EP1100 Datakommunikation och datornät

5. Routing: Problems

C1. Assume a network that uses the "distance vector routing" principle. Node A has the following routing table:

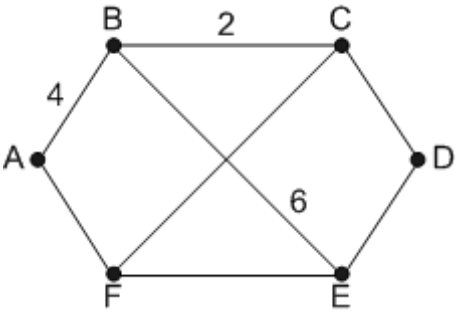
Network	Next router	Hop count
N_1	*B*	7
N_2	*C*	5
N_3	*B*	5
N_4	*D*	6
N_5	*C*	2

Node A receives a message from node B. The message contains the following information:

Network	Hop count
N_1	4
N_2	8
N_3	6
N_6	9

Show the contents of A's routing table after the reception of the message.

C2. The network in the figure below uses Distance Vector Routing. Node B has received the three distance vectors below from its neighbors, and it knows the cost of the direct links to each neighbor and they are shown in the graph. Complete B's routing table after it has been updated according to the Distance Vectors received.



Routing table at B

Node	**Cost**	**Next-hop**
A		
B	-	-
C		
D		
E		
F		

From A

To	**Cost**
A	0
B	4
C	6
D	20
E	13
F	5

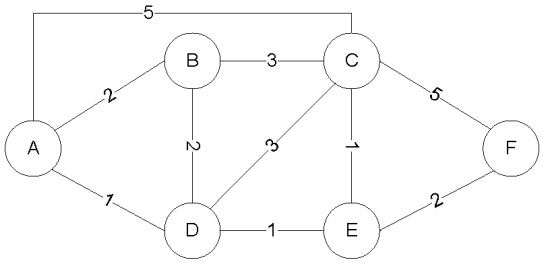
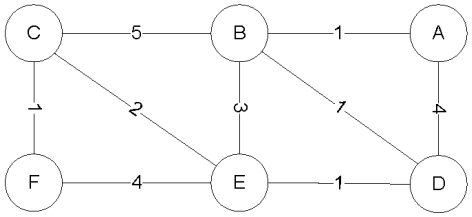
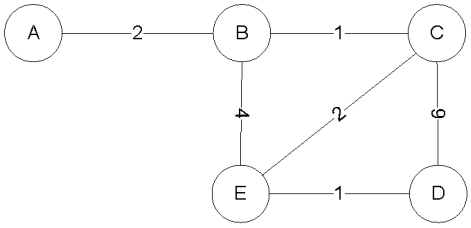
From C

To	**Cost**
A	6
B	2
C	0
D	3
E	10
F	1

From E

To	**Cost**
A	13
B	6
C	10
D	7
E	0
F	8

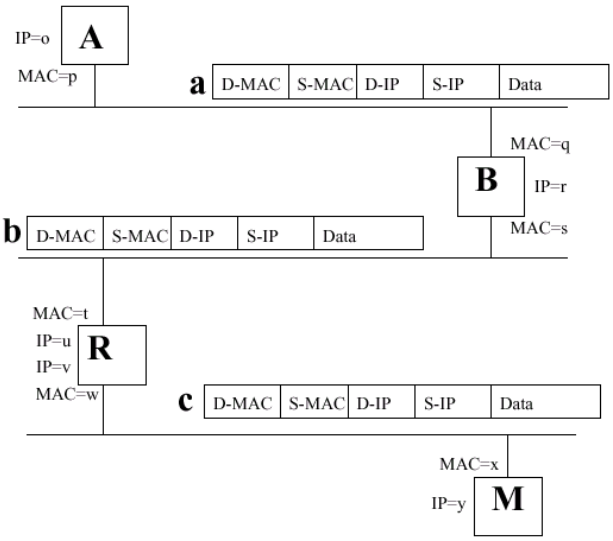
C3. Determine the shortest path with the help of Dijkstra's algorithm. Perform the calculation for the nodes stated in the table below. Show the results in a table.

a)	Node B	
b)	Node A	
c)	Node A	

C4. A message at the transport layer consists of 1500 bits data and a header with length 160 bits. It is passed to the Internet layer, where another 160 bits are added to the header. Afterwards the message has to be sent over two different types of local network, each of them adding 24 bits to the packet header. The last local network even has a maximum packet length of 800 bits. How many bits, including the headers, will the receiver get at its network layer protocol.

C5. Study the network below in which host A sends a message to host M. The bridge B and the router R have two MAC addresses, one per segment. The router has also two IP addresses, one per network. Draw the three frames a-c and fill in the correct values of:

- D-MAC = "Destination MAC address"
- S-MAC = "Source MAC address"
- D-IP = "Destination IP address"
- S-IP = "Source IP address"


IP=o
A
MAC=p
a
D-MAC
S-MAC
D-IP
S-IP
Data
MAC=q
B
IP=r
MAC=s
b
D-MAC
S-MAC
D-IP
S-IP
Data
MAC=t
IP=u
IP=v
R
MAC=w
c
D-MAC
S-MAC
D-IP
S-IP
Data
MAC=x
IP=y
M