

# **Module 1 – Overview of IT Industry**

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

Answer: A program is a set of instructions written in a programming language that tells a computer how to perform specific tasks. It functions by taking input, processing it according to defined logic, and producing output. Programs are executed by the computer's processor to perform operations efficiently.

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

Answer: The key steps in programming are: 1. Problem Analysis: Understand and define the problem. 2. Algorithm Design: Plan the solution step by step. 3. Coding: Write the program using a programming language. 4. Compilation/Interpretation: Convert code into machine-readable format. 5. Testing & Debugging: Check for errors and fix them. 6. Documentation & Maintenance: Record program details and update when needed.

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

Answer: - High-level languages: Easy for humans to read, uses natural language elements, portable, e.g., Python, Java. - Low-level languages: Closer to machine code, hardware-specific, faster execution, e.g., Assembly, Machine Code.

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

Answer: - Client: Sends requests for resources or services, usually through a web browser.  
- Server: Receives requests, processes them, and sends back the requested data or response.

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

Answer: The TCP/IP model defines rules for data exchange over the internet. Its layers are:  
1. Application Layer: Supports software applications and network services. 2. Transport Layer: Ensures reliable data transfer (TCP/UDP). 3. Internet Layer: Handles addressing and routing of data packets. 4. Network Access Layer: Manages physical transmission of data over networks.

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6. Explain Client Server Communication.

Answer: Client-server communication is a model where clients request services or data, and servers provide responses. The communication is usually request-response based and allows centralized control and resource sharing.

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

Answer: - Broadband: High-speed internet over DSL or cable, suitable for general use. - Fiber-optic: Uses light signals for faster, more reliable, and high-bandwidth connections with lower latency than broadband.

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

Answer: - HTTP: Standard protocol for web communication, not encrypted. - HTTPS: Secure HTTP, encrypts data using SSL/TLS to prevent interception and tampering.

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

Answer: Encryption protects data by converting it into an unreadable format for unauthorized users. It ensures confidentiality, integrity, and security of sensitive information in applications.

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

Answer: - System Software: Manages hardware and provides a platform for application software, e.g., OS. - Application Software: Helps users perform specific tasks, e.g., MS Word, Photoshop.

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

Answer: Modularity allows software to be divided into independent, reusable modules. It improves maintainability, scalability, and makes debugging easier.

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12. Why are layers important in software architecture?

Answer: Layers separate concerns, e.g., presentation, business logic, and data access. This improves code organization, reduces complexity, and enhances maintainability.

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

Answer: A development environment provides tools and frameworks for coding, testing, and debugging. It ensures code quality, efficiency, and smooth transition to testing and production.

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

Answer: - Source Code: Human-readable code written in a programming language. - Machine Code: Binary instructions that the computer can execute directly.

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15. Why is version control important in software development?

Answer: Version control tracks changes, allows collaboration, prevents data loss, and makes it easy to revert to previous versions.

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

Answer: GitHub helps students learn collaboration, version control, project management, and showcases coding skills in portfolios.

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

Answer: - Open-source: Free to use, modify, and distribute. - Proprietary: Licensed software with restricted access and modification.

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

Answer: Git allows multiple developers to work on the same project, track changes, merge code, and resolve conflicts efficiently.

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

Answer: Application software improves productivity, automates tasks, supports decision-making, and enhances communication in businesses.

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

Answer: 1. Requirement Analysis 2. System Design 3. Implementation (Coding) 4. Testing 5. Deployment 6. Maintenance

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

Answer: Requirement analysis defines what the software should do. Clear requirements prevent errors, reduce development cost, and ensure user satisfaction.

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

Answer: Software analysis identifies system requirements, defines functionality, and ensures the solution meets business needs before design and coding.

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23. What are the key elements of system design?

Answer: Key elements include architecture, modules, interfaces, data flow, database design, and security considerations.

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24. Why is software testing important?

Answer: Testing ensures the software is free of defects, works as intended, meets requirements, and provides reliability and user satisfaction.

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25. What types of software maintenance are there?

Answer: 1. Corrective: Fixes bugs. 2. Adaptive: Updates software for new environments. 3. Perfective: Improves performance or usability. 4. Preventive: Prevents future issues.

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

Answer: - Web Apps: Accessed via browsers, cross-platform, no installation needed. - Desktop Apps: Installed on devices, faster performance, offline access.

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

Answer: - Accessible from anywhere with internet - No installation required - Easier updates and maintenance - Cross-platform compatibility

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

Answer: UI/UX design improves user experience, ease of use, engagement, and accessibility, making applications more effective and user-friendly.

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

Answer: - Native Apps: Built for a specific platform, fast performance, access to device features. - Hybrid Apps: Cross-platform, built using web technologies, may have lower performance.

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

Answer: DFDs visually represent data flow, processes, and interactions, helping in understanding, analyzing, and designing systems effectively.

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

Answer: - Pros: Fast, offline access, full device resources. - Cons: Platform-dependent, requires installation, updates are manual.

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

Answer: Flowcharts provide a visual representation of logic and processes, making complex problems easier to understand, communicate, and implement.