HIGH LEVEL DESIGN

QUEST-PICKS

Version<4.0>

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1. Introduction

Why this High Level Design Document?

The goal of this High Level Design (HLD) Document is to provide the current project description with the additional depth needed to describe an appropriate coding model. This document can be used as a reference guide for how the modules interact at a high level and is also meant to aid in identifying conflicts before coding.

1.2. Scope

The HLD documentation outlines the system's architecture, including the technology architecture, application architecture (layers), application flow, and database architecture. The HLD employs simple to somewhat complex concepts that system administrators should be able to understand.

1.3. Overview, the HLD will:

• Present all of the design aspects and define them in detail.
• Describe the user interface being implemented.
• Describe the hardware and software interfaces.
• Describe the performance requirements.
• Include design features and the architecture of the project.
• List and describe the non-functional attributes like:

- Security
- Reliability
- Maintainability
- Portability
- Reusability
- Application compatibility
- Resource utilization
- Serviceability

2. General Description

2.1. Product Perspective

Quest-Picks E-Commerce website will be composed of several different components. Some of these components will be programmed, while others will be implementations of open-source programs. The language implemented will be dictated by its purpose. The administrative and user interfaces will be using JSP to display the pages, and SQL to retrieve, insert, delete, and update the database. Either HIBERNATE will be used to submit SQL commands for the automated part of the project such as updating the user history and DHCP data. This setup will allow for multiple users to login and interact with the program at the same time. It will also be set up using two user levels. First is the basic user, which can only view the current home page which includes shopping items. This page is automatically displayed based on their IP address. The second type of user is the Administrator. They have the ability to change information in the database such as settings and user history. This user level can only be attained by logging into the system.

2.2. Tools used

- Java Spring Boot -. Java Spring Boot (Spring Boot) is a tool that makes developing web application and micro services with Spring Framework faster and easier
- MySQL-It is a relational database management system (RDBMS).That uses structured query language.
- JSP -It is server side technology, used for creating web applications.
- Tomcat - It compiles JSP into servlets.
- Apache - This is an open source web server that will display requested pages.
- Hibernate -It is a tool that provides a framework to map object oriented domain models to RDBMS for web application.

2.3. General Constraints

Quest-Picks E-Commerce websites must be user friendly and as automated as possible. There are different types of Users namely customers and sellers. Admin and Seller are able to add products, add categories and view order list, category list and Admin should approve the seller to r on the website. Without logging in, the user will only have the ability to view the shopping items. After logging in, that user has the ability to order items, remove the ordered item, update the item and make payment.

2.4. Assumptions

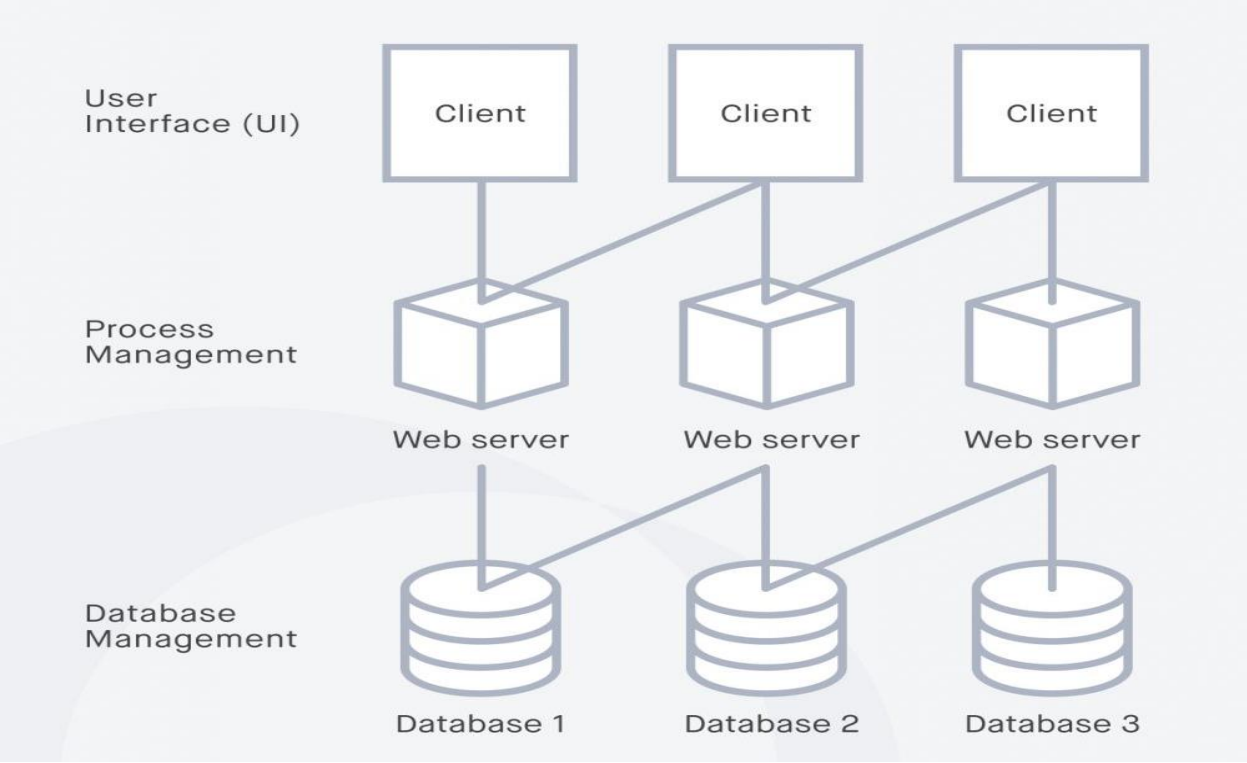
This project is based on the idea of online shopping websites like Flipkart and Amazon, and the goal is to make this idea a reality using Software Engineering practices. In doing so, many documents are created, and it is assumed that design flaws will be found early on. It is also assumed that all aspects of this project have the ability to work together in the way the designer is expecting.

