

Module 1 – Overview of IT Industry-Theory Exercise

1.What is a Program?

Ans-> A **program** is a set of instructions written in a programming language that tells a computer what to do. It's like a recipe that the computer follows step-by-step to perform a task or solve a prob

Ex. **Executed by a computer** to do things like display a webpage, play music, calculate numbers, run a game, etc.

2. What is Programming?

Ans->**Programming** is the process of writing instructions that a computer can follow to perform specific tasks. These instructions are written in a **programming language** like Python, JavaScript, C++, or Java.

->Programming is like giving a set of step-by-step instructions to a computer to tell it what to do.

3.what is key steps in programming process?

Ans -> Understanding the Problem.

-> Planning the Solution.

-> Writing the Code (Implementation).

-> Testing and Debugging.

-> Deployment.

-> Maintenance and Updates.

4. Differences Between High-Level and Low-Level Languages?

Ans->

Feature	High-Level Language	Low-Level Language
Definition	Human-friendly programming language	Hardware-friendly programming language
Abstraction	High – hides hardware details	Low – close to hardware
Ease of Use	Easy to learn and understand	Difficult to understand
Portability	Portable – can run on different systems	Not portable – hardware specific
Execution Speed	Slower due to abstraction	Faster due to direct machine access
Control over Hardware	Limited	Full control
Examples	Python, Java, C++, etc.	Assembly, Machine Code

5.Roles of the Client and Server in Web Communication?

Ans->

Client->The **client** is typically a web browser or an application that initiates communication by sending requests to a server.

Server->The server is a powerful computer or program designed to provide services to other computers. Its main responsibilities include:

6.Function of the TCP/IP Model and Its Layers?

Ans->The TCP/IP model is a foundational framework for internet and network communication that outlines how data is transmitted between devices.

-> Application Layer

-> Transport Layer

-> Internet Layer

-> Network Access Layer

7. Explain Client Server Communication?

Ans-> Client-server communication is a fundamental model in computer networking where a client (a device or program requesting a service) sends a request to a server (a program or device that provides a service), and the server sends a response back to the client. This model is the basis for how most of the internet works, from Browse websites to sending emails.

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

Ans->

Feature	Broadband Internet	Fiber-Optic Internet
Definition	A general term for high-speed internet using various technologies like DSL, cable, or satellite.	A type of broadband that uses fiber-optic cables to transmit data as light.
Technology	Uses copper wires, coaxial cables, or satellite signals.	Uses glass/plastic fiber-optic cables.
Speed	Moderate to high (up to 1 Gbps in some cases).	Very high (1 Gbps to 10 Gbps or more).
Upload/Download	Usually different speeds (asymmetrical).	Usually same speeds (symmetrical).
Latency	Higher latency (slower response time).	Very low latency (fast response time).
Signal Quality	Can weaken over long distances or during peak usage.	Maintains strong signal over long distances.
Reliability	Can be affected by interference or weather (esp. satellite).	Very reliable and stable.
Availability	Widely available, including rural areas.	Less available, mostly in urban or developed areas.

Feature	Broadband Internet	Fiber-Optic Internet
Best For	Basic use like browsing, video streaming, emails.	Heavy use like HD streaming, online gaming, remote work.

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

Ans->

Point	HTTP	HTTPS
• Security	• Data is sent without encryption.	• Data is encrypted using SSL/TLS.
• Privacy	• Vulnerable to eavesdropping.	• Protects against interception and tampering.
• Trust	• No padlock icon in browser address bar.	• Shows padlock icon for secure connection.

10. role of encryption in securing applications

Ans-> Encryption secures applications by converting readable data into unreadable form, ensuring:

- > Confidentiality – Only authorized users can read data.
- > Data in Transit Protection – Secures communication (e.g., HTTPS).
- > Data at Rest Protection – Safeguards stored data (e.g., database, backups).
- > Integrity & Authentication – Prevents tampering and verifies sources.
- > Compliance – Meets legal/security standards.

