**Task 1: What is SDLC**

SDLC: It stands for Software Development Life Cycle. It is a process used for developing software. It involves multiple phases

1. Requirement analysis
2. Planning
3. Design
4. Implementation
5. Testing
6. Deployment
7. Maintenance

And it has multiple models involved in achieving the SDLC. Below are some of the models

1. Waterfall
2. Agile
3. V model
4. Iterative

**Task 2: Why SDLC?**

SDLC is needed as it gives a structured approach for developing the software. Which means that it ensures quality software is delivered within the timeline, within the budget and within the resources. Also ensures it meets the user requirements.

**Task 3: Stages of SDLC**

1. Requirement analysis: In this phase, we understand what user needs from the software
2. Planning: This involves setting up scope, resources required, budget and the timeline for delivery
3. Design: Creating system design and the flow of achieving it
4. Development: Writing code as per requirements
5. Testing: Finding and fixing bugs
6. Deployment: Releasing software to users post testing
7. Maintenance: This phase involves working on user feedback and fixing bugs.

**Task 4,5,6 : SDLC Models, Applications, Advantages and Disadvantages**

1. Waterfall model: It is a liner or sequential model, where each phase is completed in a specific order starting from requirement gathering to design, implementation and testing. Also in this each phase must be completed before moving to the next one.



Application: Government projects where the requirements are clear

Advantages:

* 1. Simple & easy to understand and follow.
  2. Easy to track progress
  3. Fixed requirements
  4. Works well for small projects

Disadvantages:

1. Changes in development cannot be adopted
2. Delayed bug finding
3. Agile model: It is focused on developing the small functional parts in iterations. This model is widely used as it encourages frequent feedback and continuous development. It supports development even if the requirements change later in development.



Application: Mobile / web applications such as banking related, social media or quick commerce related where user feedback is continuously given and used for further development

Advantages:

* 1. Flexible and adaptive to change.
  2. Continuous improvement of software developed
  3. Early user feedback, which helps in software improvement

Disadvantages:

1. Requires more experienced folks
2. Might increase delivery timelines and budget
3. V model: This is a verification & validation model. Each phase of development in this model corresponds to a testing phase. This ensures the bugs or issues caught early in the development, thereby it improves the quality of the software. But this model does not support changing in requirements.



Application: Medical software / Stock market related applications

Advantages:

1. Early testing and feedback
2. Focused requirements
3. Easy to manage

Disadvantages:

1. Not flexible for changes
2. Iterative model: In this model, development happens in iterations. Each iteration follows Development, testing and implementation and basis the previous iteration next iteration builds the software, which helps in building the software with minimal gaps or bugs.



Applications: Mobile games

Advantages:

1. Easy to test and improve with each iteration
2. Flexible to user feedback

Disadvantages:

1. Increased budget.

**Task7: What is Scrum in Agile?**

Scrum is a project management tool, it helps teams work together on a specific project and deliver product in sprints.

**Task8: What is Sprint?**

Sprint refers to short period of time, usually 1 to 4 weeks, in this which team works to complete a set amount of work.

**Task9: what are the do’s and don’ts of Sprint?3 points each.**

Things to follow while working in a sprint:

1. Should focus on Sprint goal and the timelines while planning the sprint
2. Good to avoid extending the timelines
3. Update progress tracking tools such as Jira
4. Communicate the progress / blockers with the product owner & scrum master

Things to not to follow:

1. Adding newer tasks to the existing sprint as it may delay the sprint
2. Multitasking
3. Hiding the blocker

**Task10: What are stories and Backlogs in Scrum World?**

Story: Usually story refers to a simple description of requirement from the user pov and it helps the team to understand what needs to be done.

Backlog: This means list of work items that the teams need to complete within the sprint.

**Task11: Scrum Artifacts**

Product backlog: It contains information about the user stories, features, bugs or issues and improvement details.

Sprint backlog: This will have information about the work items that are supposed to be delivered in the current sprint.

Burn – down chart: It is a tool used for tracking the progress, which tells how much work left.

Increment: It gives the info about how much work has been done.

**Task12: What are Ports and Protocols?**

Protocols: A protocol is a set of rules that tells how data is transmitted between devices over a network. Some commonly used protocols are:

Http, Https, FTP, SFTP, TCP, UDP, SMTP

Ports: Port is a number that tells inside a network which application the data should go to. This is a 16 bit number. It is almost 65K numbers, which are used for different applications to communicate with network.

**Task13: What are the different Network types?**

Types of networks:

LAN (Local Area Network): Used within home or office buildings

WLAN (Wireless LAN): It is same as LAN but wireless

MAN (Metropolitan Area Network): This is a network within the city, formed by connecting multiple LANs

WAN (Wide Area Network): Multiple MANs connecting together forms a WAN

**Task14: What are the types of servers?**

Types of Servers:

1. Web server: Used for hosting webs and applications
2. File server: Used for storing files
3. Database server: Provides database services for applications or softwares
4. Mail server: Used for sending and receiving mail

**Task 15: What is DNS**

DNS stands for Domain Name System. This is a system that translates top level domain names into ip addresses that computers use to identify the server and get the requested information over a network. This happens through a DNS resolver.

**Task 16: What are the different Network Topologies? Name the types, write 2 lines min about each with a diagram.**

1. Bus topology: All devices are connected to the same network or a cable. This is easy to install and cost effective for a smaller range of networks.



1. Star topology: All devices are connected to a central switch. This is easy to manage and troubleshoot. As devices are connected to a central switch, one device failure doesn’t affect the other devices.



1. Ring Topology: Devices are connected in a circular loop. Here in this topology, if one device fails, that can affect the entire network.



1. Mesh topology: Every device is connected to every other device. There are two types:
2. Full mesh: All devices are interconnected
3. Partial mesh: Only a few devices are interconnected.



**Task 17:**

OSI Model:

There are 7 layers in this model.

1. Application layer: This is the top layer of OSI and interacts directly with end user. It provides application services and ensures that data is properly formatted for use by the user. It uses protocols like Http, Https, SMTP, FTP
2. Presentation layer: This layer translates data between the application and transport layers. It ensures that data sent by the application layer is in a format that the receiving application can understand.
3. Session layer: This layer is responsible for creating and managing sessions between two networks
4. Transport layer: This layer ensures reliable data transfer between two devices and provides error detection and flow control. It breaks large chunks of data into smaller segments and reassembles them at the receiving end.
5. Network layer: This layer is responsible for routing data packets from the source to the destination across different networks.
6. Datalink layer: It packages the bits from the Physical Layer into frames and ensures that data is transmitted correctly between devices on the same network.
7. Physical layer: This layer deals with the physical transmission of data over a network. This layer defines the hardware elements involved in network communication, including cables, switches, and network interface cards.