**4. Development Phase**

The **Development Phase** involves the actual creation and implementation of the **Image Gallery with Filters** based on the system design. This phase transforms the design documents and plans into a functional and interactive web application. Each component of the gallery is developed, integrated, and tested step-by-step to ensure proper working and alignment with project goals.

**1. Environment Setup:**

* Installed and configured the necessary tools for development (e.g., VS Code, browser for testing).
* Created the project folder structure, including separate directories for HTML, CSS, JavaScript, and image assets.

**2. Frontend Development:**

**HTML Development:**

* Created the basic structure of the webpage.
* Designed the gallery container to hold all image elements.
* Added semantic elements for better accessibility and SEO.

**CSS Styling:**

* Styled the gallery layout using grid or flexbox to ensure a responsive and clean design.
* Applied hover effects, transitions, and spacing for improved visual appearance.
* Ensured responsiveness using media queries for various screen sizes.

**JavaScript Functionality:**

* Implemented dynamic filtering functionality based on user selection.
* Created event listeners for filter buttons or dropdowns.
* Applied show/hide logic to display images that match selected categories.
* Added a reset or “All” filter to display all images.

**3. Image Integration:**

* Collected or created image assets and assigned each image to one or more categories.
* Embedded images in the gallery section with proper alt text for accessibility.
* Linked each image with relevant data attributes for filtering (e.g., data-category="nature").

**4. Optional Backend Development (if used):**

* Developed backend scripts (PHP, Node.js, or Python) to dynamically fetch images from a database or server.
* Set up routes and endpoints to load image data via AJAX or API calls.
* Ensured server-side validation of image metadata.

1. **Testing During Development:**

* Conducted unit testing for individual components (filter buttons, layout rendering).
* Performed manual testing for responsiveness, layout alignment, and filter functionality.
* Checked compatibility across different browsers (Chrome, Firefox, Edge, etc.).

1. **Code Optimization and Cleanup:**

* Removed unnecessary lines of code and comments.
* Minified CSS and JavaScript files for faster loading.
* Ensured proper file naming and folder organization for maintainability.

1. **Version Control (Optional):**

* Used Git for version control to track development progress.
* Maintained commits for different development stages (e.g., layout setup, filter logic, styling).

**Development Highlights:**

* Successfully created an interactive image gallery with filter functionality.
* Ensured smooth transitions and responsive behavior across devices.
* Maintained clean, readable, and modular code for future scalability.

This development phase marks the successful transformation of the project design into a functional application, laying the groundwork for testing, deployment, and future enhancements.