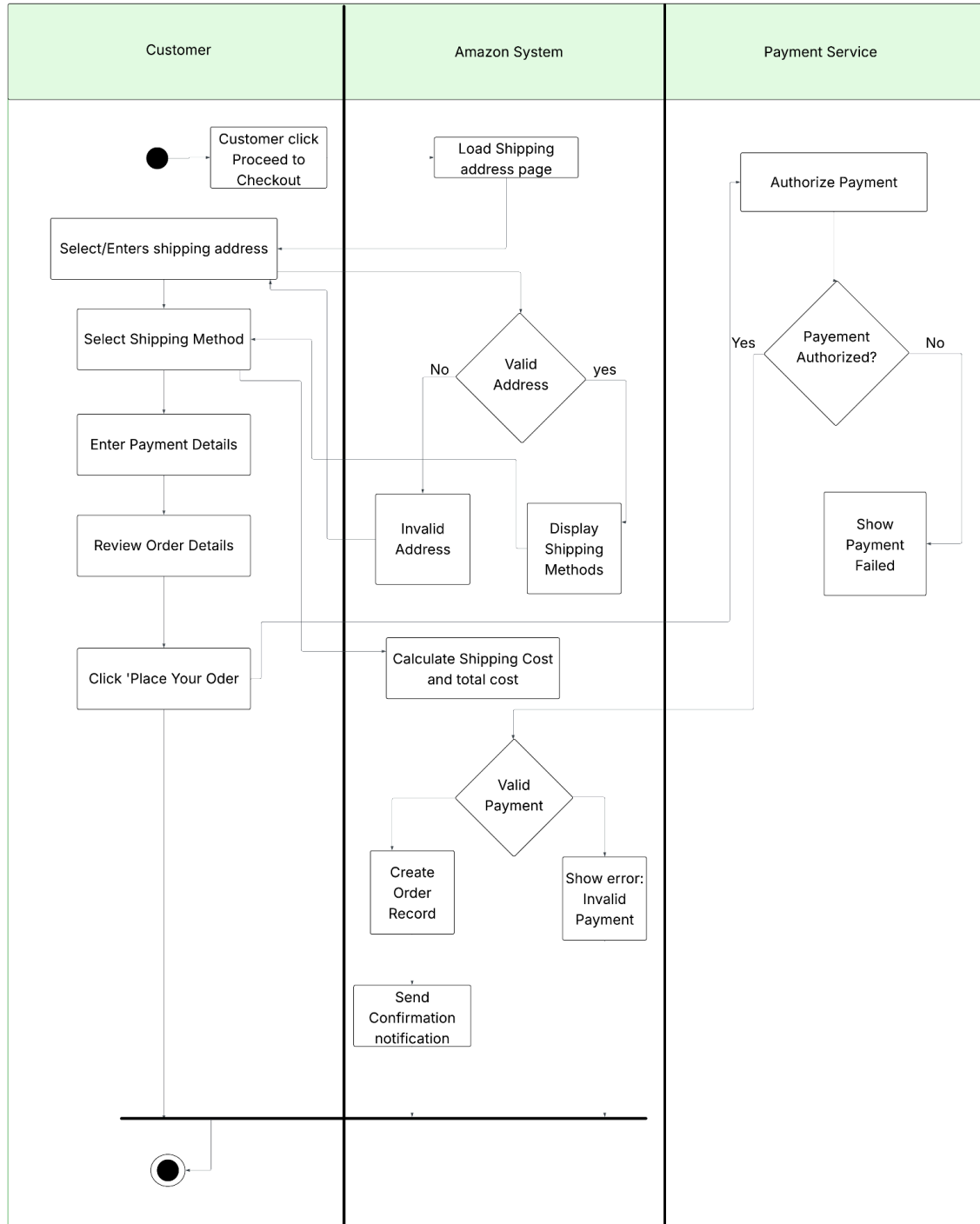


Fig3. Activity Diagram for 'Checkout'

