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Program	**BBA**
Semester	**1st SEMESTER**
Course Name	**Computer Fundamentals**
Code	**DBB1105**

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1. a. Define Computers?

b. What are the key characteristics of each generation of computers? Explain

Answer:

A computer is an electronic device that can perform calculations, process data, and communicate with other devices or systems. It can be automated to perform a variety of tasks, from simple calculations to complex operations.

Computers are made up of hardware, which is the physical equipment and components that make up the machine; and software, which is the set of instructions that tell the hardware what to do.

A computer is also used for the purpose of storing data, such as digits, texts, audio, pictures, videos, etc.

1. The First Generation of Computers spanned from 1940 to 1956.
    - The technology on which the first generation computers were built-on was 'vacuum tubes'.
    - They used magnetic tapes and magnetic drums for memory.
    - They used paper tape and punched cards for input and output.
    - They were very slow and heavy plus large in size.
    - Some examples are IBM 650, IBM 701, ENIAC, UNIVAC1, etc.

2. The Second Generation of Computers spanned from 1956 to 1963

- These computers used the technology of ‘transistors’ which replaced the vacuum tubes.
- Along with magnetic tapes & disks, they also used magnetic core for memory.
- They again used paper tape and punched cards for input and output.
- They were smaller in size and consumed less power and produced less heat.
- Some examples are IBM1400 series, PDP-8, UNIVAC 1107, CDC 3600 etc.

3. The Third Generation of Computers spanned from 1964 to 1971
    - During this time, the technology shifted from transistors to integrated circuits (“IC” for short). A single IC could hold many transistors & capacitors built on a thin layer of silicon.
    - Like the previous generations, they used magnetic tapes & disks and magnetic core for memory.
    - For input and output, they used magnetic tapes, monitors, keyboards, printers, etc.
    - This new technology of ICs helped reduce the size of the computers drastically.
    - Some examples are PDP-11, IBM 360, IBM 370, NCR 395, UNIVAC 1108, B6500, etc.

4. The Fourth Generation of Computers were first manufactured in 1971 and its used even today
    - In 1971 the first microprocessors were used. One microprocessor could contain several smaller circuits required to perform arithmetic, logic, and control operations on one single chip.
    - It uses semiconductor memory such as RAM, ROM, etc.
    - For input and output, it uses the mouse, the keyboard, monitor, printer, scanners, etc.
    - They are the size of the desktops and laptops that we have today.
    - Some examples are Intel Pentium Series, IBM PC, STAR 1000, Apple Macintosh, etc.

5. The Fifth Generation Computers are being developed in the present time and it's the future of computers
    - In the present time, Ultra Large Scale Integration (ULSI) technology is used in the design and manufacture of microchips and integrated circuits. It refers to the process of packing millions or billions of transistors and other components onto a single microchip, enabling the creation of highly complex and powerful electronic devices.
    - They use advanced RAMs and ROMs which are of high capacity & speed.
    - For input and output, they use all the technology which the 4^{th}-gen computers use, along with voice recognition, finger print scanners, face recognition, etc.
    - They are reduced to the size of laptops, tablets and mobile phones.
    - Some examples are today's laptops, tablets, smartphones, etc.

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2. Convert (1D7F) 16 to an Octal system number and (5A9.63)16 to a decimal system number.

Answer:

Given below is the table in which the HEX-Digit "1D7F" is represented by its 4 digit Binary-Value.

HEX	BINARY
1	0001
D	1101
7	0111
F	1111

Therefore "$(1D7F)_{16}$ = 1 1101 0111 1111"

Now we have to convert the above binary digits to octal digits using the table below

Binary	Octal
000	0
001	1

010	2
011	3
100	4
101	5
110	6
111	7

$(1D7F)_{16}$ = 1 110 101 111 111

$(1D7F)_{16}$ = 1 6 5 7 7

$(1D7F)_{16}$ = 16577

The answer is $(1D7F)_{16} = (16577)_8$

Given below is the table in which the HEX-Digit "5A9.63" is represented by its Decimal-Value.

HEX	DECIMAL
5	5×16^2
A	10×16^1
9	9×16^0
6	6×16^{-1}
3	3×16^{-2}

The Decimal Number of a Hex Digit is the sum of each digit multiplied by the power of 10.

