**University of engineering and technology, MDU Rohtak**

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**Project Report**

**Project name – Basic Ecommerce website using java**

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**Introduction:**

* The e-commerce website using Java is a web-based application that provides an online platform for customers to shop for products. The website allows customers to browse products, add them to the cart, and make payments online. The website also provides an admin panel for managing products, orders, and customers.
* The purpose of this project is to develop a functional e-commerce website using Java. The website aims to provide a user-friendly interface for customers to shop online and for administrators to manage the website's functionalities. The project also aims to demonstrate the integration of Java with a database and the MVC architecture for web application development.
* The project is suitable for businesses that want to have an online presence and reach a wider customer base. The website can be customized to meet the specific needs of the business, such as product categories, payment methods, and shipping options. The website's admin panel allows businesses to manage their products, orders, and customers efficiently.
* Overall, the e-commerce website using Java is a useful application for businesses that want to expand their customer base and provide an online platform for customers to shop. The project provides valuable insights into web application development using Java and its integration with databases.

**Problem statement of project:**

* The e-commerce industry is rapidly growing, and businesses that do not have an online presence may miss out on potential customers. However, developing an e-commerce website can be challenging and time-consuming, especially for businesses with limited resources.
* To address this problem, the project aims to develop a functional e-commerce website using Java that can be customized to meet the specific needs of the business. The website will be built using the MVC architecture, which separates the application logic into three components: Model, View, and Controller.
* The Model component will represent the data and the business logic of the application. This component will be responsible for interacting with the database to retrieve and store data.
* The View component will represent the user interface of the application. This component will be responsible for displaying the website's content to the user, including product catalogs, shopping carts, and checkout pages.
* The Controller component will handle the user input and respond accordingly. This component will be responsible for processing user requests, updating the Model, and rendering the appropriate View.
* The website will also integrate with a database to ensure scalability and performance. The database will store information such as product details, customer information, and order history.
* Essential features such as a product catalog, shopping cart, payment gateway, and order management will be implemented. The product catalog will display products with their images, prices, and descriptions. The shopping cart will allow customers to add and remove products and update quantities. The payment gateway will enable customers to make payments securely using credit cards or other payment methods. The order management system will allow administrators to manage orders, update order status, and process refunds if necessary.
* The website will also include a user registration and login system. Customers can create an account on the website and log in using their credentials. This system will allow customers to track their orders, view their order history, and save their shipping and billing information for future purchases.
* Overall, by developing an efficient and cost-effective e-commerce website using Java, businesses can increase their sales, reach a wider audience, and provide a better shopping experience for their customers.

**Model used in project:**

* The model of development for the e-commerce website using Java project can be the Agile software development model. Agile is an iterative and incremental model that emphasizes collaboration between cross-functional teams and customers to deliver a high-quality product in a short time frame.
* In the Agile model, the project is divided into smaller iterations or sprints, each lasting from one to four weeks. Each sprint involves a set of activities such as planning, design, development, testing, and deployment. The team works closely with the customer to understand their requirements and incorporate feedback in each iteration.
* The Agile model is suitable for this project because it allows for flexibility and adaptability to changing requirements. The e-commerce industry is dynamic, and customer needs may change over time. With Agile, the team can adjust the project scope and deliver a product that meets the current needs of the customer.
* The Agile model also promotes collaboration and communication between team members and the customer. This is crucial for developing an e-commerce website that meets the customer's expectations and provides a positive shopping experience for their customers.
* In the Agile model, the team can use various tools and techniques such as daily stand-up meetings, backlog grooming, user stories, and sprint reviews to ensure efficient and effective development. The team can also use continuous integration and continuous deployment (CI/CD) practices to ensure that the website is continuously tested, integrated, and deployed to production.
* Overall, the Agile model is a suitable model of development for the e-commerce website using Java project, as it allows for flexibility, adaptability, and collaboration, which are essential for developing a high-quality product that meets the customer's needs.

**Scope of Maintenance and upgradation in project:**

Maintenance is the process of making changes and updates to a software system after it has been deployed to production. In the context of the e-commerce website using Java project, maintenance is a critical aspect of ensuring that the website remains functional, secure, and up-to-date with the latest industry standards and technologies.

The following are the details of the various activities that are involved in the scope of maintenance for the e-commerce website using Java project:

1. Bug fixing: Bugs are errors or issues that occur in the website that may cause it to malfunction or not work as expected. To maintain the website's functionality, the maintenance team should regularly monitor the website for bugs and address them promptly. This involves investigating the cause of the bug, developing a solution, testing the solution, and implementing it.
2. Security updates: The e-commerce website processes sensitive customer information, including credit card details, making it an attractive target for cyber attacks. To maintain the website's security, the maintenance team should monitor and address any vulnerabilities or security threats that arise. This involves updating the website's security protocols and patches, monitoring access logs for any suspicious activity, and ensuring that user data is encrypted and secure.
3. Performance optimization: As the website grows and more users interact with it, it may experience performance issues such as slow loading times or server crashes. The maintenance team should regularly monitor the website's performance and identify opportunities to optimize its code and infrastructure to improve its speed and reliability.
4. Content updates: The website's product catalog, pricing, and other information may change over time. To maintain the website's accuracy and relevance, the maintenance team should regularly update the website's content. This involves making changes to the website's database, updating product descriptions, and modifying pricing information.
5. Technology updates: The e-commerce industry is constantly evolving, and new technologies may emerge that can improve the website's functionality or security. The maintenance team should stay up-to-date with the latest technologies and evaluate whether they can benefit the website. If so, the team should implement them to maintain the website's competitiveness and relevance.
6. User experience improvements: As users interact with the website, they may provide feedback on its usability and functionality. The maintenance team should consider this feedback and make improvements to the website's user experience where necessary. This involves modifying the website's design, layout, or functionality to improve its ease-of-use and overall user satisfaction.