3. Design Details

3.1. Main Design Features

The main design features include five major parts: the architecture, the user interface design, external interface, the database, process relation, and automation. In order to make these designs easier to understand, the design has been illustrated in attached diagrams (ER, Use Case, and Screenshots).

3.2. Application Architecture



- Quest-Picks E-commerce website is based on the client-server architecture.
- A client can be an application, which uses a Graphical User Interface (GUI) that sends requests to a server for certain services.
- The server is the provider of the services requested by the client.
- Quest-Picks E-commerce, a client refers to a customer who requests for certain services and the server refers to the business application through which the services are provided.
- The business application that provides services is deployed on a Web' server.
- The Quest-Picks E - Commerce Web server is a computer program that provides services to "other computer programs and serves requested Hyper Text Mark-up Language (HTML) pages or files.
- In client-server architecture, a machine can be both a client as well as a server.
- There are two types of client server architecture that E-commerce follows: two-tier and three-tier.

Quest-Picks E- Commerce System Architecture: Two-tier architecture:

- In two-tier client-server architecture the user interface runs on the client and the database is stored on the server. The business application logic can either run on the client or the server. The user application logic can either run on the client or the server. It allows the client processes to run separately from the server processes on different computers.
- The client processes provide an interface for the customer that gathers and presents the data on the computer of the customer. This part of the application is known as the presentation layer. The server processes provide an interface with the data store of the business.
- This part of the application is known as the data layer. The business logic, which validates data, monitors security and permissions and performs other business rules, can be kept either on the client or the server.

E- Commerce System Architecture: Three-tier architecture:

- The three-tier architecture includes three tiers: top tier, middle tier and third tier.
- The top tier includes a user interface where user services such as session, text input, and dialog and display management reside.
- The middle tier provides process management services such as process development, process monitoring and process resourcing that are shared by the multiple applications.
- The third tier provides database management functionality. The data management component ensures that the data is consistent throughout the distributed environment, the centralized process logic in this architecture, which makes administration easier by localizing the system functionality, is placed on the middle tier.

3.3. Technology Architecture

3.3.1. Web Application Architecture

The front end of the program is a web application. Functionality will vary based on user privileges if a user is logged in. Normal users are not required to log in, and can view their personal average and history. Administrators will have access to administrative abilities based on permissions given to them.

Typically a web-based application architecture comprises 3 core components:

- **Web Browser**: The browser or the client-side component or the front-end component is the key component that interacts with the user, receives the input and manages the presentation logic while controlling user interactions with the application. User inputs are validated as well, if required.
- **Web Server:** The web server also known as the backend component or the server-side component handles the business logic and processes the user requests by routing the requests to the right component and managing the entire application operations. It can run and oversee requests from a wide variety of clients.
- **Database Server**: The database server provides the required data for the application. It handles data-related tasks. In a multi-tiered architecture, database servers can manage business logic with the help of stored procedures.

