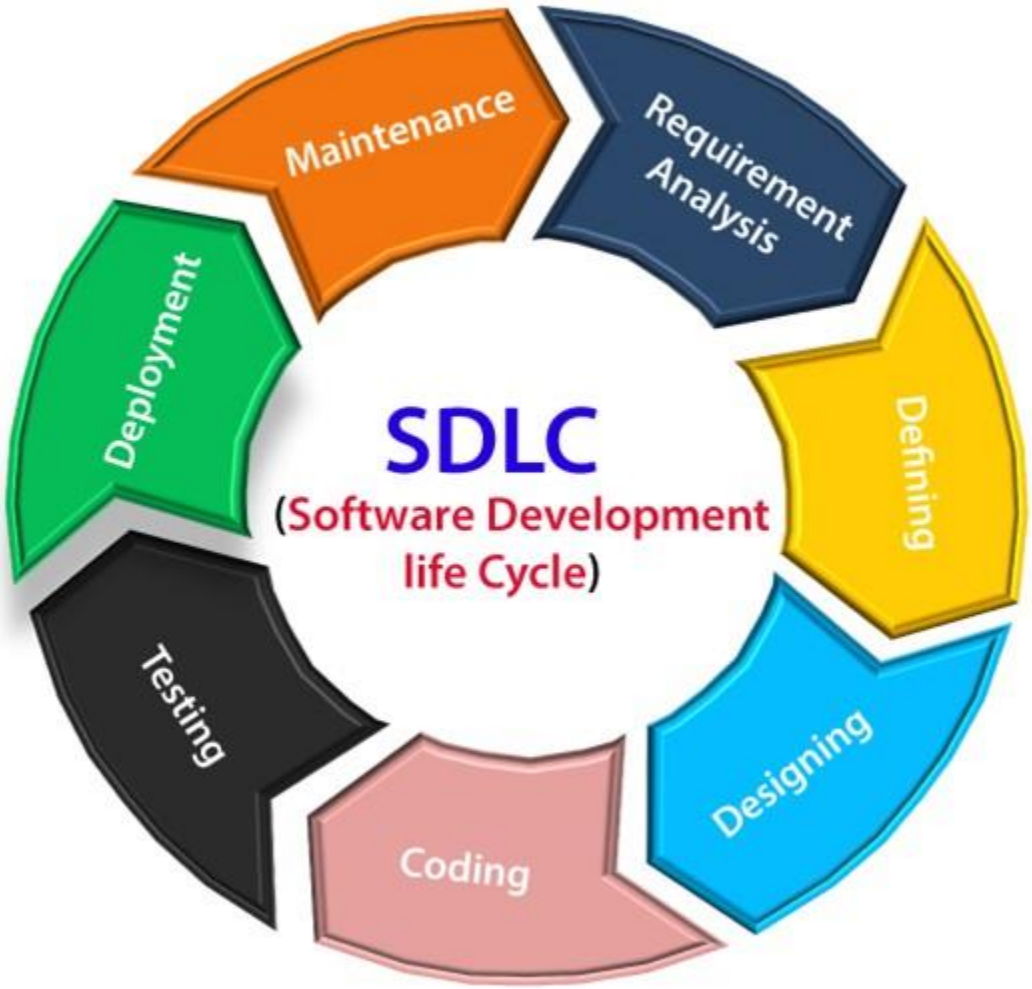
Assignment 1: SDLC Overview - Create a one-page infographic that outlines the SDLC phases (Requirements, Design, Implementation, Testing, and Deployment), highlighting the importance of each phase and how they interconnect.

Ans.



The stages of SDLC are as follows:

Stage1: Planning and requirement analysis

Requirement Analysis is the most important and necessary stage in SDLC.

The senior members of the team perform it with inputs from all the stakeholders and domain experts or SMEs in the industry.

Planning for the quality assurance requirements and identification of the risks associated with the projects is also done at this stage.

Business analysts and Project organizers set up a meeting with the client to gather all the data like what the customer wants to build, who will be the end user, what is the objective of the product. Before creating a product, a core understanding or knowledge of the product is very necessary.

Stage2: Defining Requirements

Once the requirement analysis is done, the next stage is to certainly represent and document the software requirements and get them accepted from the project stakeholders.

This is accomplished through "SRS"- Software Requirement Specification document which contains all the product requirements to be constructed and developed during the project life cycle.

Stage3: Designing the Software

The next phase is about to bring down all the knowledge of requirements, analysis, and design of the software project. This phase is the product of the last two, like inputs from the customer and requirement gathering.

Stage4: Developing the project

In this phase of SDLC, the actual development begins, and the programming is built. The implementation of design begins concerning writing code. Developers have to follow the coding guidelines described by their management and programming tools like compilers, interpreters, debuggers, etc. are used to develop and implement the code.

Stage5: Testing

After the code is generated, it is tested against the requirements to make sure that the products are solving the needs addressed and gathered during the requirements stage.

During this stage, unit testing, integration testing, system testing, acceptance testing are done.

