"ONLINE SHOPPIG SYSTEM"

Course Name: Information Science and Engineering

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Title: Online Shopping System

Name: A Rashmitha Kulal

USN: NNM24IS002

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Department: Information Science & Engineering

Institution Name: NMAMIT

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Instructor Name: Dr. Jason Elroy Martis

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ABSTRACT

This project is all about building a modern Online Shopping System that actually keeps up with the way people shop today. As we know most of us have traded store for scrolling on our phones, businesses need more than just a website they need platforms that are fast, secure, and easy to use. The heart of this study is a of three different development styles like Waterfall, Incremental, and Spiral model to see which one is best at handling the tricky stuff, like keeping stock numbers accurate in real-time, protecting credit card data, and staying cash-proof during a big sale.

To ground this study in practical reality, a detailed requirements engineering framework was established, outlining both the core functionality (such as cart management and order tracking) and critical non-functional attributes like data privacy and system latency. By simulating two distinct versions of the requirements, this assignment illustrates how a platform must adapt to fluctuating market trends, promotional surges, and emerging cybersecurity threats.

The analysis conclude that Waterfall method gives you a solid plan, it's just not flexible enough for the fast-paced world of on. The Incremental and Spiral models are much better fits because they let developers release new features in stages rather than all at once. This is a huge advantage because it allows you to catch and fix issues early—which is vital when you're handling people's money and sensitive data.

GITHUB REPOSITORY LINK

INTRODUCTION

In the world of Software Engineering, it's easy to focus on the code, but the real secret to success is the process behind it. And also Building a high quality of system that actually works for people which requires a solid plan to start. One of the most critical decisions a developer makes is choosing a software process model.

In this assignment, I'm putting three well known methods to test the Waterfall, Incremental, and Spiral model. My goal is to see which one actually holds up best when we are building a modern Online Shopping System. This project is part of my work for Unit I (Introduction and Requirements Engineering), which is all about picking the right strategy and figuring out exactly what the system needs to be successful. By using an e-commerce site as my example, I want to show how these classroom theories actually work in the real world.

PROBLEM STATEMENT

The aim of this project is to develop an online shopping system that helps to buy products easily and convenient for customers. It helps the users to browse the products, place orders and make secure payments anytime from anywhere. Online shopping system also reduces manual work for business by managing the products, orders and customer information efficiently. The main challenge is to design and develop reliable software solution that meets both customer expectations and business needs ensuring data security, high performance and easy to use.

SYSTEM DESCRIPTIVE

Think of an Online Shopping System as it is a busy digital store where several parts work together behind the scenes to make sure everything runs smoothly. It starts with the Interface, where it acts like a front door where customers can browse and the staff can manage the business. All items are organized on the Catalog, which is like a digital shelf that keeps product details and prices up to date. When you find something, you like the Shopping Cart tracks your choices and manages the checkout process. To finish the purchase, the Payment Desk securely connects to your bank to protect your money and personal data. Think of the Database as the brain of the whole operation.

TOOLS AND TECHNOLOGIES USED

- Documentation Tool: Microsoft Word
- Diagram: Draw.io
- Version Control Tool: Git
- Repository Hosting: GitHub