Activity Diagram  
Add to Cart Use Case

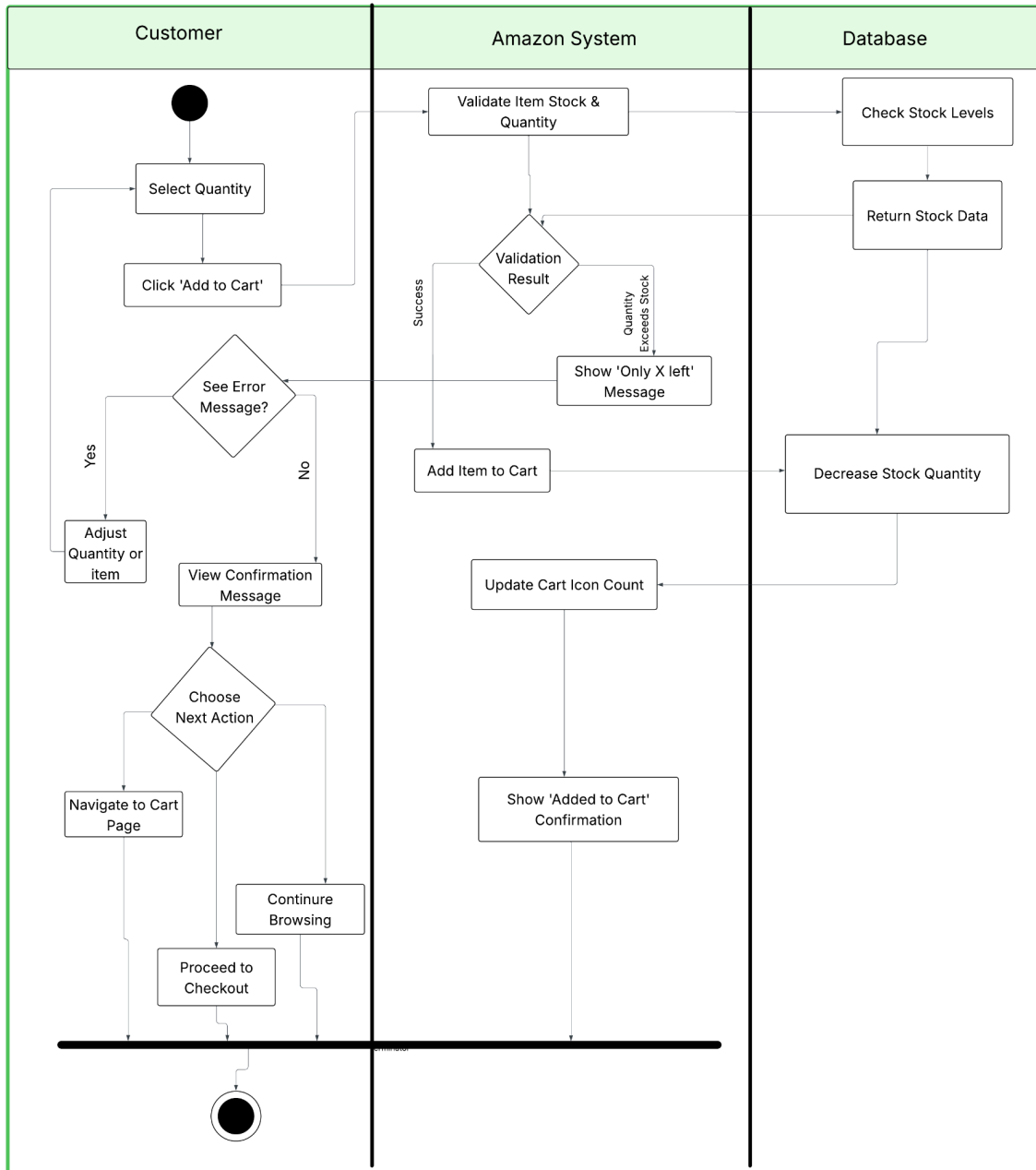


Fig4. Activity Diagram for 'Add to Cart'

