1.

Stations 1, 4, 8, 11 and 15 want to send. Slots are needed, with the contents of each slot being as follows:

slot 1: 1, 4, 8, 11, 15
slot 2: 1, 4, 8
slot 3: 1, 4
slot 4: 1
slot 5: 4
slot 6: 8
slot 7: 11, 15
slot 8: 11
slot 9: 15

2.

a.

For each Ethernet frame, a minimum frame length limitation is required (64 bytes). When a collision is detected during transmitting, the transceiver will cut the current frame, so part of the broken frame has been transmitted on the link. Let's assume the broken frame is very short and the next valid frame behind is also very short. In this case, it's difficult to distinguish the valid frame. Therefore, we set a minimum frame length to make the distinction easily. If the data length is too short, the ***Pad*** field can fill out the frame to 64 bytes.

In addition, setting a minimum frame length can avoid misunderstanding. If a short frame from station A collides with another frame from station B on the cable, station B detects the collision, stop transmitting and send a noise burst on the cable. Before station A receives the noise burst warning from B, the short frame has been transmitted on the cable. In this case, station A will make a wrong conclusion that this short frame successfully sent. To avoid this happening, the short frame should be padding to the minimum length to guarantee every frame is transmitting until the noise burst's coming when a collision happens. In the usual case of assumption, we get the minimum size after calculation, which is 64 bytes.

b.

The minimum size of a valid Ethernet frame is 64 bytes from destination address to checksum. The destination address and the source address are both 6 bytes long. The type field is 2 bytes and the checksum part is 4 bytes, so there is already 18 bytes, i.e., the remaining part of the frame should be 46 bytes. The IP packet is 47 bytes long, which means there is no need to pad the frame.

3.

Given: $C \rightarrow B = 8,\ C \rightarrow D = 2,\ C \rightarrow E = 5$

From C to A:

a. $C \rightarrow B \rightarrow A = 8 + 2 = 10$

b. $C \rightarrow D \rightarrow A = 2 + 14 = 16$

c. $C \rightarrow E \rightarrow A = 5 + 7 = 12$

So the best route is $C \rightarrow B \rightarrow A = 10$

From C to F:

a. $C \rightarrow B \rightarrow F = 8 + 2 = 10$

b. $C \rightarrow D \rightarrow F = 2 + 10 = 12$

c. $C \rightarrow E \rightarrow F = 5 + 4 = 9$

So the best route is $C \rightarrow E \rightarrow F = 9$

10	B
8	B
0	—
2	D
5	E
9	E

The new routing table for ***C***

4.

a.

The subnet mask 255.255.240.0 converts to binary format is:

11111111.11111111.11110000.00000000

Therefore, for this class B network, the total number of subnet is 2^4 =16.

b.

For A: 1000 (2^{10}) addresses are required, so it should be 10 bits for host part.

For B: 512 (2^9) addresses are required, so it should be 9 bits for host part.

For C: 2000(2^{11}) addresses are required, so it should be 11 bits for host part.

For D: 8000(2^{13}) addresses are required, so it should be 13 bits for hose part.

	First IP address	Last IP address	Subnet mask	Network address
A	128.14.0.0	128.14.3.255	255.255.252.0/22	128.14.0.0/22
B	128.14.4.0	128.14.5.255	255.255.254.0/23	128.14.4.0/23
C	128.14.8.0	128.14.15.255	255.255.248.0/21	128.14.8.0/21
D	128.14.32.0	128.14.63.255	255.255.224.0/19	128.14.32.0/19