3.3.2. Presentation Layer

It has the ability to change histories and system settings, which the higher-layer entities may use different syntax and semantics if the presentation service provides a mapping between them. If a mapping is available, presentation service data units are encapsulated into session protocol data units, and passed down the stack. This layer provides independence from data representation (e.g., encryption) by translating between application and network formats. The presentation layer transforms data into the form that the application accepts. This layer formats and encrypts data to be sent across a network.

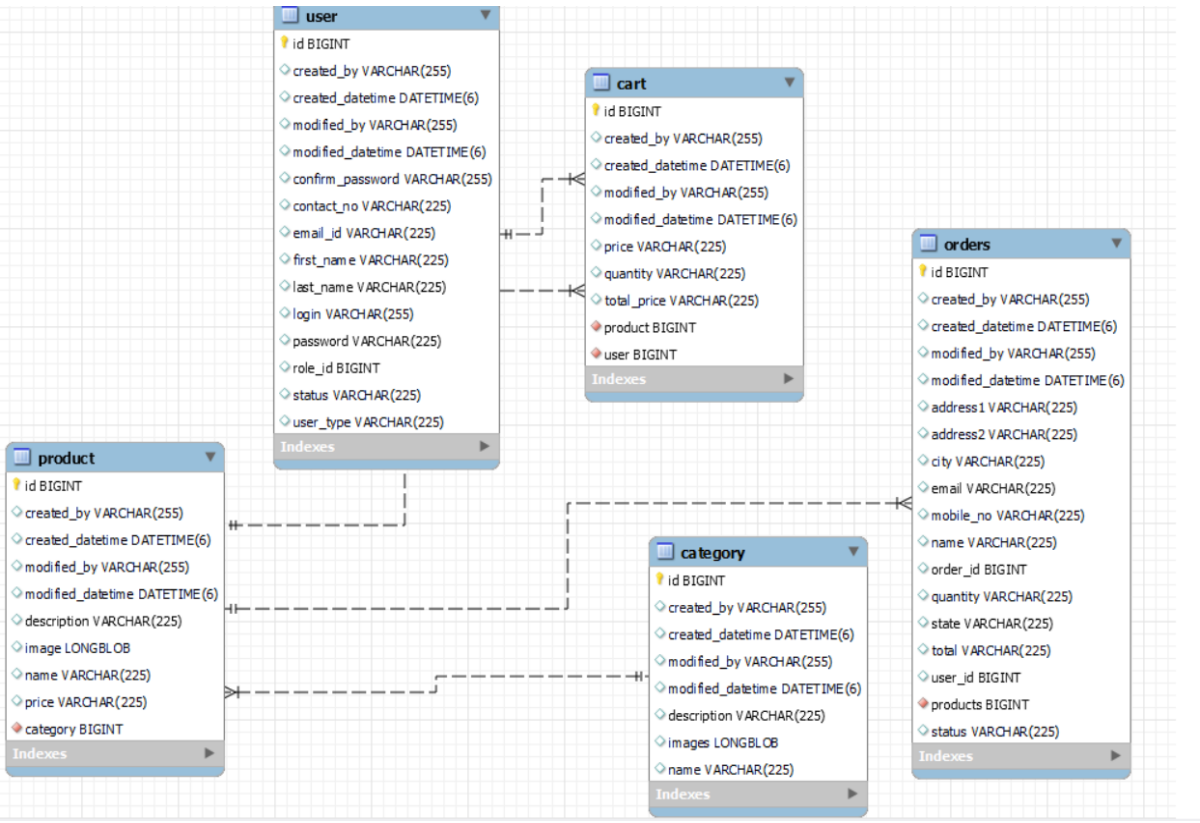
3.3.3. Data Access Layer

This is the component of the website responsible for storing and managing customer data, product information, and order details. It is typically built using a relational database management system such as MySQL.

3.4. Standards

Database – relational
Inputs – entered through text field and stored in database.
Security – username and password are required for access to the system.
Quality – by keeping the interface simple and direct, quality should be kept at a maximum.

