

B.Sc. 2nd Semester

Computer Networks & Internet technologies

1. What do you mean by computer network?

Ans: A computer network consists of two or more autonomous computers that are linked or connected together. The term autonomous implies that the computers can function independent of others. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

2. Explain briefly about LAN, Man and WAN.

Ans: Computer networks are classified according the area they are localized in as follows:

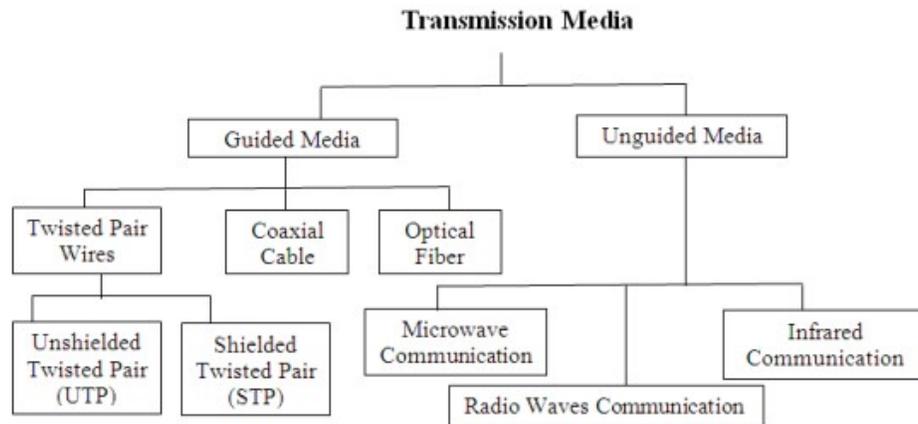
(i) Local Area Network (LAN) The network that spans a relatively small area that is in the single building or campus in known as Local Area Network.

(ii) Metropolitan Area Network (MAN) The type of computer network that is designed for a city or town is known as Metropolitan Area Network.

(iii) Wide Area Network (WAN) A network that covers a large geographical area and covers different cities, states and sometimes even countries, is known as Wide Area Network.

3. Explain briefly about different types of guided media in computer networks.

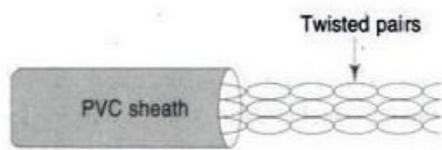
Ans: Guided media are those that provide a channel from one device to another. Here we consider three guided Medias, twisted pair cable, coaxial cable and fiber optic cable.



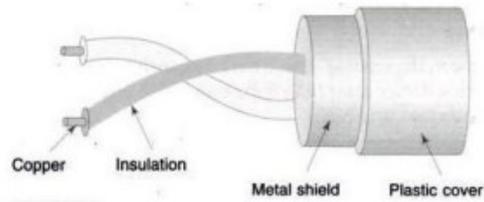
Twisted Pair Cable : A twisted pair cable consists of two insulated copper wires. Typically, the thickness of each wire is 1 mm. One of the wires is used to carry signals to the receiver, and the other is used only as a ground reference. The receiver uses the difference between the two. The wires are twisted together in a helical form. The twisting of wires reduces the electrical interference. The bandwidth depends on the thickness of the wire and the distance travelled, but several megabits/sec can be achieved for a few kilometres in many cases.

Twisted pair cable is available in two forms:

- Unshielded twisted pair (UTP) cable
- Shielded Twisted Pair (STP) cable.



Unshielded twisted pair (UTP)



Shielded Twisted Pair (STP)

Coaxial Cable Coaxial cable carries signals of higher frequency ranges than twisted pair cable. The coaxial cable has a central core conductor of solid usually copper enclosed in an insulating sheath, which is encased in an outer metallic conductor. The outer metallic wrapping not only serve as a shield against noise but it also act as a second conductor, which completes the circuit. Coaxial Cable Coaxial cables are categorized by their radio government (RG) ratings as shown below, Category Impedance Use RG 59 75 Ω Cable TV RG 58 50 Ω Thin Ethernet RG 11 50 Ω Thick Ethernet Categories of coaxial cables The most common type of connector used today is the Bayone-Neill-Concelman (BNC).

