Experiment No. 1

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Aim: To identify a suitable life cycle model for your case study and justify your choice

Abstract

It is a type of online marketplace that leverages blockchain technology and decentralised applications to facilitate secure and transparent transactions between buyers and sellers. Unlike traditional ecommerce platforms, web3 ecommerce platforms enable direct peer-to-peer transactions without intermediaries such as banks or payment processors. This is possible through the use of smart contracts, which are self-executing contracts with the terms of the agreement directly written into code. Web3 ecommerce platforms also offer enhanced privacy and security features, such as the ability to encrypt personal and financial data using cryptographic protocols. In addition, they enable buyers and sellers to maintain control over their own data and funds, as opposed to having to rely on centralised third-party entities.

Product:
Our Web3 ecommerce platform is a decentralised online marketplace that leverages blockchain technology and smart contracts to facilitate secure and transparent transactions between buyers and sellers. The platform provides a direct peer-to-peer environment, eliminating intermediaries such as banks or payment processors, and allowing users to maintain control over their own data and funds. The platform also offers enhanced privacy and security features, such as the ability to encrypt personal and financial data using cryptographic protocols.

Users:
Our platform is designed for anyone who wants to buy or sell goods or services online in a secure and decentralised environment. This includes individuals, small businesses, and large corporations looking to reduce transaction fees and increase user control over data and funds.

Features:

- Direct peer-to-peer transactions: The platform enables buyers and sellers to transact directly without intermediaries, reducing fees and increasing user control over data and funds.
- Smart contracts: Self-executing contracts with the terms of the agreement directly written into code, ensuring that transactions are executed securely and transparently.

- Enhanced privacy and security: The platform offers encryption of personal and financial data using cryptographic protocols, ensuring that data is secure and private.
- Lower fees: By eliminating intermediaries, the platform reduces transaction fees for buyers and sellers, making it more cost-effective than traditional ecommerce platforms.
- Faster transactions: The platform leverages blockchain technology to enable faster transactions, reducing the time it takes to complete a transaction and increasing overall efficiency.
- Greater user control: The platform enables users to maintain control over their own data and funds, reducing the reliance on centralised third-party entities and increasing user autonomy.

The scope:

- Requirements gathering: This includes identifying the functional and non-functional requirements of the platform, such as security, scalability, and performance. Some requirements for our project include **integration with blockchain technology, decentralised storage and hosting, support for cryptocurrency payments and transactions, integration of smart contracts (for verifying the authenticity of products, managing inventory, and processing payments)**
- Design: This includes the user interface design, database design, and system design. The design should be aligned with the platform's requirements. Our project must have a **decentralised design, multi currency support, enhanced privacy and security. The system architecture must accommodate blockchain technology, smart contracts.**
- Development: This includes selecting the programming languages, frameworks, and tools that are best suited for the platform. **Programming languages could include Solidity, RUST, Python, and other tools like MetaMask wallets, etc. could be used.**
- Testing: This includes functional, performance, security, and usability testing.
- Deployment: This involves deploying the platform to a production environment, ensuring that it is secure and scalable. **Blockchain Network hosts like Ethereum, Celo, Filecoin could be used.**
- Maintenance: This involves ongoing maintenance of the platform to ensure that it continues to function properly and meets the changing needs of the business.

In addition to these processes, it is important to consider the unique challenges of building a web3 e-commerce platform, such as managing digital assets, ensuring security,

and integrating with blockchain networks. The scope of the software engineering process for a web3 e-commerce platform should take into account these challenges to ensure a successful platform.

