UNIT => 4

* Routing :-

A routing algorithm is a procedure that lays down the route or path to transfer data packets from source to the destination. They help in directing internet traffic efficiently after a data packet leaves its source it can choose among the many diff. paths to reach its destination.

* Types of routing algorithms

Algorithm divided into 2 parts

1] Adaptive routing algorithm

2] Non-Adaptive routing algorithm

1] Adaptive routing algorithm :- It is also known as dynamic routing algorithms, Make routing decisions dynamically depending on the network conditions.

The 3 popular types of adaptive routing algorithms are :-

1] centralized algorithm
2] Isolated algorithm
3] Distributed algorithm

2] Non - adaptive routing algorithm :- It is also known as static routing algorithm construct a static routing table to determine the path through which packets are to be sent.

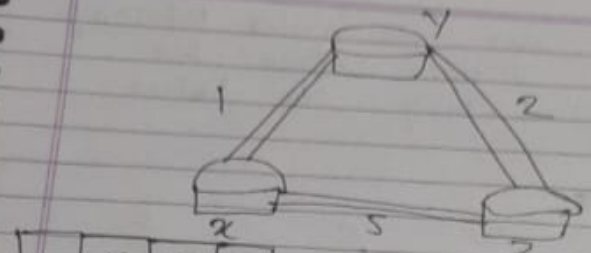
There are 2 types of non-adaptive routing algorithm are :-

1] Floating 2] Random walks

Distance vector routing (DVR) :-

A distance vector routing (DVR) protocol require that a router inform its neighbours of topology change periodically. Historically known as the old ARPANET routing algorithm (or known as bell man ford algorithm).

Example ⇒ consider 3 router x, y and z as shown in fig. each router have their routing table every routing table will contain distance to the destination nodes.



	x	y	z
x	0	1	5
y			
z			

	x	y	z
x			
y			
z	5	2	0

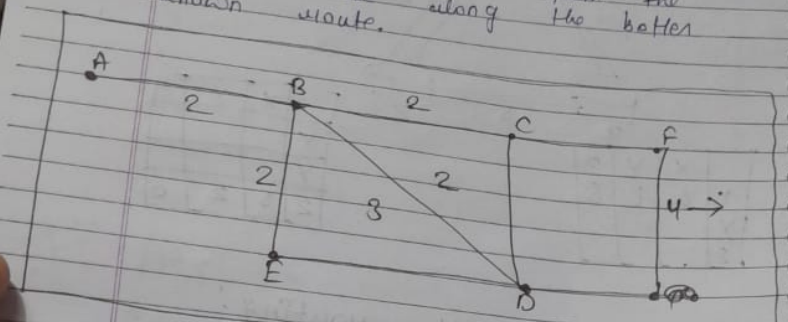
	x	y	z
x	1	0	2
y			
z			

Shortest path routing:

In this algorithm to select a route, the algorithm discovers the shortest path b/w 2 nodes. It can use multiple hopes the geographical area in kms or labeling of areas for measuring path length.

In shortest path routing, the topology/ communication network is defined using a directed weight graph. The nodes in the graph define switching components and the directed areas in the graph define communication connection b/w switching components.

For example, uses the nodes labelling with its distance from the source node along the better known route.



Graphical representation of nodes with labelled path.

It can be done in various passes as follows, with A is the source.

- pass 1. B(2, A), C(∞, -), F(∞, -), E(∞, -), d(∞, -), M&D
- pass 2. B (2, A), C(4, B), D(5, B), E(4, B), F(∞, -), H(∞, -)
- pass 3. B (2, A), C (4, B), D(5, B), E(4, 3), F(4, C) H(9, D)

Introduction to Ip:-

This is the host network layer delivery protocol designed for the Internet. Ip is a connectionless & datagram protocol with one guarantee or reliability it is an unreliable protocol because it doesn't provide any error control or flow control. Ip can only detect the error and discards the packet if it is corrupted.

Structure of Ip frame Header:-

The Ip frame header contain information & control information associated with datagram delivery. The Ip header structure is as shown in various field in the Ip header are as follows:-

1] VER (version): The field defines the version of Ip current version of Ip is Ipv4 and the latest version of Ip is Ipv6. It is a four bit long field.

2] HLEN (Header length):- This field defines the length of the datagram header in 4 byte word. Its value must be multiplied by 4 to given

the length in bytes.