$(5A9.63)_{16} = (5 \times 16^2) + (10 \times 16^1) + (9 \times 16^0) + (6 \times 16^{-1}) + (3 \times 16^{-2})$

$(5A9.63)_{16} = (1449.38671875)_{10}$

The answer is $(16577)_8 = (1449.38671875)_{10}$

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3. Discuss the advanced formatting options available in MS Word. How would you create a custom template and apply it quickly to slides?

Answer:

There are numerous options provided by Ms-Word for the purpose of formatting text, page, document, etc. For this assignment, I shall be discussing about 2 such advanced formatting features.

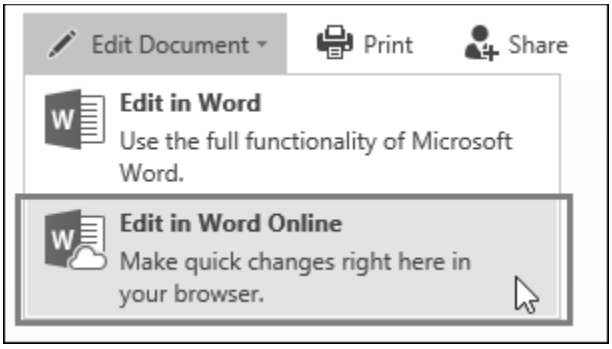
1) How to add footnotes and endnotes
2) How to create A Table Of Content

- How to add footnotes and endnotes

We use footnotes and endnotes as an additional comment or explanation in documents. Footnotes are located at the end of a page and endnotes are located at the end of the document.

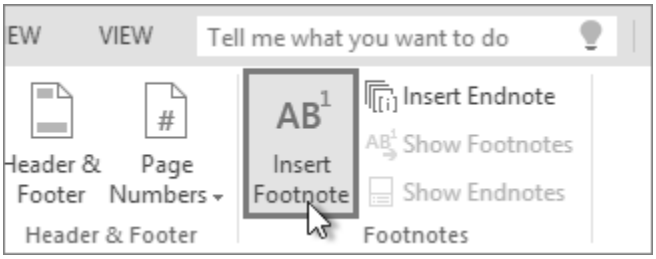
Given below are the steps to add footnotes and endnotes.

Firstly, switch to Editing View if you are in the Reading View, and you can do this by clicking Edit Document.



Adding a footnote -

1. First, select where you want to add the footnote.
2. And then click on Insert > Insert Footnote.

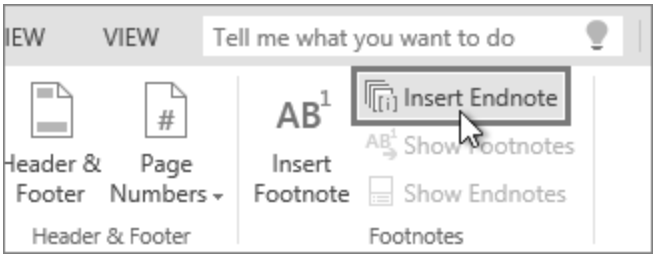


Word inserts a reference mark in the text and adds the footnote mark at the bottom of the page.

3. Type the footnote text.

Add an endnote

1. Click where you want to add the endnote.
2. Click Insert > Insert Endnote.



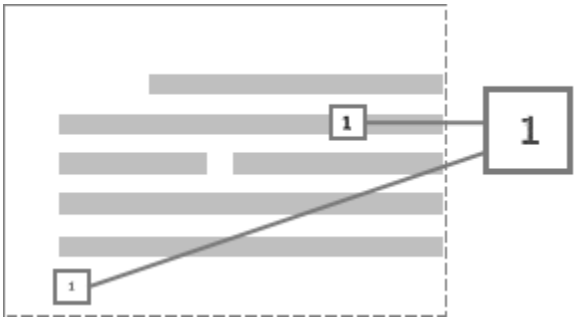
Word inserts a reference mark in the text and adds the endnote mark at the end of the document.

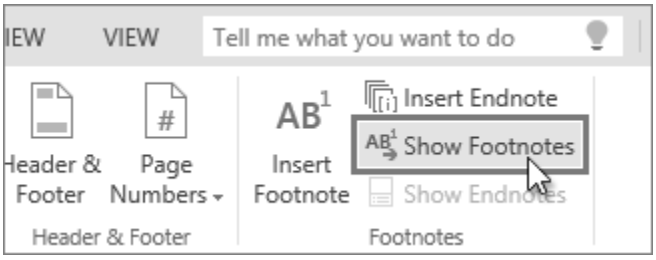
3. Type the endnote text.