Every Life Cycle and best fit

1) **Waterfall Model:** The waterfall model is a linear sequential approach to software development, where each stage of the development cycle follows the previous one. While this model was widely used in the past for its linear and sequential approach, it may not be the best fit for web3 based e-commerce due to its Lack of flexibility. In web3 e-commerce projects, requirements are often subject to change due to the fast-evolving nature of the technology. Higher risk of failure, Delayed testing, and limited customer involvement In a web3 e-commerce project, it is essential to have continuous customer feedback and involvement to ensure that the final product meets their needs and expectations.
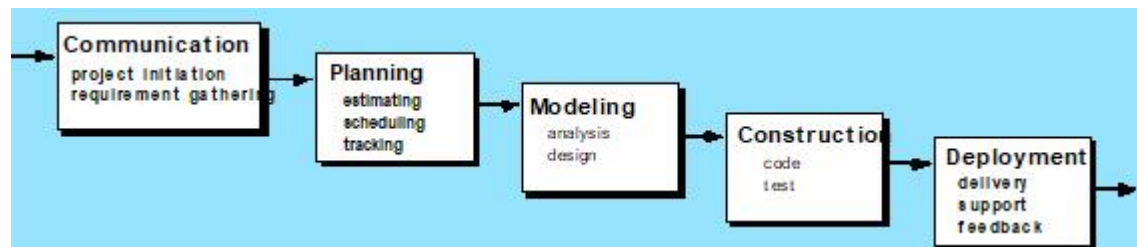

2) **RAD Model:** The Rapid Application Development (RAD) model is a software development approach where the emphasis is on speed and flexibility. The Rapid Application Development (RAD) model prioritises fast prototyping and iterative development, but its disadvantages are Lack of documentation. In web3 e-commerce projects, documentation is essential for security and audit purposes, and the lack of it may create vulnerabilities and compliance issues. Limited testing, Limited scalability, Limited collaboration, . In web3 e-commerce projects, it is essential to have a collaborative and cross-functional team to ensure that the product meets the needs of both customers and the business.
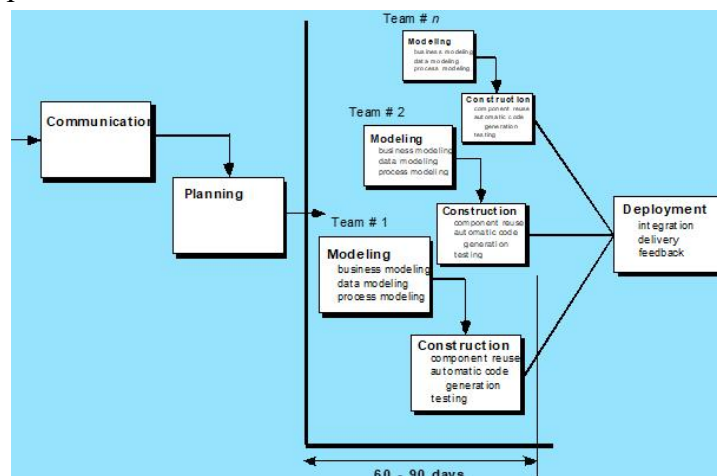
