

MAKILANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY

DEPARTMENT OF ICT

Assignment No: 01

Course Code : ICT-4101

Course Title : Telecommunication Engineering

Assignment name : Introduction of telecommunication  
and Data networks

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Question:

1. What is the Telecommunication? Need for switching exchange Explain.

Ans:

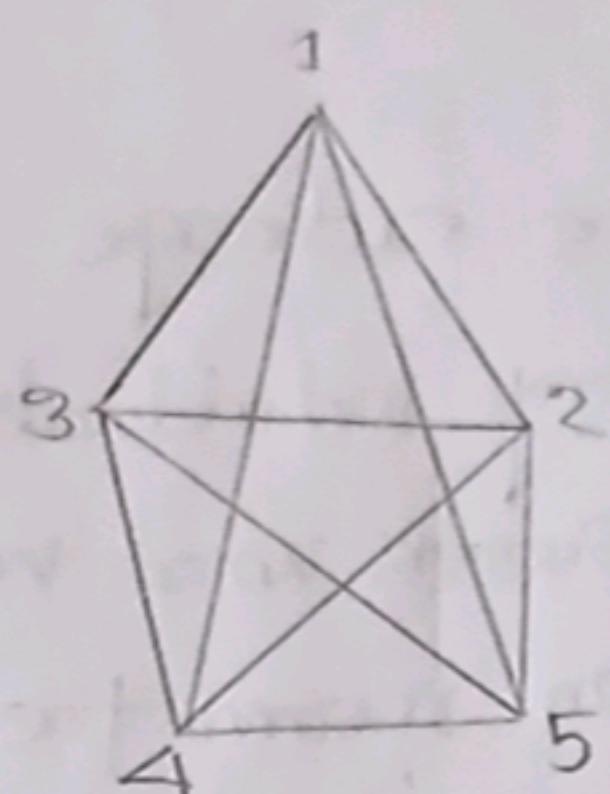
Telecommunication:

The exchange of information between two or many individuals is called communication. The word tele is a Greek word which means distance. Hence, Telecommunication means the exchange of information between two distance place.

Need for Switching Exchanges:

The point-to-point connection for establishing communication requires the telephone sets to be linked using wires. If the number of telephone sets or the subscribers present is low in numbers, the type of connection will be a little complex. However, if this number is high or moderate, then the connections will lead to a mess. To understand the complication, let us consider a network of 5 subscribers.

The following illustration shows a point-to-point connection for five subscribers (telephone sets).



