DC Assignment III

1. **Explain circuit-switched Network with neat Diagrams.**

Communication via circuit switching implies that there is a dedicated communication path between two stations.

That path is a connected sequence of links between network nodes.

Communication via circuit switching involves three phases:

Circuit establishment

Before any signals can be transmitted, an end-to-end (station-to-station) circuit must be established.

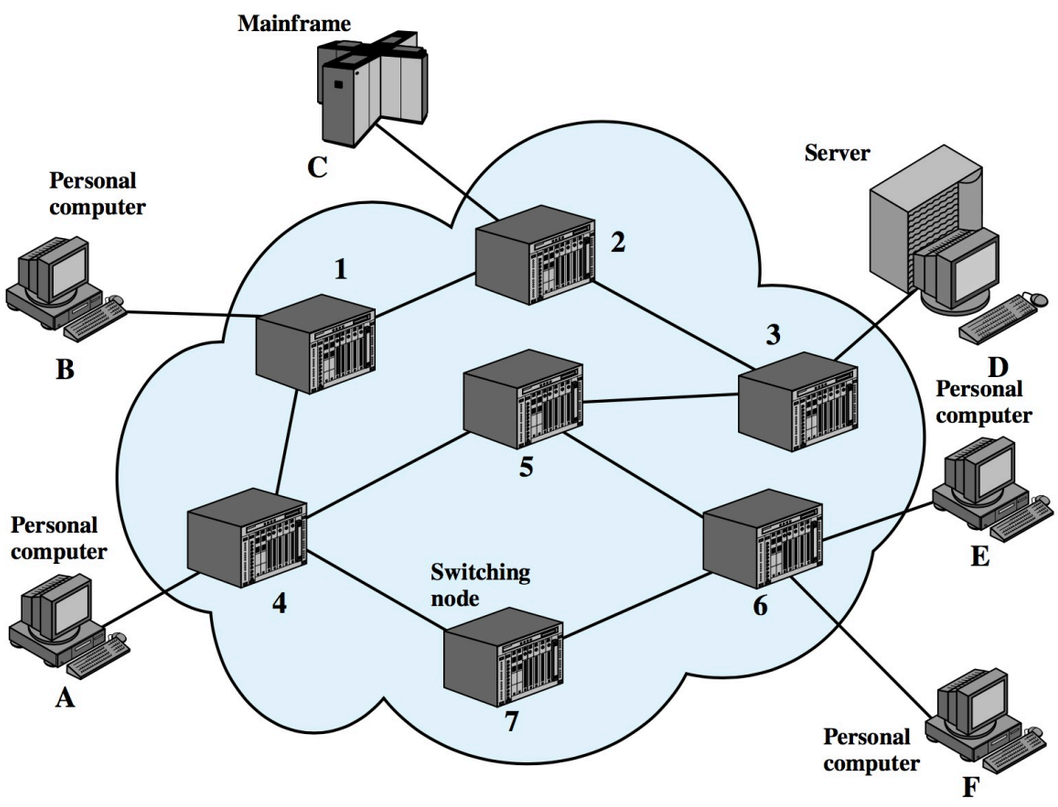
For example, station A sends a request to node 4 requesting a connection to station E. Typically, the link from A to 4 is a dedicated line, so that part of the connection already exists. Node 4 must find the next leg in a route leading to E. Based on routing information and measures of availability and perhaps cost, node 4 selects the link to node 5, allocates a free channel (using FDM or TDM) on that link, and sends a message requesting connection to E. So far, a dedicated path has been established from A through 4 to 5. The remainder of the process proceeds similarly.

Data transfer

Data can now be transmitted from A through the network to E. The transmission may be analog or digital, depending on the nature of the network. As the carriers evolve to fully integrated digital networks, the use of digital (binary) transmission for both voice and data is becoming the dominant method.

Circuit disconnect.

After some period of data transfer, the connection is terminated, usually by the action of one of the two stations.



