KIET-Group of institution DELHI-NCR, Ghaziabad

Fundamental of computer & Emerging Technologies (KCA-101

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Assignment - 2

1. Define Computer Networks with its application areas, advantages, and disadvantages.

Computer networking refers to interconnected computing devices that can exchange data and share resources with each other. These networked devices use a system of rules, called communication protocols, to transmit information over physical or wireless technologies.

OR

A group of computer which are connected to each other for the purpose of sharing their resources is called Computer network.

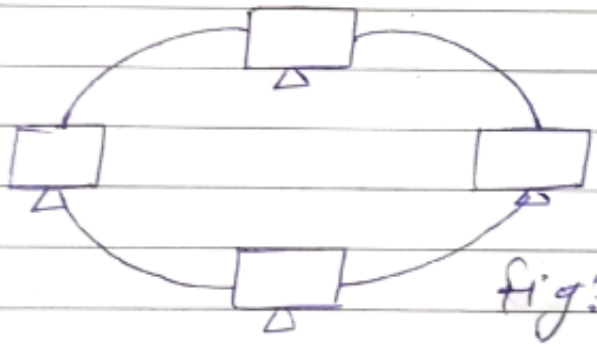

fig:- Computer Network

First Computer Network:- ARPANET

(Advanced Research Projects Agency Network)

Characteristics:-

1. Resource sharing
2. Communication speed
3. Back up
4. Scalability
5. Reliability
6. S/w & H/w sharing
7. Security

Application:-

(1) Marketing and Sales
(2) Manufacturing
(3) Financial Services
(4) Teleconferencing
(5) Cable Television
(6) Information Services
(7) Electronic messaging
(8) Electronic Data Interchange
(9) Directory Services

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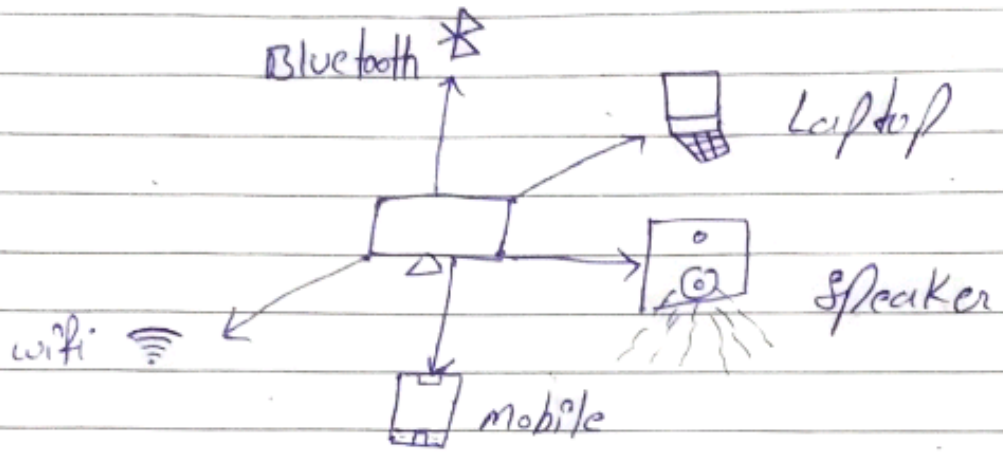
Network Devices:- HUB, Switch, BRIDGE, Gateway, Modem, Router, Repeater etc...