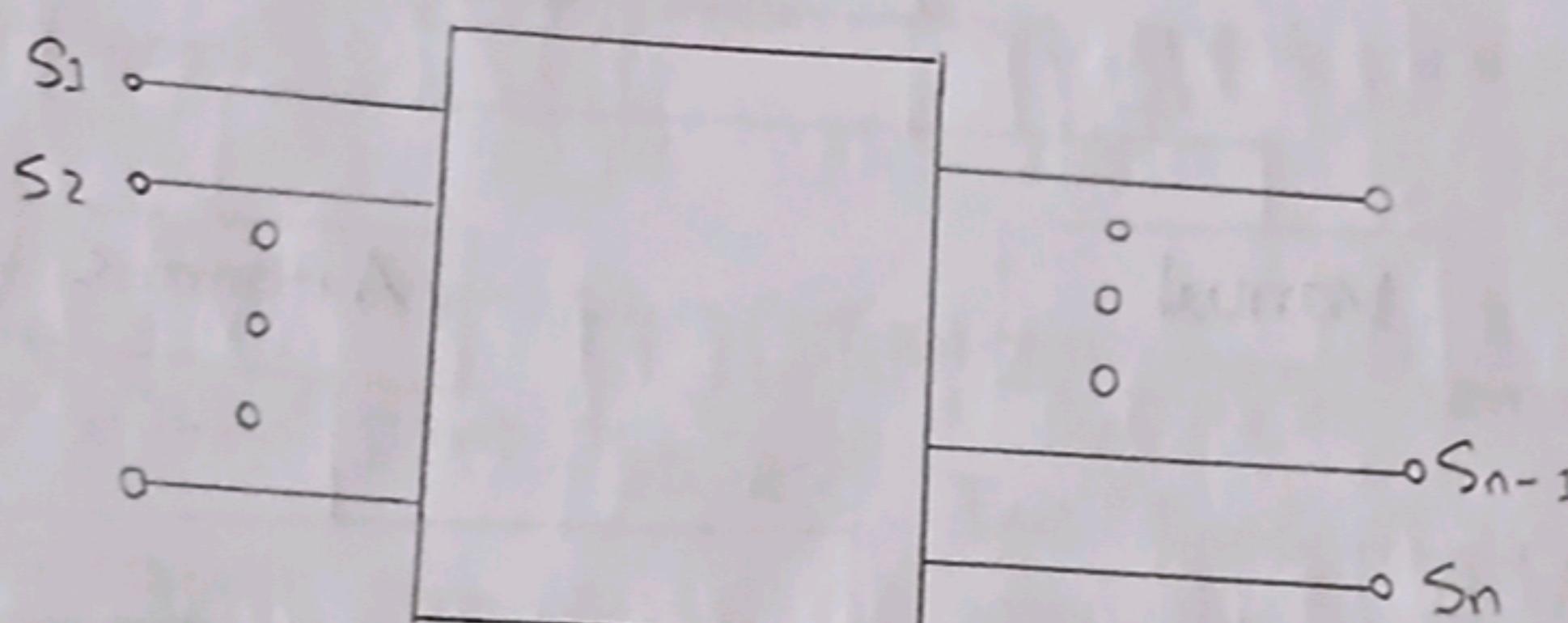
In the point-to-point connection, for  $n$  entities, we need  $n(n-1)/2$  links. All these links form a network. Networks with point-to-point links among all the entities are known as Fully connected networks. The number of links required in a fully connected network becomes very large even with moderate values of  $n$ .

Hence, a system of switching the networks is needed in between these subscribers.

2 Q: What is Switching system? Write the classification of switching system

Switching System:

