Practical - 2

Aim: To Identify Suitable design and Implementation model from the different software engineering models for **Retail Store Management System.**

When selecting a software engineering model for the **Retail Store Management System**, it's essential the system's complexity, requirements, timeline, and Scalability. Below are key factors for the decision:

1. **The project involves well-defined features** (inventory management, sales, order returns, admin portal, etc.) but can expand overtime.
2. **The requirements are fairly clear** , but minor changes may arise based on stakeholder feedback.
3. **The system must be developed iteratively** to allow incremental delivery and frequent testing for quality assurance.

Based on these considerations, the Incremental Development Model and Agile Model are the most suitable.

➢ Incremental Development Model

The Incremental Model focuses on developing the system, manageable parts (increments). Each increment adds specific features, building upon previously implemented functionality.

Why Incremental Model?

a. Suitable for systems where requirements are clear but development needs to be phased.
b. Ensures **early delivery** of core functionalities (e.g., Inventory Management) before moving to advanced features (e.g., Low-Stock Reports, Order Return Management).
c. Allows feedback from stakeholders after each increment to improve the system.

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Implementation Strategy:

The system can be broken down into the following increments:

Increment	Features Implemented
Increment 1	Admin portal: Product insertion, updates, and deletions. Inventory tracking (stock levels).
Increment 2	Sales Management: Cart handling, billing and Payments.
Increment 3	Customer Management: Add/edit customer details, track purchase history.
Increment 4	Order Return Management: Customer return request and approval workflows.
Increment 5	Reports and Analytics: Generate sales, inventory, and low-stock reports.

➢ Advantages:

i. Prioritizes delivery of core features, ensuring stakeholders can start using the system early.
ii. Easier to manage risk as testing is performed after each increment.
iii. Flexibility to adapt and add features in later increment based on feedback.

➢ Agile Development Model

The **Agile Model** emphasizes flexibility, iterative development, and collaboration with stakeholder. It involves frequent releases of working software and continuous feedback to refine the product.

Why Agile Model?

a. Ideal for systems where minor requirements might change during development.
b. Supports rapid iteration and delivery of working modules (e.g., Inventory and Admin Portal first).
c. Encourages stakeholder involvement to ensure the system aligns with business needs.

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- **Implementation Strategy (Scrum Approach):**
  i) **Sprint Planning :** Break down features into smaller tasks to be implemented in short cycles (2-4 weeks).
  ii) **Sprints:** Each sprint delivers a working module:
    (1) **Sprint 1:** Admin Portal for product management and basic inventory tracking.
    (2) **Sprint 2:** Sales Management with transaction processing.
    (3) **Sprint 3:** Customer Management and loyalty program.
    (4) **Sprint 4:** Order Return Management workflows for customers and store owners.
    (5) **Sprint 5:** Reports, analytics, and low-stock alerts.
  iii) **Daily Standups:** Regular team meetings to track progress and resolve challenges.
  iv) **Sprint Review:** Demonstrate the completed work to stakeholders for feedback.
  v) **Sprint Retrospective:** Discuss what worked well and identify areas for improvement.
- **Advantages:**
  - Allows for continuous improvement based on stakeholder feedback.
  - Delivers a usable product early, with new features added incrementally.
  - Handles changes in requirements effectively without affecting overall progress.

Comparison of Models

Aspect	Incremental Model	Agile Model
Flexibility	Medium: Features are pre-planned but can adapt incrementally.	High: Changes can be incorporated during any sprint.
Stakeholder Involvement	Moderate: Feedback after each increment.	High: Continuous feedback throughout development.
Delivery of Features	Gradual delivery with clear increments.	Frequent delivery of working software.
Risk Management	Medium: Risk management incrementally.	High: Frequent testing reduces risk.
Project Complexity	Suitable for medium-complexity systems.	Suitable for medium to high complexity systems.

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- **Conclusion: Final Recommendation**
  - **Primary Choice: Agile Development Model**
    - It aligns with the need for flexibility, frequent testing, and incremental feature delivery.
    - Agile ensures active involvement of stakeholders (store owners, employees) to refine requirements, particularly for features like **Low-Stock Alerts** and **Order Return Management.**
  - **Secondary Choice: Incremental Development Model**
    - If the project scope is well-defined with minimal changes expected, the Incremental Model is an effective alternative.

The Agile Model is particularly recommended because of its adaptability and efficiency in delivering a robust and scalable **Retail Store Management System** that meets stakeholder expectations.

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