3) **Prototyping Model**: The prototyping model, which involves creating a working model of a system to test and refine its functionality before building the final product, has several disadvantages in the context of web3 e-commerce. Time and Cost, Creating prototypes can be time-consuming and expensive. Limited Scope, Risk of Misinterpretation, Technical Complexity Web3 e-commerce systems can be highly complex, with many different components and technologies involved. Creating accurate prototypes that reflect this complexity can be challenging, and errors or oversights in the prototyping stage can have significant consequences later on.
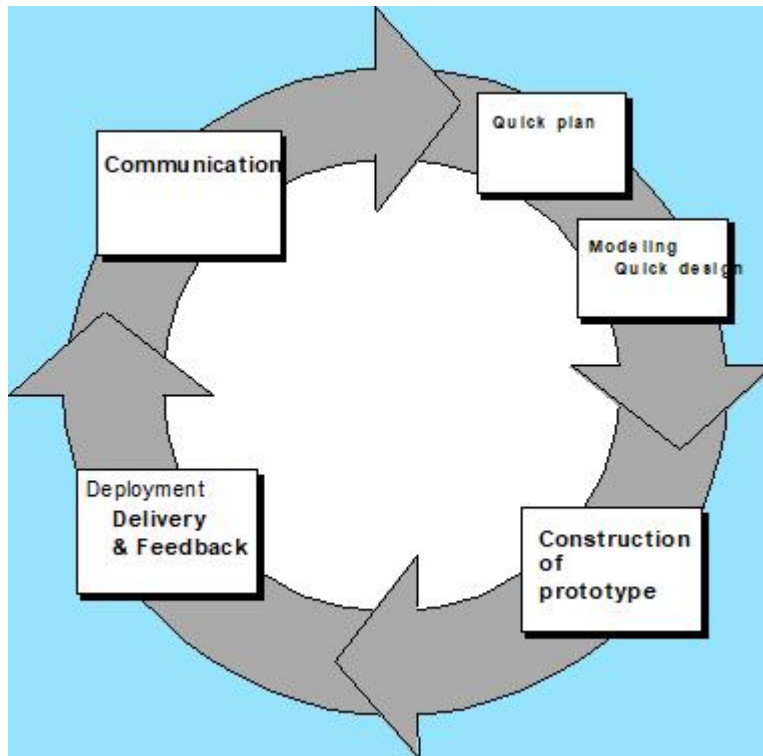
4) **Concurrent Model**: The concurrent model is a software development approach where multiple stages of the development cycle are executed simultaneously. Disadvantages include performance bottlenecks, difficult to debug, data inconsistency, longer development time
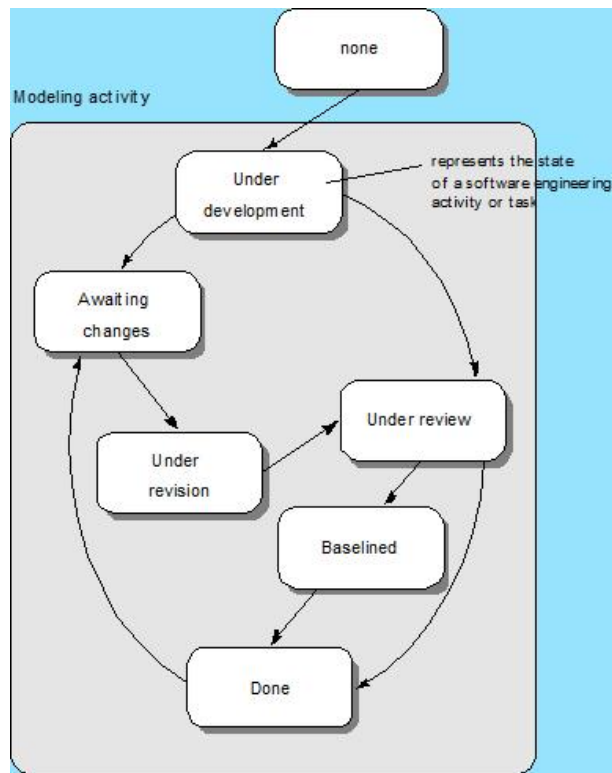
5) **Agile-XP**: Agile XP may not scale well to larger teams or more complex projects.Agile XP requires a high level of collaboration and engagement from all team members, which can be a disadvantage when working with a team that is not experienced with or committed to Agile development practices.Limited documentation:software over comprehensive documentation, which can be a disadvantage for Web3 e-commerce websites that require detailed business rules and security requirements.