Advantages

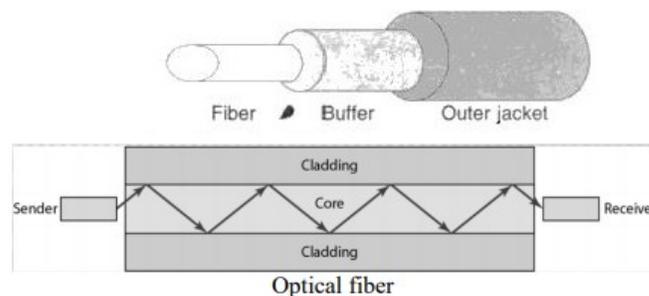
- Higher bandwidth
- 400 to 600Mhz
- up to 10,800 voice conversations
- Can be tapped easily (pros and cons)
- Much less susceptible to interference than twisted pair

Disadvantages

- High attenuation rate makes it expensive over long distance
- Bulky

Optical Fiber

An optical fiber is a thin, flexible medium capable of conducting optical rays. Optical fibers use reflection to guide light through a channel. In optical fibers, a cladding of less dense glass or plastic surrounds a glass or plastic core. Due to the difference between the density of core and cladding, the light moving through the core is reflected off the cladding instead of being refracted into it.



Advantages :

- greater capacity (bandwidth of up to 2 Gbps)
- smaller size and lighter weight
- lower attenuation
- immunity to environmental interference
- highly secure due to tap difficulty and lack of signal radiation

Disadvantages:

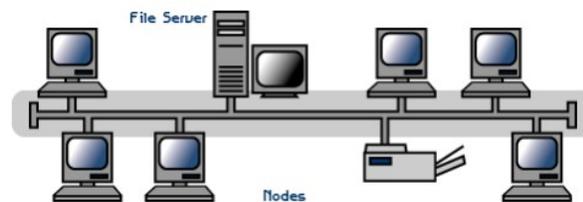
- expensive over short distance
- requires highly skilled installers
- adding additional nodes is difficult

4. What do you mean by Network Topology? Explain various network topologies.

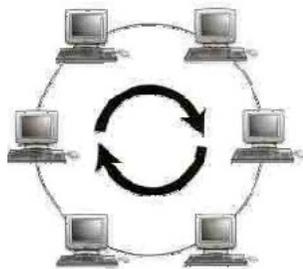
Ans: A topology is usually schematic description of the arrangement of a computer in a network.

There are six basic topologies:

Bus Topology : All devices are connected to a central cable, called the bus or backbone. Bus networks are relatively inexpensive and easy to install for small networks. Ethernet systems use a bus topology. Bus topology is also



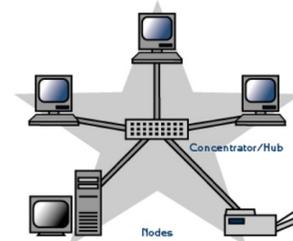
known as linear topology. In this architecture connects all nodes to a single bus using tap. A tap is a connector that connects the nodes with the metallic core of the bus. Terminators are using both ends of the bus to stop reflection of signal. A device wanting to communicate with another device on the network sends a broadcast message onto the bus that all other devices see, but only the intended recipient actually accepts and processes the message.



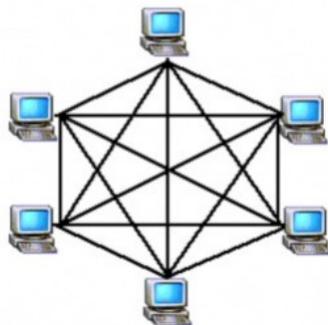
Ring Topology : A ring network is a standard circular topology in which each link or computer is connected directly to another two

'either-side' of it. A token is used to control which computer can transmit at any one time. Data is transmitted around the ring in one direction only; each station passing on the data to the next station till it reaches its destination.

Star Topology: A star topology operates from a central hub which acts as a base and transmits messages throughout the network. This helps reduce the number of failures within the



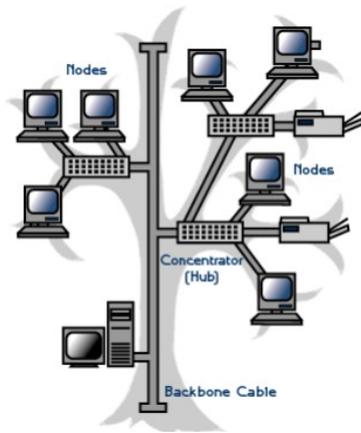
network, as all external nodes connect only to the central hub, which rejects any bad transmissions, only individual stations are likely to be affected. This is referred to as an 'isolation of devices'.