## 9. Sequence Diagrams

### Confirmation of shipping and payment

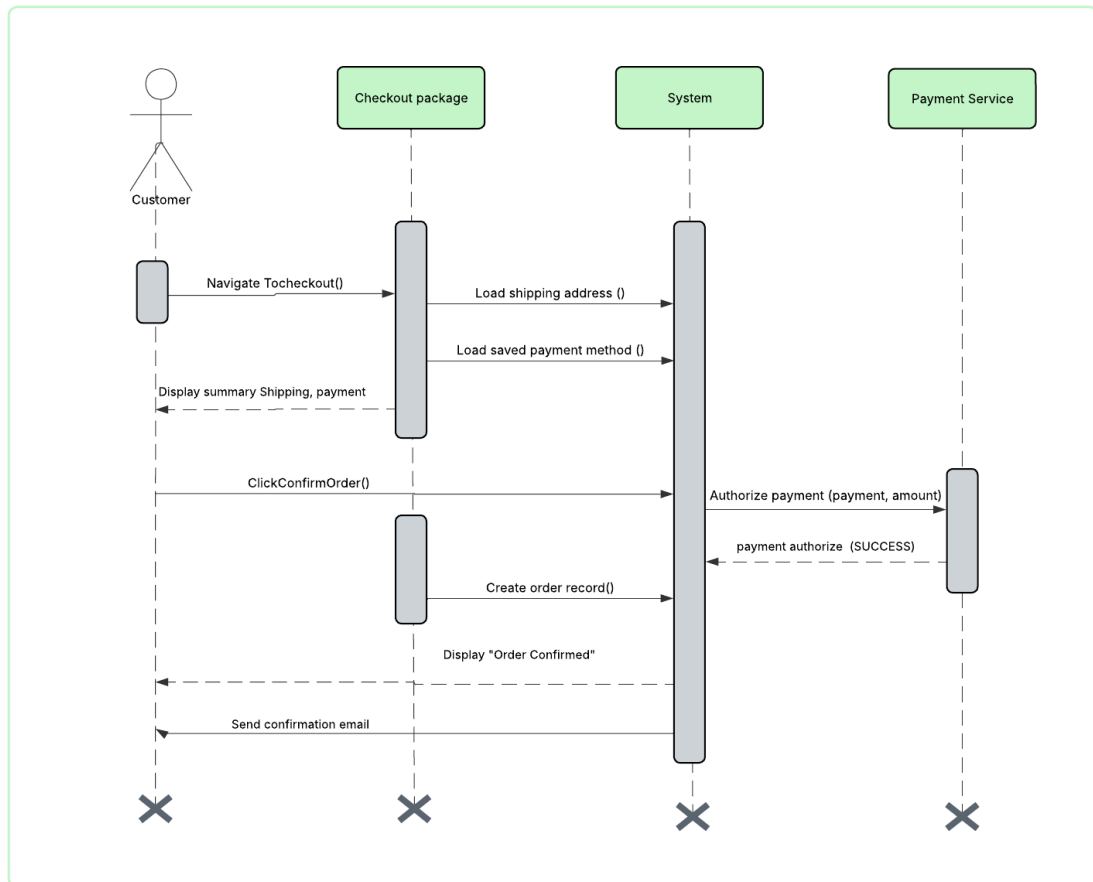


Fig 5. Sequence Diagram for Confirmation of shipping and payment

*Customer add a new item to the card*

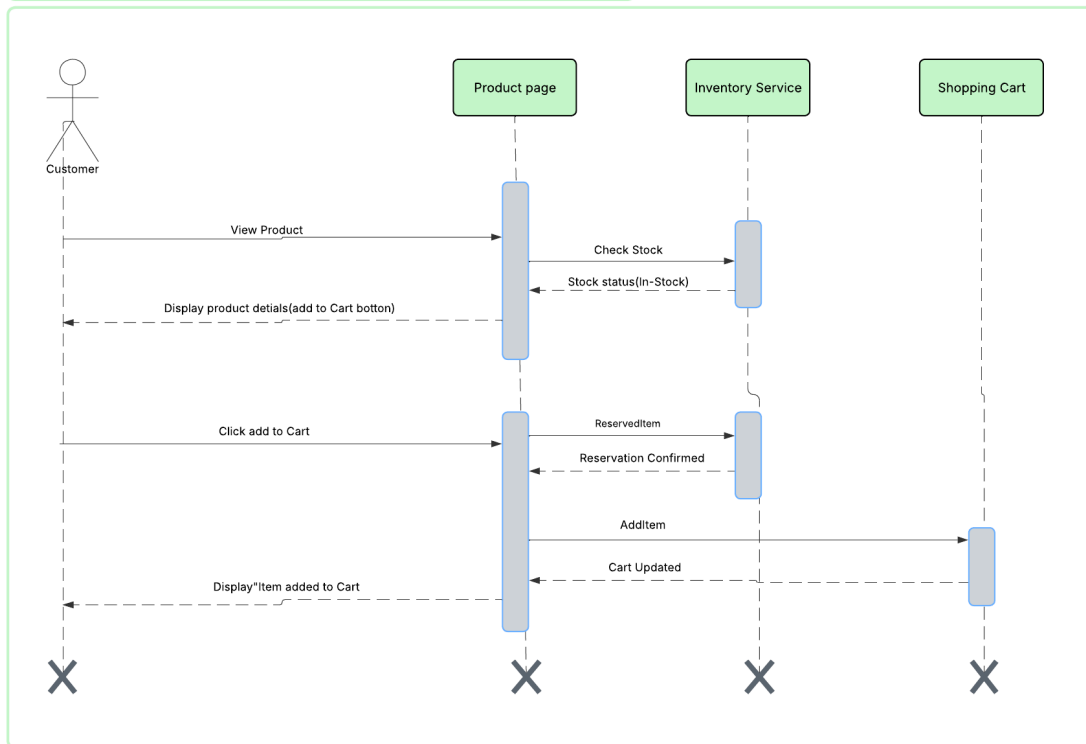


Fig 6. Sequence Diagram for Adding a New Item to Cart

## 10. State Machine Diagrams

State Machine Diagram  
Order lifecycle - Amazon System

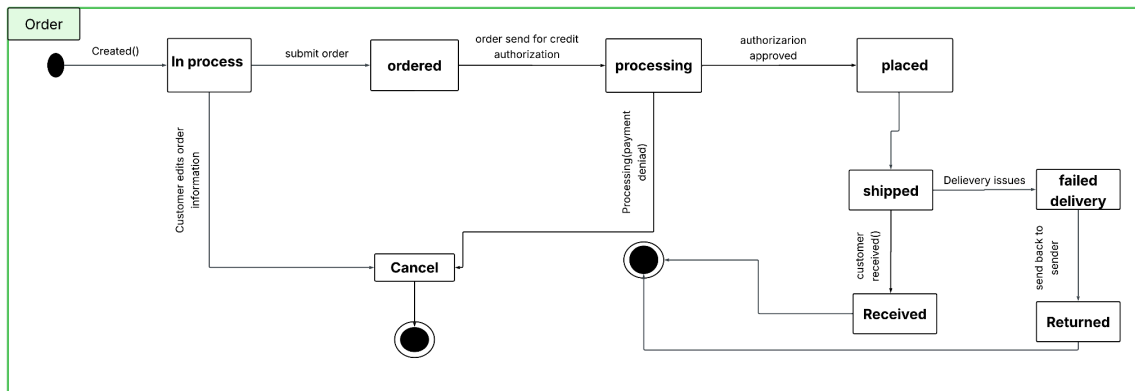


Fig7. State Machine Diagram

## 11. Class Diagram

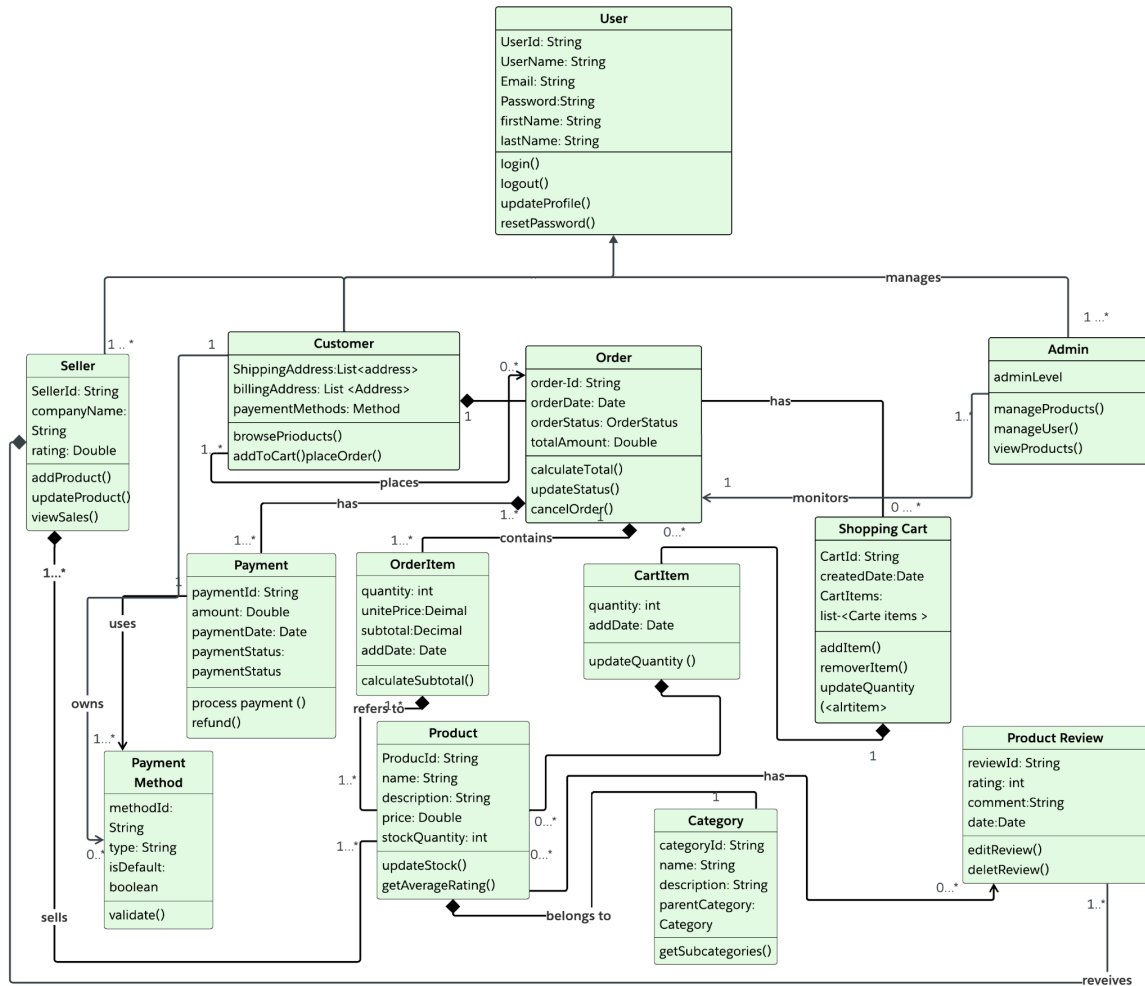


Fig8. Class Diagram

## 12. System Development Methodologies

### 1. Scrum (Agile)

Overview: Scrum is an Agile framework that separates work into short cycles (Duration usually is 1-4 weeks and focuses on regular communication, adapting to change, and incremental delivery. One of the advantages is that Scrum accepts changes, delivers small increments, inspects, and adapts, rather than trying to define everything up front.

#### **Requirements analysis: gathering & specification**

According to ThinkPi Publishing (n.d.), Scrum helps you with a high-level product backlog, like a list of features or user stories at the beginning. Continuously refine requirements via workshops, user interviews, story mapping, and impact mapping. ThinkPi Publishing (n.d.) describes how agile requirements, instead of huge formal specifications, can be written as user stories, such as "As a customer, you want to add a new item to your cart so that you can purchase it." It is going to accept criteria, example-mapping. Tools like Jira, Confluence are used for backlog boards, but also visual techniques like story mapping to clarify requirements.