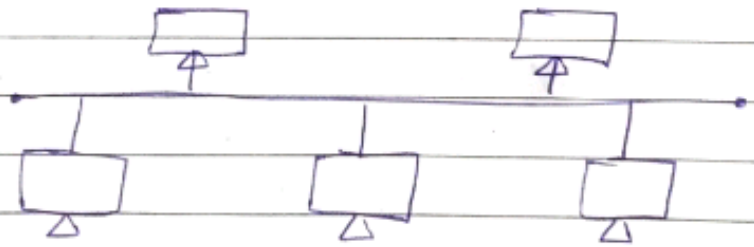
Network types:-

① **PAN:-** Personal Area Network



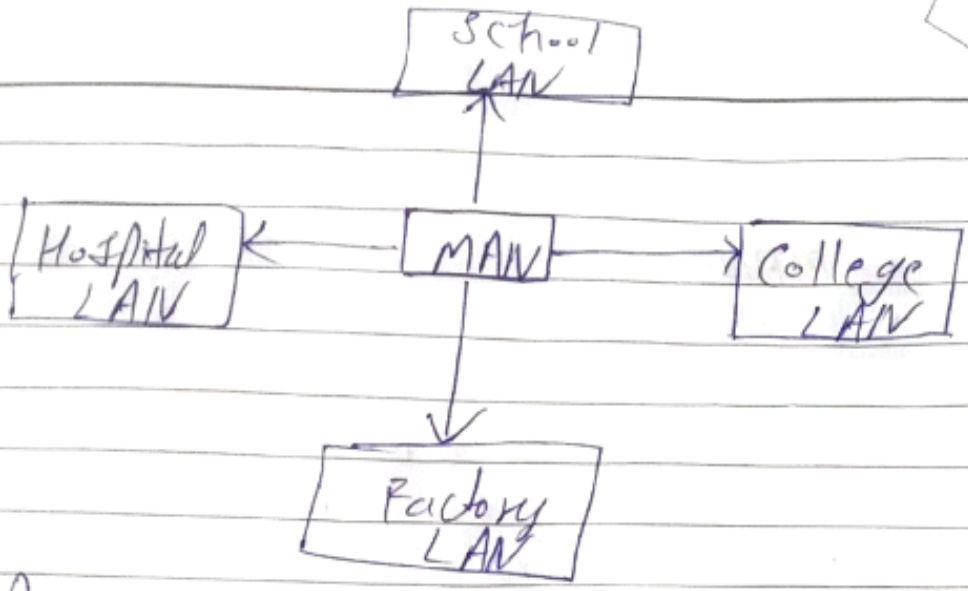
Range → (<10m) , use → Home (for personal use)

② **LAN:-** Local Area Network



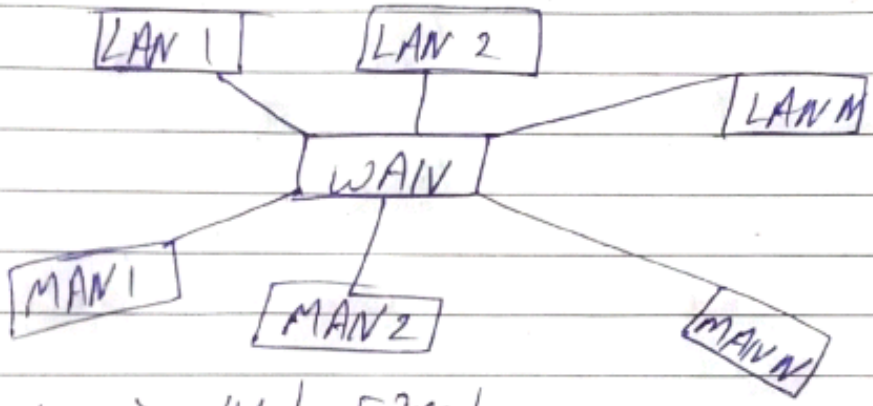
Range → <1Someter use → office (Building)

③ **MAN:-** Metropolitan Area Network
Collection of LAN network & called MAN



Range → <50 km use: within city

(4) WAN:- Wide Area Network



Range → Not Fixed
use:- for countries or all around world.