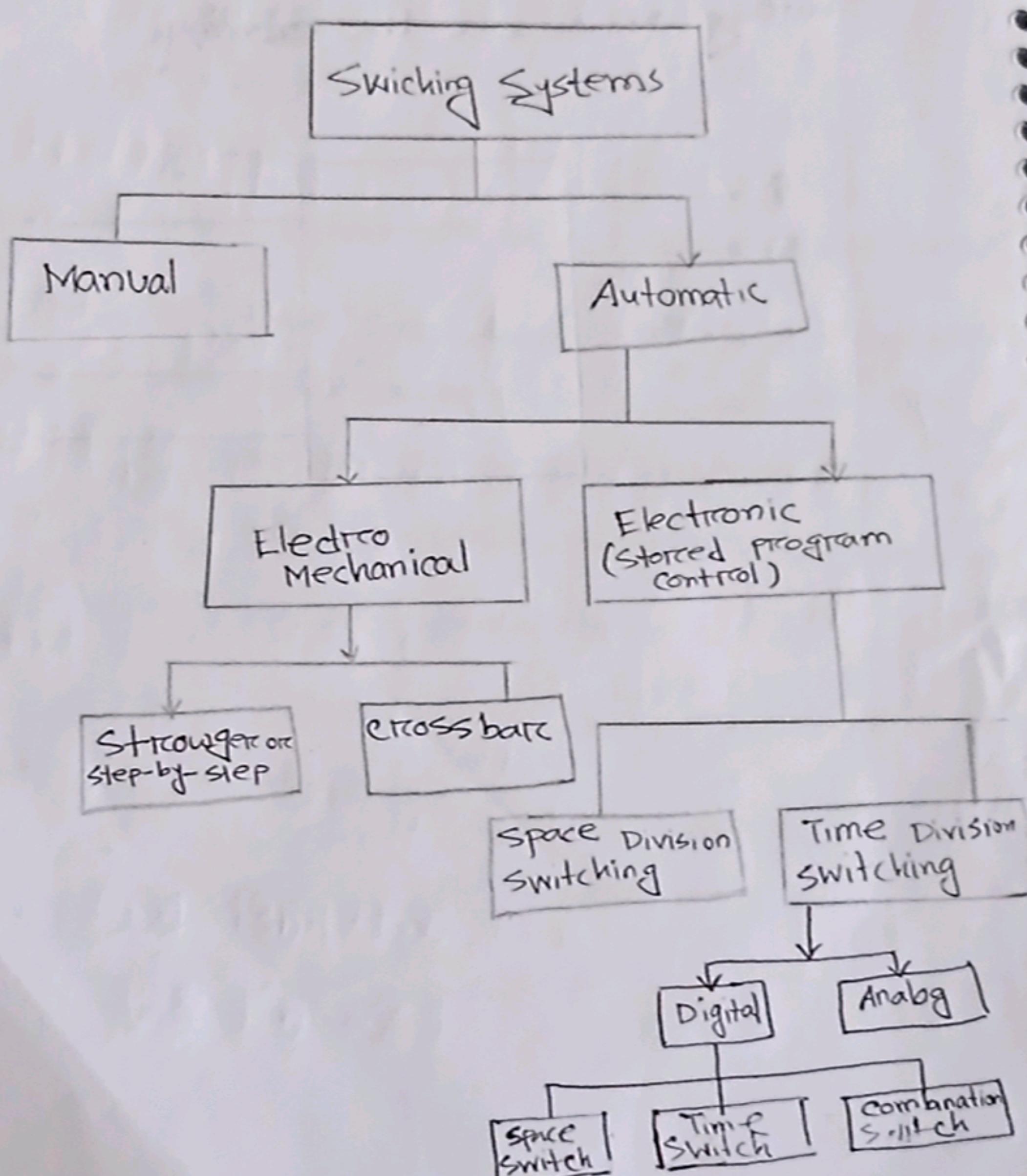
Theis network connection cannot be simply made with telephone sets and bunch of wires, but a good system is required to make or break a connect. This system is known as the Switching System or the Switching office or the exchange.