2. **Explain datagram Network which uses packet switching with neat diagrams.**

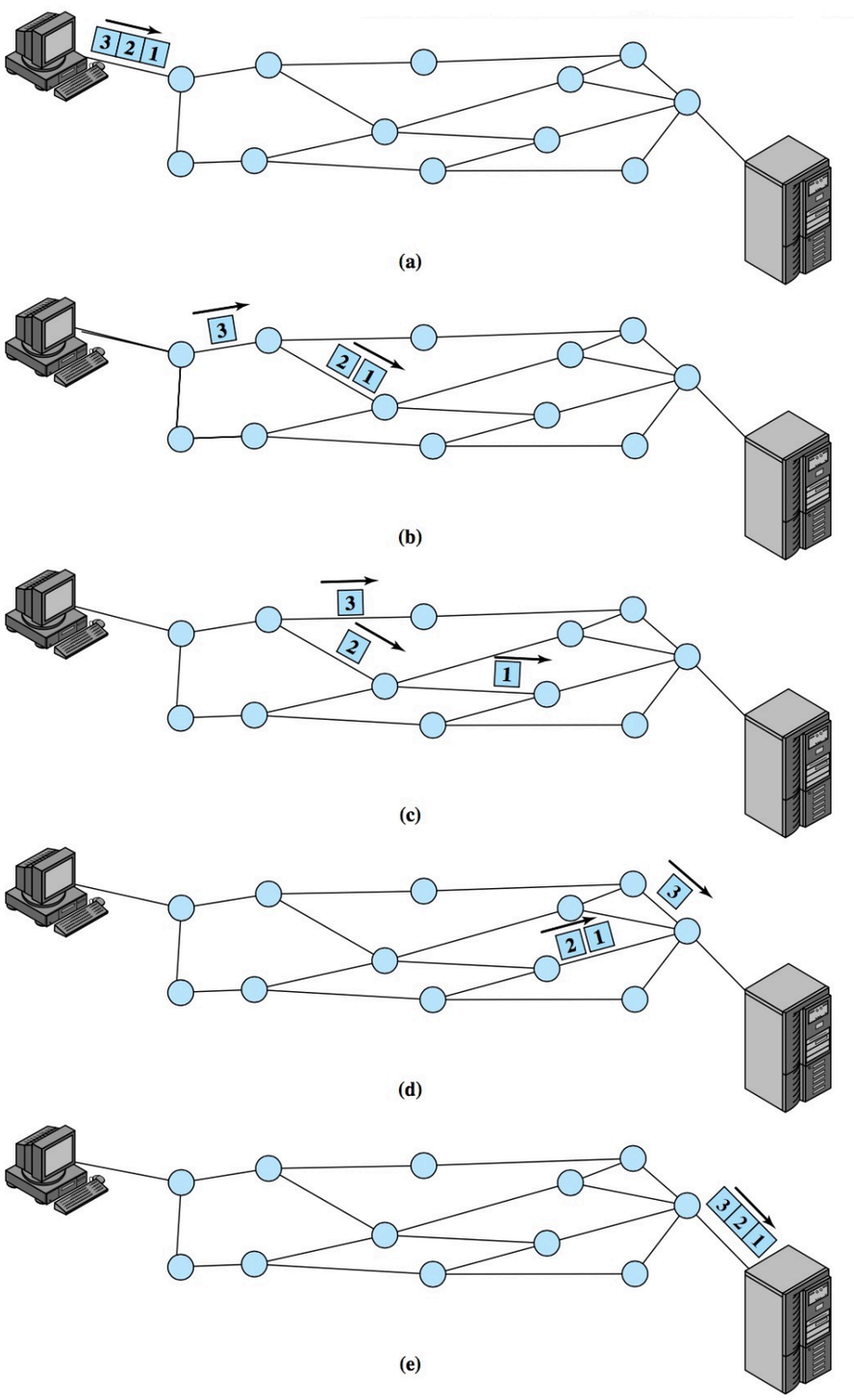
In the **datagram** approach, each packet is treated independently, with no reference to packets that have gone before.

Each node chooses the next node on a packet's path, taking into account information received from neighboring nodes on traffic, line failures, and so on.