Customize your footnotes and endnotes

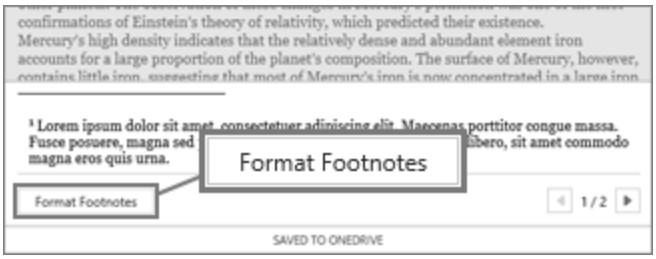
To customize a footnote or endnote:

1. Click the reference number or mark in the body of the text or click Insert > Show Footnotes (for endnotes, click Insert > Show Endnotes).

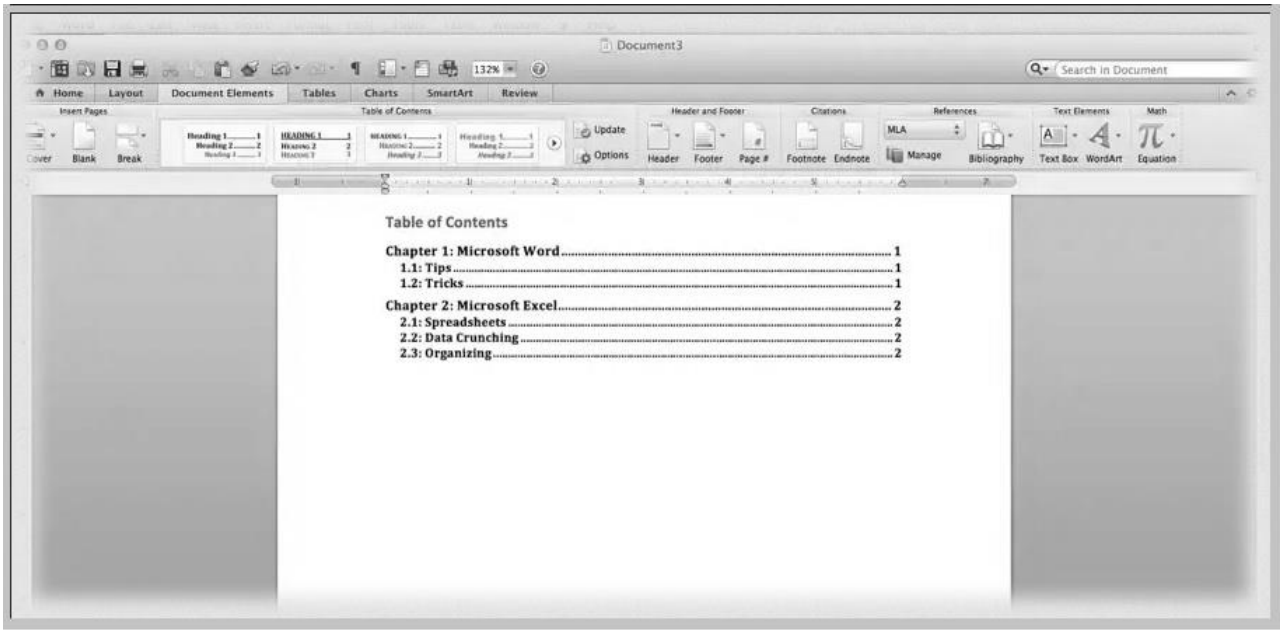




2. In the footnote/endnote view, Select Format Footnotes or Format Endnotes to display from the Format Options dialog. In here we can change the size, font, and indentation of the footnotes or endnotes.



- How to create A Table Of Content

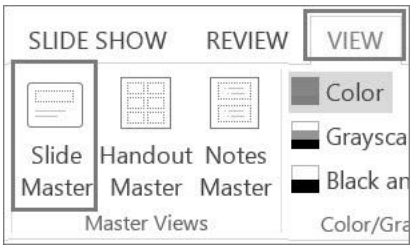


The "Table of Contents" option is available under the References tab in Ms-Word.