### 2. Waterfall (Classic/Sequential)

#### **Overview**

Waterfall is a sequential, linear methodology. You gather all requirements up front, then design, implement, test, and deploy. Although if you finish a phase, you generally don't go back. It lacks flexibility for change.

#### **Requirements analysis: gathering & specification**

At the outset, you attract stakeholders and users by capturing a comprehensive set of requirements. Interviews, questionnaires, existing system reviews, and formal models (CERTNSoft, n.d.). You record a comprehensive requirements specification document that includes both functional and non-functional requirements. Typically frozen before design begins, like use cases, detailed diagrams, and formal requirements (dmj.one, n.d.). Formal documentation tools like IBM DOORS for requirements, or diagramming tools like Lucidchart can be used ("Waterfall model," n.d.).

## Amazon Pro New Features:

Based on the user responses, participants request better collaboration during shopping, improved product authenticity, and increased trust and transparency in the buying process. To address these needs, we introduced two new features for the Amazon system: **Shopping Together** and **TrustGuard**. These features aim to enhance user experience by making online shopping more interactive, secure, and reliable. By adding these features, we named the website Amazon Pro.

### 1. Shopping Together

It is a collaborative feature that allows users to search, browse, review, and decide on products by clicking the shop together feature at the top right of the web page. You can create a session for yourself, and then choose options: pay one person, pay split equally, or split by item. Moreover, you can browse together, share a cart, and discuss the products in chat and voice.

