Three-tier Database Application:
Daily Deals Shopping
Project Requirements

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Description

We propose a web-based database application that will be a shopping website allowing users to browse and purchase the daily deals on the site. Our application will only allow customers to a limited selection of curated items every day. Features include: user login, sign-up, user authentication, sessions, client-side/server-side validation. The stakeholders for this application are any consumers who shop online, this project is important to them because our project will provide a clean interface to shop for unique curated products with no frills or distractions. The appeal of this website is that is a quick place for shoppers to see the daily deals and quickly purchase items they want or check in the next day to see what is fresh in stock. This will enable us to develop a sleek and fast product for the customers.

Functional Requirements

Users will be able to access our application through their web browser. The application will allow users to sign-up and will store the username & password hash in a table inside the database. If the user wants to log in, then we can query the corresponding login information and authenticate the user. Users will be able to select products they would like to purchase and continue through the checkout process. The following features will be supported on our website:

I. Account Registration
   A. This feature will allow any person to create an account with a valid email. Registration will require first name, last name, email, and password. These items will all be stored in the database and used for user authentication. The password will be saved as a hash in the database.
   B. Emails will be validated to ensure they are formatted correctly.
   C. Passwords will have a minimum requirement of 8 characters, and at least one number and one symbol

II. Log in system
   A. Customers will be able to securely log into the website by entering their email and password, the login information will be securely sent using SSL when the final project is launched.
   B. The hashed password will be queried from database by email. Then the hash will be compared with the hashed password from user's input. The plain text is never used after account registration.

III. Browse products
   A. Customers will be able to browse items from our main page. They will be able to view detailed descriptions when they click on the items. They will be taken to another page for the product details.
   B. Everyday there will be 10-20 items to browse. This enables shoppers to quickly visit our site and see what deals there are today and then quickly purchase the

desired items if wanted.

IV. Product detail page outlining the product description
    A. Reviews
        1. Each product will feature a section allowing registered customers to leave a review with a thumbs up or thumbs down to go along with their review. The site will then calculate which percentage of users recommend the product.
        2. The percentage of people who liked the product will be displayed under the product name
    B. other information regarding the product
        1. Product dimensions
        2. Product specification
        3. additional images
    C. Price
        1. Customers will be able to view product prices.

V. Shopping cart
    A. In the shopping cart, there will be items' name and quantity as well as a total price.
    B. The shopping cart will also show any available sales and promotions a customer has

VI. Checkout and confirmation page
    A. At the checkout page, customers can make adjustments to quantities of the items, fill out payment & delivery information, and submit order. Customers will receive an order#.
    B. Customers will be able to choose from saved delivery and payment information.
    C. Customers will have the option to save their delivery information for future use.
    D. Customers will have the option to save their payment information for future use.
    E. If Customers choose to save their payment/shipment information, the information will be saved under customer's profile, otherwise the information will only be used once for the order.

VII. Order history page
    A. From the order history page, customers can view their previous orders, including items' name, quantity, and total price.

VIII. Account management page
    A. A simple account management page will provide quick access to common features such as:
    B. changing password
    C. changing address
    D. changing email address

E. and other account-related settings.

IX. Wishlist feature

A. Customers will be able to wishlist items they would like to buy in the future. This will enable them to purchase the item at a later time. The list of items on a customer's wish list will also be stored in the database. Wishlisted items can only be purchased when the item is in stock.

X. Orders to be filled (Business view)

A. The software will support a view of all the orders that have been placed and need to be filled.

B. Each order page will display what the customer purchased, the quantity of items, as well as the customer's shipping address

Description of a Typical User

A typical user of our website is someone who enjoys online shopping but does not have the time to browse through the endless amount of products available on other websites to have to hunt for a deal. Our website will provide customers seeking daily deals a quick place to stop by and buy some sweet items. Our typical user base is any and all online shoppers interested in a simpler way to shop.