SOFTWARE PROCESS MODEL

1. Waterfall Model

Waterfall model is a first SDLC model to be used widely in software engineering to ensure success of the project. It is also referred as a linear sequential life cycle model and it is also simple and easy to understand. Each phase is fully completed before moving to the next one. In this each phase must be completed before the next phase can begin and there is no overlapping in the phases. The stages include requirement analysis, system design, coding, testing, deployment and maintenance. This model works only when requirements are clear and do not change. [1]
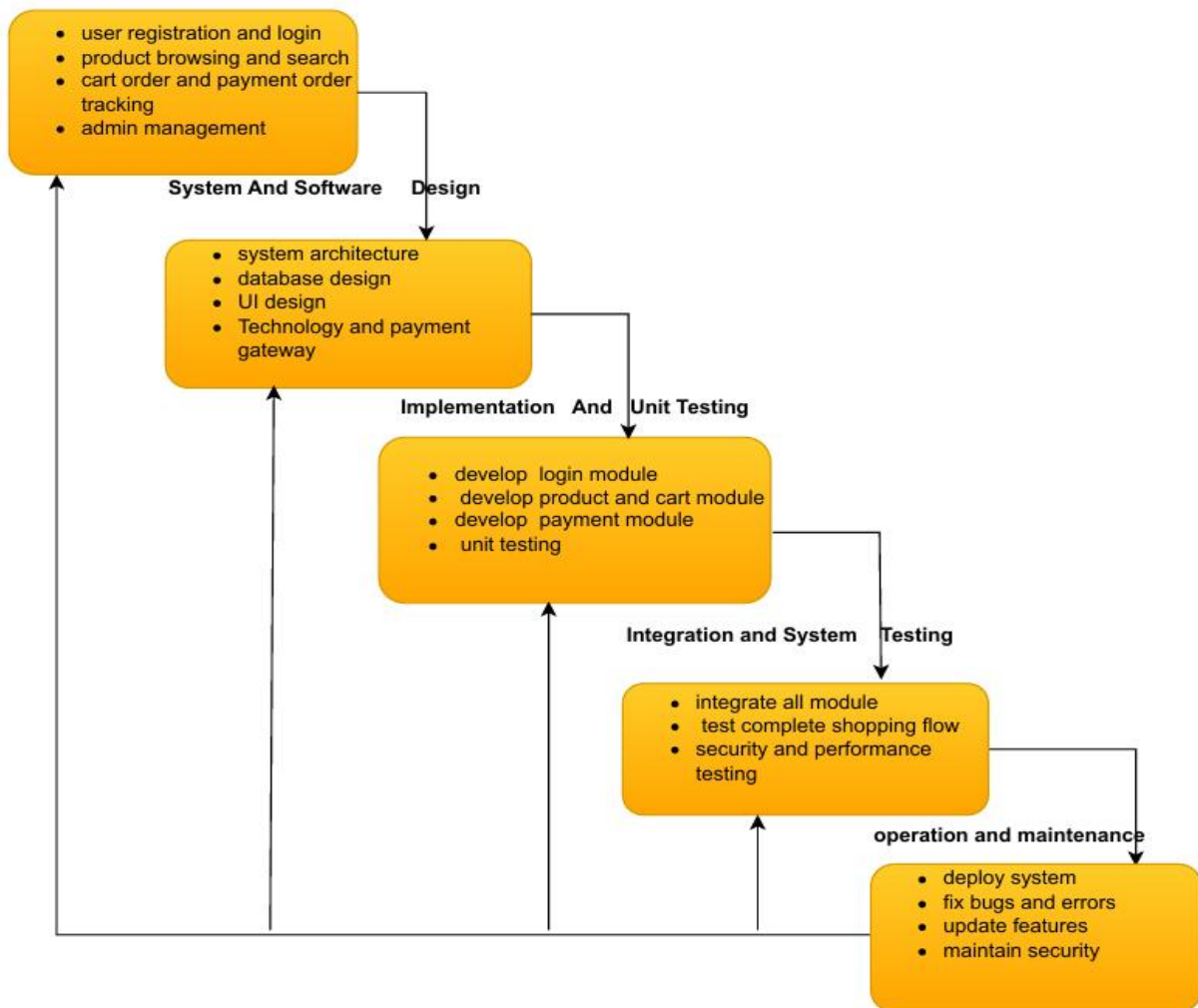
Advantages:
- Easy to understand and manage
- Proper documentation is maintained
- Suitable for small system with well-defined requirements

Disadvantages:
- Difficult to make changes once development starts
- Testing is done late which may expose the issues at the end
- Not suitable fast changing E-commerce systems

Example:

