Sprint 3 Deliverables

IP Questions:

1. IP does not make any assumptions regarding lower-level links and local networks used to transmit datagrams. IP is concerned with getting datagrams to their destinations regardless of what IP version they are on. This is because one of the goals of IP is heterogeneity, which means that IP can "run over anything," even when new technology is introduced and deployed. Another goal of IP is scalability, the fact that IP can "run over anything" helps the protocol to reach a global scale.

2. IP does not make any promises about performance and reliability. It is a best-effort service model in that the main goal is to get a datagram from the sender to the receiver. However, there is not a guarantee that a datagram will make it to the receiver, but IP is reliable most of the time. Most of the performance and reliability concerns are handled by other protocols like TCP.

3. The MAC space is flat. Knowing a MAC address gives no information about how to locate a host on the internet. MAC addresses are instead used to locate hosts on a local network. The solution for this problem is IP addressing. Every address has a host part and a network part. IP addresses are able to identify hosts based on how they relate to the network that they are on.

4. This is a classless network based on the /20 at the end of the IP address. The prefix length is 20 bits, which means that 12 bits are left to identify hosts. Thus, there can be 2^{12} = 4096 hosts.
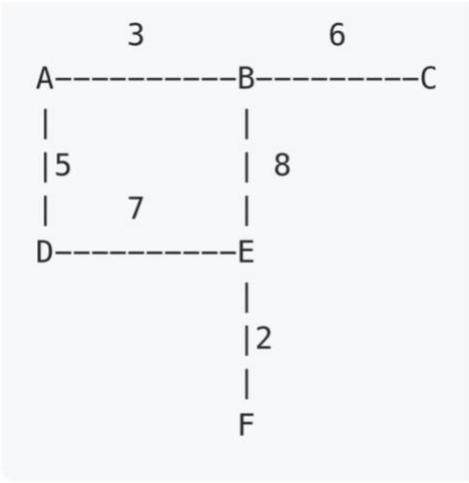
Dijkstra

Node	Best Distance	Path
A ✔	0	
B ✔	3	A→B
D ✔	5	A→D
C ✔	9	A→B→C
E ✔	11	A→B→E
F ✔	13	A→B→E→F
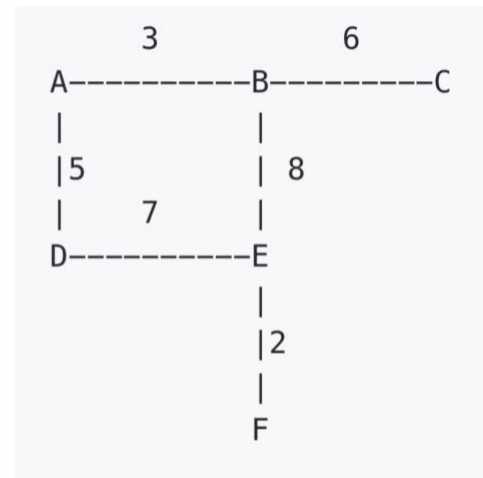
RIP

	A	B	C	D	E	F
A	0	3		5		
B	3	0	6		8	
C		6	0			
D	5			0	7	
E		8		7	0	2
F					2	0

	A	B	C	D	E	F
A	0	3	9	5	11	
B	3	0	6	8	8	10
C	9	6	0		14	
D	5	8		0	7	9
E	11	8	14	7	0	2
F		10		9	2	0

	A	B	C	D	E	F
A	0	3	9	5	11	13
B	3	0	6	8	8	10
C	9	6	0	14	14	16
D	5	8	14	0	7	9
E	11	8	14	7	0	2
F	13	10	16	9	2	0

SDN

The control plane is the part responsible for receiving and forwarding packets along connected links. The control plane normally involves hardware support. The data plane makes routing decisions and enforces policies. The data plane involves software support. Decentralization was a key goal of the internet, but decentralization adds complexity and overhead. Separating the control plane and the data plane adds flexibly and solves the complexity issue. Routers and switches were beginning to become more costly and more complex. The typical router contained 100 million lines of code. SDN allows networks to be managed with ease and allows for the use of simple switches.