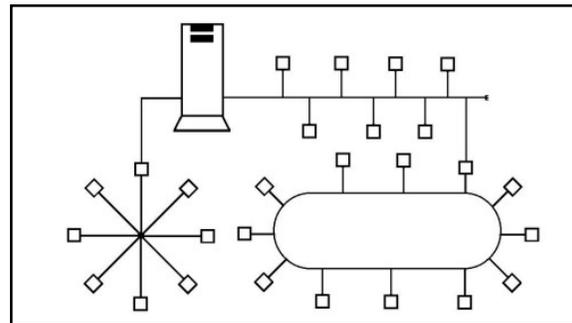
Mesh Topology : In this topology each node is connected to every other node. Two nodes are connected by dedicated point-point links between them. So the total number of links

to connect n nodes = $n(n-1) / 2$; this also means that every node must have $(n-1)$ Input/Output ports. With this topology there is no need to provide any additional information, which is from where the packet is coming, along with the packet because two nodes have a point-point dedicated link between them. And each node knows which link is connected to which node on the other end.

Tree Topology : This topology can be considered topology but the nodes are connected to the secondary hub, which in turn is connected to the central hub. In this topology group of star configured networks are connected to a linear bus backbone.



Hybrid Topology : Hybrid, as the name suggests, is mixture of two different things. Similarly in this type of topology we integrate two or more different topologies to form a resultant topology which has good points(as well as weaknesses) of all the constituent basic topologies rather than having characteristics of one specific topology. Hybrid topologies are becoming quite common today as corporations continue to link their internal LANs together while adding external networks to the mix via wide area networks (WANs). This topology description usually refers to a collection of networks. For example, if there exists a ring topology in one office department while a bus topology in another department, connecting these two will result in Hybrid topology.



5. What is protocol?

Ans: The protocol defines a common set of rules which are used by computers on the network that communicate between hardware and software entities. One of the most popular protocols for LANs is the Ethernet. Another popular LAN protocol for PCs is the token ring network.

6. What is SMTP?

Ans: SMTP stands for "Simple Mail Transport Protocol".

An SMTP server performs two functions:

1. Verifies proper configuration and grants permission to a computer attempting to send a message.
2. Sends an outgoing message to a predefined destination and tracks the successful delivery of the message. If it is not deliverable, a message is sent back to the sender.

7. What is ISP?

Ans: The term Internet service provider (ISP) refers to a company that provides access to the Internet to both personal and business customers. ISPs may also provide other services such as email services, domain registration, web hosting, and browser services. Some common ISP in India is BSNL, Airtel, Jio etc.

8. What is FTP?

Ans: File Transfer Protocol (FTP): A member of the TCP/IP suite of protocols, used to copy files between two computers on the Internet. Both computers must support their respective FTP roles: one must be an FTP client and the other an FTP server.

9. What is www?

Ans: The World Wide Web and commonly known as the Web, is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them via hyperlinks. The Web was created to address information distribution problems on the Internet. Until the creation of the Web, almost all information distribution was accomplished through email, FTP, Archie, and Gopher. The World Wide Web is a system that makes exchange of data on the Internet easy and efficient.

10. What is URL?

Ans: Uniform Resource Locator An address that uniquely identifies a location on the Internet. A URL for a World Wide Web site is preceded with `http://`, as in the fictitious URL `http://www.example.microsoft.com/`. A URL can contain more detail, such as the name of a page of hypertext, usually identified by the file name extension `.html` or `.htm`.

11. What is switch?

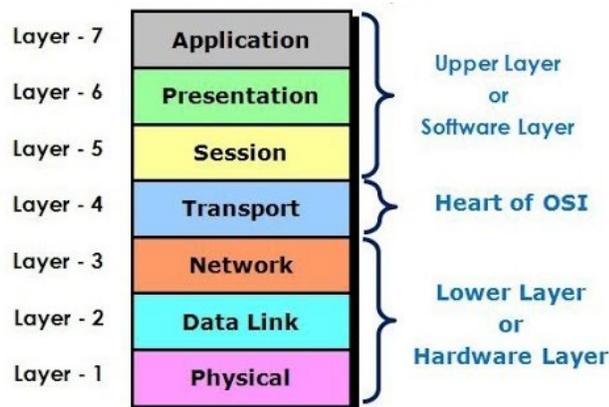
Ans: A network switch connects devices such as computers, printers access points in a network to each other, and allows exchanging data packets. Switches can be hardware devices that manage physical networks, as well as software-based virtual devices.

12. What is router?

Ans: The router is a physical or virtual internetworking device that is designed to receive, analyze, and forward data packets between computer networks. There are various types of routers in networking such as Wireless Router, Brouter, Core router, Edge router: etc.

13. Briefly explain the OSI reference model.

Ans: OSI reference model is a short name for the Open Systems Interconnection (OSI) reference model for networking. This theoretical model explains how networks behave within an orderly, seven-layered model for networked communication.



