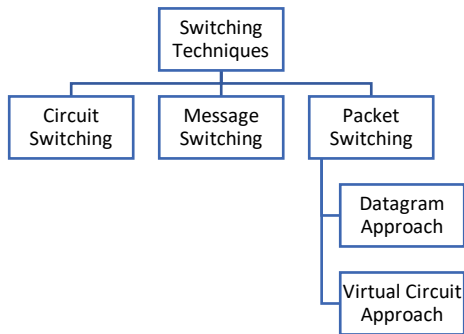## Switching Techniques in computer networking:

Switching in computer network helps in deciding the best route for data transmission if there are multiple paths in a larger network

```
              ┌─────────────────┐
              │   Switching     │
              │   Techniques    │
              └────────┬────────┘
        ┌──────────────┼──────────────┐
  ┌──────────┐   ┌──────────┐   ┌──────────┐
  │ Circuit  │   │ Message  │   │ Packet   │
  │Switching │   │Switching │   │Switching │
  └──────────┘   └──────────┘   └────┬─────┘
                                     │  ┌──────────┐
                                     ├──│ Datagram │
                                     │  │ Approach │
                                     │  └──────────┘
                                     │  ┌──────────────┐
                                     └──│Virtual Circuit│
                                        │  Approach     │
                                        └──────────────┘
```
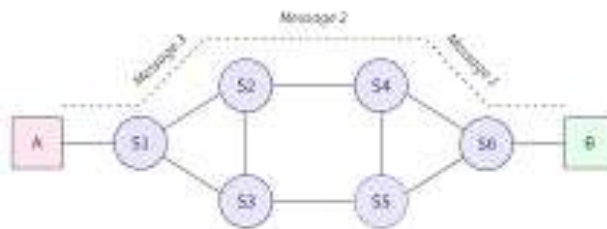
1. Circuit Switching
   - ✓ A dedicated path is established between the sender and receiver.
   - ✓ Before data transfer, connection will be established first.
   - ✓ Example: Telephone network
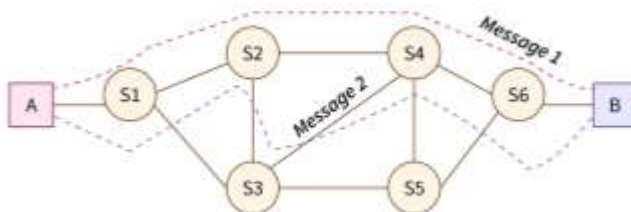
        3 phases in circuit switching:
        1. Connection establishment
        2. Data transfer
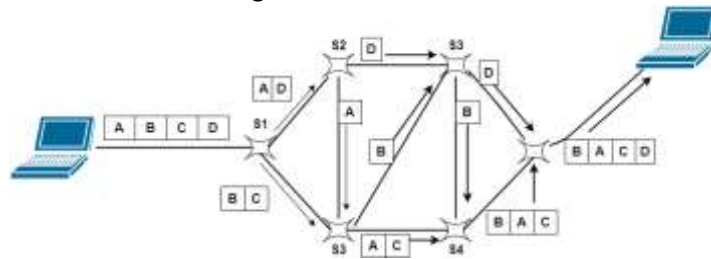   3. Connection Disconnection

2. Message Switching
   - ✓ Store and forward mechanism
   - ✓ Message is transferred as a complete unit and forwarded using store and forward mechanism at the intermediary node.
   - ✓ Not suited for streaming media and real-time applications.

3. Packet Switching
   - ✓ The internet is a packet switched network
   - ✓ Message is broken into individual chunks called as packets
   - ✓ Each packet is sent individually
   - ✓ Each packet will have source and destination IP address with sequence number
   - ✓ Sequence number will help the receiver to
     - o Reorder the packets
     - o Detect missing packets and
     - o Send acknowledgments

Two Approaches To Packet Switching

1. Datagram Approach
   - ✓ Datagram packet switching is also known as connectionless switching
   - ✓ Each independent entity is called as datagram
   - ✓ Datagrams contain destination information and the intermediary devices uses this information to forward datagram to right destination
   - ✓ In datagram packet switching approach, the path is not fixed
   - ✓ Intermediary nodes take the routing decisions to forward the packets.
2. Virtual Circuit Approach
   - ✓ Virtual Circuit Switching is also known as connection-oriented switching
   - ✓ In the case of Virtual circuit switching, a preplanned route is established before the messages are sent
   - ✓ Call request and call accept packets are used to establish the connection between sender and receiver.
   - ✓ In this approach, the path is fixed for the duration of a logical connection