### 2. trustGuard

TrustGuard is a new feature that will satisfy a huge number of customers because it is a security and authenticity verification feature. It is designed to detect fake products from the original. You can ask about a specific product or upload an image, and it gives important information about the product. Especially give you the reasons why this product is fake or original.

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[https://www.certnsoft.com/info/Methodology-in-Practice-Info8.html?utm\\_source=chatgpt.com](https://www.certnsoft.com/info/Methodology-in-Practice-Info8.html?utm_source=chatgpt.com)

## 14. Appendix

To collect requirements for the Amazon-style system, we used an online survey and short interviews. These methods helped us understand what people expect from an e-commerce platform. The survey was shared with 10 users to find out what features they value most when shopping online. The interviews were done with three users to get more detailed feedback about their experiences and problems with current shopping sites.

Note: The responses that we have received from the interviewees and surveys are not from the real users of Amazon, and we are aware that they do not use Amazon right now, and they will answer as if they will use it in the future.

### Main findings:

- Users suggest easy product search, secure payment, fast and exact delivery.
- Common frustrations include slow-loading pages and complicated payment steps.

## **Appendix 1:**

### Interview questions

1.	How often do you shop online?
2.	What do you like most about shopping online?
3.	Do you have information about Amazon? Have you ever visited the website?
4.	If you visit the website, is there anything difficult to find?
5.	If you want to add one feature to Amazon or for any online shopping, what would it be?
6.	Do you think that on Amazon or any online shopping website, you can find the product that you want?
7.	Do you find the image-search feature useful?
8.	Do you have any other commonalities to add for Amazon or any other online shopping

Interviewee: Zakia Rahim Position: Customer future user  
 Date: 11/13/2025 Time: 4:00 PM  
 Place: AUW, Chittagong, Bangladesh  
 Subject: Collecting requirements of a system for Amazon plus online shopping

Time Allocated	Interviewer Question or Objective	Interviewee Response
	<b>Objective</b> Open the interview: - Introduce yourself - Thank _____ for his/her valuable time - The purpose of this interview is to gather your requirements for the Amazon e-commerce site.	
1.	How often do you shop online?	Regularly
2.	What do you like most about shopping online?	Fast delivery great deals
3.	Do you have information about Amazon? Have you ever visited the website?	Yes, I know Amazon and I visit.
4.	If you visit the website, is there anything difficult to find?	yes, sometimes the fake and original product cannot be diffd
5.	If you want to add one feature to Amazon or for any online shopping what would it be?	A price-drop alert
6.	Do you think in Amazon or any online shopping website you can find the product that you want?	yes, the variety is huge, so it's rare
7.	Do you find the image-search feature useful?	I didn't see it yet.
8.	Do you have any other common to add for Amazon or any other online shopping	More personalized recommendation system
	Conclude the interview: - Thank _____ for the cooperation and assuring that a copy of what transpired during the interview will follow.	
<b>General Comments and Notes:</b> <u>Zakia find it convenient and useful.</u>		

Interviewee: Mansura Haidari Position: Customer future user  
 Date: 11/14/2025 Time: 4:00 PM  
 Place: Allu, Chittagong, Bangladesh  
 Subject: Collecting requirements of a system for Amazon plus online shopping

Time Allocated	Interviewer Question or Objective	Interviewee Response
	<b>Objective</b> Open the interview: - Introduce yourself - Thank _____ for his/her valuable time - The purpose of this interview is to gather your requirements for the Amazon e-commerce site.	
1.	How often do you shop online?	Several times a month
2.	What do you like most about shopping online?	Huge variety without leaving home
3.	Do you have information about Amazon? Have you ever visited the website?	Yes, I am familiar and I check the site for product
4.	If you visit the website, is there anything difficult to find?	No, the site layout is clear for me
5.	If you want to add one feature to Amazon or for any online shopping what would it be?	Smart search engine that filter irrelevant junk
6.	Do you think in Amazon or any online shopping website you can find the product that you want?	usually yes
7.	Do you find the image-search feature useful?	Yes, it's really useful
8.	Do you have any other comment to add for Amazon or any other online shopping	It's convenient and save time
	Conclude the interview: - Thank _____ for the cooperation and assuring that a copy of what transpired during the interview will follow.	
<b>General Comments and Notes:</b> <u>Online shopping is improving, and people like Mansura find it a great experience</u>		

Interviewee: Fatima Ibrahim Position: Customer - User  
 Date: 11/12/2025 Time: 4:00 PM  
 Place: AUW, Chittagong, Bangladesh  
 Subject: Collecting requirements of a system for Amazon plus online shopping

Time Allocated	Interviewer Question or Objective	Interviewee Response
	<b>Objective</b> Open the interview: - Introduce yourself - Thank _____ for his/her valuable time - The purpose of this interview is to gather your requirements for the Amazon e-commerce site.	
1.	How often do you shop online?	One in a month
2.	What do you like most about shopping online?	Convenience Just one click away
3.	Do you have information about Amazon? Have you ever visited the website?	No, I have not visit but I have info-
4.	If you visit the website, is there anything difficult to find?	-
5.	If you want to add one feature to Amazon or for any online shopping what would it be?	An AI Fraud detector
6.	Do you think in Amazon or any online shopping website you can find the product that you want?	Yes, most of the time.
7.	Do you find the image-search feature useful?	Sometimes when you do not know the exact product name
8.	Do you have any other comment to add for Amazon or any other online shopping	I'd love to see faster delivery
	Conclude the interview: - Thank _____ for the cooperation and assuring that a copy of what transpired during the interview will follow.	
<b>General Comments and Notes:</b> <u>people are interested in fast delivery</u>		