In summary, maintenance is a crucial aspect of software development that ensures the e-commerce website using Java project remains functional, secure, and up-to-date with the latest industry standards and technologies. It involves regular monitoring, bug fixing, security updates, performance optimization, content updates, technology updates, and user experience improvements. By maintaining the website effectively, the maintenance team can help ensure that the website meets the customer's needs and provides a positive shopping experience for users.

**Testing of project:**

Testing is a critical aspect of software development, and it plays a vital role in ensuring the quality and reliability of the e-commerce website using Java project. Testing is performed at various stages of the development cycle, including unit testing, integration testing, and system testing. The following are the details of the various testing activities that are involved in this project:

1. Unit testing:

Unit testing involves testing individual modules or units of code to ensure that they are functioning as intended. In the e-commerce website using Java project, unit testing can involve testing each module that performs a specific function, such as adding items to the shopping cart, updating customer information, or processing payments.

2. Integration testing:

Integration testing involves testing how different modules of the website interact with each other. In the e-commerce website using Java project, integration testing can involve testing how the shopping cart interacts with the payment gateway, how the search function interacts with the product catalog, and how the user authentication process interacts with the user profile module.

3. System testing:

System testing involves testing the entire system as a whole to ensure that it meets the functional and non-functional requirements of the project. In the e-commerce website using Java project, system testing can involve testing the website's overall functionality, performance, security, and usability.

4. User acceptance testing:

User acceptance testing involves testing the website's usability and functionality from the end-users' perspective. In the e-commerce website using Java project, user acceptance testing can involve testing how easy it is for users to navigate the website, find products, add items to the cart, and make payments.

5. Security testing:

Security testing involves testing the website's security to ensure that it is protected against common security threats, such as SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF). In the e-commerce website using Java project, security testing can involve testing how well the website is protected against these threats and ensuring that user data is encrypted and secure.

In summary, testing is a critical aspect of software development and ensures that the e-commerce website using Java project meets the functional and non-functional requirements of the project. Testing involves various activities, including unit testing, integration testing, system testing, user acceptance testing, and security testing, and ensures that the website is reliable, secure, and provides a positive shopping experience for users.

Tools used in project:

In the e-commerce website using Java project, various tools are used to streamline the development process and ensure the quality and reliability of the website. The following are some of the tools used in this project:

1. Eclipse IDE: Eclipse IDE is a popular integrated development environment for Java. It is used to write, debug, and deploy Java applications, and it provides various features that make the development process more efficient, such as code completion, refactoring, and debugging tools.
2. Apache Tomcat: Apache Tomcat is an open-source web server that is used to run Java-based web applications. It is used in the e-commerce website using Java project to deploy and run the website on a web server.
3. MySQL: MySQL is an open-source relational database management system. It is used in the e-commerce website using Java project to store and manage data, such as customer information, product details, and order history.
4. Bootstrap: Bootstrap is a popular front-end framework that is used to design responsive and mobile-friendly websites. It provides various pre-built CSS and JavaScript components that make it easy to create a modern and visually appealing website.
5. JUnit: JUnit is a popular unit testing framework for Java. It is used in the e-commerce website using Java project to write and execute automated tests that ensure the functionality and reliability of the website.
6. Git: Git is a popular version control system that is used to track changes to the website's source code. It allows developers to collaborate on the project, manage changes, and revert to previous versions of the code if necessary.
7. Apache Maven: Apache Maven is a popular build automation tool for Java. It is used in the e-commerce website using Java project to manage dependencies, build the project, and generate deployable artifacts.

These tools are used in the e-commerce website using Java project to streamline the development process, ensure code quality, and facilitate collaboration between developers. They are chosen based on their popularity, ease of use, and compatibility with Java development.

**Conclusion of project:**

The e-commerce website using Java project is a comprehensive solution that provides an online platform for businesses to sell their products and services to customers around the world. The project utilizes various Java technologies, such as JSP, Servlet, and JDBC, to develop a robust and scalable web application that meets the needs of modern e-commerce businesses.

Throughout the development cycle, various software development models, such as the Agile model, are used to ensure that the project is completed on time, within budget, and with the highest level of quality. The project is also tested rigorously at various stages, including unit testing, integration testing, system testing, user acceptance testing, and security testing, to ensure that it meets the functional and non-functional requirements of the project.

Additionally, the project utilizes various tools, such as Eclipse IDE, Apache Tomcat, MySQL, Bootstrap, JUnit, Git, and Apache Maven, to streamline the development process, ensure code quality, and facilitate collaboration between developers.

The scope of maintenance and upgradation of the project is also considered, which ensures that the project remains up-to-date with the latest technological advancements and is able to adapt to changing business needs.

Overall, the e-commerce website using Java project is a comprehensive solution that addresses the needs of modern e-commerce businesses and provides a reliable and secure platform for businesses to sell their products and services online.

**References for this project:**

1. Oracle Java documentation: <https://docs.oracle.com/en/java/>
2. W3Schools Java Servlets tutorial: <https://www.w3schools.com/java/java_servlets.asp>
3. Oracle MySQL documentation: <https://dev.mysql.com/doc/>
4. Bootstrap documentation: <https://getbootstrap.com/docs/5.1/getting-started/introduction/>
5. JUnit documentation: <https://junit.org/junit5/docs/current/user-guide/>
6. Git documentation: <https://git-scm.com/doc>
7. Apache Maven documentation: <https://maven.apache.org/guides/index.html>

In addition to these references, there are many other online resources, such as tutorials, forums, and documentation, that can be useful for developing an e-commerce website using Java. It is important to consult reliable sources and stay up-to-date with the latest best practices in software development when working on a project like this.