COMPUTER NETWORKING

- **Define Network :-** A network is a set of devices connected by physical medial links . A network is recursively is a connection of two or more nodes by a physical link or two or more network connected by one by one or more nodes .
- **What is a Link :-** At the lowest level , a network can consist of two or more computers directly connected by same physical medium such as **coaxial cable** or **optical fiber** . such a physical medium is called as link .
- **What is a Node:-** A network can consist of two or more computer directly connected by some physical medium such as **coaxial cable** or **optical fiber** . Such a physical medium is called as Links and the computer it connect is called as nodes .
- **What is a Gateway or Router :-** A node that is connected two or more network is commonly called as Router or Gateway . It generally forwards message from one network to another .
- **What is Point to Point link :-** If the physical links are limited to a pair of nodes it is said to be point to point link .
- **What is Multiple Access :-** If the physical links are shared by more than two nodes , it is said to be multiple Access.
- **What are the advantage of Distributed Processing :-**
  - **i)** Security / Encapsulation
  - **ii)** Distributed Data-base
  - **iii)** Faster Problem Solving (FPS)
  - **iv)** Security Through Redundancy
  - **v)** Collaborative Processing

- **What are the criteria necessary for an effective and efficient network :-**
  - **a.) Performance :-** It can be measured in many ways , including transmit time and response time .
  - **b.) Reliability:-** It is measured by frequency of failure , the time it takes a link to recover from a failure , and the network's robustness .
  - **c.) Security :-** Security issues includes protecting data from unauthorized access and virus .

- **Name the factors that affect the performances of the network :-**
  - **a.) Numbers of users**
  - **b.) Type of transmission medium**
  - **c.) Hardware**
  - **d.) Software**

- **Name the factors that affect the reliability of the network :-**
  - **a.) Frequency of failure**
  - **b.) Recovery time of a network after a failure .**
- **Name the factors that affect the security of the network :-**
  - **a.) Unauthorized Access**
  - **b.) Viruses**
- **What is Protocol:-** A protocol is a set of rules that govern all aspects of information communication .
- **What are the key elements of Protocol**s:-

  The key elements of protocol are :-
  - **a.)** Syntax :- it refers to the structure or format of the data , that is the order in which they are presented .
  - **b.)** Semantics :- It refers to the meaning of each section of bits .
  - **c.)** Timing :- Timing refers to two characteristics: When data be sent how fast they can be sent .
- **What are the design issues of a Computer Network :-**
  - **a.) Connectivity**
  - **b.) Cost-effective Resources sharing**
  - **c.) Support for common services**
  - **d.) Performance**

- **Define Band-Width and Latency :-** Network performance is measured in Band-With (Throughput) and Latency (Delay)

  - **a.) Band-With :-** Band-width of a network is given by the number of bits that can be transmitted over the network in a certain period of time .
  - **b.) Latency :-** Latency corresponds to how long it takes a message to travel from one end off a network to the other . it is strictly measured in the terms of time .

- **Define Routing :-** The process of determining systematically hoe to forward messages towards the destination nodes based on it's address is called routing .

- **What is a peer-peer process :-** The process on each machine that communication at a given layer are called peer-peer process.

- **What is a Round Trip-Time :-** The duration of time it takes to send a message form one end of a network to the other and back , is called RTT .

- **When a Switch is said to be congested :-** It is possible that a switch receives packet's faster than the shared link can accommodate stores in its memory , for an extended period of time , then the switch will eventually run out of buffer space , and some packets will have to be dropped and in this is said to congested state .

- **What is semantic gap :-** Defining a useful channel involves both understanding the application requirements and recognizing the limitations of the underlying technology . The

gap between what application expects and what the underlying technology can provide is called semantic gap .

- **Define the terms Unicasting ,Multicasting and Broadcasting :-**

  a.) **Unicasting :-** If the message is sent from a source to a single destination node , it is called unicasting .
  b.) **Multicasting :-** If the message is send to some subset of other nodes , it is called multicasting .
  c.) **Broadcasting :-** If the message is sent to all the M nodes in the network . It is called broadcasting .

- **What is Multiplexing :-** It is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link .

- **Name the categories of multiplexing :-**

  a.) Frequency Division Multiplexing (FDM)
  b.) Time Division Multiplexing (TDM)
      - i) Synchronous TDM
      - ii) Asynchronous TDM or Statistical TDM
  c.) Wave Division Multiplexing (WDM)

- **What if FDM :-** It is an analog technique that can be applied when the band-width of a link is greater than the combined band-width of the signals to be transmitted .
- **What is WDM :-** It is conceptually the same as FDM ,except that the multiplexing involve light signals transmitted through fiber optics channel .
- **What is TDM :-** It is a digital process that can be applied when the data rate capacity of the transmission medium is greater than the data rate required by the sending and receiving devices .
- **What is Synchronous TDM :-** In STDM , the multiplexer allocates exactly the same time slot to each device at all times , whether or not a device has anything to transmit .
- **List the layer of OSS :-**
  a.) Physical layer
  b.) Data link layer
  c.) Network layer
  d.) Transport layer
  e.) Session layer
  f.) Presentation layer
  g.) Application layer

- **Which layer are network support layers :-**

  a.) Physical layer
  b.) Data link layer
  c.) Network layer

- **Which layers are user support layer :-**

  a.) **Session layer**
  b.) **Presentation layer**
  c.) **Application layer**

- **Which layer link the network support layers and user support layers :-** The transport layer links the network support layers and user support .