## Appendix 2:

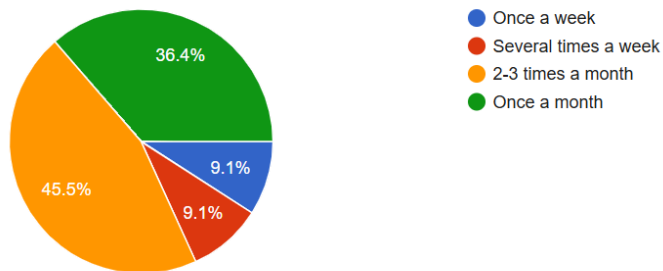
### Survey Responses:

#### User Profile & Shopping Habits

How often do you shop on Amazon ?

 Copy chart

11 responses

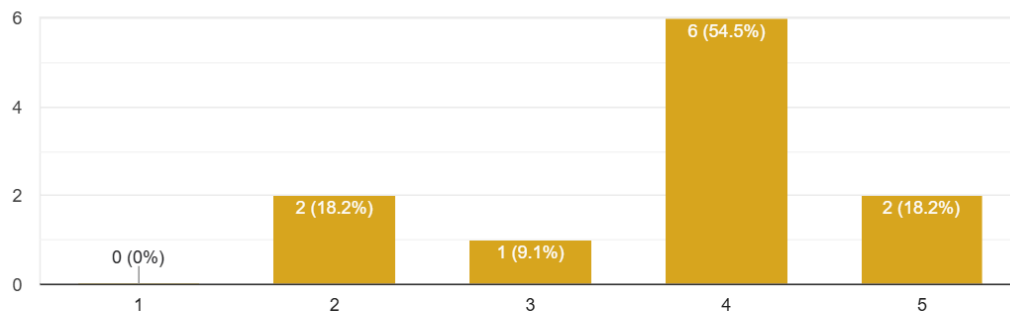


How satisfied are you with the speed of loading pages during online shopping?

 Copy chart

11 responses

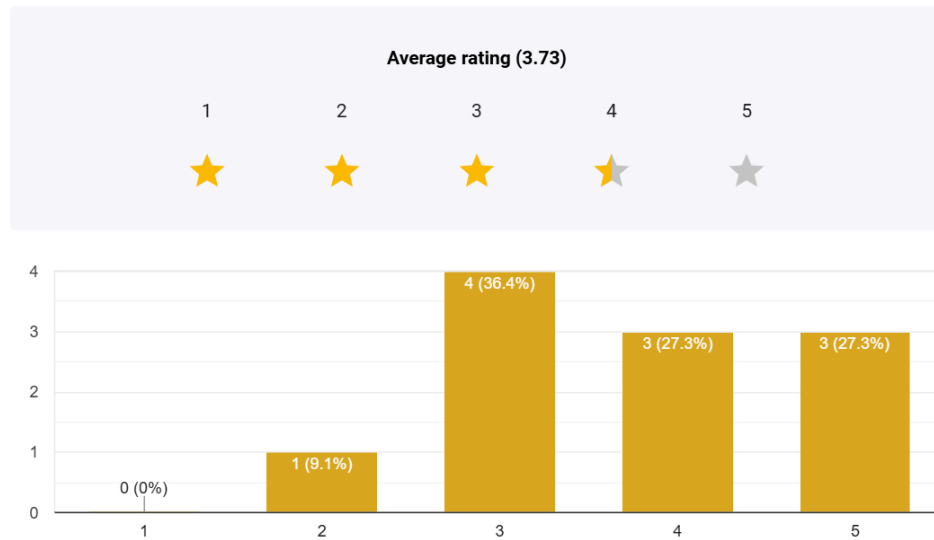
Average rating (3.73)



How clear and organized do you find the checkout steps when completing an online purchase?

[Copy chart](#)

11 responses



How helpful would a feature be that automatically alerts you about low-stock items you viewed?

[Copy chart](#)

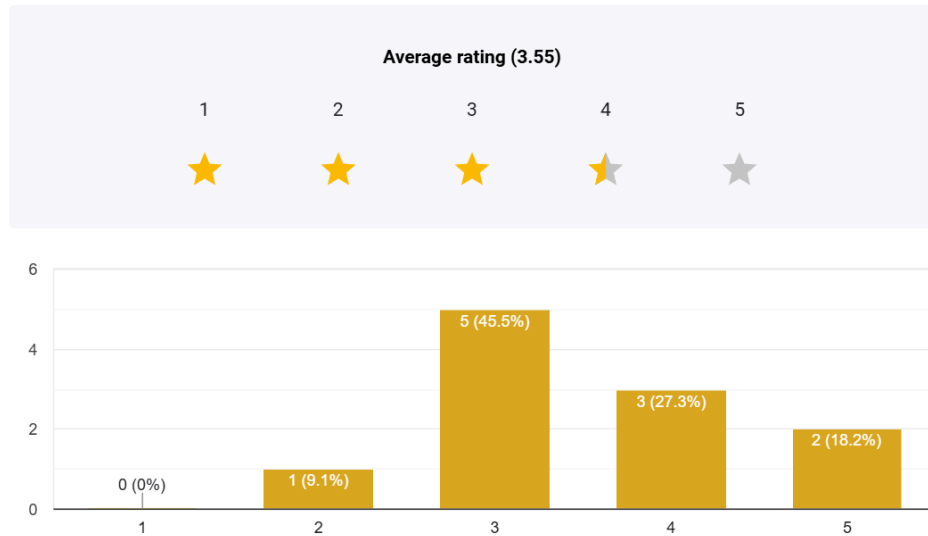
11 responses



How confident are you that the product you see online matches what you will receive?