There are seven layers in Open System Interconnection (OSI) reference model which are explained below:

(1) **Application Layer (Layer 7)** The application layer is the top layer and it defines the language and syntax that program use to communicate with other programs. The application layer

represents the purpose of communicating in the first place. For example, a program in a client workstation uses commands to request data from a program in the server. Common functions at this layer are opening, closing, reading and writing files, transferring files and email messages, executing remote jobs and obtaining directory information about network resources, etc.

(2) Presentation Layer (Layer 6) The presentation layer performs code conversion and data reformatting (syntax translation). It is the translator of the network; it makes sure the data is in the correct form for the receiving application. When data are transmitted between different types of computer systems, the presentation layer negotiates and manages the way data are represented and encoded. This layer is also used for encryption and decryption. It also provides security features through encryption and decryption.

(3) Session Layer (Layer 5) The session layer decides when to turn communication on and off between two computers. It provides the mechanism that controls the data exchange process and coordinates the interaction (communication) between them in an orderly manner. It sets up and clears communication channels between two communicating components. It determines one way or two way communications and manages the dialogue between both parties; for example, making sure that the previous request has been fulfilled before the next one is sent. It also marks significant parts of the transmitted data with checkpoints to allow for fast recovery in the event of a connection failure.

(4) Transport Layer (Layer 4) The transport layer is responsible for overall end to end validity and integrity of the transmission i.e. it ensures that data is successfully sent and received between two computers. The lower data link layer is only responsible for delivering packets from one node to another. Thus if a packet gets lost in a router somewhere in the enterprise internet, the transport layer will detect that. This layer acts as an interface between the bottom and top three layers.

(5) Network Layer (Layer 3) This network layer establishes the route between the sending and receiving stations. The unit of data at the network layer is called a packet. It provides network routing and flow and congestion functions across computer network interface. The network layer establishes, maintains, and terminates logical and physical connections. The network layer is responsible for translating logical address, or names into physical address. The main device found at the network layer is a router.

(6) Data Link Layer (Layer 2) The data link layer groups the bits that we see on the physical layer into frames. It is primarily responsible for error free delivery of data on a hop. The data link layer is split into two sub-layers i.e. the logical link control and media access control. The data link layer handles the physical transfer, framing, flow control and error control functions over a single transmission link. The main network device found at the data link layer is a bridge.

(7) Physical Layer (Layer 1) The data units on this layer are called bits. This layer defines the mechanical and electrical definition of the network medium or cable and network hardware. This includes how data is impressed onto the cable and retrieved from it. The physical layer is responsible for passing bits onto and receiving them from the connecting medium. This layer gives the data link layer its ability to transport a stream of serial data bits between two communicating systems; it conveys the bits that move along the cable. The main network device found in physical layer is a repeater.

14. Define Internet, Intranet and Extranet.

Ans: Internet is a global system of interconnected computer networks that use standard internet protocol suite to link several devices worldwide. It is an international network of

networks, linked by optical, wireless and electronic networking technologies which consists of business, public, educational and government networks.

An **intranet** is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the wide area network.

An **extranet** is a private network that uses Internet technology and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses.

15. Differentiate between internet and intranet.

Ans:

INTERNET	INTRANET
Simultaneously link computers on different network / global network	Owned by local or private organisations / companies
Support multiple users	Users are limited
Unsafe, not protected	Protected and secured
It's a public network with more traffic	A private network and traffic is less
Can transfer unlimited data	Can transfer only limited data
Can be widely accessed and used	Company or organisation employees or admin with access to login details can only use this
More data or information can be accessed or availed	Data or information accessible over intranet will be limited and specific to the company records or details

16. What is e-commerce?

Ans: E-Commerce refers to any form of business transaction conducted online. The most popular example of e-Commerce is online shopping, which is defined as buying and selling of goods via the internet on any device.

17. What do you mean by video conferencing?

Ans: Video conferencing is a technology that allows users in different locations to hold real-time face-to-face meetings, often at little to no cost. There are many ways to utilize video conferencing technology, such as company meetings, job training sessions, or addressing board members. Video conferencing saw a huge boost amid the global COVID-19 pandemic.

18. Explain various features of HTML.

Ans: Various Features of HTML:

1. It is the language which can be easily understood and can be modified.
2. Effective presentations can be made with the HTML with the help of its all formatting tags.
3. It provides the more flexible way to design web pages along with the text.
4. Links can also be added to the web pages so it helps the readers to browse the information of their interest.
5. You can display HTML documents on any platforms such as Macintosh, Windows and Linux etc.
6. Graphics, videos and sounds can also be added to the web pages which give an extra attractive look to your web pages.

