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**Started on** Monday, 25 April 2022, 3:00 PM

**State** Finished

**Completed on** Monday, 25 April 2022, 3:55 PM

**Time taken** 54 mins 50 secs

**Marks** 58.00/60.00

**Grade** 96.67 out of 100.00

### Question 1

Correct

Mark 1.00 out of 1.00

DHCP is an application layer protocol that runs on top of UDP.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

### Question 2

Correct

Mark 1.00 out of 1.00

IGRP and IS-IS are two examples of intra-AS routing protocols.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

### Question 3

Correct Mark 16.00 out of 16.00

A host with **private IP address** is accessing a web server through NAT. A snippet of wireshark packet capture at **host/client** side is shown in the following figure:

No.	Time	Source	Destination	Protocol	Length	Info
4	1.140...	192.168.1.100	74.125.91.113	TCP	66	4330 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=4 SACK_PERM=1
5	1.207...	74.125.91.113	192.168.1.100	TCP	66	80 → 4330 [SYN, ACK] Seq=0 Ack=1 Win=5720 Len=0 MSS=1430 SACK_PERM=1 WS=64
6	1.207...	192.168.1.100	74.125.91.113	TCP	54	4330 → 80 [ACK] Seq=1 Ack=1 Win=260176 Len=0
7	1.208...	192.168.1.100	74.125.91.113	HTTP	1035	POST /safebrowsing/downloads?client=navclient-auto-ffox&appver=3.0.14&pver=
10	1.269...	74.125.91.113	192.168.1.100	TCP	60	80 → 4330 [ACK] Seq=1 Ack=982 Win=7744 Len=0
11	1.274...	74.125.91.113	192.168.1.100	HTTP	853	HTTP/1.1 200 OK (application/vnd.google.safebrowsing-update)
12	1.474...	192.168.1.100	74.125.91.113	TCP	54	4330 → 80 [ACK] Seq=982 Ack=800 Win=259376 Len=0

Another wireshark packet capture at the **server** side is shown in the following figure:

No.	Time	Source	Destination	Protocol	Length	Info
4	0.099...	71.192.34.104	74.125.91.113	TCP	66	4330 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=4 SACK_PERM=1
5	0.166...	74.125.91.113	71.192.34.104	TCP	66	80 → 4330 [SYN, ACK] Seq=0 Ack=1 Win=5720 Len=0 MSS=1430 SACK_PERM=1 WS=64
6	0.167...	71.192.34.104	74.125.91.113	TCP	60	4330 → 80 [ACK] Seq=1 Ack=1 Win=260176 Len=0
7	0.167...	71.192.34.104	74.125.91.113	HTTP	1035	POST /safebrowsing/downloads?client=navclient-auto-ffox&appver=3.0.14&pver=
8	0.228...	74.125.91.113	71.192.34.104	TCP	60	80 → 4330 [ACK] Seq=1 Ack=982 Win=7744 Len=0
9	0.232...	74.125.91.113	71.192.34.104	HTTP	853	HTTP/1.1 200 OK (application/vnd.google.safebrowsing-update)
10	0.434...	71.192.34.104	74.125.91.113	TCP	60	4330 → 80 [ACK] Seq=982 Ack=800 Win=259376 Len=0

Based on the above information, please summarize the source and destination IP addresses as well as source and destination port numbers of the packet when it goes through different location in the network, e.g. from host to gateway router, from gateway router to web server, from web server to gateway router and from gateway router to host.

Location	Source IP address	Dest. IP address	Source port nr.	Dest port nr.
Host --> GW router	192.168.1.100 ✓	74.125.91.113 ✓	4330 ✓	80 ✓
GW router --> server	71.192.34.104 ✓	74.125.91.113 ✓	4330 ✓	80 ✓
Server --> GW router	74.125.91.113 ✓	71.192.34.104 ✓	80 ✓	4330 ✓
GW router --> host	74.125.91.113 ✓	192.168.1.100 ✓	80 ✓	4330 ✓

### Question 4

Incorrect Mark 0.00 out of 1.00

AS-PATH attribute in BGP always tells a router about the shortest AS PATH information towards the destination.

Select one:

- ☒ True ✗
- ☐ False

AS PATH lists all ASs through which the advertisement has passed

The correct answer is 'False'.

## Question 5

Correct Mark 1.00 out of 1.00

A BGP route information can advertised by a gateway router to another gateway router in other AS through eBGP session.

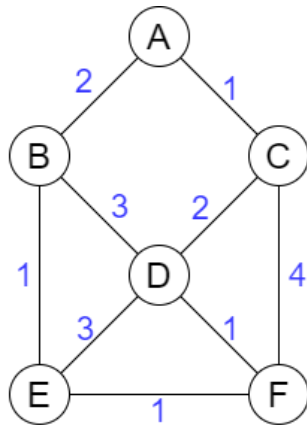
Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

## Question 6

Partially correct Mark 29.00 out of 30.00



Consider the above network. With the indicated link costs, use Link State routing algorithm to compute the shortest path from **A** to all network nodes. Show how the algorithm works by computing a table in the following format:

NOTE:

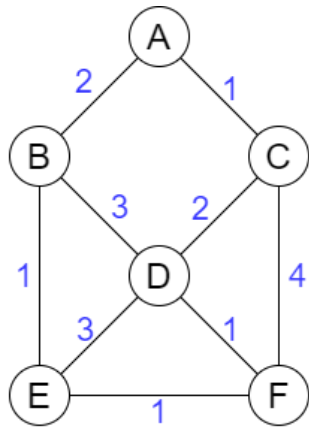
- Do not give space between D(x) and p(x), while the node is case insensitive, e.g. 3,A or 4,b or 5,c etc
- For infinity link cost, you can simply write **inf**.
- If a node has been added to the N', indicate its D(x), p(x) with '-' in the next iteration.
- If there is any tie in least cost path calculation to some nodes, take **left most** node **first**, and then go to the right. For example: D(A) = 3, D(C) = 3, D(E) = 3, then you take D(A) first, then D(C), and finally D(E).

Step	N'	D(B),p(B)	D(C),p(C)	D(D),p(D)	D(E),p(E)	D(F),p(F)
0	A	2,A ✓	1,A ✓	inf ✓	inf ✓	inf ✓
1	AC ✓	2,A ✓	- ✓	3,C ✓	inf ✓	5,C ✓
2	ACB ✓	- ✓	- ✓	3,C ✓	3,B ✓	5,C ✓
3	ACBD ✓	- ✓	- ✓	- ✓	3,B ✓	4,D ✓
4	ACBDE ✓	- ✓	- ✓	- ✓	- ✓	4,E ✗
5	ACBDEF ✓					

## Question 7

Correct

Mark 10.00 out of 10.00



Consider the network shown above, and assume that each node initially knows the costs to each of its neighbors. Consider the **distance-vector** algorithm. Show the distance vector table entries at node **C** after the **first** iteration!

**NOTE:**

- It is case insensitive
- If the cost = infinity, you can simply write **inf** and the corresponding next hop can be written as '-' (without quote)
- If there are more than one paths with similar minimum cost, choose only one possible next hop (don't write all possible next hops)

	A	B	D	E	F
Cost	1 ✓	3 ✓	2 ✓	5 ✓	3 ✓
Next hop	A ✓	A ✓	D ✓	D ✓	D ✓