Advantages:-

1. Open to everyone
2. File sharing
3. Security
4. Easy to add new devices
5. Backup & Storage

Disadvantages:-

1. N/w device required
2. Virus attack
3. Required Handler
4. High speed Internet
5. Server

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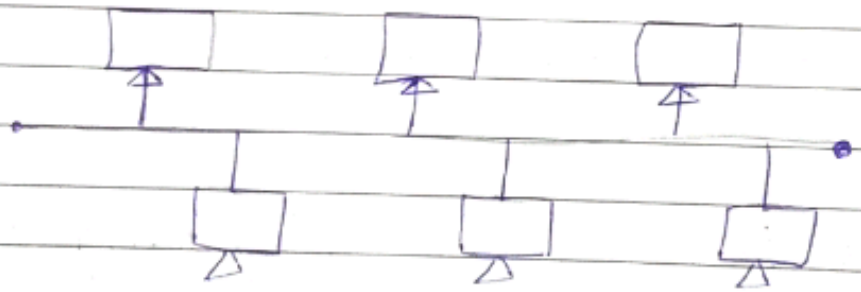
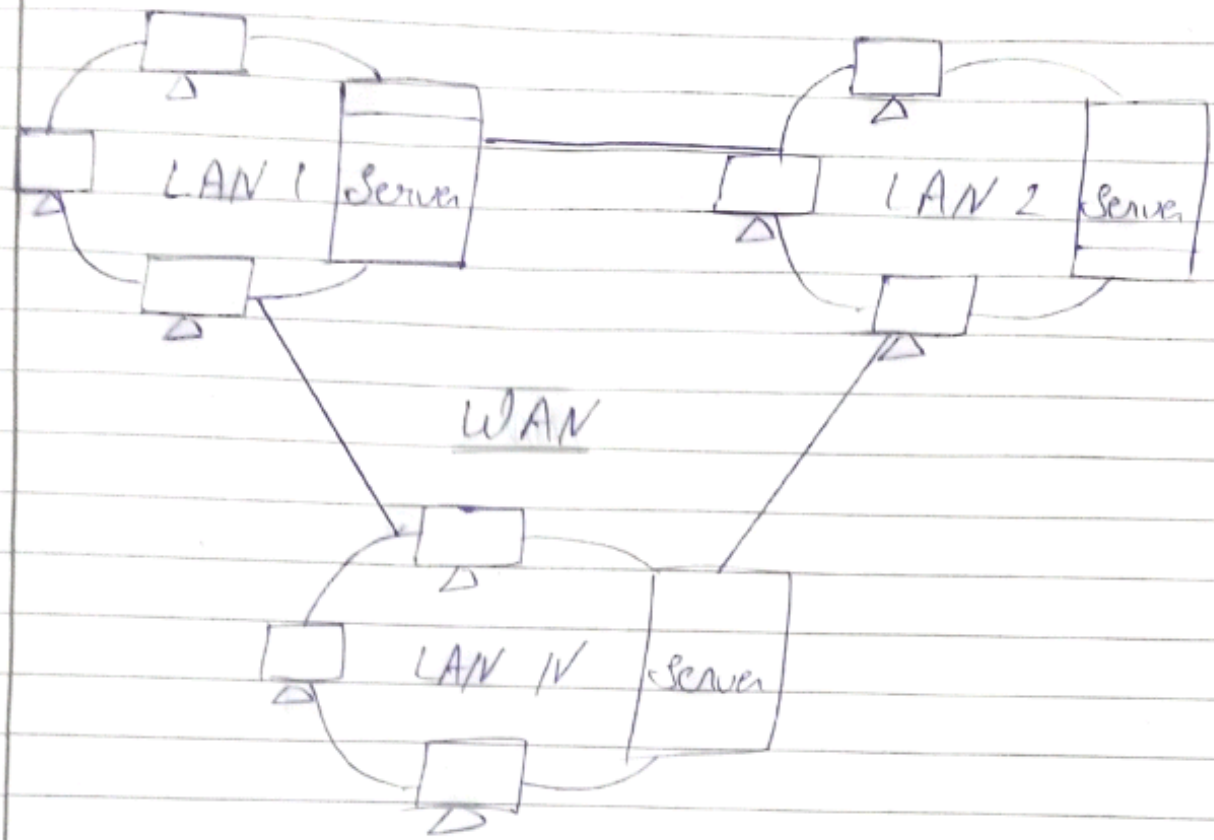
2. Classify the Computer Networks on basis of:
   - -> LAN
   - -> MAN
   - -> WAN

1. LAN (Local Area Network) :- LAN is the most frequently used network. A LAN is a computer network that connects computers together through a common communication path, contained within a limited area, that is, locally. A LAN encompasses two or more computers connected over a server.
   - -> The two important technologies involved in this network are Ethernet and wi-fi
   - -> Examples of LAN are networking in a home, school, library, laboratory, college, office, etc.