6) **Agile-FDD**: FDD requires a high level of collaboration and engagement from all team members, which can be a disadvantage when working with a team that is not experienced with or committed to Agile development practices.FDD prioritises flexibility and adaptability over predictability, which can be a disadvantage for Web3 e-commerce websites that require strict adherence to project timelines and budgets.

7) **Agile-Crystal**: Crystal requires a high level of collaboration and engagement from all team members, which can be a disadvantage when working with a team that is not experienced with or committed to Agile development practices.Crystal focuses on a limited scope of work in each iteration, which can be a disadvantage when developing a Web3 e-commerce website that involves multiple complex components and features.

8) **Agile-Adaptive software development**:ASD may not scale well to larger teams or more complex projects. This can be a disadvantage for Web3 e-commerce websites, which may involve many complex and interconnected components and features.ASD requires a high level of collaboration and engagement from all team

members, which can be a disadvantage when working with a team that is not experienced with or committed to Agile development practices.
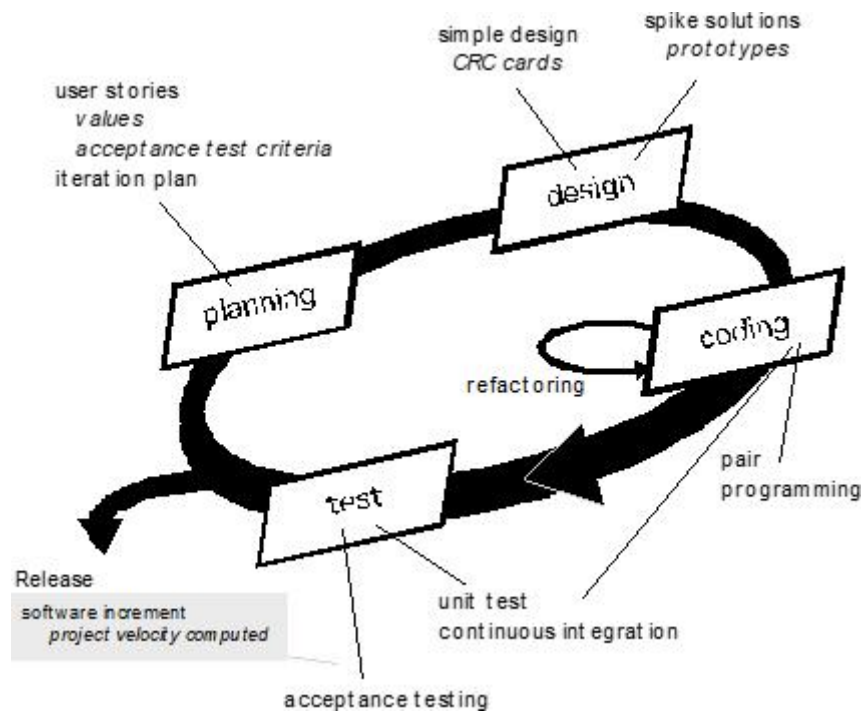
Models that we choose and why:
Out of the given life cycle models, the three best models that fit a web3 ecommerce platform are the Incremental Model, the Agile Model - Scrum, and the Spiral Model. Here's why:
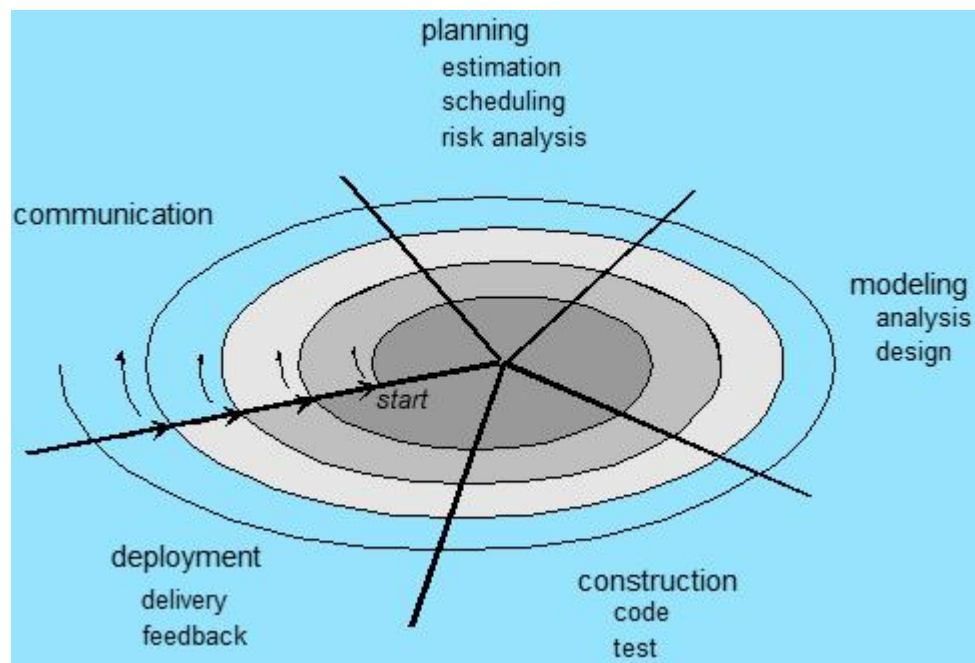
● **Incremental Model**: The Incremental Model is a software development model in which the development process is divided into small, manageable phases or increments. Each increment builds on the previous increment, and the system is developed and tested incrementally. This model is suitable for web3 ecommerce platforms because it allows for iterative development, which means that the platform can be continuously improved and adapted to meet changing user needs and business requirements.Using an incremental model allows for the rapid delivery of new features, which can help keep the website competitive and up-to-date.