## Classification of Switching Systems:

Shows how the switching systems were classified

The following flowchart

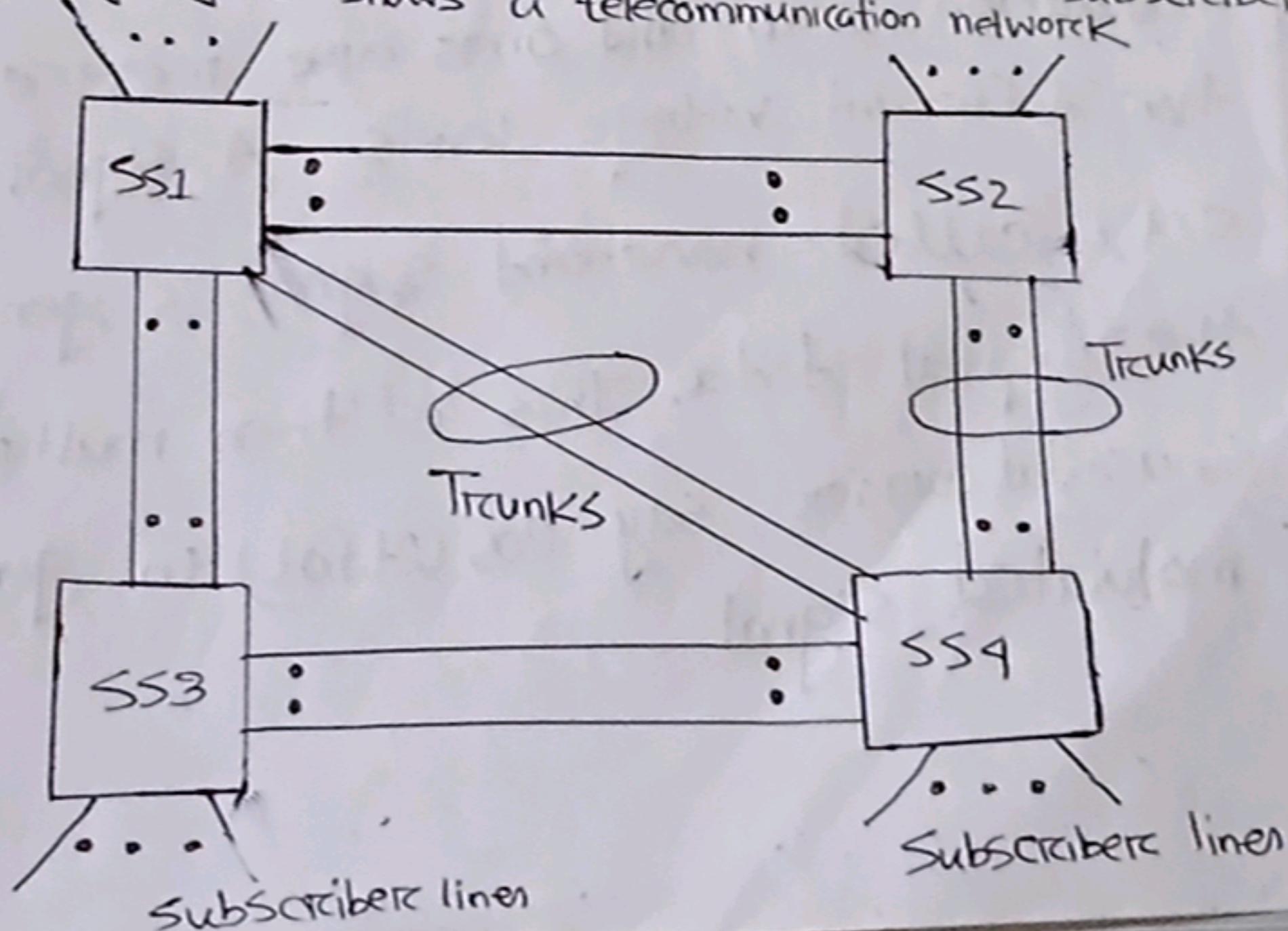


3. What is the telecommunication Network? describe it.

Telecommunication:

A Telecommunication network is a group of systems that establishes a distant call. The switching systems are part of a telecommunication network.

The switching systems are connected using lines called the Trunks. The lines that run to the subscriber premises are called the subscriber lines. The following figure shows a telecommunication network.



Example:

1. Telegraph networks
2. Telex networks
3. Telephone networks
4. Data networks

Q) What's modems? Describe it.

Modem:

Amplitude, frequency and phase modulation are used in the design of modems. In amplitude modulation, zero and ones are represented by two different voltage levels. A signal waveform  $s(t)$ , called baseband signal, is generated from the digital data. This is then multiplied by a sinusoidal carrier, say  $\cos(2\pi f_0 t)$  to generate a modulated signal.

$m(t) = \sin(2\pi f_m t)$

At the receiver end, the modulated signal is again multiplied by  $\cos(2\pi f_s t)$

yielding a received signal

$$\begin{aligned} r(t) &= s(t) \cos(2\pi f_s t) \\ &= \frac{s(t)}{2} + \frac{s(t)}{2} \cos(2\pi(f_s - f_m)t) \end{aligned}$$

⑤

Q) What is the LAN with example? write the working of LAN.

### LAN:

LAN Stands for "local area network"

A local area network (LAN) typifies a distance environment and finds applications in a number of areas.

Example:

1. office automation
2. Factory
3. Distributed computing
4. Fire and security systems
5. process control
6. Document distribution

### Advantage:

The advantages offered by the LANs are given below.