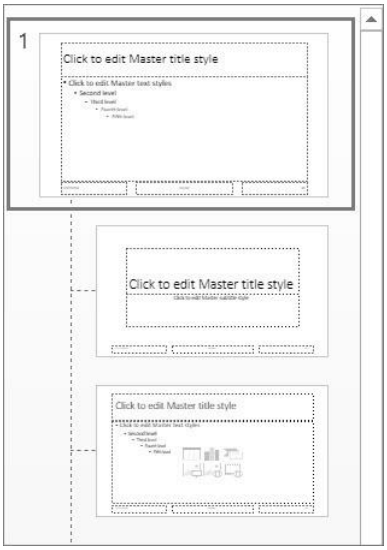
From this tab, we can select which style of Table of Contents we would like to use. If we do not like any of the Ms-Word's default styles, then we can also download other styles from the internet.

Given below are the steps to create a new template and to apply it to a slide in Power Point

1) In Power-Point, open a blank presentation : File > New > Blank Presentation
2) On the Design tab, select Slide Size > Custom Slide Size and choose the page orientation and dimensions you want.
3) On the View tab, in the Master Views group, choose Slide Master.

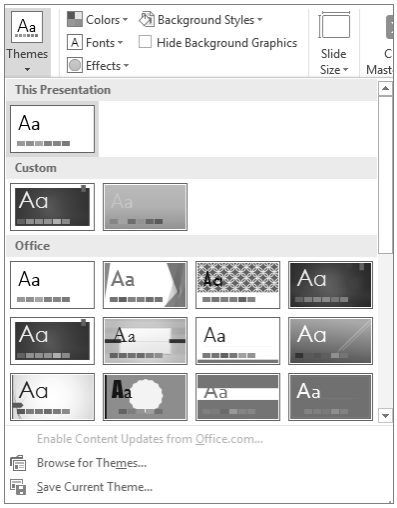


(The slide master is the largest slide image at the top of the slide thumbnail list, to the left of your slides. Associated slide layouts are positioned beneath the slide master.)

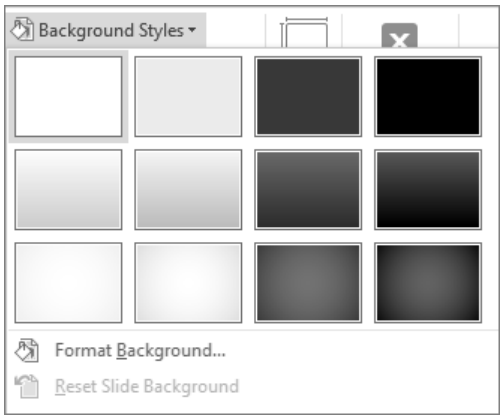


4) To make changes to the slide master or slide layouts, on the Slide Master tab, do any of the following:

    - To add a colorful theme with special fonts and effects, click Themes, and choose a theme from the gallery. Use the scrollbar on the right to see more themes.

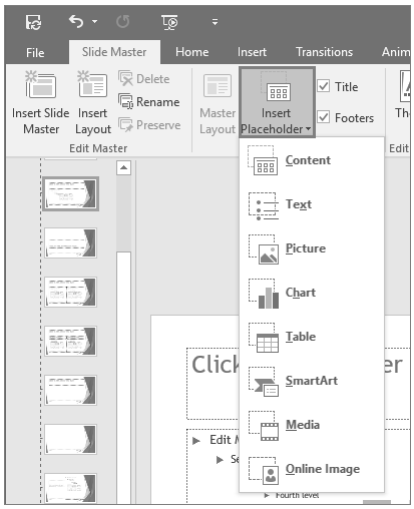


- To change the background, click Background Styles, and choose a background.



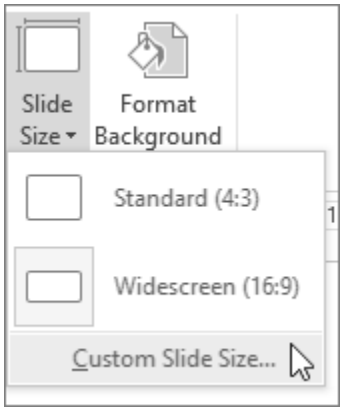
5) To add a placeholder (to hold text, a picture, chart, video, sound, and other objects), in the thumbnail pane, select the slide layout that you want to hold the placeholder, and do the following:

- Click Insert Placeholder, and select the type of placeholder you want to add.