So the packets, each with the same destination address, do not all follow the same route, and they may arrive out of sequence at the exit point. In this example, the exit node restores the packets to their original order before delivering them to the destination.

In some datagram networks, it is up to the destination rather than the exit node to do the reordering. Also, it is possible for a packet to be destroyed in the network.

For example, if a packet-switching node crashes momentarily, all of its queued packets may be lost. Again, it is up to either the exit node or the destination to detect the loss of a packet and decide how to recover it. In this technique, each packet, treated independently, is referred to as a datagram.



3. **Explain Virtual Circuit Connection setup with neat diagrams.**

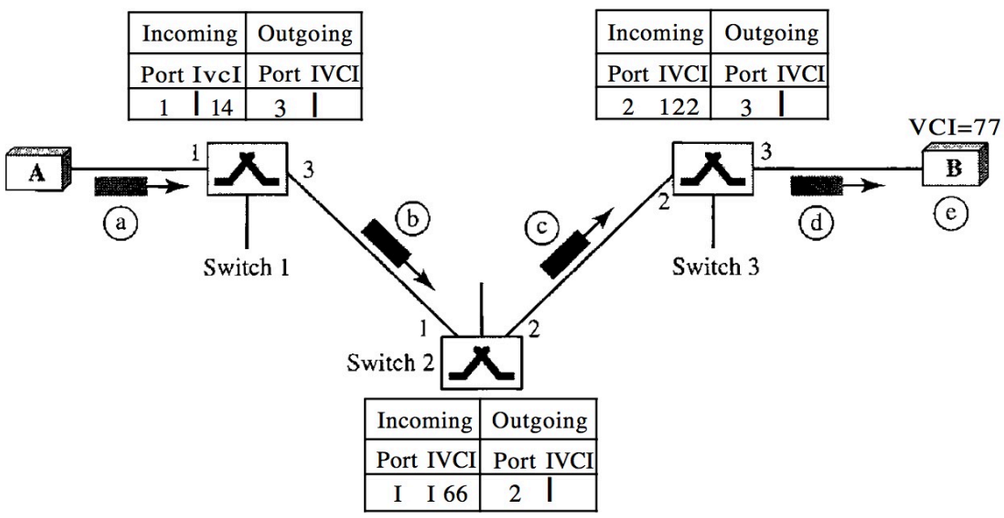
In the **virtual circuit** approach, a preplanned route is established before any packets are sent. Once the route is established, all the packets between a pair of communicating parties follow this same route through the network.

In a virtual-circuit network, two types of addressing are involved: global and local (virtual-circuit identifier).

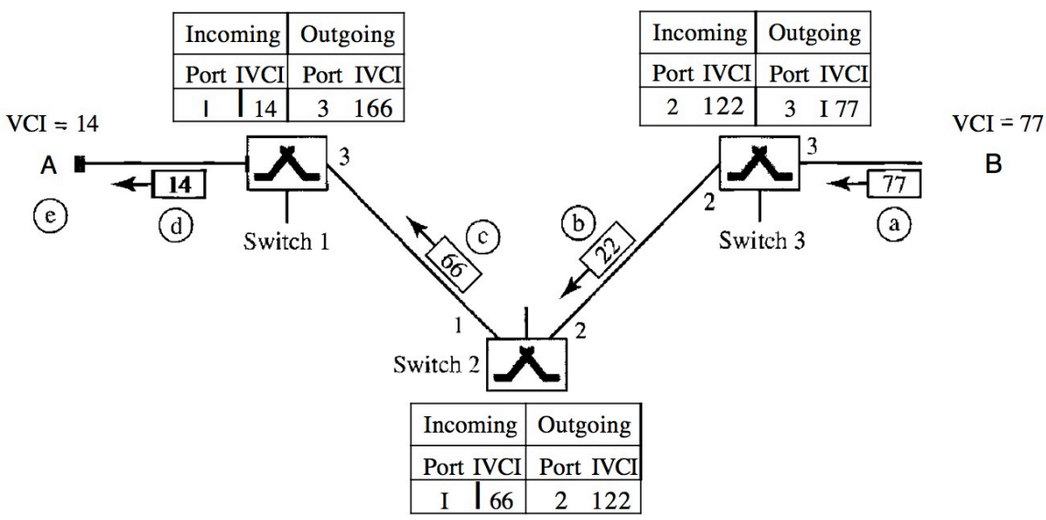
In the setup phase, the source and destination use their global addresses to help switches make table entries for the connection.

