CN - Assignment #3 (21K-4577)

Question 1:

a) Software Defined Networks (SDN) is a network architecture where control and data planes are decoupled, allowing centralized control via software controllers. In traditional networks, control and data planes are integrated with network devices.

- Centralized Control: SDN has a centralized controller managing the network, while traditional networks distribute control across devices.
- Programmability: SDN allows dynamic network configuration through software interfaces, unlike traditional networks relying on manual device configurations.
- Abstraction: SDN abstracts hardware, easing management, whereas traditional networks are tied to specific hardware.

b) In routers, switching fabrics include:

- Shared Memory: All ports share a memory of packet buffering. Cisco 7500 series routers use this.
- Bus-Based: Modules connect via a shared bus. Cisco 7200 series Routers utilize this fabric.
- Crossbar: Offers dedicated path between input and output ports. Cisco 12000 series Routers employ this fabric.

packets	Arrival Time	Leaving Time	Delay Time LT − AT
1	0	0	0
2	0	1	1
3	1	2	1
4	1	3	2
5	3	5	2
6	2	4	2
7	3	6	3
8	5	7	2
9	5	8	3
10	7	9	2
11	8	10	2
12	8	11	3

$$\text{avg delay} = \frac{\sum DT}{N} = \frac{0+1+1+2+2+2+3+2+3+2+2+3}{12}$$

$$= 1.92$$

Question 2a) : classfull addressing is a method of organizing and allocating IPV4 address, which was used in early days of the internet. dividing the 32bit IPV4 address space into five classes. each with a specific range based on the number of network bits and host bits.

class	HB	NIB	HIB	No. of Network	No. of host per network	Range.
A	0	8	24	2^7	2^{24}	0.0.0.0 to 127.255.255.255
B	10	16	16	2^{14}	2^{16}	128.0.0.0 to 191.255.255.255
C	110	24	8	2^{21}	2^8	192.0.0.0 to 223.255.255.255
D	1110	N/A	N/A	N/A	N/A	224.0.0.0 to 239.255.255.255
E	1111	N/A	N/A	N/A	N/A	240.0.0.0 to 255.255.255.255

class D and E are among the reserved catagories class D used for multicast and class E being retained for use in the future. However A, B, C are used for network hosts.

Question 2b) : VLSM is a method of subnetting that allows for more efficient use of the IPV4 address space. It allows for the creation of subnets with varying lengths, unlike traditional addressing system.

192.168.10.160 SM = 255.255.255.224

subnet bits = 27

host bits = 32 - 27 = 5

no. of usable address = 2^5 = 32 bits.

Call 30 usable address since we subtract - 2 because first address is subnet itself and last address is broadcast address.

Question 2c):

Max size of each datagram = 1500 bytes.

IP header size = 20 bytes.

= 1500 - 20 = 1480 bytes.

Total size of MP3 = 48,840 bytes.

no. of datagram required = 48,840/1480

= 32.93

approximately 33 datagrams = 33 would be required to send any MP3.

Question 3

a) otherwise → link 3.

b) match to "111000" entry, link 2.