[Copy chart](#)

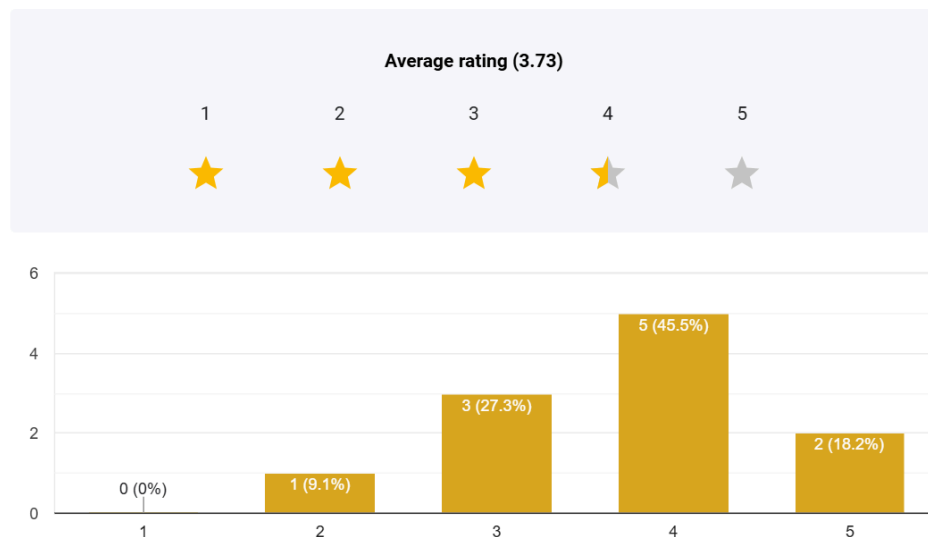
11 responses



How useful would real-time delivery tracking be for your online shopping experience?

[Copy chart](#)

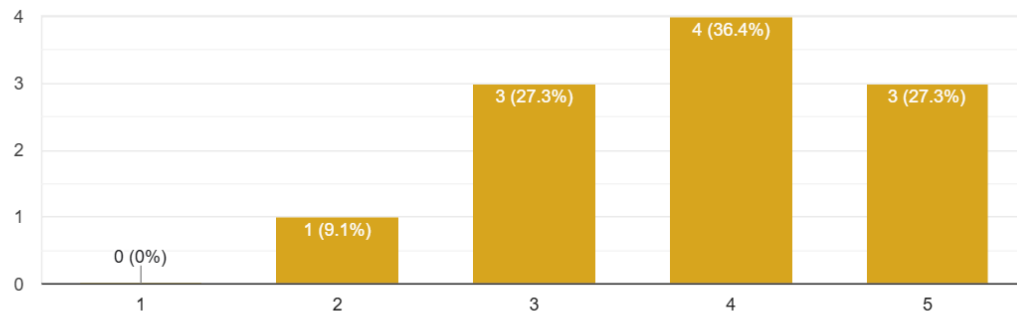
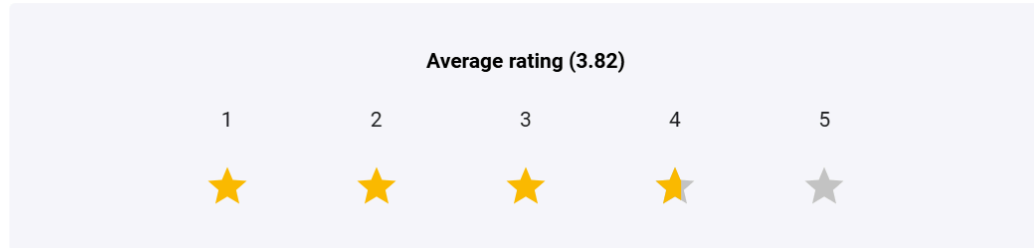
11 responses



How easy is it for you to understand product ratings and reviews when deciding what to buy?

 [Copy chart](#)

11 responses



How important is it that your shopping cart saves items even after you log out?

9 responses

usually accurate

It is really important

It is essential for keeping the records.

good

Saving items after I log out is too important to me.

a lot

It's very important. I often add items and come back later, so having my cart saved even after logging out makes shopping much easier and more convenient.

Hard to trust

It is important for me

How likely are you to use a feature that allows you to shop together with a friend in real time?

9 responses

not really my thing

I really like it, and been interested to use it.

Looking forward to it since such a system will be amazing!

good idea, i would like to.

I will find it useful and interactive

love it.

I would be likely to use it, especially when I want a friend's opinion before buying something. A real-time shared shopping feature sounds fun and helpful.

