* **What is A Program ?**
* A Program is a set of instructions that a computer follows to perform a specific

task.

- Programs are written in Programming Languages, and are stored as codes.

- While executing, the program directs the hardware to carry out instructions.

- Every Proper Program has an output or a result.

* **Key Steps of Programming :**
* Programming Involves defining the Problem, Designing a Solution, Coding it, Testing for Errors, and Maintaining the Software after Deployment.
* **Types of Programming Languages :**
* Programming languages include : -

1. Procedural Language like C
2. Object-Oriented Language like Java
3. Functional Language like Haskell
4. Scripting Language like JavaScript
5. Low-Level Languages like Assembly

* **Difference between High-Level and Low-Level Programming Languages :**

|  |  |
| --- | --- |
| High-Level | Low-Level |
| * Easier to Learn and Use. | * More Complex and Harder to Learn. |
| * Highly Portable. | * Less Portable. |
| * Examples :   Python, C++, Java, JavaScript | * Examples :   Assembly Language and Machine Code |

* **World Wide Web & how internet Works :**
* The World Wide Web(WWW) is a system of interlinked Web Pages and Resources accessed via the Internet.
* The Internet is a global network where data travels through routers using protocols like TCP/IP, Connecting Devices instantly across the world.
* **TCP/IP :**

- The Full Form of TCP/IP is, (Transmission Control Protocol/Internet Protocol).

- It is a conceptual framework that defines how data is transmitted across

computer networks, most notably the internet.

- Its primary function is to provide a standardized set of rules & procedures

that allow diverse devices & networks to communicate seamlessly.

* **Client-Server Communication :**
* Client Sends a request > Server Processes it > Server Replies to Client
* It Uses HTTP For Data Exchange.
* It Enables Web & API Interactions.
* **Types of Internet Connections :**

**-> Types of connections availible :**

* DSL,Cable, Fiber, Satellite, and Mobile Broadband, etc,
* 1) Cable :-
* The Cable Internet offers High-Speed, Wide Availibility, etc.
* Some of their cons are Asymmetrical Speeds, Shared Bandwidth, etc.
* 2) DSL :-
* The DSL is Affordable and offers dedicated connection, wide availibility,etc.
* Cons are Slower & Asymmetrical Speeds, and it's dependant on Phone Line
* Quality.
* 3) Mobile Broadband :-
* It offers Quick Setup, Portability, etc.
* It's cons are Higher cost, Variable Performance.
* **Broadband & Fiber-Optic Internet Difference :**
* Broadband is a general term for high-speed internet. Fiber-Optic internet is a specific, high-performance type of broadband. It uses light signals for much faster, more reliable connections than other broadband technologies that rely on copper wires.
* Therefore, fiber is a type of broadband, but not all broadband is fiber.
* **Role of Encryption :**
* Encryption plays a fundamental & critical role in securing applications by transforming readable data into an unreadable format.
* It ensures that even if unauthorized individuals gain access to data, it remains incomprehensible & useless without correct decryption key.
* It’s key benefits are Data Confidentiality, Data Integrity, Regulatory Compliance, etc.
* **Difference between System & Application Software :**
* System Software manages a computer’s hardware and provides a platform for other programs to run. It is the essential foundation, including OS like Windows and MacOS.
* Application Software is designed for specific user tasks such as web Browse or Word Processing, and it relies on system software to function.
* **Significance of modularity in Software Architecture :**
* Modularity in Software Architecture is the practice of breaking a system into smaller, independent components called modules. This simplifies maintainance, allows for concurrent development, and makes code reusable and easier to understand. It’s significant because it helps manage complexity, improves efficiency, and makes software more flexible and scalable.
* **Why are layers important in Software Architecture ?**
* Layers organize software into distinct parts with specific jobs, simplifying development, maintainance, and scalability by isolating concerns. This structured approach ensures a more manageable system.
* **Development Environment in Software Production :**
* A development environment in software production is a workspace equipped with a specific set of tools, configurations and processes that developers use to write, test, debug, and refine code.
* It’s essentially a controlled ‘sandbox’ where software can be built and iterated upon without affecting live systems or end users.