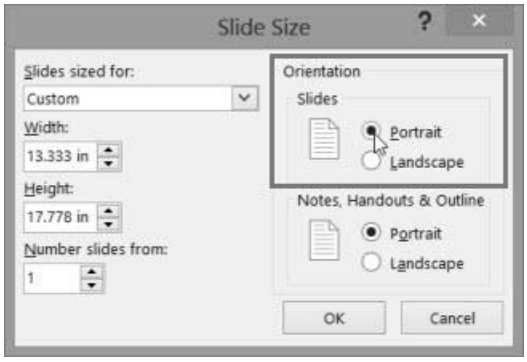


- To move a placeholder around on a slide master or slide layout, select the edge and then drag it into a new position.

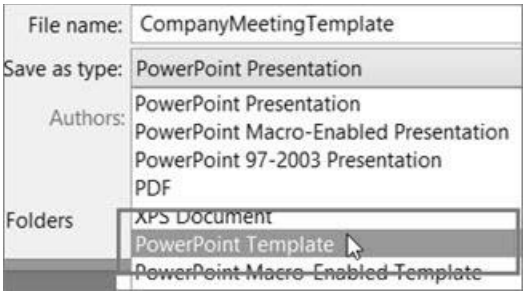
- To remove an unwanted placeholder in a slide master or slide layout, select it in the slide thumbnail pane, and then select the border of the placeholder on the slide and press Delete.
- To set the page orientation for all of the slides in your presentation, click Slide Size > Custom Slide Size.



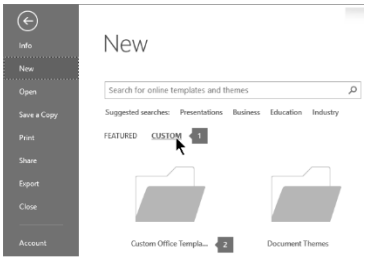
(Under Orientation, choose Portrait or Landscape.)



6) Once the custom template is created, we need to save it as a PowerPoint Template (.potx). For this, in the Save As dialog box, in the Save as type list, choose PowerPoint Template.



7) After all the above steps are completed, now to use your template for a new presentation we need to click File > New. Then click Custom > Custom Office Templates, and then double-click the template that we saved/created.



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4. Explain various design strategies for Software System Design. What are the four quality measures for building software products?

Answer:

When designing a software, there are various factors that we need to take into account such as the product design, the software interface, the core architecture, the data, etc.
And so, in Software Engineering the term 'System Design' generally refers to the methodologies and strategies incorporated to find the best approach in implementing the most optimal solution.

There are three main approaches in implementing System Design. And, they are:

- Structured design is a design approach that emphasizes the use of modularity and hierarchy to organize code into smaller, independent units that can be easily understood, modified, and tested. It is based on the idea that a system should be divided into smaller, self-contained units called modules, which can be combined to form a larger system. Structured design focuses on the functions and processes of a system, rather than the data it manipulates.
- Function-oriented design is an approach to software design that is based on the idea of breaking a system down into small, independent functions that can be combined to perform larger tasks. It is focused on the functionality of a system and the relationships between different functions, rather than the data structures and objects that make up the system.
- Object-oriented design is a design approach that is based on the idea of organizing code around objects and the interactions between those objects. In object-oriented design, a system is modeled as a collection of objects that have specific properties and behaviors, and the relationships between those objects are used to structure the system. Object-oriented design emphasizes the reuse of code through the use of inheritance and polymorphism, and it is a popular approach to software design in many programming languages.

There are two main strategies for Software Design. And they are:

- Bottom-Up Strategy – In this strategy, the design starts with the lowest level subsystems or components, and by using them the next immediate higher-level subsystems or components are created. And this process is repeated until all the subsystems or components are composed into one single complete system.
- Top-Down Strategy – In this strategy, the design is started initially by defining the system as a whole, and is divided into smaller components or subsystems. And each of these subsystems is further divided into much smaller components or subsystems until the lowest level of the system is reached. By doing so, a system hierarchy structure is formed, and the complete software system is considered a single entity.

There are many 'Software Quality Models' and 'Metrics' used to measure the quality of a software. Amongst them, the 4 common software-quality measures are

1) Reliability

    - The Reliability metrics refers to the reliability and stability of the program. It checks if the software is able to provide the expected service at the right time. Reliability can be measured using "Mean Time Between Failure (MTBF)" and "Mean Time To Repair (MTTR)".