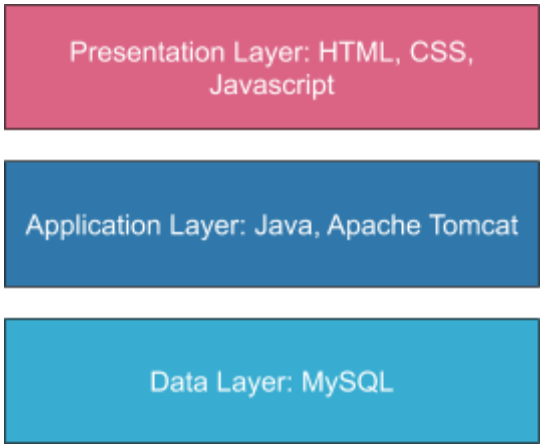
Standard User Flow

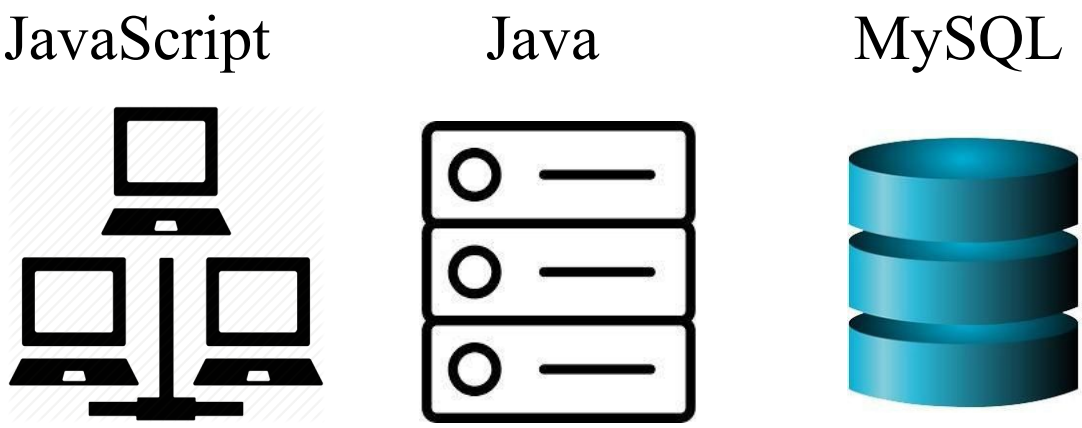
A standard flow a user would go through when visiting our site would be the following:

1. Navigate to our website using their browser
2. View and browse through today's available products
3. click on a product to visit the details page
4. view user reviews, item specifications
5. scroll through images of the product
6. click on the add to cart button
7. click on the shopping cart to proceed to checkout
8. use email and password to login or sign up as a new user
9. Once on the checkout page, the user can select the quantity of items
10. Enter payment information
11. Enter shipping and billing info
12. View a confirmation page
13. Confirm order

System Environment

The backend of the application will be developed using Java which is utilized in the Application Layer. The Application Layer will communicate with the Data Layer using JDBC. For the middleware "business" tier we will use Apache Tomcat/Jetty to deploy our webserver. Lastly, we will use MySQL/PostgreSQL for the database itself in the data layer.





System Environment

- Application Languages: Java 8, JavaEE 7, HTML5, CSS3, JavaScript 1.8.5, XML, MySQL
- Software Used: Apache Tomcat, Gradle
- RDBMS: MySQL Community Server 5.7.19

Non-functional issues

GUI

We will use HTML, CSS, and Javascript and React to build the front end of our website to be displayed in the browser.

Products will be displayed in a 4 x 5 grid where 10-20 products will be displayed at any given time. The top of the website will feature our logo, and navigation links on the top right hand side. There will be an account page to manage your account and a logout button. If a user does not have an account, they will be directed to do so when attempting to purchase a product or when clicking on the account link.

Each product in the grid will display an image of the product, the name of the product, the price, and show the percentage of users that recommend the product.

On the product details page you will see the name of the product at the top, below it the

