

Module-1

Overview of IT Industry

1. What is program?

A program is a set of instruction that tells a computer what to do. These Instruction written in different programming language. Which is specialized language that computer can understand after some translation.

Example: - c++, java, python etc...

2. What is programming?

Programming means to create a program, which involves a set of instruction that a computer can understand and execute. And set of instruction are written in specific language.

Steps of programming: -Requirement Collection

- Analysis & SRS

- Designing

- Developing (coding)

- Testing

- Implementation & Maintenance

3. Types of programming language

POP:- procedural oriented programming language. C language

FOP:- functional oriented programming language. Python

OOP:- object oriented programming language. C++

SPL:- Scripting programming language.

LPL:- Logical programming language, Prolog Language.

4. : What are the main differences between high-level and low-level programming languages?

Low level language is machine dependent (0.1) programming language. They deal directly with computer's memory & Registers without any Compiler or Interpreter.

They are difficult to learn & write.

Development time is typically longer.

Machine Readable only.

Example:- Assembly language & Machine language.

High-level programming language (HLL) is designed for developing User friendly software programs and websites. This programming language requires a compiler or interpreter to translate the program into machine language (execute the program).

They are easier to learn And Use.

Development time is typically shorter.

Human can easily Understand & Read,

Example:-Python, Java, C++, java script.

5. World Wide Web & How Internet Works?

The World Wide Web is a system of interconnected documents and other resources, accessed via the internet. In other words, it is a collection of websites & web pages which stored in web servers.

Users can access from using their device like computer, cell phone, tab etc..

It contains has text pages, images, audio, video etc...

The internet is a vast network of interconnected devices world wide in various term like cables or wireless systems. When a client request arrives, a server collect all data and send back to client for uses. Its has best future is the ability to communicate with others.

Example:- Email, Social Media, etc...

6. Describe the roles of the client and server in web communication.

The client is typically a user's web browser (like Chrome, Edge, or Safari) or any application that requests information from a server. It initiates the communication by sending requests for web pages, images, videos, or other data.

The server is a computer or software system that stores and delivers information to clients. It receives requests from clients, processes them, and sends back the requested data for Multiple uses.

7. Explain the function of the TCP/IP model and its layers.

The TCP/IP model's primary function is to facilitate communication between diverse devices on a network, regardless of their underlying hardware or software.

It achieves this by breaking down data in to smaller packets & Routing trough the network & reassembling them to destination.

1) Application Layer

This the top layer, where user applications interact with the network.

It provides services that directly support applications, such as Web browsing (HTTP), Email (SMTP), File Transfer (FTP).

2) Transport Layer

This layer ensures reliable data delivery between two applications.

Breaking data into segments.

Controlling data flow.

3) Internet Layer:

This layer is responsible for logical addressing and routing.

It uses IP (Internet Protocol) addresses to identify devices on the network.

4) Network Interface Layer (or Link Layer):

This is the bottom layer, which handles the physical transmission of data.

It deals with the hardware and physical media used to connect devices, Such as ethernet Cables, wi-fi signals.

This layer is where the data is put onto the physical network.

8. . Explain Client Server Communication.

Client initiates a request to server when required data using of web browser in laptop, mobile, etc...

Client does not communicate with another client directly. Its need server for communication.

Server Received requests from many clients, and its always on, its required fixed well known address .

Does not initiate contract with the clients.

Example:- web server for web site.

9. Types of Internet Connections

Digital subscriber line(DSL)

Cable internet

Wireless internet

Satellite based Internet

Fibre optic internet

Broadband over powerlines.

10. How does broadband differ from Fiber-optic internet?

Broad band is a general term for highspeed internet using cables & wires, sometimes it affected in terms of speed when user is more.

Fibre optic internet uses specific types of plastic or Glass cables for transfer data offering faster speed & lower latency.

11. What are the protocols?

Protocol means “ set of rules” which is Accompanied by network.

Example:- HTTP & HTTPS, FTP(File transfer protocol), Email protocols, Transmission Control Protocol, User Datagram protocol.

12. : What are the differences between HTTP and HTTPS protocols?

HTTP (Hypertext transfer Protocol) is a protocol using which hypertext transferred over the web.

Its most widely used data transfer protocol because of its simplicity, the data transferred trough http is not secure as well https.

https (Hypertext transfer Protocol secure) is extended version of HTTP, its used for secure communications.

13. What is the role of Encryption in securing applications?

Encryption plays a critical role in securing applications by transforming sensitive data into an unreadable format, they cannot decipher it without the proper decryption key, effectively protecting confidential information like user logins, financial details, and medical records from unauthorized access or interception during transmission or storage within an application.

14. : What is the difference between system software and application software?

System software is designed to run a computer's application program and hardware. Its co-ordinates function with hardware & software.

Example:- OS(window-11), Notepad, Calculator etc...

Application software is a computer software package that perform a specific task for users or in some case for another applications.

Examples:- office suites, Graphics software, software development tools, PowerPoints etc...