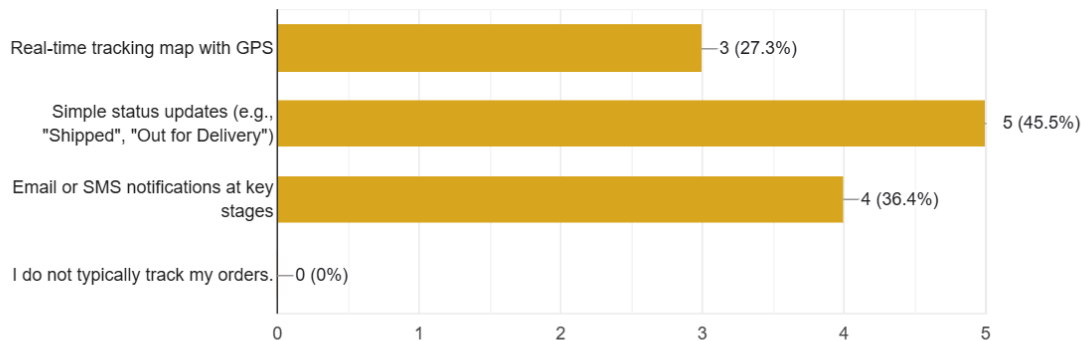
Probably yes

I really like the idea and use it in the future

How do you prefer to track your orders? (Select all that apply)

 Copy chart

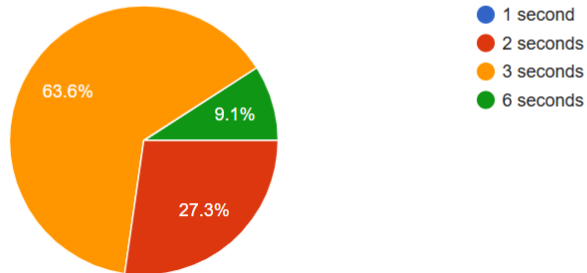
11 responses



What is the maximum amount of time you are willing to wait for a webpage to load before becoming frustrated?

[Copy chart](#)

11 responses

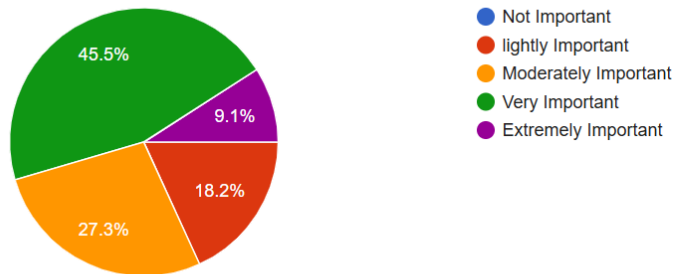


### Section 3: System Performance & Usability (Non-Functional Requirements)

How important is it for the website to remember your preferences (like recently viewed items, saved addresses) for a personalized experience?

[Copy chart](#)

11 responses

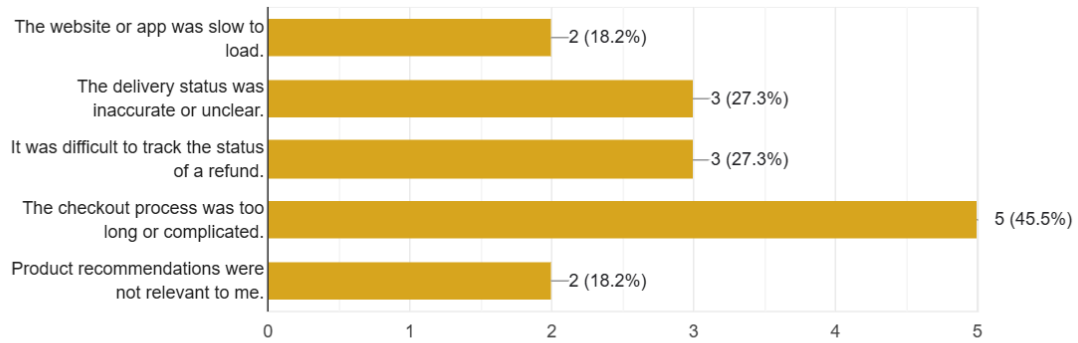


## Challenges & Desired Improvements

**What is the most frustrating issue you have faced when shopping online?  
(Select up to two)**

 [Copy chart](#)

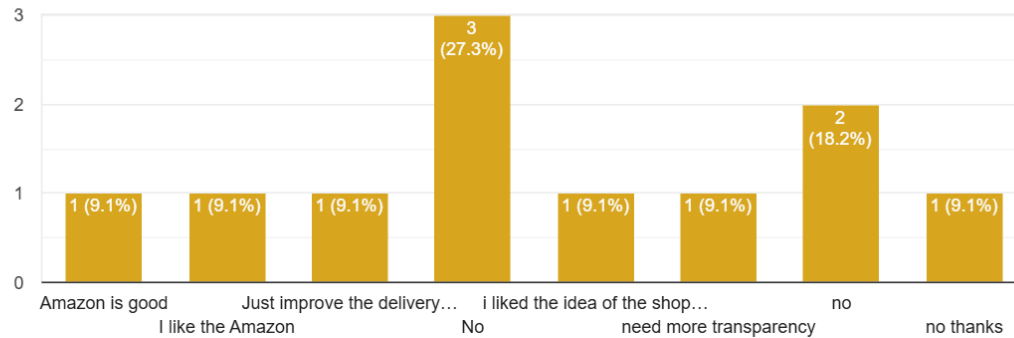
11 responses



**Any other comments or suggestions?**

 [Copy chart](#)

11 responses



**Thank you for your valuable time and input!**