**E-Commerce Site and Mobile Application for Automobile Spare Parts Manufacturer using SDLC V-Model**

**Project Overview:**

The project involves designing and developing an e-commerce website and a mobile application for a manufacturer of automobile spare parts. The manufacturer will have control over product uploads, pricing, and will facilitate online payments through Razorpay. This project will follow the SDLC V-Model, emphasizing verification and validation at each phase.

**SDLC V-Model Phases:**

**1. Requirements Analysis:**

**Verification:**

* **Goal:** Gather detailed requirements from the manufacturer.
* **Output:** Requirement Specification Document.
* **Activities:** Conduct meetings with stakeholders to understand requirements for product management, pricing control, and payment integration.
* **Validation:** Review requirements with stakeholders to ensure completeness and clarity.

**2. System Design:**

**Verification:**

* **Goal:** Design the overall system architecture.
* **Output:** High-Level Design (HLD) Document.
* **Activities:** Define system components, data flow, and interactions between the website, mobile application, and backend server.
* **Validation:** Review design with stakeholders to ensure it meets requirements.

**3. Architecture Design:**

**Verification:**

* **Goal:** Detail the system's technical architecture.
* **Output:** Low-Level Design (LLD) Document.
* **Activities:** Define detailed design for the database schema, API endpoints, and integration points for Razorpay.
* **Validation:** Conduct design reviews and walkthroughs to ensure technical accuracy and feasibility.

**4. Module Design:**

**Verification:**

* **Goal:** Design individual modules or components.
* **Output:** Module Design Specifications.
* **Activities:** Create design documents for key modules such as User Authentication, Product Management, Shopping Cart, and Payment Processing.
* **Validation:** Validate designs through peer reviews and stakeholder feedback.

**5. Coding:**

**Verification:**

* **Goal:** Implement the design into code.
* **Output:** Source Code.
* **Activities:** Develop frontend using React.js/Angular.js for the website and Flutter/React Native for the mobile app. Develop backend using Node.js/Express.js or Python/Django/Flask. Integrate Razorpay for payment processing.
* **Validation:** Conduct code reviews and unit testing for each module.

**Corresponding Testing Phases:**

**6. Unit Testing:**

**Verification:**

* **Goal:** Test individual components or modules.
* **Activities:** Write and run unit tests for each module to ensure they function correctly.
* **Validation:** Validate that each unit meets its design specifications and requirements.

**7. Integration Testing:**

**Verification:**

* **Goal:** Test interactions between integrated modules.
* **Activities:** Perform integration tests to ensure modules work together as expected.
* **Validation:** Validate the system's behavior as a whole, ensuring seamless interaction between the website, mobile app, and backend.

**8. System Testing:**

**Verification:**

* **Goal:** Test the complete system.
* **Activities:** Conduct system testing to verify that the entire application meets the specified requirements.
* **Validation:** Validate end-to-end functionality, including user registration, product management, shopping cart, and payment processing.

**9. Acceptance Testing:**

**Verification:**

* **Goal:** Validate the system against user requirements.
* **Activities:** Conduct user acceptance testing (UAT) with stakeholders.
* **Validation:** Ensure the final system meets business needs and user expectations.

**Implementation Details:**

**Technology Stack:**

* **Frontend (Website):** HTML, CSS, JavaScript, React.js or Angular.js
* **Mobile Application:** Flutter or React Native
* **Backend:** Node.js with Express.js or Python with Django/Flask
* **Database:** MongoDB or MySQL/PostgreSQL
* **Payment Gateway:** Razorpay

**Development Process using V-Model:**

**Requirement Analysis:**

* **Activities:** Gather requirements for product upload, pricing control, and payment integration through meetings and workshops.
* **Output:** Requirements Specification Document.
* **Validation:** Review and approval from stakeholders.

**System Design:**

* **Activities:** Create system architecture diagrams and HLD document.
* **Output:** High-Level Design Document.
* **Validation:** Design review with stakeholders.

**Architecture Design:**

* **Activities:** Detail database schema, API design, and module interactions.
* **Output:** Low-Level Design Document.
* **Validation:** Technical review and approval.

**Module Design:**

* **Activities:** Design individual modules and create detailed design documents.
* **Output:** Module Design Specifications.
* **Validation:** Peer reviews and stakeholder feedback.

**Coding:**

* **Activities:** Develop the frontend, backend, and integrate Razorpay.
* **Output:** Source Code.
* **Validation:** Code reviews and unit testing.

**Testing Phases:**

**Unit Testing:**

* **Activities:** Write and run unit tests for each module.
* **Output:** Test Results.
* **Validation:** Ensure individual modules function correctly.

**Integration Testing:**

* **Activities:** Test interactions between modules.
* **Output:** Integration Test Results.
* **Validation:** Verify module interactions.

**System Testing:**

* **Activities:** Conduct end-to-end system testing.
* **Output:** System Test Results.
* **Validation:** Ensure the system meets requirements.

**Acceptance Testing:**

* **Activities:** Perform UAT with stakeholders.
* **Output:** Acceptance Test Results.
* **Validation:** Confirm the system meets business needs.

**Timeline:**

* **Requirement Analysis:** 2 weeks
* **System Design:** 2 weeks
* **Architecture Design:** 3 weeks
* **Module Design:** 2 weeks
* **Coding:** 6 weeks
* **Testing Phases:** 5 weeks
* **Deployment:** 1 week
* **Maintenance and Support:** Ongoing

**Conclusion:**

Following the SDLC V-Model ensures that each phase is thoroughly verified and validated before moving to the next, resulting in a high-quality e-commerce website and mobile application that meets the manufacturer’s needs for product management and payment processing.