Introduction to Programming language

Summary

In today's session, we will learn in brief about Computer Programming Languages. We will begin with the Operating System and its basic functionalities. We will learn about system software and application software. Further, discuss programming languages and their implementation. We will also learn about computer networks and their different types, along with the basic concept of the internet. We will learn the basic functionality of the Client-Server Model and web application architecture. We will learn about different Programming languages used to design the Web-Applications.

On completion of the session, you will be able to:

- Describe the functioning and role of Operating systems.
- Describe the importance of Programming language.
- Understand the world wide web and the basic terms associated with it.
- Understand the journey of the request on WWW.

Operating System

An Operating System, or OS, is system software that's responsible for handling the basic functionalities of a computer. The OS has control over both the software and hardware resources of a computer. At the core of an operating system is the *kernel* which manages all the interactions between the hardware and software components of a computer.

Functions of an OS

- **Process Management** - When we run a program, the instance of that execution is represented by a process. Operating systems handle the responsibility of managing active processes.
- **Memory Management** - OS is responsible for the management of primary memory stored in RAM to store the information we need to run a process, only needs to be stored temporarily while the application is in use, as well as it is responsible for the management of permanent data stored in hardware like hard disks
- **File Management** - The operating system manages information about individual files as well as the directories they belong in. The OS is also responsible for maintaining file systems by being able to perform tasks such as creating, deleting, renaming, and copying files and/or directories.
- **IO Management** - IO stands for Input/Output and represents the devices used for interaction. The operating system plays a large role in managing IO by ensuring communication between IO hardware and IO software.

- **Multitasking** - this feature allows OS to execute multiple tasks simultaneously improving its working efficiency.
- **Networking** - It is a special function of an operating system that allows users to connect with other computers, devices, and software resources available in the same network.
- **Security** - OS security refers to the processes or measures taken to protect the OS itself from dangers, including viruses, worms, malware, and remote hacker intrusions.

Programming languages

A programming language is a system of notation for a computer or a computing device to perform specific tasks. The term programming language usually refers to high-level languages, such as BASIC, C, C++, Java, Pascal, etc.

Programming languages have some similarities with natural languages but they also have significant differences. Programming languages are defined by rules just as a natural language's grammar defines what is proper English, Spanish, or another language. A program contains statements of different types just as we find in English (or Spanish, etc.) and there also are ways to construct compound statements. Statements in programming languages contain terms and expressions involving terms.

Computer Networks and Internet

A Computer Network is a set of two or more endpoint devices that communicate with each other through a shared medium. In other words, It is a group of connected computers that share data with each other; it can be as simple as two laptops connected by a short cable or as complex as the Internet. The Internet is basically a network of multiple computer networks.

To implement a network, it requires a network interface card (NIC), along with the network operating system (NOS). Computer networks are everywhere we go. Most importantly, they let us quickly exchange ideas and files with each other, allowing us to use resources more efficiently. For example, companies can set up a single network printer accessible by everyone or a single shared storage drive instead of paying for separate storage for each computer.

Types of computer networks
- **Personal area network (PAN)**
  It is the smallest type of network and typically consists of a single wireless modem connecting computers, printers, smartphones, and tablets. Your home network is an example of a PAN.

- **Local area network (LAN)**
  LANs connect many computers and devices that are physically close to each other. Typically, LANs consist of computers located in the same building, or in a small group of buildings

- **Wide area network (WAN)**
  A WAN is essentially a decentralized network that allows groups of people to connect when they're far away. Whenever you connect to the Internet, you're connecting to a wide area network (WAN).
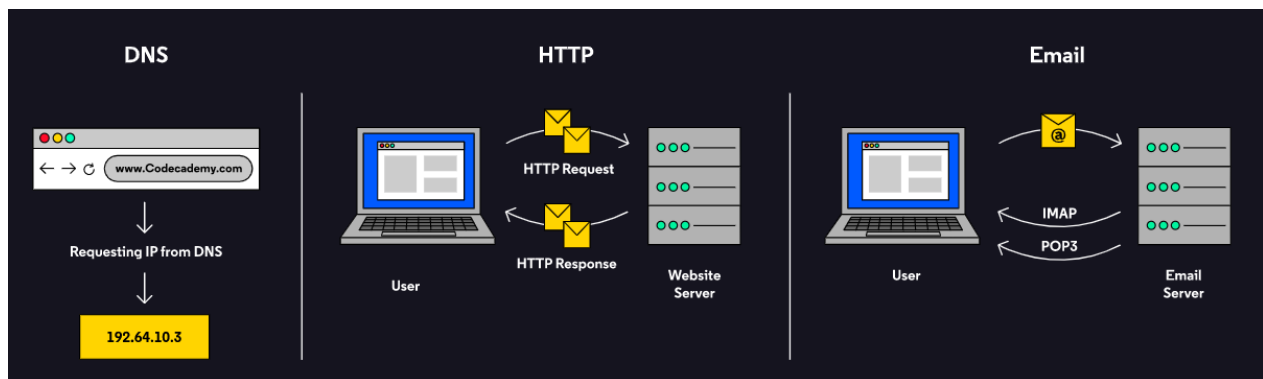
- **Wireless local area network (WLAN)**
  WLANs allow computers to communicate with modems and with each other using a wireless transmitter — no network cables are needed.

Network Protocols

Data travels in a network through network protocols. Network protocols are simply a set of standards for devices interacting on the Internet. Below are a few protocols within the TCP/IP implementation Application layer.

- **DNS:** The Domain Name System (DNS) protocol converts domain names to IP addresses.

- **HTTP:** The HTTP (The HyperText Transfer Protocol) handles our web requests to servers. HTTP uses methods like GET, POST, PUT, and HEAD, to retrieve and send data.

- **IMAP, POP, and SMTP:** IMAP (Internet Message Access Protocol) and POP (Post Office Protocol) allow users to access emails stored on a remote web server. And to send an email, the standard is SMTP (Simple Mail Transfer Protocol).

Reference Material:

- https://www.codecademy.com/courses/operating-systems-introduction/articles/basics-of-operating-systems-article
- https://www.chakray.com/programming-languages-types-and-features/#:~:text=Natural%20languages%20are%20spoken%20by,existence%20of%20a%20basic%20composition