2) Performance efficiency

    - The Performance metric measures the performance of the software by analyzing how much time and resource it is utilizing for providing the service. Performance depends upon how its source code is written, the software architecture and the components within like the databases, web servers, etc.

3) Security

    - The Security metric assesses how well the software program protects sensitive information against attackers/hackers. A central concept in security is "vulnerabilities" and poor coding and architectural weaknesses often lead to software vulnerabilities.

4) Maintainability

- The Maintainability metric tells us how easy and manageable the software is when it need to be modified to meet new requirements or adapt to a new environment, how portable it is from one development team to another, etc.

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5. Enlist the main functions of the operating system? Describe various components of operating systems.

Answer:

An Operating System (also called "OS") is a program/software that acts as an interface between the user and the system hardware. It is also the code software which manages the other system software and hardware resources. It handles files, memory, processes, input & output, controls peripheral devices like disk drives and printers, among other things. The operating system is the most important type of system software in a computer system.

We can look at the OS from 2 point of view

- From a "Resource Manager" point of view, the OS manages the different parts of the system.
- From an "Extended Machines" point of view, the OS provides a virtual machine to the users.

The main functions of the operating system are data management, job management, task management and device management.

- In regards to data management, the operating system is responsible for organizing and storing data on the computer's storage devices, such as hard drives and SSDs. This includes tasks such as creating and deleting files, organizing data into directories and folders, and managing access to data by different users and processes.
- In regards to job management, the operating system is responsible for scheduling and executing jobs (also known as processes or tasks) on the computer. This includes tasks such as prioritizing and scheduling the execution of jobs, allocating resources such as CPU time and memory to jobs, and controlling the execution of jobs.
- In regards to task management, the operating system is responsible for managing the execution of tasks within a job. This includes tasks such as managing the

allocation and deallocation of resources, controlling the flow of execution, and providing mechanisms for synchronizing and communicating between tasks.

- In regards to device management, the operating system is responsible for controlling access to and managing the operations of hardware devices such as printers, keyboards, and disk drives. This includes tasks such as detecting the presence of new devices, allocating resources to devices, and controlling the flow of data to and from devices.

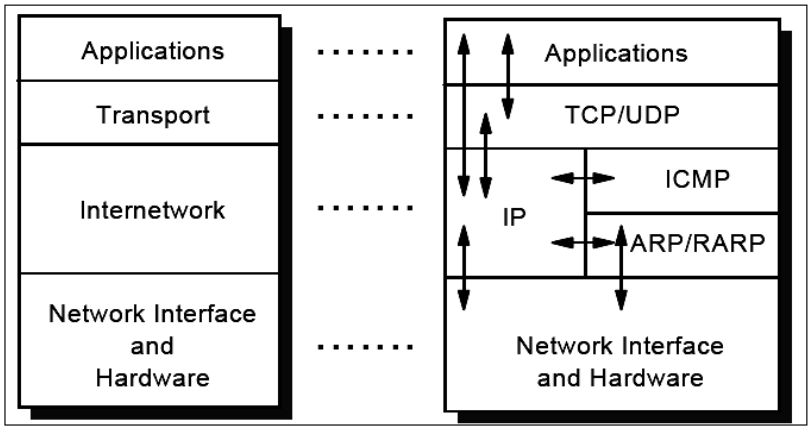
The main components of the operating system are

