Assignment 1: Design a Real-Time Online E-commerce System for Amazon

As an Architect, your task is to design a real-time online E-commerce system for Amazon that meets the following requirements:

# Functional Requirements:

1. User Registration and Login: The system should allow users to register and login securely.
2. Product Catalog Management: Sellers should be able to add, delete, and modify products they want to sell. The website should include a catalog of products that is searchable by name, keyword, or category.
3. Shopping Cart Functionality: Buyers should be able to add, delete, or update items in their shopping carts.
4. Order and Payment Processing: Buyers should be able to purchase items in their shopping carts and make payments securely.
5. Shipping and Fulfillment: The system should manage the shipping and fulfillment of purchased items.
6. Inventory Management: The system should track inventory levels and notify sellers when they need to restock.
7. Customer Support and Feedback: The system should provide customer support and allow customers to provide feedback on their purchases.
8. Search and Filtering Functionality: The system should allow buyers to search and filter products based on different criteria such as price, category, and availability.
9. Personalized Recommendations: The system should provide personalized product recommendations based on the buyer's browsing and purchase history.
10. Marketing and Promotion Management: The system should allow sellers to create and manage marketing campaigns and promotions.
11. Analytics and Reporting: The system should provide sellers with analytics and reporting on their sales, customer behavior, and product performance.

# Non-functional Requirements:

1. Security and Data Privacy: The system should ensure the security and privacy of user data and payment information.
2. Scalability: The system should be scalable to handle a large number of users and transactions.
3. Availability and Uptime: The system should be highly available and have minimal downtime.
4. Performance and Responsiveness: The system should be fast and responsive, with low latency and high throughput.
5. Usability and User Experience: The system should have a user-friendly interface and provide a seamless user experience.
6. Compatibility with Different Devices and Browsers: The system should be compatible with different devices and browsers.
7. Integration with Third-party Services: The system should integrate with third-party services such as payment gateways, shipping providers, and analytics platforms.
8. Regulatory Compliance: The system should comply with relevant regulations such as PCI DSS and GDPR.

# Deliverables:

1. Architecture Diagram: Create an architecture diagram that shows the different components of the system and how they interact with each other.
2. System Design Document: Write a system design document that describes the architecture, components, and technologies used in the system.
3. Implementation Plan: Create an implementation plan that outlines the steps needed to implement the system.
4. Testing Plan: Write a testing plan that describes how the system will be tested to ensure it meets the functional and non-functional requirements.
5. Security and Compliance Plan: Create a security and compliance plan that outlines how the system will ensure the security and privacy of user data and comply with relevant regulations.