3] Differential Services (DS) :- The field defines the class of service purpose. for quality of service precedence Network may offer accept traffic meaning that they certain precedence only above of high load. There is at time a 2 way trade off b/w low high reliability & throughput.

4] Total length :- This field defines the total length of the IP datagram the total length includes the length of headers as well as the data field.

5] Time to length :- This is an 8 bit long field which controls the maximum no. of routers visited by the datagram.

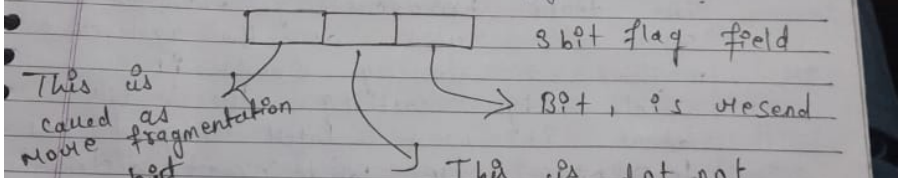
6] Header checksum :- A checksum in IP packet covers on the header only since some header field is recomputed change this field is and verified at each point that can the internet header is processed.

7] Source address :- This field is used for defining the Ip address of the source.

8] Destination address :- This field is used for defining the Ip address of the destination.

Identification flag & offset :-

- Identification ⇒ The field identifies the datagram originating from the same host when a datagram is fragmented, the value in the identification field is copied into all fragments. The identification number helps the destination in reassembling the fragments of the datagram.
- Flags :- This is an 3 bit field. The 3 bits are shown in fig.



- Fragmentation offset :- This is a 3 bit field which shows the relation position of this fragment with respect

to the whole datagram.

A1 Broadcasting :- It is the distribution of audio or video to a dispersed audience via any electronic mass communication medium but typically one using the electromagnetic spectrum (radio waves) in a one to many model broadcasting began with an radio which come into popular use around 1920 with the spread of vaccum tube, radio transmittes and receives this most implementation before electronic communications (early radio, telephone, and telegraph) were one to one with message intended for a single recipient. The term broadcasting evolved from it uses as the agriculture method of sowing seeds in a field by casting the broadly about it was later adopted describing the widespread distribution of information by printed material or by telegraph. Example applying it to "one to many" radio transmissions of an individual

Station to multiple listeners appeared as early as 1988.

* unicasting: This type of information transfer is useful when there is a participation of a single leader & a single receipent so, in short, you can term it a one-to-one transmission, for ex: if a device having Ip address 10.1.2.0 in the other network, then unicasting comes into the picture. This is the most common form of data transfer over networks.

* Multicast: In it, one/more Sender & transfer traffic. In this method traffic decline b/w the boundary of unicast (one to one) & broadcast (one-to-all) Multicast lets Server direct single copies of data streams that are then simulated & routed to hosts that request it. Ip multicast requires the support of some the protocols like IGMP (Internet group Managment protocol), multicast routing for it work, Also in classful Ip addressing class D is reserved for multicast groups.

ISDN (Integrated Services Digital network) :

These are not a set of communication standards for simultaneous digital transmission of voice, video, data & other network. before integrated Service Digital network (ISDN), the telephone system seems as a may to transmit voice, with some special services available for data. The main feature of ISDN is that it can integrate speech & data on the same lines, which were not available in the classic telephone system.

In the context of the OSI model, ISDN is employed as the network & data linked & physical layers but commanly ISDN is often limited to usage to Q.931 & related protocols these protocols introduced in 1986.

Historical outline :

In the 1960s, as trade spread throughout the world, the analoge phone network could not

handle the long distance calls made by for ex:- advertising executives in new yourk, who wanted to call their counterparts in the london at place & the then current phone network was not able to keep up. It was during this decade, over 60 years ago, that the entire phone network began to change to a digital switching system.

1] Basic Rate Interface (BRI):- There are 2 data bearing channels ('B' channels) & one signaling channels ('D' channel) in BRI to initiate connections. The B channels operate & maximum of 64Kbps. while the D channel operates at a maximum of 16Kbps. The 2 channels are independent of each other.

forex:- one channel is used as a TCP/IP connection to a send a fax to a remote location. In series ISDN supports a basic rate interface (BRI) specifies a digital pipe consisting of 2 B channel of 64Kbps each & one D channel of 16Kbps The equals a speed of 144 Kbps. In addition, the BRI service itself requires can operating overhead of 48Kbps. Therefore a digital pipe 192 Kbps is required.