1. Collect the requirements (login, product list, cart, payment)

2. The system design is prepared completely

3. Develop the code

4. Test the system

5. Deploy and maintain

Requirements Definition

- user registration and login
- product browsing and search
- cart order and payment order tracking
- admin management

System And Software Design

- system architecture
- database design
- UI design
- Technology and payment gateway

Implementation And Unit Testing

- develop login module
- develop product and cart module
- develop payment module
- unit testing

Integration and System Testing

- integrate all module
- test complete shopping flow
- security and performance testing

operation and maintenance

- deploy system
- fix bugs and errors
- update features
- maintain security

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Fig 1: Waterfall Model

2. Incremental Development Model

In the Incremental Model is a software development approach in which the system is developed and delivered in small manageable parts called increments. Each of the increment adds new functionality to the system until the product is built completely. Software is not delivered all at once. Instead, the development will be divided into multiple increments. Requirements for current increment are gathered here and clearly it will be defined. Later the system design is prepared and new features are developed. Each increment will be tested to ensure new and the existing features. The tested increment is delivered and integrated with previous versions.[2]

Advantages:
- It provides faster delivery of the initial version
- Testing becomes more easier when features are added step by step
- Requirements changes can be handled better in waterfall model

Disadvantages:

- It Require careful planning
- There may be integration issues that may occur between increments