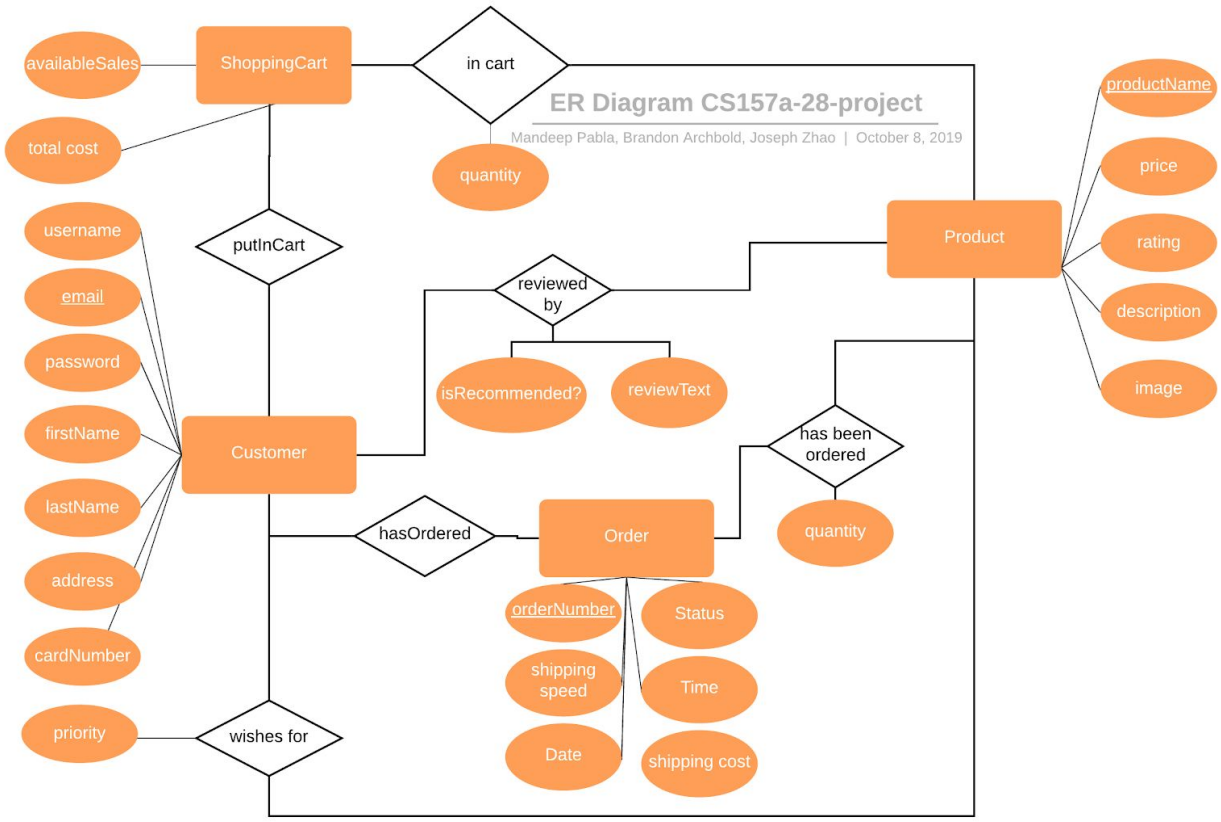
percentage of people that liked the product, with a thumbs up for ratings of over 70% and thumbs down for ratings below 40%. Ratings between 40% and 70% will be represented as an orange circle. On the left there will be a product preview pane where the user may browse through several images of the product (if available). On the right of the image will be the price, and below it the product specifications and details. On the right side of this section there will be a button that lets users add the product to the shopping cart.

Below this section will be a product details page with further details about the product (if available). Below this section will be a reviews section with reviews of the product.

Security

For user authentication we will use SSL (when the website goes live) and only store the hash of the user's password so that if the database gets hacked, the user's passwords are safe from attackers. This will be the only access control as we would like anyone to be able to buy products from our website as long as they create an account. Users will be authenticated with their username and password combination. Users will only be able to access the account information of their own account and will not be able to view other members orders or personal information. All product information will be public to all users.

Project Data Model and DB Design



Customer: This entity set keeps track of all the customers and the information that is relevant to each. The

email is the customer's primary key as it is required to create an account and it must be unique so it is an obvious choice. Customer has many relationships as they customer can review products, place items in their cart, order products, and place items in their wishlist.

Order: This entity set keeps track of all orders with a primary key of a unique orderNumber. This set is used by customers to see what they have ordered, and by the business to see what has been ordered and what needs to be shipped.

Product: This entity set contains all the available products with the productName as the primaryKey as no two products can share the same name.Products can be placed in shopping carts, ordered, reviewed, or placed in a customer's wish list.

wishes for: This relationship is used for a customer to add a product to a list to save for later. This is useful if they are not ready to purchase immediately but they are interested.

putInCart: This relationship occurs when a customer places a product in their shopping cart for checkout. The cart will total the cost of products in the cart.

in cart: This relationship links the products and quantity of products in a given shopping cart.

reviewed by: This relationship is used for customer reviews of products. If an entry exists that means that a particular customer has left a review for that particular product.

hasOrdered: This relationship indicated which customer has made a particular order. This links the customer to the order.

hasBeenOrdered: This relationship indicates which products are in a particular order and the quantity of those products.

wishes for: This relationship indicates which products a customer has on their wishlist. The customer can view a list of their items organized by the priority in which they would like.