11. system software vs application software

Ans->

Aspect	System Software	Application Software
Purpose	Runs and manages computer hardware and system tasks	Helps users perform specific tasks
User Interaction	Works in the background	Used directly by the user
Examples	Operating System, Device Drivers, Utilities	MS Word, Web Browser, Media Player
Installation	Pre-installed or comes with the system	Installed by the user as needed
Dependency	Needed for the system to work	Needs system software to run
Access to Hardware	Direct access to hardware	Indirect, through system software

12.significance of modularity in software architecture

Ans->

- > Easy to maintain.
- > Code reuse possible.
- > Easy to scale.
- > Simple testing.
- > Parallel team work.
- > Easy to understand.
- > More reliable system.

13 important layer in software architecture?

Ans->

- > Presentation Layer – User interface, jo user dekhte hain.
- > Business Logic Layer – Rules, calculations, and processing.

- > Data Access Layer – Database read/write handling.
- > Database Layer – Actual data storage.

14. Importance of a Development Environment

Ans->

- > Efficient coding – Provides tools, editors, and syntax highlighting.
- > Debugging support – Helps find and fix errors quickly.
- > Testing capabilities – Allows running and checking code before deployment.
- > Version control integration – Manages code history and teamwork.
- > Consistency – Keeps all developers on the same setup.
- > Productivity – Speeds up development with automation features.
- > Error prevention – Real-time error detection and suggestions.

15.source code vs machine code

Ans->

Point	Source Code	Machine Code
Format	Written in human-readable language.	Written in binary (0s and 1s).
Understandable By	Programmers.	Computer CPU.
Conversion	Needs compilation or interpretation.	Directly executed by CPU.
Example	<code>printf("Hello");</code>	10110000 01100001

16. importance of version control

Ans->

- > Track changes – Keeps history of all code modifications.
- > Collaboration – Multiple developers can work together without conflicts.
- > Backup & recovery – Restore previous versions if something breaks.
- > Conflict management – Handles simultaneous changes in code safely.
- > Accountability – Shows who made which changes and when.
- > Release management – Supports branching and merging for different versions.
- > Improved productivity – Reduces errors and streamlines development workflow.

17. Benefits of Using GitHub for Students

Ans->

- > Free hosting for projects – Students can host repositories at no cost.
- > Version control practice – Learn Git workflows and collaboration.
- > Portfolio building – Showcase projects to employers or colleges.
- > Collaboration skills – Work with peers on group projects.
- > Open-source contribution – Participate in real-world projects.
- > Backup of code – Keep all projects safe online.
- > Learning resources – Access tutorials, code examples, and community support.

18.open source vs proprietary software

Ans->

Point	Open-Source Software	Proprietary Software
Accessibility	Source code is freely available.	Source code is closed and restricted.
Cost	Usually free.	Usually paid.
Modification	Can be modified by anyone.	Cannot be modified without permission.

Examples	Linux, GIMP.	Windows, MS Office.
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19. How Git Improves Collaboration

Ans->

- > Multiple developers work simultaneously – Each can work on separate branches.
- > Version tracking – Every change is recorded with author and timestamp.
- > Merge management – Changes from different developers can be combined safely.
- > Conflict resolution – Detects and helps resolve code conflicts.
- > Code review support – Facilitates pull requests and peer reviews.
- > Backup & recovery – Team can revert to previous versions if needed.
- > Transparency – Everyone can see project history and progress.

20. Role of Application Software in Businesses

Ans->

- > Automates tasks – Reduces manual work and increases efficiency.
- > Improves productivity – Helps employees complete tasks faster.
- > Data management – Organizes, stores, and retrieves business data easily.
- > Communication – Supports email, messaging, and collaboration tools.
- > Decision making – Provides analytics and reporting for informed decisions.
- > Customer relationship management – Manages interactions with clients effectively.
- > Competitive advantage – Streamlines processes, reducing cost and improving service.

21. Main Stages of the Software Development Process (SDLC)

Ans->

- > Requirement Analysis – Understand and document what the users need.
- > Implementation / Coding – Write the actual program code.
- > System Design – Plan the architecture, modules, and data flow.
- > Testing – Check for errors, bugs, and ensure requirements are met.
- > Deployment – Install and release the software for use.
- > Maintenance – Update, fix, and improve the software over time.

22. importance of requirement analysis

Ans->

- > Clear understanding – Identifies exactly what the users need.
- > Reduces errors – Minimizes misunderstandings and mistakes in later stages.
- > Better planning – Helps design and development teams plan resources and timelines.
- > Cost-effective – Prevents costly changes during development.
- > Improves quality – Ensures the final software meets user expectations.
- > Facilitates communication – Bridges gap between stakeholders and developers.
- > Foundation for testing – Provides clear criteria to test the software against.