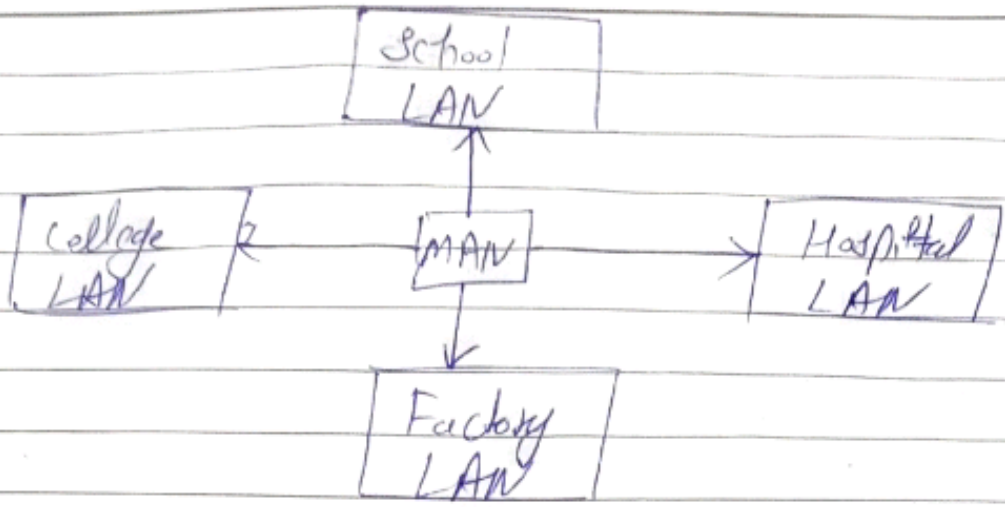


2. Wide Area Network (WAN) :- WAN is a type of computer network that connects computers over a large geographical distance through a shared communication path. It is not restrained to a single location but extends over many locations.

- WAN can also be defined as a group of local area networks that communicate with each other.
- The most common example of WAN is the Internet.



3. Metropolitan Area Network (WAN): A MAN is larger than a LAN but smaller than a WAN. This is the type of computer network that connects computers over a geographical distance through a shared communication path over a city, town or metropolitan area.
- Examples of MAN are networking in towns, cities, a single large city, large area within multiple buildings, etc.



Difference :-

	LAN	MAN	WAN
1)	LAN stands for local area network	1) MAN stands for metropolitan area n/w.	1) WAN stands for wide area n/w.
2)	It is used for building like offices.	2) It is used for city like Kolkata.	2) It is used for countries.
3)	Transmission speed of data is high	3) Transmission speed of data is average	3) Transmission speed is low.
4)	Range of LAN 0 to 150 m.	4) Range of MAN 5 to 50 km	4) Not fixed
5)	LAN network ownership is private.	5) MAN network ownership is private or public.	5) also private or public
6)	Easy to maintain	6) Difficult to maintain than LAN	6) Also difficult to maintain than MAN as well as LAN
7)	LAN network error rate & setup cost is low	7) MAN n/w error rate & setup cost is average	7) WAN n/w error rate & setup cost is very high.

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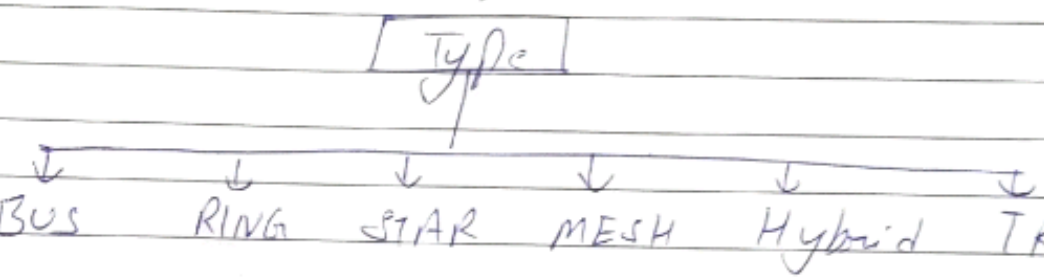
3. Discuss various network topologies and application areas.

