

Module 1

1. Explain in your own words what a program is and how it functions.



Define :-

“A ‘**program**’ is a set of command written in a programming language that tell the machine how to perform a given task.”



How a Program Functions:-

- The program starts by receiving input and follow the instruction (Processing) as well as storage the data after that the it's given the output.
- In simple Terms, each program function following the simple steps: - Input → processing → storage → Output.

2.What are the key steps involved in the programming process?

- 1) Requirement Analysis
- 2) Design
- 3) Implementation (Coding)
- 4) Testing
- 5) Debugging
- 6) Documentation
- 7) Deployment
- 8) Maintenance and Updates

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

High Level Language	Low Level Language
Easy to understand and learn	Difficult to understand and learn
It is a user friendly language.	It is a machine friendly language.
It can run on any platform.	It is a machine dependent.
High-Level language is lower execution speed.	Low-Level language is higher execution speed.
e.g.:- <ul style="list-style-type: none">▪ C▪ C++▪ java	e.g.:- <ul style="list-style-type: none">▪ Machine language▪ Assembly language

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

- In web communication the client is responsible for sends request to the server for specific resource. While the server is responsible for receives and processes incoming requests from the client. It decide which type of resources or services is being requested such as web page, a file....
From a database.

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

➤ Layers of the TCP/IP Model

- **Application Layer:** The packets are created by the application such as web browser and moved to the transport layer.
- **Transport Layer:** The transport layer distribute the packets and add control information (such as port numbers), and ensures reliability using protocols like TCP or UDP.
- **Internet Layer:** The packets the packets are framed and transmitted over the physical medium (Ethernet, WI-FI, etc.) to the destination device. Are reserve destination IP address and routed across network to their target device.
- **Network Access Layer:** Finally, the packet are converted into frames, transmitted over the physical medium (e.g.:- Ethernet or WIFI) to the destination device.

6. Explain Client Server Communication.

Client Server is a model for network communication where one device send request (the client) from the another device (the server).such as, web browsing, email, file transfer, etc.

➤ Benefits of client server communication:-

- Easy Management
- Security
- Centralization
- Cost Effective

➤ Protocol of client server communication:-

- HTTP/HTTPS
- FTP(File Transfer Protocol)
- SMTP(Simple Mail Transfer Protocol)

7.How does broadband differ from fibre-optic internet?

Broadband	Fiber-Optic Internet
General term for high-speed internet	A specific type of broadband using fibre-optic cables
It's use technologies like wireless cable, satellites	Fiber optic cables using light signals
Widely available in many forms	Limited availability, mostly in urban areas
General internet use, streaming, browsing	Heavy data usage, streaming, gaming, business applications
Varies(cheaper for DSL and Cable)	Typically more expensive to install

8.What are the differences between HTTP and HTTPS protocols?

HTTP	HTTPS
Hypertext Transfer Protocol	Hypertext Transfer Protocol Secure
Default Port 80	Default Port 443
No additional security features	Users SSL certificates for public-key encryption
Works in application layer of the OSI model	Works in transport layer of the OSI model
Helps to transport text, audio, video, images, through webpages	Helps to transfer data securely via the network

9.What is the role of encryption in securing applications?

- Encryption is use to protect data from being stolen, change or compromised and work by scrambling data into secrete code that can only be unlock with a unique digital key.
- It's help to protect user and organizational data from cyber threats for application handles sensitive information such as financial transaction and healthcare data.

10. What is the difference between system software and application software?

System Software	Application Software
System software is used for operating computer hardware	Application software is used by user to perform specific task
System software the main purpose of Manages hardware and system resources	Application software the main purpose of Helps users perform specific tasks
Updates:- Less frequent, primarily for maintenance and security	More frequent, adding features and fixing bugs.
Essential for computer operation	Depends on system software to function
<ul style="list-style-type: none">• Operating systems• Device Drivers	<ul style="list-style-type: none">• Word Processers• Browsers• Games

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

- Modularity in software architecture is significant because it maintainability, scalability, flexibility, testability, and security.
- It allows systems to evolve and adapt efficiently while improving collaboration among development teams.
- By focusing on smaller, independent components, modularity also promotes better organization, easier debugging, and reuse of components across different projects.

12. Why are layers important in software architecture?

- Layers in software architecture helps organize and structure the system into decide levels or components, responsible for each and every specific tasks.
- This layer makes the software easy to develop, manage and maintain.

13. Explain the importance of a development environment in software production.

- The development environment is a set of tools software and settings that developer use to build, test and debug application.
- It's a workspace where all the necessary resource are organized to help developers write and maintain code efficiently.