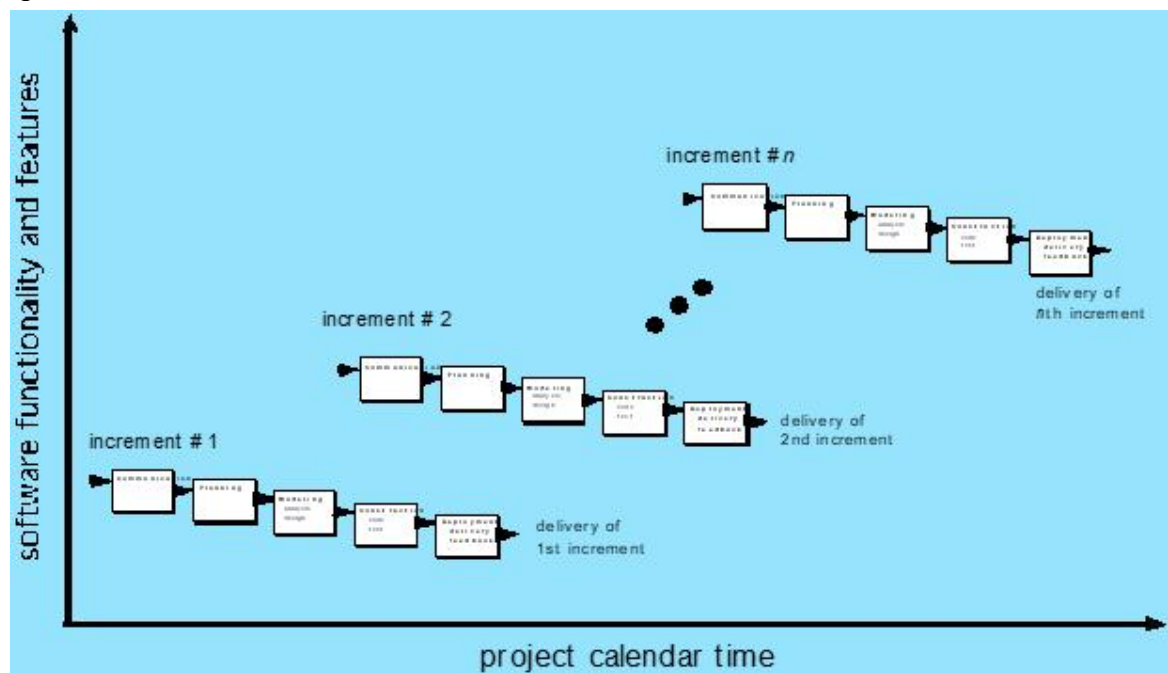
● **Agile Model-Scrum**: Scrum emphasises collaboration and communication among team members, which is particularly important in developing a Web3 e-commerce website. This type of website requires expertise in multiple areas, including blockchain development, smart contract programming, and e-commerce functionality. Scrum is suitable for web3 ecommerce platforms because it allows for frequent releases and rapid feedback, which is critical for keeping up with the fast-changing market and customer demands.

- **Spiral Model**: The Spiral Model is a software development model that combines the iterative nature of the Incremental Model with the risk management and prototyping of the Prototyping Model. The Spiral Model is suitable for web3 ecommerce platforms because it allows for early identification and management of risks, which is important in the context of an online platform that deals with sensitive user data and financial transactions.

In summary, the Incremental Model, Agile Model - Scrum, and Spiral Model are the three best life cycle models that fit a web3 ecommerce platform due to their iterative and

flexible nature, ability to manage risks and adapt to changing requirements, and support for frequent releases and rapid feedback.

Since a web3 ecommerce platform involves various technologies, such as blockchain and cryptocurrency, the development process may involve several uncertainties, and requirements may change quickly. The Agile Model is well-suited for such scenarios, as it emphasises flexibility, collaboration, and continuous feedback, allowing the development team to make changes quickly and efficiently.

<u>Conclusion:</u>

In this experiment we have studied various process models and are able to apply suitable process model for our application.