Example:
1. First develop the logging and product browsing

2. The first version is released to the user

3. Add cart and order features

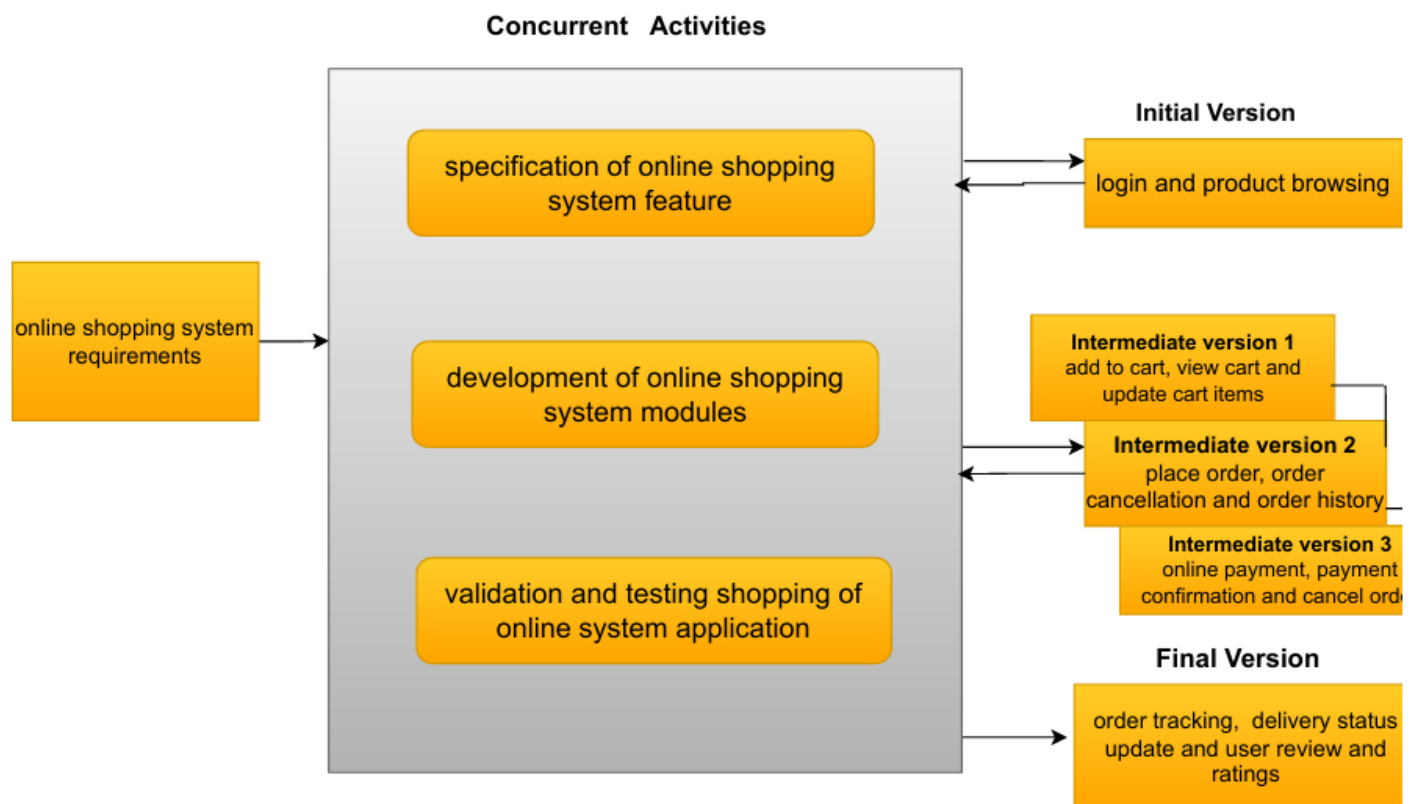4. Release next version

5. Add payment and tracking

Fig 2: Incremental Model

3. Spiral Model

The Spiral Model is one of the most important SDLC models, combining structured approach of the waterfall model with flexibility of the iterative model. It is mainly used in risk handling in large and complex projects. Development progress is spiral shape consisting of multiple loops where each loop will represent a complete development cycle. The number of loops indicates project size, complexity and risk. Development is carried out in cycles and each cycle includes planning, risk analysis, development and evaluation. Allows continuous improvements based on feedback. [3]

Advantages:
- This model is effective in risk handling
- Flexible to requirements changes
- Suitable for large projects
- Early customer review

Disadvantages:
- It is costly and complex to implement
- It requires more time to implement
- Requires experience project management

Example:

1. Identify the requirements
2. Analyze the risks (payment security)
3. Build the prototype
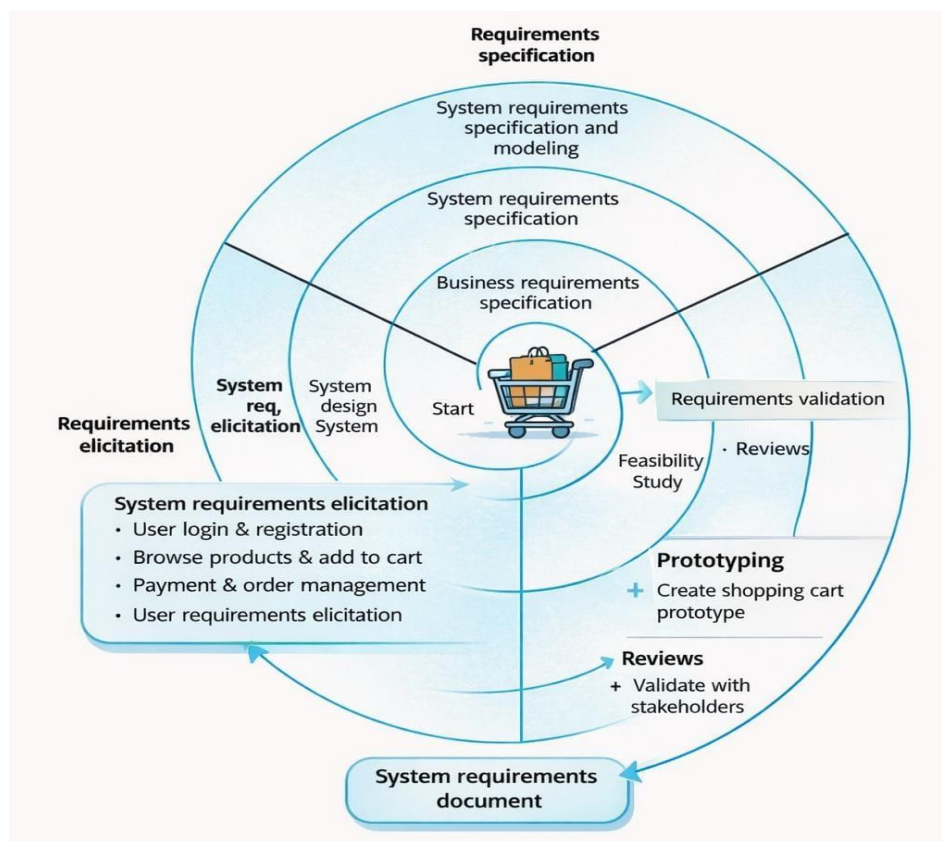4. User feedback is collected
5. Improve the report cycle