23.Role of Software Analysis

Ans->

- > Understanding requirements – Converts user needs into detailed functional specifications.
- > Identifying problems – Detects gaps, inconsistencies, and potential issues early.
- > Defining system scope – Determines what the software will and will not do.
- > Improves design – Provides a solid foundation for system architecture and design.

- > Risk management – Helps anticipate and mitigate potential project risks.
- > Resource planning – Guides allocation of time, budget, and manpower effectively.

24.Key Elements of System Design

Ans->

- > Architecture Design – Defines overall system structure and interaction between components.
- > Interface Design – Specifies how different modules and users interact with the system.
- > Data Design – Organizes how data is stored, accessed, and managed.
- > Component Design – Details individual modules and their functionality.
- > Database Design – Plans the database structure, relationships, and constraints.
- > Security Design – Ensures data and system protection against threats.
- > Performance Design – Optimizes system for speed, efficiency, and scalability.

25 Importance of Software Testing

Ans->

- > Detects bugs.
- > Ensures quality.
- > Improves reliability.
- > Saves cost.
- > Enhances user experience.
- > Verifies performance.

26. Types of Software Maintenance

Ans->

- > Corrective Maintenance – Fixing bugs and errors in the software.

-> Adaptive Maintenance – Updating software to work with new environments or platforms.

-> Perfective Maintenance – Improving performance, features, or usability.

-> Preventive Maintenance – Making changes to prevent future issues or failures.

27.Web Application vs Desktop Application

Ans->

Point	Web Applications	Desktop Applications
Location	Runs inside a web browser.	Installed locally on a device.
Point	Web Applications	Desktop Applications
Internet Requirement	Needs internet to function.	Can work offline.
Updates	Updated on server, instantly available to all users.	Requires manual updates on each device.
Accessibility	Accessible from any device with a browser.	Accessible only on the installed device.

28.Advantages of web Application Over Desktop Application

Ans->

-> Accessible anywhere.

-> No installation needed.

-> Works on multiple platforms.

-> Easy updates.

-> Cost-effective.

-> Supports collaboration.

-> Easily scalable.

29.Role of UI/UX Design in Application Development.

Ans->

Point	Native Mobile Apps	Hybrid Mobile Apps
Development	Built for a specific OS using platform-specific languages.	Built using web technologies for multiple OS.
Performance	High performance, optimized for platform.	Slightly lower due to compatibility layers.
Maintenance	Requires separate code for each OS.	One codebase works for multiple platforms.
Examples	Android apps in Kotlin/Java, iOS apps in Swift.	Apps built with Flutter, React Native.

30.Native vs Hybrid Mobile Apps

Ans->

->Native Apps: Built for a specific platform (iOS or Android) using platform-specific languages; offer high performance, better UI/UX, full access to device features, but costlier and need separate development for each platform.

->Hybrid Apps: Built using web technologies (HTML, CSS, JS) wrapped in a native container; cost-effective, single codebase for multiple platforms, easier maintenance, but slightly lower performance and limited access to device features.

31. Significance of DFDs in System Analysis

Ans->

Point	Desktop Applications	Web Applications
Installation	Requires installation on the system.	No installation required.
Platform Dependency	Usually works only on specific OS.	Works on multiple platforms via browser.
Performance	Often faster and can use full system resources.	May be slower, limited by browser capabilities.
Accessibility	Accessible only on installed device.	Accessible anywhere with internet.

32. Pros and Cons of Desktop Applications

Ans->

Pros	Cons
Works offline without internet.	Requires installation on each device.
Often faster and more responsive than web apps.	Platform-dependent, may not work on all OS.
Can utilize full system resources (CPU, GPU, storage).	Updating requires manual effort on each device.
Generally offers better performance for heavy tasks (e.g., video editing, gaming).	Not accessible remotely unless additional setup is done.

33. How Flowcharts Help in Programming and System Design

Ans->

- >Visualizes logic.
- > Simplifies complex processes.
- > Aids planning.
- > Helps detect errors.
- > Improves communication.
- > Acts as documentation.
- > Clarifies decision paths