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Course name – B.tech ese

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Batch no- 1

Task no- 3

Task name- Imagine you need to develop a product for new startup company

✓ Initially you are going with the Waterfall model for product development

✓ Create a Waterfall development model for any product

* Preview the premium waterfall project methodology template and
* Create your own waterfall development model

**Product Idea:**

**"SmartCart" – AI-Powered Grocery Shopping App**

* **Purpose:** Helps users shop for groceries online with **personalized recommendations, smart budget tracking, and automated list creation**.
* **Target Audience:** Busy individuals, families, and working professionals who prefer online grocery shopping.

**Step 1: Understanding the Waterfall Development Model**

The **Waterfall Model** is a **linear, sequential approach** to product development, where each phase must be completed before moving on to the next.

* It’s ideal for **well-defined projects** where requirements are clear from the start.
* Each phase has **specific deliverables and deadlines**.

**Step 2: Waterfall Development Phases for SmartCart**

Here’s how the **Waterfall Model** applies to the **SmartCart app** development:

**1. Requirements Gathering & Analysis Phase**

**Purpose:**

* Collect all necessary requirements from stakeholders.
* Define the project scope, goals, and deliverables.

**Activities:**

* **Identify Core Features:**
  + User account creation and management.
  + Grocery product catalog and categories.
  + Smart recommendations based on past purchases.
  + Budget tracking and spending analytics.
* **Define Functional and Non-Functional Requirements:**
  + Functional: Product search, checkout, and payment gateway.
  + Non-functional: Performance, security, and scalability.

**Deliverables:**

* **Requirement Specification Document (RSD)**
* Stakeholder approval

**2. System Design Phase**

**Purpose:**

* Define the overall **architecture and technical design** of the product.
* Create **mockups, wireframes, and database schemas**.

**Activities:**

* **High-Level Design (HLD):**
  + Architecture design (backend, frontend, database structure).
  + Selection of **tech stack** (React.js for frontend, Node.js for backend, MongoDB for database).
* **Low-Level Design (LLD):**
  + Create **wireframes and prototypes**.
  + Design UI/UX with user-friendly navigation.

**Deliverables:**

* **Design Documents:** HLD and LLD
* **Mockups and Wireframes:** Visual representation of the app
* **Database Schema:** Table structures and relationships

**3. Implementation (Coding) Phase**

**Purpose:**

* Convert the design into **working code**.
* Build the app’s backend, frontend, and integrate the database.

**Activities:**

* **Backend Development:**
  + Create RESTful APIs to handle authentication, product retrieval, and payment.
* **Frontend Development:**
  + Develop **user interfaces** for product search, cart management, and checkout.
* **Database Integration:**
  + Store **user data, product details, and order history**.

**Deliverables:**

* **Codebase:** Backend, frontend, and database code
* **Version Control:** GitHub repository with commits and branches
* **Working Prototype:** Basic version of the app

**4. Testing Phase**

**Purpose:**

* Ensure the product is **bug-free, functional, and reliable**.
* Conduct **unit testing, integration testing, and system testing**.

**Activities:**

* **Unit Testing:** Test individual components (e.g., product search, checkout).
* **Integration Testing:** Validate **API interactions** with the frontend and backend.
* **System Testing:** Verify the app’s overall performance and stability.
* **User Acceptance Testing (UAT):**
  + Gather **feedback from real users** to identify issues.
* **Bug Fixing:**
  + Resolve any identified bugs and glitches.

**Deliverables:**

* **Test Cases and Results:** Documentation of test scenarios and results.
* **Bug Report:** List of identified and resolved bugs.

**5. Deployment Phase**

**Purpose:**

* Release the product to the market.
* Ensure it is **properly configured and fully functional**.

**Activities:**

* **App Deployment:**
  + Publish on **Google Play Store and Apple App Store**.
  + Deploy backend to **cloud servers** (e.g., AWS, DigitalOcean).
* **Performance Monitoring:**
  + Use **analytics tools** to track app usage and performance.
* **Marketing & Promotion:**
  + Launch **social media ads** to promote the app.

**Deliverables:**

* **Live App:** Available for download on app stores.
* **Deployment Documentation:** Instructions for installation and maintenance.

**6. Maintenance Phase**

**Purpose:**

* Regularly update the app to **fix bugs and add new features**.
* Ensure long-term stability and performance.

**Activities:**

* **Monitor System Performance:**
  + Use **error logs and crash reports** to detect issues.
* **User Feedback:**
  + Collect reviews and suggestions.
* **Bug Fixes & Updates:**
  + Release regular **updates and patches**.
* **New Features:**
  + Introduce enhancements based on user feedback.

**Deliverables:**

* **Patch Releases:** Bug fixes and performance improvements.
* **Feature Updates:** New functionalities over time.

**Step 3: Waterfall Development Model Visualization**

Here’s a visual representation of the **Waterfall development process** for SmartCart:

**Waterfall Development Model**

pgsql

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| Requirements Phase |

| - Gather requirements |

| - Define scope |

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| System Design Phase |

| - Create architecture |

| - UI/UX wireframes |

| - Database schema |

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| Implementation Phase |

| - Backend & Frontend Dev |

| - Database integration |

| - Feature development |

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| Testing Phase |

| - Unit & Integration Test |

| - System & UAT Testing |

| - Bug Fixing |

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| Deployment Phase |

| - Deploy app to servers |

| - App Store release |

| - Monitor performance |

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| Maintenance Phase |

| - Regular updates |

| - Bug fixes |

| - Performance monitoring |

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