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

Source Code	Machine Code
Human-readable code written in a high-level language	Low-level binary code that the CPU can directly execute
Written in programming languages(e.g:- C, Java, Python)	Written in binary, consisting of 0s and 1s
Needs to be compiled or interpreted before execution	Can be directly executed by the computers cpu
Source code is a independent platform	Machine code is not independent platform
Print("Hello, World!")(Python)	10110000 01100001 000000 (binary instruction)

15. Why is version control important in software development?

- Version control is also known as “source control” OR “revision control”.
- Version control is key in software development because it helps team work together without tracks changes, easy recovery from the mistakes that code is always backup and secure.
- Its fundamentals tools for collaboration, debugging and organized codebase.

16. What are the benefits of using GitHub for students?

- Collaboration and Teamwork.
- Learning and Documentation.
- Networking and Community.
- Free Access for Students.
- Project and Task Management.
- Documentation and Knowledge Sharing.
- Security and Backup.

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

Open-Source Software	Proprietary Software
Open source software can be installed on any computer	Proprietary software cannot be install into any computer without a valid licence
Typically free or low cost	Requires purchasing or licensing
Community-driven, possibly paid support	Professional, company-driven support
Usually developed and maintained by non-profit organizations	Usually developed and maintained by for-profit entities–
e.g.:- Linux Apache	e.g.:- Windows Adobe photoshop

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

- Git makes collaboration easier by allowing multiple developers to work on the same codebase at the same time.
- It tracks changes helps to updates and keeps a history of a project. With git, teams can collaborate more smoothly, improve code quality and avoid mistakes.

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

- When a user interacts with a piece of software directly it is known as application software.
- Application software is crucial role in businesses by helping to improve efficiency, reduce cost and increase productivity. It can also have businesses modify to market trends, scale operations and provide better customer application.

20. What are the main stages of the software development process?

- ☐ Requirement Gathering and Analysis
- ☐ System Design
- ☐ Implementation (Coding/Development)
- ☐ Testing
- ☐ Deployment
- ☐ Maintenance and Support
- ☐ Evaluation and Feedback

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

- The **requirement analysis** phase is critical because it down the foundation for the entire software development process.
- It make sure the software is built to the right needs, clear sets expectation, helps with planning, reduce risk and improve communication.
- Without proper requirement analysis, the project could easily go of track, leading to wasted time, money and effort.

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

- Software analysis is key because it helps developer understand exactly what the software needs to do, who will use it, how it should work.
- It provides a clear plan, reduces risk, ensure quality and aligns the entire team on the projects goal.
- Software analysing requirements at the starts, the development process is smoother, faster and more successful.

23. What are the key elements of system design?

- System Architecture
- Component Design
- Data Design
- Interface Design
- Security Design
- Performance Design
- Testing and validation design

24. Why is software testing important?

- Software testing is important because it helps insure the software works as planned, improves quality, save time and money, prevents security issues insure similarity and meets business requirements.
- Without testing, software could be unreliable, unsafe, leading (main) to problems after lunch.

25. What types of software maintenance are there?

- Corrective Maintenance
- Adaptive Maintenance
- Perfective Maintenance
- Preventive Maintenance
- Emergency Maintenance

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

Web Applications	Desktop Applications
No installation required	Requires installation on the user's device
Platform-independent(via browsers)	Often platform-specific (windows, macros, etc.)
Can be slower, dependent on network and servers	Faster, local performance
Requires internet access(except for PWAs)	Typically works offline
Gmail Facebook	Microsoft Word Adobe Photoshop

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

- Cross-Platform Accessibility
- Ease of Collaboration
- Accessibility Anywhere
- Cost-Effective
- Security Benefits
- Device Independence and Responsive Design

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

- UI/UX design is essential in application development because it determines (decide) how the app looks and feels, directly affecting how users interact with it.
- UI/UX design plays a critical role in making an application visually attractive, easy of use and enjoyable for users.
- UI/UX design leads to bater user satisfaction and greater app success.

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

Native Mobile App	Hybrid Mobile App
Maintain Updates for each platform separately	Easier to maintain with one code base
Slower development cycle	Faster development cycle
Highly secure	Less secure
More expensive to code	Less cost
More time to needed code	Less time to code

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

- DFDs are significance in system analysis because they provide a clear and simple way to visualize how data moves through a system, identify components, improve communication, detect problems and guide system design.
- They help in breaking down complex system, making it easier for every one involved to understand and contribute to building and effective system.

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

➤ Desktop Application Advantages

- Offline Access
- More Privacy
- Cost-Efficient
- Optimized Performance

➤ Desktop Application Disadvantages

- More Space Utilization
- Installation is necessary
- Upgraded Manually

➤ Web Application Advantages

- No Downloading and Installation
- Cross-Platform Compatibility
- Self-Updating Solutions
- Less Load on System

➤ Web Application Disadvantages

- Requirement of Internet
- Slow Performance
- Security Issues
- High Subscription Rates

32. How do flowcharts help in programming and system design?

- Flowcharts are an essential tool in both programming and system design because they offer a clear, organized way to visualize and document processes, logic, and workflows.
- Flowcharts also support efficient system design and future maintenance, making them indispensable for both developers and designers in ensuring successful system development and management.