Fig 3: Spiral Model

REQUIREMENTS ENGINEERING

Functional Requirements:

1. User registration and login

2. Search and filter products

3. Add/remove items from cart

4. Place orders

5. Online payment

6. Order tracking

7. Admin product management

Non-Functional Requirements:

1. Fast response time

2. Secure payment processing

3. System available 24/7

4. User-friendly interface

5. Handles many users simultaneously

REQUIREMENTS VALIDATION STRATEGY

Requirements validation is a process used for checking if the system is up to the mark or not and tells whether the requirements are correct, complete, consistent, and workable. Validation always comes after verification. We usually use requirements validation to check errors at initial development phase. If the error where not detected on time then they might excessively increase the work.[4]

Validation techniques which, includes requirements reviews, which helps to check the shopping system requirements before building it. Prototyping means before building full system create the sample version of the shopping. Test-case generation means creating different situations to test if the shopping system works properly. User validation sessions which, means asking for the real users to test the system.

CHALLENGE IN REQUIREMENTS VALIDATION

- When we are creating an online shopping website, it is not easy to always make sure that the requirements are correct, there will be some common problems that can happen
- Sometimes users do not clearly explain what they want
- Changing Business needs means in online shopping business trends check very quickly
- Different people require different things according to there needs and sometimes there will be communication gaps which leads to misunderstanding between developers and clients
- Non-functional requirements are harder and difficult to check [4]

COMPARATIVE ANALYSIS

Best choice is **Incremental Model** for online shopping system as compared with Waterfall Model and Spiral Model because the Waterfall Model offers low flexibility and poor handling, making it less suitable for online shopping systems. The Incremental Model provides moderate flexibility and better risk handling making it good choice. The Spiral Model offers high flexibility and excellent risk management making it most suitable for large E-commerce platforms, but it is expensive.

CONCLUSION

In this assignment we studied different SDLC models and how they can be used to develop Online Shopping System. After comparing the models, it is clear that the Incremental development model and Spiral models are more suitable for this type of system. This is because Online Shopping platforms requires updates, new features and strong security so that these models allow flexibility and better in handling the risk. Also, Online Shopping system must deal with many things like secure payments, users data protection, and also for changing customer needs.

This assignment also shows how important requirements engineering is. Also clearly helps us to understand what customers and the business owners needs, checking the user requirements carefully, and considering Functional features like login, cart, payment and Non-functional features like security, speed, reliability are very important for building a successful system.

REFERENCES

[1] "SDLC - Waterfall Model" **https://www.tutorialspoint.com/sdlc/sdlc_waterfall_model.htm**

[2] "SDLC- Incremental Model"https://www.geeksforgeeks.org/software-engineering/software-engineering-incremental-process-model/

[3] "SDLC- Spiral Model" https://www.Spiral Model in Software Engineering - GeeksforGeeks

[Fig] - (Sommerville, Software engineering / Ian Sommerville. — 9th ed.)

[4] "Requirements validation "https://Requirements Verification and Validation in Software Engineering - Visure Solutions

DECLARATION

I hereby declare that this assignment is my original work and has not been copied or plagiarized from any source. All references and resources used have been properly cited. Any ambiguities will lead to forfeiting my marks.

Signature:

Date:13-02-2026