The physical arrangement of the computer system / node, which is connected to each other via communication medium is called topology.
A topology is a layout of a network which determines how the network communicates with different devices. Both the physical and logical structure of nodes and connections in a network are shown in network topology diagram.

Types of network topology:



(1) Bus topology: In Bus topology, one long cable acts as a single communication channel & all the devices are connected to this cable.

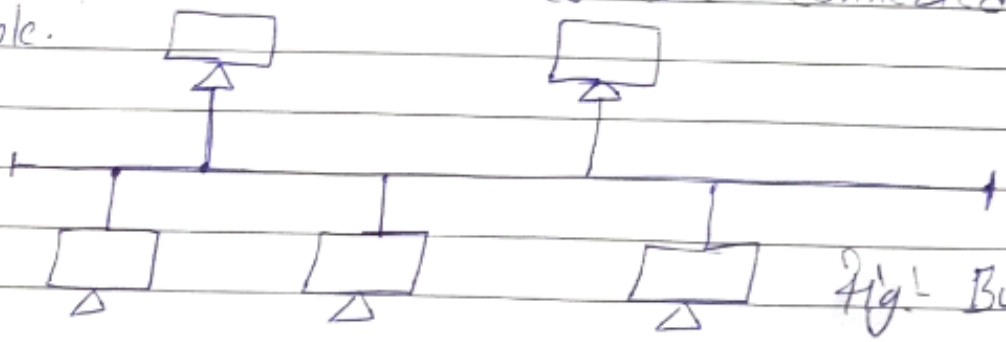


Fig: Bus topology

Advantage.

(1) Easy to add/remove nodes in a network.
(2) Required only cable
(3) It is less expensive
(4) It broadcast the message to each device which are connected through the cable.

Disadvantage:

(1) If cable is fail then the entire network will be failed
(2) The messages are broadcast so, we can't send private messages.

⑤ It is easy to maintain.
⑥ In case of any computer failure, then will be no effect on other device.

③ It takes more time to pass the messeges from one place to another place
④ The length of cable is limited.
⑤ In this topology data is transfer only one direction.

② RING Topology:- It is called ring topology because it forms a ring. In this topology each node is strogly connected with its adjacent node.

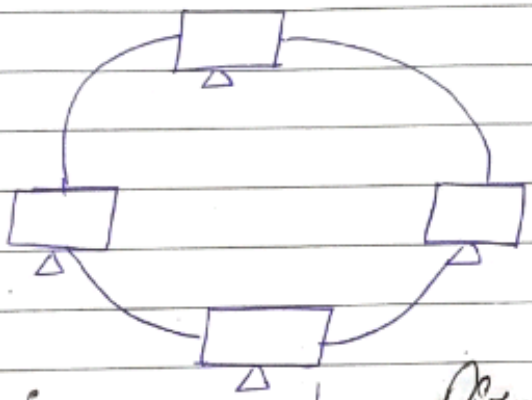


fig:- RING topology

Advantage:-

① It forms a strong network.
② Each an every node can share data with another node connected through a ring topology.
③ Transmission rate of data is very speed.
④ The data send through ring topology will be broadcast.

Disadvantage:-

① It is very difficult task to add some new Computer.
② If we want to send data from a source to destination machine then data will unnecessary passed to all nodes.
③ Single point of failure, that means if a node goes down entire network goes down.
④ It is very difficult to recover the ring topology if any particular machine is not working properly.
⑤ can't send private message.

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(3) STAR Topology:- In Star topology all the nodes are connected with a central device called HUB. And the sharing of data is only possible through HUB.

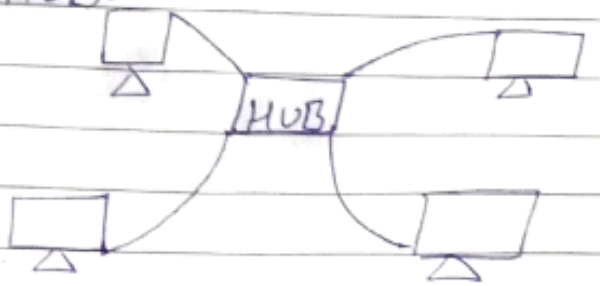

Fig:- Star topology

Advantage:-	Disadvantage:-
(1) It broadcast the messages.	(1) In Star topology we must required a network device like HUB, Switch etc.
(2) It is less expensive due to less cable.	(2) If two nodes want to share the data, sharing is only possible through HUB.
(3) Easy to connect new nodes without affecting rest of the network.	(3) If HUB is failed the entire network will be failed.
(4) If one node failed, then it would not be failure of entire network.	(4) We can't send private data.