19. What do you mean by www?

Ans: World Wide Web is the mechanism originally developed by Tim Berners-Lee for CERN physicists to be able to share documents via the internet. The web allows computer users to

access information across systems around the world using URLs to identify files and systems and hypertext links to move between files on the same or different systems.

20. What is webpage? What is website?

Ans: A web page or webpage is a document, commonly written in HTML, that is viewed in an Internet browser and a website means collection of several WebPages.

21. What do you mean by web server?

Ans: Web server can refer to either the hardware (the computer) or the software (the computer application) that helps to deliver web content that can be accessed through the Internet. The primary function of a web server is to deliver web pages on the request to clients using the Hypertext Transfer Protocol (HTTP). A Web server is a program that, using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP), serves the files that form Web pages to Web users. Every computer on the Internet that contains a Web site must have a Web server program. Two leading Web servers are Apache, the most widely-installed Web server, and Microsoft's Internet Information Server (IIS).

22. What is search engine?

Ans: A search engine is a web-based tool that enables users to locate information on the World Wide Web. Popular examples of search engines are Google, Yahoo!, and MSN. Search engines provide users with search results that lead to relevant information on high-quality websites. if any information required and we don't know the proper URL , we can search those information with the help of Search Engines, like Google, Yahoo etc.

23. Explain domain name with example.

Ans: A domain name is basically a Web site address.

For example,

www.dibru.ac.in" is the domain name of the Dibrugarh University Web site.

www.google .com is the domain name of Google.

24. Name any two web designing tool.

Ans: 1. Dreamweaver 2. Bootstrap

25. Write HTML code to insert an image.

Ans:

26. Write HTML code to create 3 rows and 3 columns.

Ans:

```
<table>
  <tr>
    <th>Sl No.</th>
    <th>Name</th>
    <th>Class</th>
  </tr>
  <tr>
    <td>1</td>
    <td>Jyoti Gogoi </td>
    <td>BA 1st SEM </td>
  </tr>
  <tr>
    <td>2</td>
    <td>Anand Sharma</td>
    <td>BA 2nd SEM</td>
  </tr>
```

```
</tr>
</table>
```

27. What is CSS? Explain different types of css ?

Ans: CSS, or Cascading Styles Sheets, is a way to style and present HTML. Whereas the HTML is the meaning or content, the style sheet is the presentation of that document.

Types of CSS:

- **Inline CSS**
- **Internal CSS**
- **External CSS**

In-line

In-line styles are writing straight into the HTML tags using the style attribute.

They look something like this:

```
<p style="color: red">text</p>
```

Internal

Embedded, or internal, styles are used for the whole page. Inside the head element, the style tags surround all of the styles for the page.

```
<!DOCTYPE html>

<html>
<head>
<title>CSS Example</title>
<style>
  p {
  color: red;
  }
  a {
  color: blue;
  }
  h1{
  color: green;
  }
</style>
```

External

External styles are used for the whole, multiple-page website. There is a separate CSS file, which will simply look something like:

```
p {
color: red;
}
a {
color: blue;
}
```

If this file is saved as "style.css" in the same directory as your HTML page then it can be linked to in the HTML like this:

```
<!DOCTYPE html>
<html>
<head>
<title>My first web page</title>
<link rel="stylesheet" href="style.css">
</head>
```

28. What do you mean by data type?

Ans: In Computer Programming data types are used to identify the type of data a memory location can hold and the associated operations of handling it.

29. What do you mean by event in java script?

Ans: JavaScript's interaction with HTML is handled through events that occur when the user or the browser manipulates a page. When the page loads, it is called an event. When the user clicks a button, that click too is an event. Other examples include events like pressing any key, closing a window, resizing a window, etc.

30. Write a JavaScript code to find the sum of three numbers?

Ans:

```
<HTML>
<HEAD>
<TITLE>Add three numbers</TITLE>
<SCRIPT>
function addThreeNums (inOne, inTwo, inThree) {
var inOne = Number(inOne);
var inTwo = Number(inTwo);
var inThree = Number(inThree);
return Number(inOne + inTwo + inThree);
}
</SCRIPT>
</HEAD>
<BODY>
<FORM Name="theForm">
<INPUT Type=Text Name="num1">
<INPUT Type=Text Name="num2">
<INPUT Type=Text Name="num3">
<INPUT Type=Button Value="Add Them"
onClick='document.write("The sum of the three numbers is " +
addThreeNums(theForm.num1.value,theForm.num2.value,theForm.num3.value));'>
</FORM>
</BODY>
</HTML>
```