In the setup phase, a switch creates an entry for a virtual circuit. For example, suppose source A needs to create a virtual circuit to B. Two steps are required: the setup request and the acknowledgment.

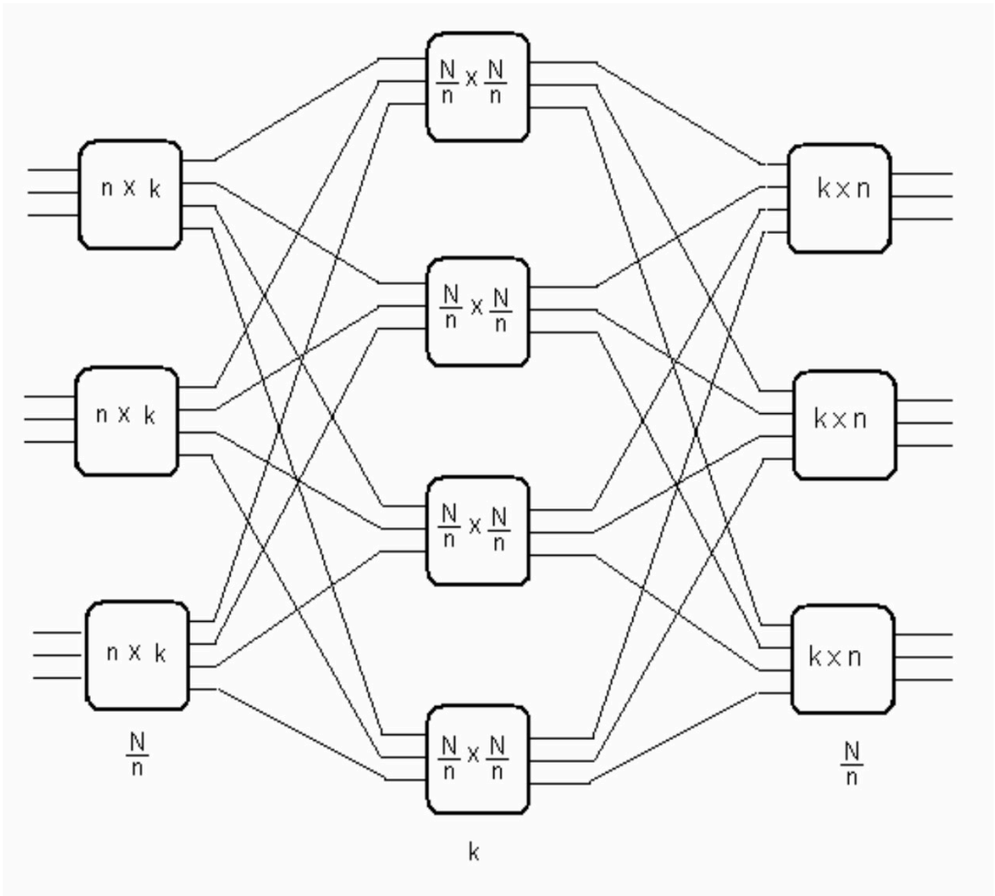
A setup request frame is sent from the source to the destination.



A special frame, called the acknowledgment frame, completes the entries in the switching tables.



4. Explain the design of Multistage switch with neat diagrams.



Out of N lines. , N/n groups of n lines are made available as input and output.

k is the number of second stage switches. These second stage switches are shared. Each user has got multiple path for reaching a particular user. The system can support k simultaneous calls. So k should be as large as possible to educe the probability of blocking. But large k means larger size, complex control and hence more costly.