Stage6: Deployment

Once the software is certified, and no bugs or errors are stated, then it is deployed.

Then based on the assessment, the software may be released as it is or with suggested enhancement in the object segment.

After the software is deployed, then its maintenance begins.

Stage7: Maintenance

Once when the client starts using the developed systems, then the real issues come up and requirements are to be solved from time to time.

This procedure where the care is taken for the developed product is known as maintenance.

Assignment 2: Develop a case study analyzing the implementation of SDLC phases in a real-world engineering project. Evaluate how Requirement Gathering, Design, Implementation, Testing, Deployment, and Maintenance contribute to project outcomes.

Ans.

- **Case Study:** Implementation of SDLC Phases in an E-commerce Platform Development Project.

1. Requirement Gathering:

A retail company, Fashion Trends Inc. decides its online presence by developing a new e-commerce platform. The project team conducts market research and gathers requirements by interviewing stakeholders, including marketing, sales, and IT departments. They identify key features such as product catalog management, user authentication, shopping cart functionality, payment gateway integration, and order tracking.

2. Design:

Based on the requirements gathered, the design phase begins. The team creates a detailed design document outlining the platform's architecture, database schema, user interface designs, navigation flows, and integration points with third-party services. They collaborate with the client to ensure that the design aligns with their brand identity and user experience goals.

3. Implementation:

With the design finalized, the development team starts coding the e-commerce platform according to the specifications outlined in the design document. They leverage modern web development technologies and frameworks to build responsive and scalable front-end and back-end components. The implementation phase involves iterative development, with regular feedback loops and updates based on testing results and client feedback.

4. Testing:

Once the initial version of the e-commerce platform is developed, rigorous testing is conducted to identify and address any bugs or issues. The testing phase includes functional testing, performance testing, security testing, and usability testing. Test automation tools are used to streamline the testing process and ensure comprehensive coverage. Any issues identified during testing are documented and resolved before proceeding to deployment.

5. Deployment:

After successful testing and client approval, the e-commerce platform is deployed to production environments. The deployment process involves setting up servers, configuring domain settings, integrating with third-party services (such as payment gateways and shipping providers), and migrating data from existing systems. A phased rollout approach may be adopted to mitigate risks and ensure a smooth transition for both customers and internal stakeholders.

6. Maintenance:

Once the e-commerce platform is live, ongoing maintenance and support are essential to ensure its optimal performance and reliability. Fashion Trends Inc. provides regular updates, security patches, and bug fixes to address any issues that arise post-deployment. They also monitor the platform's performance and user feedback to identify areas for improvement and implement new features or enhancements as needed.

Assignment 3: Research and compare SDLC models suitable for engineering projects. Present findings on Waterfall, Agile, Spiral, and V-Model approach, emphasizing their advantages, disadvantages, and applicability in different engineering contexts.

Ans.

● **Waterfall Model**: It is one of the classic and oldest methods. It includes a linear sequential way of doing a job. The processes involved are Requirement Gathering, Designing, Implementation, Testing, Deployment, and Maintenance. All these processes occur one after another.

○ Advantage:
■ Simple method.
■ Easy to follow
■ Each phase is sequential and does not require rigorous review.

○ Disadvantage:
■ Not flexible.
■ Features once implemented cannot be changed in later stages.
■ Mismatched during deployment will stop the entire life cycle.

○ Applicability:
■ Projects where the vision is clear.
■ Simple projects
■ Less maintainability or easy-to-maintain projects
■ Sequence of operation is required

● **Spiral Mode**l: It is derived from Waterfall and Iterative models. Includes the same strategy as the waterfall model but each stage requires prototyping. If any stage fails then it rolls back to its previous stage until the prototype comes to a satisfactory level.

○ Advantage:
■ Feature can be seen early
■ Feature can be added if needed
■ Stakeholder is involved at each stage

○ Disadvantage:
■ Too much prototyping
■ Complexity increases with each edition
■ Cost increases with each iteration

○ Applicability:
■ Large Project
■ Feature Loaded
■ Requires more stakeholder input

● **V-Model:** It is also derived from waterfall mode but each phase has its testing and verification stage. After each stage rigorous testing is done to ensure the quality of the project. It does not have a rollback like the spiral model.

○ Advantage :
■ Early Detection of defects
■ Structured and sequential like a waterfall model.
■ High-quality product

○ Disadvantage :
■ Testing at each stage is resource-intensive
■ Small project does not fit well
■ High Cost

○ Applicability:
■ High Risk Project
■ Safety is important
■ Testing required at each stage

● **Agile Model**: Agile model derived from incremental and iterative models. It has its short development phase and stages can be designed according to the needs of the project.

○ Advantage :
■ Very Flexible
■ Fast Delivery
■ Feature can be added after the cycle

○ Disadvantage:
■ Less vision in the beginning
■ Fast Pace makes it difficult to deliver
■ Management Issues

○ Applicability:
■ Customer Oriented
■ Cycles Change with each feature