- **What are the responsibilities of Network layer :-** The Network layer is responsible for the source – to – destination delivery of the packet possibly across multiple network (links).

a.) **Logical addressing .**
b.) **Routing**

- **What are the concerns of the physical layer :-** Physical layers coordinates the function required to transmit a bit stream over a physical medium .
  a.) **Physical characteristics of interface and media**
  b.) **Representation of bits**
  c.) **Data rate**
  d.) **Synchronization of bits**
  e.) **Line configuration**
  f.) **Physical topology**
  g.) **Transmission mode**

- **What are the responsibilities of data link layer :-** The data link transforms the physical layer, a raw transmission facility , to a reliable link and is responsible for node – node delivery .

  a.) **Framing**
  b.) **Physical Addressing**
  c.) **Flow control**
  d.) **Error control**
  e.) **Access control**

- **What are the responsibilities of session layer :-** The session layer is the network dialog controller . It establishes , maintains and synchronizes the interaction between the communicating system .
  a.) **Dialog control**
  b.) **Synchronizes**

- **What are the responsibilities of Presentations layer :-** The presentation layer is concerned with the syntax and semantics of the information exchanged between two system .
  a.) **Translation**
  b.) **Encryption**
  c.) **Compression**

- **What are the responsibilities of Application layer :-** The Application layer is enables the user , whether human or software , to access the network . It provides user interface and

support for services such as e-mail( ) , shared database managements and other types of distributed information services .

a.) Network virtual Terminal
b.) File transfer , access and managements (FTAM)
c.) Mail services
d.) Directory services .

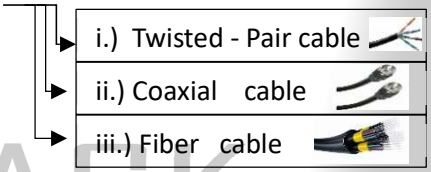
- **What are the different Link types used to build a computer network :-**

  a.) Cables
  b.) Leased lines
  c.) Last-mile links
  d.) Wireless links

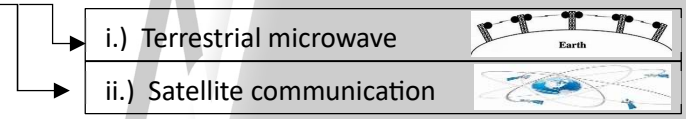
- **What are two classes of hardware building blocks :-** Nodes and Links .

- **What are the categories of transmission media :-**

  a.) Guided Media

  b.) Unguided Media

- **What are the type of errors :-**

  a.) Single – Bit Error :- In a single – bit error , only one bit in the data unit has changed .
  b.) Burst Error :- A Burst error means that two or more bits in the data have changed .

- **What is error Detection & its' methods :-** Data can be corrupted during transmission , for reliable communication errors must be deduced and corrected . Error Detection uses the concept of redundancy , which means adding extra bits of detecting error at the destination .

  👉 **Here some common Error Detection methods are :-**

  - **Vertical Redundancy Check (VRC)**
  - **Longitudinal Redundancy check (LCR)**
  - **Cyclic Redundancy check (CRC)**
  - **Checksum.**

- **What is Redundancy :-** The concept of including extra information in the transmission solely for the purpose of comparison . This technique is called redundancy .

- **What is VRC :-** It is the most common and least expensive mechanism for error Detection . In VRC , a parity bit is added to every data unit so that the total number of 1^s become even for even parity . It can detect all single – number of errors in each unit is odd .

- **What is LRC :-** It is block of bits is divided into rows and a redundant row of bits is added to the whole block . It can detect burst errors . If two bits in one data unit are damaged and bits in exactly the same positions in another data unit are also damaged , the LCR checker will not detect an error an error . In LCR a redundancy data unit follows n data unit .

- **What is CRC :-** It is the most powerful of the redundancy checking techniques , is based on the binary division .

- **What is Checksum :-** This is used by the higher layer protocols (TCP/IP) for error detection .

- **List the steps involved in creating Checksum :-**

  a.) Divide the data into sections.
  b.) Add the section together using 1's complement arithmetic .
  c.) Take the complement of the find sum , this is the checksum .

- **What are the data link protocols :-** Data link protocols are set of specification used to implement the data link layer . The categories of data link protocol are .

1.) Asynchronous protocols .
2.) Synchronous Protocols.

- i.) Character Oriented Protocols .
- ii.) Bit Oriented protocols .

- **Compare Error Detection and Error Correction :-**

  ➔ **Error Detection :-** It is a method that can kook as some data detect if is has been corrupted while it was stored or transmitted .

  ➔ **Error Correction :-** It is a step better than error detection ; when detects as error it tries to put the data back to how it should have been .

THANKS

Our journey is endless