1. Unlike a large centralized system, a LAN may evolve with time.
2. Since LAN is a set of multiple interconnected systems enhances the reliability and availability of the systems to users.
3. LAN provides a resource-sharing environment. Expensive peripherals, hosts and databases may be shared by all the LAN users.
4. A LAN adhering to a certain standard permits multivendor systems to be connected to it.
5. In LAN, the systems are generally so chosen as to meet most of the user

Q) What is the MAN? describe it

MAN:

MAN stands for "Metropolitan area network". A metropolitan area network (MAN) usually covers a geographical area spanning a distance of 5-50 Km. In functionality MANs support services that require guaranteed bandwidth and bounded delay performance, in addition to data services than do not pose such restrictions. MANs may operate at speeds of 1 Mbs and above, although a more common range is 50-150 kbps.

⑦ What is the FIBRE OPTIC NETWORKS?

Optical fibre networks are characterised by

1. High speed operation (typically 100 Mbps or more)
2. Ability to span large distances (100-200 Km)
3. Ability to support a moderate number of stations, typically 10 to a few hundred stations are supported with a maximum limit around 100

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⑧ Define and describe given below's topologies

\* Mesh Topology

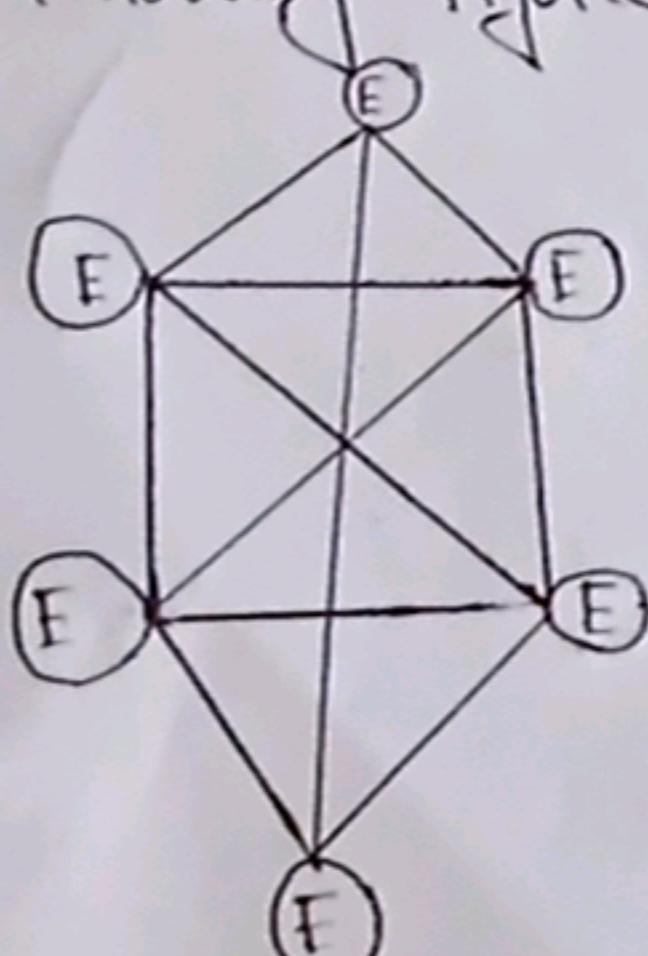
\* Star

\* Hierarchical

Mesh Topology:

Mesh Topology, as the name implies is a fully connected network. The number of trunk groups in a mesh network is proportional to the square of the exchanges being interconnected. Hence, these mesh topologies are widely used in metropolitan areas where there is heavy traffic.

The following figure shows how a mesh topology looks like.



### Star Topology:

Star Topology is connected in the shape of a Star, which utilizes an intermediate exchange called a tandem exchange through which all other exchanges communicate. The figure given below shows the model of a Star network. The Star network is used when traffic levels are comparatively low. Many Star networks can be used by interconnecting through additional tandem exchange, leading to a two-level Star network as shown in following figure.

### Hierarchical:

The hierarchical topology is used to handle heavy traffic with minimal numbers of trunk groups. The traffic flows through the final route which is the highest level of hierarchy. If the traffic intensity between any pair of exchanges is high

direct trunk routers may be established between them as indicated by dashed lines in the figure given below. These direct trunk routers are

High usage routers.