

# Module 1

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

“A program is a set of instructions written in a programming language that directs a computer on how to perform specific tasks.”

- A program operates by taking input from the user or another source, processing the data according to predefined instructions, storing the data as needed, and then producing an output. The basic flow can be.
- simplified as:  
Input → Processing → Storage → Output.

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

- I. Requirement Analysis
- II. Design
- III. Implementation (Coding)
- IV. Testing
- V. Debugging
- VI. Documentation
- VII. Deployment

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

High Level Language	Low Level Language
Easier to understand and use	More complex and harder to understand
User-friendly	Machine-friendly
Platform-independent	Platform-dependent
Slower execution speed	Faster execution speed
e.g.:- <ul style="list-style-type: none"> <li>▪ C</li> <li>▪ C++</li> <li>▪ java</li> </ul>	e.g.:- <ul style="list-style-type: none"> <li>▪ Machine language</li> <li>▪ Assembly language</li> </ul>

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

- The *\*client\** is the device or program that makes a request to the server for a resource, such as a web page or file.
- The *\*server\** is the machine or service that receives, processes, and responds to the client's request, providing the requested resource or information.

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

##### Layers of the TCP/IP Model

- I. *\*Application Layer\**: Creates data packets via applications like browsers, which are passed to the transport layer.
- II. *\*Transport Layer\**: Distributes packets and ensures reliable delivery with control information (e.g., port numbers).
- III. *\*Internet Layer\**: Packets are framed and routed across networks, ensuring they reach their destination device.
- IV. *\*Network Access Layer\**: Transmits packets over physical media (e.g., Ethernet, Wi-Fi) to the destination device.

#### **6. Explain Client Server Communication.**

- The *\*client-server model\** involves a client making a request to a server, which processes the request and sends a response. This model is used in various internet services like web browsing, email, and file transfers.

➤ **Benefits of client server communication:-**

- Easy management and centralization of data
- Enhanced security
- Cost-effective solution

➤ **Protocol of client server communication:-**

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

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

<b>Broadband</b>	<b>Fiber-Optic Internet</b>
A general term for high-speed internet	A specific broadband type using fiber-optic cables
Uses technologies like DSL, wireless, and satellites	Uses fiber-optic cables transmitting data through light signals
Available widely, including in rural areas	Typically available in urban regions
Suitable for general use like browsing and streaming	Ideal for heavy data use, gaming, and business applications
Varies in cost (cheaper for DSL and Cable)	Generally more expensive

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

<b>HTTP</b>	<b>HTTPS</b>
Stands for Hypertext Transfer Protocol	Stands for Hypertext Transfer Protocol Secure
Uses port 80 by default	Uses port 443 by default
Does not include security features	Encrypts data using SSL certificates
Operates at the application layer of the OSI model	Operates at the transport layer of the OSI model
Used for standard data transfer (text, images, etc.)	Secures data transfer to protect privacy

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

- Encryption is used to protect sensitive data from unauthorized access, theft, or alteration. It works by converting readable data into an unreadable format using a key.
- It helps ensure the confidentiality and integrity of user data, especially for applications that handle sensitive information such as financial transactions, healthcare data, and personal information, thus protecting against cyber threats.

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

<b>System Software</b>	<b>Application Software</b>
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
Essential for computer operation	Depends on system software to function
<ul style="list-style-type: none"> <li>• Operating systems</li> <li>• Device Drivers</li> </ul>	<ul style="list-style-type: none"> <li>• Word Processers</li> <li>• Browsers</li> <li>• Games</li> </ul>

## **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?**

<b>Source Code</b>	<b>Machine Code</b>
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?**

<b>Open-Source Software</b>	<b>Proprietary Software</b>
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
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
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## **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 a 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 aliens 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?**

- I. System Architecture
- II. Component Design
- III. Data Design
- IV. Interface Design

- V. Security Design
- VI. Performance Design
- VII. 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 requirement
- Without testing, software could be unreliable, unsafe, leading (main) to problems after launch.

## **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?**

<b>Web Applications</b>	<b>Desktop Applications</b>
No installation required Requires	installation on the user's device
Platform-independent	Often platform-specific
Can be slower, dependent on network and servers	Faster, local performance
Requires internet access	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?**

<b>Native Mobile App</b>	<b>Hybrid Mobile App</b>
Maintain Updates for each platform separately	Easier to maintain with one code base
Slower development cycle	Faster development cycle
More expensive to code and Less cost	More time to needed code and 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.