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<title>TutorialPoint</title>

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<frame src = "frame\_3.html ">

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<head>

<title>Header</title>

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}

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<body>

<header>TutorialPoint</header>

</body>

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<html><body>

<ul><li><a href ="Database.html" target="right"><h4>Database</h4></a></li><li><a href ="Computer Networks.html" target="right"><h4>Computer Networks</h4></a></li><li><a href ="Microprocessor.html" target="right"><h4>Microprocessor</h4></a></li><li><a href ="Theory of Computer Science.html" target="right"><h4>Theory of Computer Science</h4></a></li></ul></body></html>

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<u><font color=blue>About Us</font></u>

<p>Tutorials Point originated from the idea that there exists a class of readers who respond better to online content and prefer to learn new skills at their own pace from the comforts of their drawing rooms.

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<body><h1>Computer Networks</h1><br>

A computer network is a system in which multiple computers are connected to each other to share information and resources.

<img src="computer\_networks.jpg" alt="Network of Computers">

<h3>Characteristics of Computer Networking</h3><br>

<ul>

<li>Share resources from one computer to another.</li>

<li>Create files and store them in one computer, access those files from the other computer(s) connected over the network.</li>

<li>Connect a printer, scanner, or a fax machine to one computer within the network and let other computers of the network use the machines available over the network.</li>

</ul><br> <br>

<strong>Network Cables</strong>

Network cables are used to connect computers. The most commonly used cable is Category 5 cable RJ-45.

<img src="network\_cables.jpg"><br>

<strong>Distributor</strong>

A computer can be connected to another one via a serial port but if we need to connect many computers to produce a network, this serial connection will not work.<br>

<img src="network\_distributor.jpg"><br>

The solution is to use a central body to which other computers, printers, scanners, etc. can be connected and then this body will manage or distribute network traffic.<br><br>

<strong>Router</strong>

A router is a type of device which acts as the central point among computers and other devices that are a part of the network. It is equipped with holes called ports. Computers and other devices are connected to a router using network cables. Now-a-days router comes in wireless modes using which computers can be connected without any physical cable.<br>

<img src="network\_router.jpg"><br><br>

<strong>Network Card</strong>

Network card is a necessary component of a computer without which a computer cannot be connected over a network. It is also known as the network adapter or Network Interface Card (NIC). Most branded computers have network card pre-installed. Network cards are of two types: Internal and External Network Cards.<br>

<b>Internal Network Card</b>

Motherboard has a slot for internal network card where it is to be inserted. Internal network cards are of two types in which the first type uses Peripheral Component Interconnect (PCI) connection, while the second type uses Industry Standard Architecture (ISA). Network cables are required to provide network access.<br>

<img src="network\_card1.jpg"><br>

<b>External Network Card</b>

External network cards are of two types: Wireless and USB based. Wireless network card needs to be inserted into the motherboard, however no network cable is required to connect to the network.<br>

<img src="external\_network\_card.jpg"><br>

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<body> <h1>DataBase</h1><br>

Database is a collection of related data and data is a collection of facts and figures that can be processed to produce information.

Mostly data represents recordable facts. Data aids in producing information, which is based on facts. For example, if we have data about marks obtained by all students, we can then conclude about toppers and average marks.

A database management system stores data in such a way that it becomes easier to retrieve, manipulate, and produce information.<br>

<h3>Characteristics</h3>

Traditionally, data was organized in file formats. DBMS was a new concept then, and all the research was done to make it overcome the deficiencies in traditional style of data management. A modern DBMS has the following characteristics -

<ul>

<li>Real-world entity - A modern DBMS is more realistic and uses real-world entities to design its architecture. It uses the behavior and attributes too. For example, a school database may use students as an entity and their age as an attribute.</li>

<li>Relation-based tables - DBMS allows entities and relations among them to form tables. A user can understand the architecture of a database just by looking at the table names.</li>

<li>Isolation of data and application - A database system is entirely different than its data. A database is an active entity, whereas data is said to be passive, on which the database works and organizes. DBMS also stores metadata, which is data about data, to ease its own process.</li>

<li>Less redundancy - DBMS follows the rules of normalization, which splits a relation when any of its attributes is having redundancy in values. Normalization is a mathematically rich and scientific process that reduces data redundancy.</li>

<li>Consistency - Consistency is a state where every relation in a database remains consistent. There exist methods and techniques, which can detect attempt of leaving database in inconsistent state. A DBMS can provide greater consistency as compared to earlier forms of data storing applications like file-processing systems.</li>

<li>Multiple views - DBMS offers multiple views for different users. A user who is in the Sales department will have a different view of database than a person working in the Production department. This feature enables the users to have a concentrate view of the database according to their requirements.