(4) MESH Topology:- In this topology each an every computer is directly connected with each other, So we can directly send the data to the destination machine without going to Intermediate machine

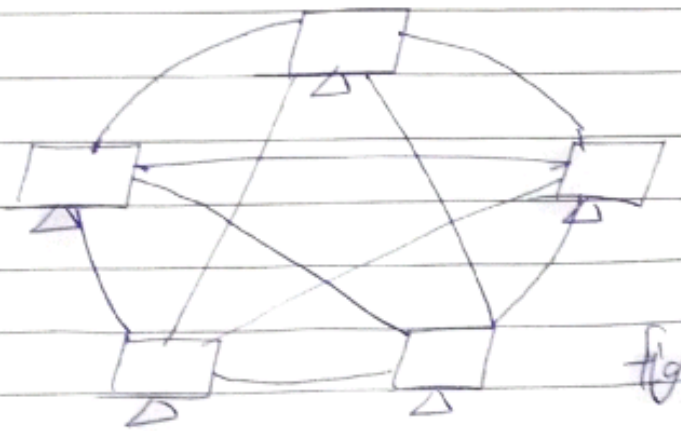

fig:- Mesh topology

Advantage	Disadvantage :-
① It is very good topology to send the private messages.	① It is very difficult to add some new node because each an every computer directly connected with another one.
② All nodes are are directly associated with another node so, it provide point-to-point connection	② If a particular machine not working then, we can't send or receive data from the failure machine.
③ Un-like ring topology, if a particular machine is failed then entire network will not fail.	
④ Multiple devices can send or receive data simultaneously.	

⑤ Hybrid Topology :- Combination of various different topology is called hybrid topolotogy.

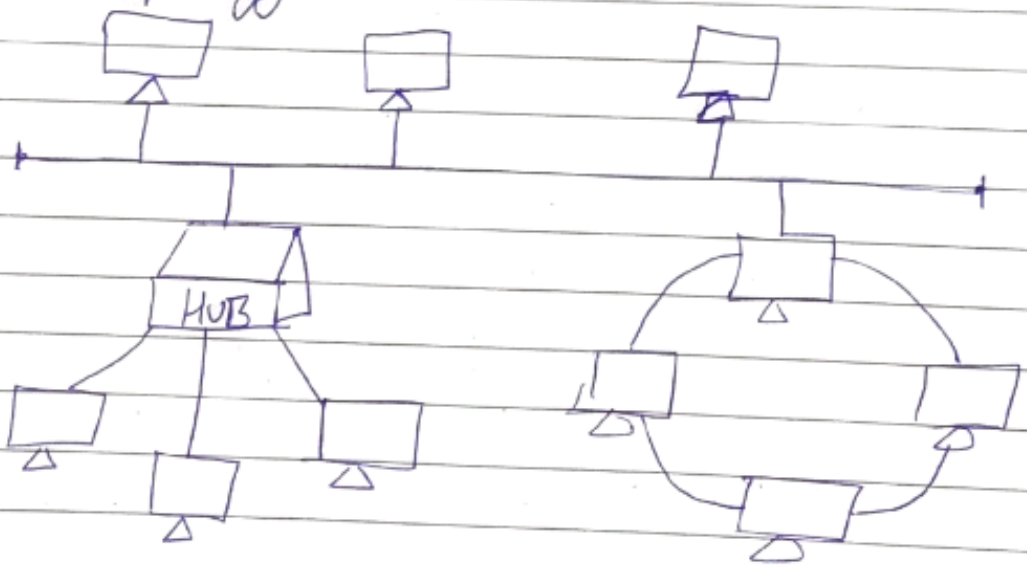

Fig :- Hybrid topology.

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(6) TREE Topology: In this topology, all the nodes are connected like a branches of tree. The Combination of BUS & STAR topology is called tree topology.