3.5. Database Diagram



3.6. Files

This product will not use a large number of files.Tomcat uses JSP pages. A file will be used to store all of the usernames and passwords and all other attributes specified for those users. This file will be accessed at login. It can be modified by the administrator at any time. Another file will store the database. This file will be accessed and modified by all users with proper permission.

3.7. User Interface

The user interface is a very simple plain layout with little to no graphics. It will display information very clearly for the user and will primarily output information to the user through HTML pages. Administrative screens are used mainly for input through text fields in HTML pages. Screenshots have been provided to demonstrate the user and administrative interface.

3.8. Reports

The reports will display the user's average usage up to the last time the system calculated it and their history. Reports can also be created by an administrator of any user's shopping details.

3.9. Error Handling

Should errors be encountered, an explanation will be displayed as to what went wrong. An error will be defined as anything that falls outside the normal and intended usage.

Here are a few best practices for error handling in a library management system:

- DuplicateProductException: Exceptions are a built-in mechanism in Java for handling errors. They allow you to separate the error handling code from the main logic of the system, making the code more readable and maintainable.If admin/seller adds the same product that is already existing in the system then an exception occurs.

- RecordNotFound Exception: If a user searches for the product that is not available in the website then record not found exception occurs.

3.10. Interfaces

There are two main interfaces for this project. First, the user interface, which consists of the user details that goes through the mediums. Second is the interface for the administrators which are sent from the medium to the database.

3.11. Help

Help will come in the form of all the documentation created prior to coding, which explains the intended uses. Should time allow, detailed instructions will be written on how to create and implement the system with the intention of publishing as an Open Source solution.

3.12. Performance

Performance is going to be very important for Quest-Picks E-Commerce. For everything to run smoothly for this project, the medium will have to be able to update data on the database and refresh the tables before it is supposed to do so again. This is likely to be the most processor intensive aspect of the project. The medium will also need to supply requested pages to the users at a reasonable speed. The database server will need to keep up with all database requests and transactions.

3.13. Security

Security is not the prime focus of this project, only the minimal aspects of security will be implemented. A username and password will be required to log into an administrative interface and database. For now, all data will be sent in plain text. There will also be log of failed attempts of an administrator logging in.

Four dimensions of e-commerce security

- Integrity: prevention against unauthorized data modification.
- Authenticity: authentication of data source.
- Confidentiality: protection against unauthorized data disclosure.
- Privacy: provision of data control and disclosure.

3.14. Maintainability

Very little maintenance should be required for this setup. An initial configuration will be the only system required interaction after the system is put together. The only other user maintenance would be any changes to settings after setup, and any specified special cases where user settings need to be changed. And it is a set of attributes that bear on the effort needed to make specified modifications" The ability to identify and fix a fault within a software component is what the maintainability characteristic addresses. It comes into play after the deployment of the system software. Software is said to be maintainable if the system software is able to fix bugs and solve difficulties faced by users.

3.15. Portability

Portability is a set of attributes that bear on the ability of software to be transferred from one environment to another. In today's era of modern gadgets, there are more mobile and tablet users who use these devices for online shopping. Few Indian websites are solely available on mobile. This raises a grave need for quality such as portability. This system should have the ability that, once it is together, the entire system should be able to be physically moved to any location.

3.16. Reusability

Reusability is "a set of attributes that bear on the effort needed for use, and on the individual assessment of such use, by a stated or implied set of users". Usability refers to the ease of use for a given function. Usability is an extremely important factor that determines the success of a website. It becomes even more critical in ecommerce since websites are the major means of revenue. When visitors come to shop online, they expect easy and hassle-free navigation in addition to easy access to what they are looking for. Problems may cause visitors to leave the website which can lead to poor purchase. Quality usability ensures that the performance of a website meets user requirements and satisfaction, which leads to positive feedback and revenue generation. The code written and the components used should have the ability to be reused with no problems. Should time allow, and detailed instructions are written on how to create this project, everything will be completely reusable to anyone.

3.18. Application compatibility

The different components for this project will be using Java as an interface between them. Each component will have its own task to perform, and it is the job of the Java code to ensure proper transfer of information.

3.19. Major Classes

There are a total of two major classes: Administrators, Users. The relationships between these major classes are: An administrator can view or modify a user's details. An administrator can modify system settings. There are two types of users: seller and customer .Seller can modify the products. A user can view the user details and the shopping items.