Number of cross connects in the above structure is

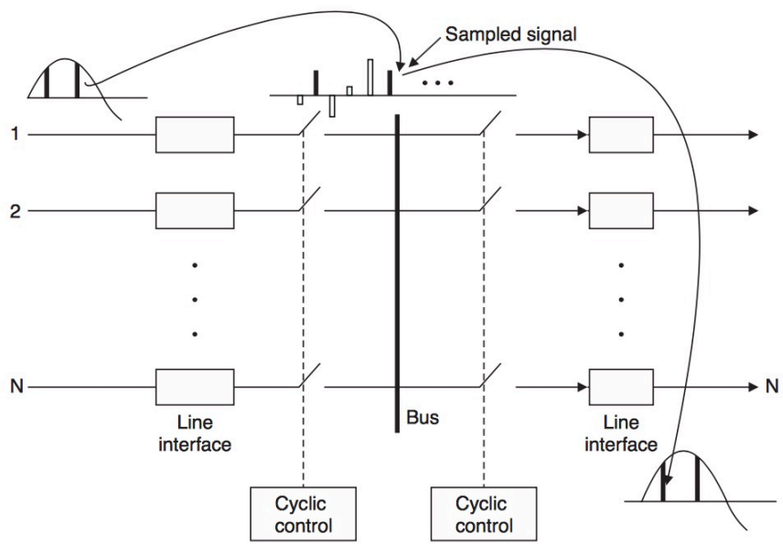
$$N_x = 2\frac{N}{n}(n \times k) + k\left(\frac{N}{n} \times \frac{N}{n}\right)$$

$$\text{i.e. } N_x = 2Nk + k\frac{N^2}{n^2}$$

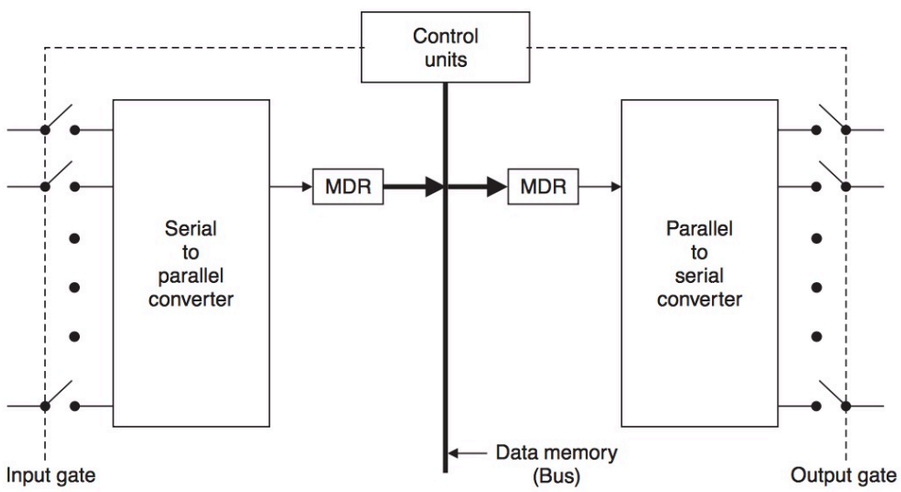
5. Explain Time-Division Switch with Diagram.

The data is carried as PAM analog samples or PCM digital samples, occurring at regular intervals.

When PAM samples are switched in a time division manner, the switching is known as analog time division switching.



If PCM binary samples are switched, then the switching is known as digital time division switching.



The analog time division switching is useful for both analog and digital signals. The digital time division multiplexed signals usually requires switching between time slots as well as between physical lines.

The basic requirement of time division switching is that the transfer of information arriving at in a time slot of one input link to other time slot of any one of output link. A complete set of pulses, arriving at each active input line is referred to as a frame. The frame rate is equal to the sample rate of each line.

A time switch operates by writing data into and reading data out of a single memory. In TSI (Time Slot Interchange) operation, inputs are sequentially controlled and outputs are selectively controlled. The RAM have several memory locations, each size is the same as of single time slot.