15. What is the significance of modularity in software architecture?

Modularity is a fundamental principle in software architecture, and its significance stems from the way it helps manage complexity and improve the overall quality of software systems. Here's a breakdown of its key benefits:

- Reduce complexity
- Improved maintenance
- Enhance reusability
- Increase flexibility
- Facilitate team work
- Better error solution.

16. Why are layers important in software architecture?

Layers are a fundamental concept in software architecture, and their importance stems from the numerous benefits they provide in managing complexity and improving software quality. Here's Are types of layers.

- Presentation Layer

- Application Layer

- Business Layer

- Persistence Layer

- Database Layer

17. : Explain the importance of a development environment in software production. Source Code?

A development environment is crucial in software production, acting as the foundation upon which high-quality, reliable software is built. Here's a breakdown of its importance, especially concerning source code:

- Code creation & editing

- Testing & Debugging

- Collaboration & Team work

- Consistency & Standardization

- Efficiency & Productivity

18. What is the difference between source code and machine code?

Source code is Written by programmers using programming languages like python, java, c++ etc.. These languages are design to be relatively easy for humans to understand.

Machine code is the lowest level programming language, it consists of binary code like (0,1), That the CPU can directly understand & execute. it's extremely difficult for humans to read or write.

19. Why is version control important in software development?

Version control is fundamental in software development for tracking changes, introducing new facility or fix the bugs, and improve workflow. Also used for adding some new facility.

20. : What are the benefits of using GitHub for students?

GitHub can help students learn and collaborate on software development projects.

21. What are the differences between open-source and proprietary software?

Open-source software is publicly available. that means anyone can view, modify, and distribute it. It is almost free of cost for use. Proprietary software is not publicly available, it is developed by one company or organisation & have a licenced for uses. It is paid software for use.

22. : How does GIT improve collaboration in a software development team?

Git significantly enhances collaboration within software development team's through several key features like Branching, Merging, Version control, code review, remote repositories, and conflict resolutions.

23. What is the role of application software in businesses?

Application software plays a vital role in modern business for improving efficiency & productivity, simplifying Business Process, Enhancing Communication & Collaboration, manage data, CRM, Accounts, etc...

24. : What are the main stages of the software development process?

Requirement Gathering

Analysis & SRS

Designing

Implementation

Testing

Maintenance

25. Why is the requirement analysis phase critical in software development?

Its ensuring Alignment with customer's need, reducing cost And Rework, establishing a clear foundation, Improving communication, Risk and Effective Testing.

26. What is the role of software analysis in the development process?

It's crucial role of software analysis in the development process likes, Requirement gathering, system modelling & design, Risk identification & Mitigation, improving software Quality etc...

27. What are the key elements of system design?

System design is the art of creating a blueprint for a system that meets specified requirements, solves user problems, and handles future growth.

Key components of design like architecture, Database design, Application programming, caching, Load balancing, security, scalability and performance, fault tolerance, monitoring & user experience.

28. Why is software testing important?

Software testing is important for high standard of quality, reliability and performance of application. Trough testing developer can fix the issue, improve functionality as per industry standard.

29. What types of software maintenance are there?

Corrective software Maintenance

Adaptive software Maintenance

Perfective software Maintenance

Preventive software Maintenance.

30. What are the key differences between web and desktop applications?

Functions	Web	Desktop
Accessibility and Deployment	Access Trough Web on Internet	Install on direct computer's OS
	No installation Required	Installation & update Manually
	Platform Independent	Specific platform required
	Required Internet Connection	Can function Online

Performance & Resources	Depend on speed & Load of Net	Faster & more Responsive
	Relies on browser capability	Can utilise Full Power of PC
Update & Maintenance	easy to Maintain & fix Bug	Complex due to Variation in system
Security	It's depended on Server & coding Practise	Depend on application & System security

31. What are the advantages of using web applications over desktop applications?

Web Application Priorities Accessibility and ease of use, while Desktop Application Priorities performance & control. It is based-on Requirements of user or organization.

32. What role does UI/UX design play in application development?

UI/UX plays a crucial role in application development for enhance user experience, increase usability & functionality of software. Software can attract and retain user. making it more Successful.

33. What are the differences between native and hybrid mobile apps?

A hybrid app is particular type of native apps, user can download & install from app store, initially hybrid app like more web pages. Hybrid app lie between native app and web page.

34. What is the significance of DFDs in system analysis?

Data flow Diagram (DFD) provides a graphical representation of Data flow of the system, it is easy way to understand for both technical or non-technical person.

The models enable software engineers, customers, and user to work to gather effectively during the analysis and specification of Requirements.

35. What are the pros and cons of desktop applications compared to web applications?

Desktop application provides more speed, functionality, and better performance for data intensive operations. web apps provide accessibility, ease of updates, and cross platform compatibility.

Desktop application Require specific Platforms, Web application access through out any platform on internet.

36. : How do flowcharts help in programming and system design?

Flowcharts are the visual representation of algorithm or a Process. Flowchart uses symbol, arrows, rectangles, diamond to properly explain the sequence of steps involved in algorithm or process.