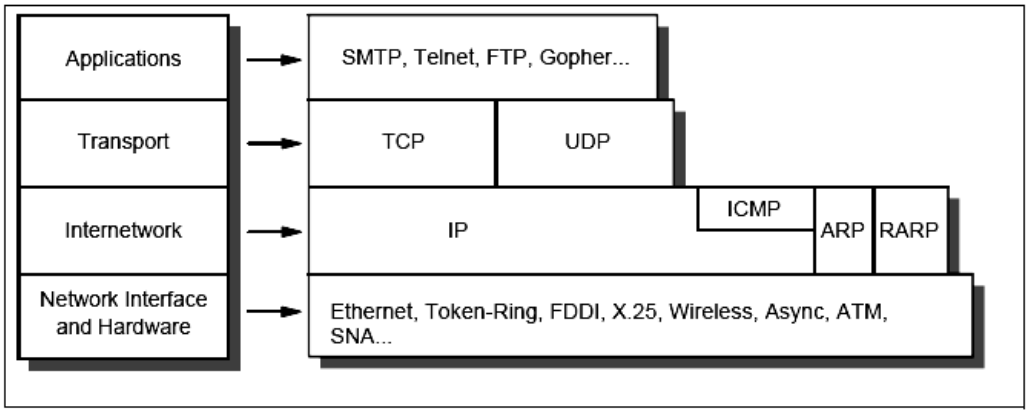
- Process Management – It is a component that manages all the processes that run simultaneously on the operating system which range from user programs to system programs.
- Main-Memory Management – This component of the OS manages the Random Access Memory (RAM). When a computer program is executed, it is stored temporarily in the main memory for execution.
- File Management – This feature of the OS enables the computer to store/save the data normally organized into directories to ease their use. It is also responsible for organizing and managing data files.
- I/O System Management – The I/O device management component hides the details of hardware devices from the application programmer. It also provides and manages custom drivers for particular hardware devices.
- Secondary-Storage Management – The secondary-storage is used to store data permanently with the use of hard-disk/SSD, USB flash drive, CD/DVD, etc.
- Network Management - The network manager is a component of an operating system that is responsible for managing the network connectivity of a device. It is responsible for configuring and controlling the network interfaces of a device, such as Ethernet and Wi-Fi adapters, and for connecting the device to networks and the internet.
- Security Management - The security mechanisms in an operating system controls the access of programs, processes, or users to the restricted resources.
- Command Interpreter System – It enables the user to interact with the OS using a command-line interface where the user can enter commands to be executed. It is one of the most important components of the OS.

6. Discuss the TCP/IP protocol layers with the help of a diagram. Explain how the internet works

Answer:

The TCP/IP model (Transmission Control Protocol/Internet Protocol) is a framework for networking that defines how devices on a network communicate with each other. It is a set of protocols (rules and standards) that govern the transmission of data over the internet and other networks.





The TCP/IP Model contains four layers. They are -

1. The application layer: This is the top layer of the TCP/IP model and is responsible for providing the interface between the network and the applications that use it. It includes protocols for common network services, such as email (Simple Mail Transfer Protocol, or SMTP), file transfer (File Transfer Protocol, or FTP), and web browsing (Hypertext Transfer Protocol, or HTTP). This layer is the most visible to end users, as it provides the means for them to interact with the network and access the various services it offers.
2. The transport layer: This layer is responsible for providing reliable communication between devices on the network. It includes the TCP and UDP protocols, which are used to segment and reassemble data into packets and to ensure that data is delivered to its destination without errors. TCP is a connection-oriented protocol that establishes a reliable, end-to-end connection between two devices and ensures that all data is delivered correctly. UDP is a connectionless protocol that does not establish a connection and does not guarantee the delivery of data. It is used for real-time applications that require low latency, such as online gaming and voice over IP (VoIP).
3. The internet layer: This layer is responsible for routing data between devices on the network. It includes the IP protocol, which is used to identify the source and destination of each packet and to route it to its destination through a series of interconnected networks. IP addresses are unique numerical identifiers assigned to each device on the network, and they are used to route packets to their destination. The internet layer also includes the Internet Control Message Protocol (ICMP), which is used to communicate network-level information, such as error messages and status messages.
4. The network interface layer: This is the bottom layer of the TCP/IP model and is responsible for physically transmitting data over the network. It includes protocols for different types of physical media, such as Ethernet and Wi-Fi. The network interface layer is responsible for sending and receiving data at the hardware level, using the appropriate protocols and hardware interfaces.

The workings of the internet –

The internet is a global network of interconnected computers, servers, and other devices that communicate with each other using a variety of protocols and technologies. It allows people to share information and communicate with each other across long distances and in real-time.

Here's a brief overview of how the internet works:

1. When you access the internet, you connect to a network using a device such as a computer, smartphone, or tablet.
2. Your device sends a request to a server, which is a computer that stores and manages information.
3. The server receives your request and responds by sending the requested information back to your device.
4. Your device receives the information and displays it to you, either as a website, an app, or some other form of content.

To make this process possible, the internet relies on a number of technologies and protocols. For example, the Hypertext Transfer Protocol (HTTP) is used to send and receive information over the internet, and the Domain Name System (DNS) is used to translate human-readable domain names (e.g., google.com) into numerical addresses that computers can understand.

The internet is made up of millions of interconnected networks, each with its own set of servers and devices. These networks are connected to each other using a variety of technologies, such as fiber optic cables and satellite connections.