</li>

<li>Security - Features like multiple views offer security to some extent where users are unable to access data of other users and departments. DBMS offers methods to impose constraints while entering data into the database and retrieving the same at a later stage. DBMS offers many different levels of security features, which enables multiple users to have different views with different features. For example, a user in the Sales department cannot see the data that belongs to the Purchase department. Additionally, it can also be managed how much data of the Sales department should be displayed to the user. Since a DBMS is not saved on the disk as traditional file systems, it is very hard for miscreants to break the code.

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<body><h1>Microprocessor</h1><br>

Microprocessor is a <u>controlling unit</u> of a micro-computer, fabricated on a small chip capable of performing ALU (Arithmetic Logical Unit) operations and communicating with the other devices connected to it.

<p>Microprocessor consists of an ALU, register array, and a control unit. ALU performs arithmetical and logical operations on the data received from the memory or an input device. Register array consists of registers identified by letters like B, C, D, E, H, L and accumulator. The control unit controls the flow of data and instructions within the computer.</p><br>

<h3>Block Diagram of a Basic Microcomputer</h3>

<img src="basic\_microcomputer.jpg" ><br>

<h3>How does a Microprocessor works?</h3>

The microprocessor follows a sequence: Fetch, Decode, and then Execute.

<p>Initially, the instructions are stored in the memory in a sequential order. The microprocessor fetches those instructions from the memory, then decodes it and executes those instructions till STOP instruction is reached. Later, it sends the result in binary to the output port. Between these processes, the register stores the temporarily data and ALU performs the computing functions.</p>

<strong>List of Terms Used in a Microprocessor</strong>

<ol>

<li>Instruction Set - It is the set of instructions that the microprocessor can understand.</li>

<li>Bandwidth - It is the number of bits processed in a single instruction.</li>

<li>Clock Speed - It determines the number of operations per second the processor can perform. It is expressed in megahertz (MHz) or gigahertz (GHz).It is also known as Clock Rate.</li>

<li>Word Length - It depends upon the width of internal data bus, registers, ALU, etc. An 8-bit microprocessor can process 8-bit data at a time. The word length ranges from 4 bits to 64 bits depending upon the type of the microcomputer.</li>

<li>Data Types - The microprocessor has multiple data type formats like binary, BCD, ASCII, signed and unsigned numbers.</li>

</ol>

<strong>Features of a Microprocessor</strong>

<ol>

<li>Cost-effective - The microprocessor chips are available at low prices and results its low cost.</li>

Size - The microprocessor is of small size chip, hence is portable.

<li>Low Power Consumption - Microprocessors are manufactured by using metaloxide semiconductor technology, which has low power consumption.</li>

<li>Versatility - The microprocessors are versatile as we can use the same chip in a number of applications by configuring the software program.</li>

<li>Reliability - The failure rate of an IC in microprocessors is very low, hence it is reliable.</li>

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<body><h1>Thoery of Computer Science</h1><br>

Theoretical computer science is a term generally used to refer to parts of the computer science world that are less “hands-on” or demonstrable and more theoretical in nature. IT professionals who discuss theoretical computer science are often talking about some of the more mathematical and esoteric ideas about computing, and some of the more theoretical applications of technologies like algorithms, data structures and cryptography.

<p>One essential part of theoretical computer science is the theory of computation, which handles the use of computational models, for example, algorithms.</p>

<p>A lot of the practical discussion around theoretical computer science contrasts the theoretical side of computer science to the “application” or “programming” side. Professionals ask about whether they should focus on either direct code application or theoretical computer science skills and research. Some ask about whether studying one “side” of computer science makes someone better at the other areas as well. There is debate about the general value of theoretical computer science for some types of job roles. Broadly, theoretical computer science is used to describe that wide spectrum of ideas that are less directly applicable to a particular working programming project.</p>

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