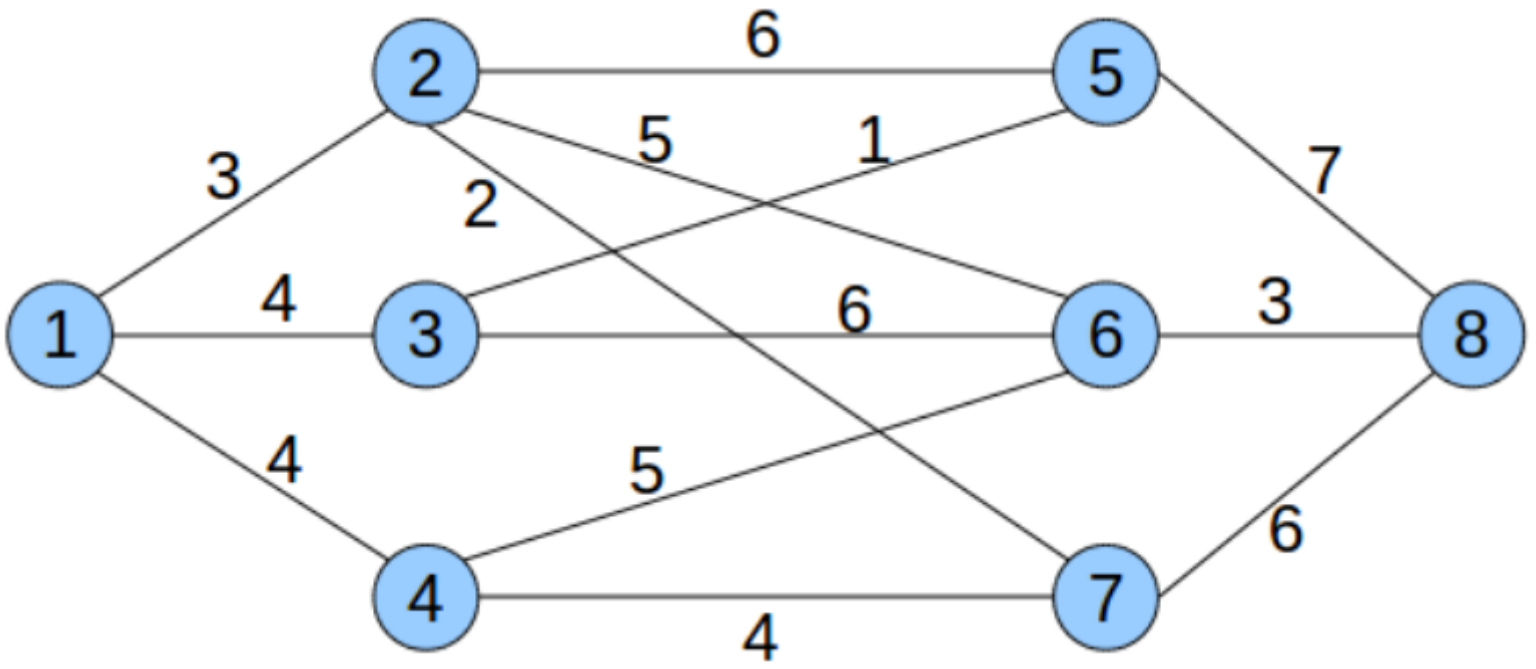
Started on	Sunday, 22 September 2019, 10:21 AM
State	Finished
Completed on	Sunday, 29 September 2019, 9:56 PM
Time taken	7 days 10 hours
Marks	80.10/100.00
Grade	**8.01** out of 10.00 (**80**%)

Information

The figure below shows a network topology, where the nodes are routers and the edges mark a link between nodes. The edges are weighted to show the cost of using the link. The following questions refer to this figure.



Question **1**

Correct

Mark 4.00 out of 4.00

Is the Bellman-Ford algorithm a link-state or distance vector routing algorithm?

Penalty regime: 100%

Select one:

- a. Link-state routing.
- b. Distance-vector routing. ✔

Your answer is correct.

The correct answer is: Distance-vector routing.

Correct

Marks for this submission: 4.00/4.00.

Question **2**

Correct

Mark 13.00 out of 13.00

Apply the Bellman-Ford routing algorithm to the figure shown at the top of the page to find the minimum cost routes from station 1 to all other stations. Please fill in the following table with the calculation steps.
Please use "inf" to specify an infinite cost and "-" to specify no next hop.

Bellman-Ford Algorithm Results for station 1

Station	1-Hop (cost, next-hop)	2-Hop (cost, next-hop)	3-Hop (cost, next-hop)
1	0,1	0,1	0,1
2	3 ✔ , 2 ✔	3 ✔ , 2 ✔	3 ✔ , 2 ✔
3	4 ✔ , 3 ✔	4 ✔ , 3 ✔	4 ✔ , 3 ✔
4	4 ✔ , 4 ✔	4 ✔ , 4 ✔	4 ✔ , 4 ✔
5	inf,-	5 ✔ , 3 ✔	5 ✔ , 3 ✔
6	inf,-	8 ✔ , 2 ✔	8 ✔ , 2 ✔
7	inf,-	5 ✔ , 2 ✔	5 ✔ , 2 ✔
8	inf,-	inf,-	11 ✔ , 2 ✔

Penalty regime: 100% per cell

Correct

Marks for this submission: 13.00/13.00.

Question **3**

Correct

Mark 6.00 out of 6.00

With reference to the previous question, complete the forwarding table for station 1 after Bellman-Ford has converged.

Destination	Next hop
2	2 ✔
3	3 ✔
4	4 ✔
5	3 ✔
6	2 ✔
7	2 ✔
8	2 ✔

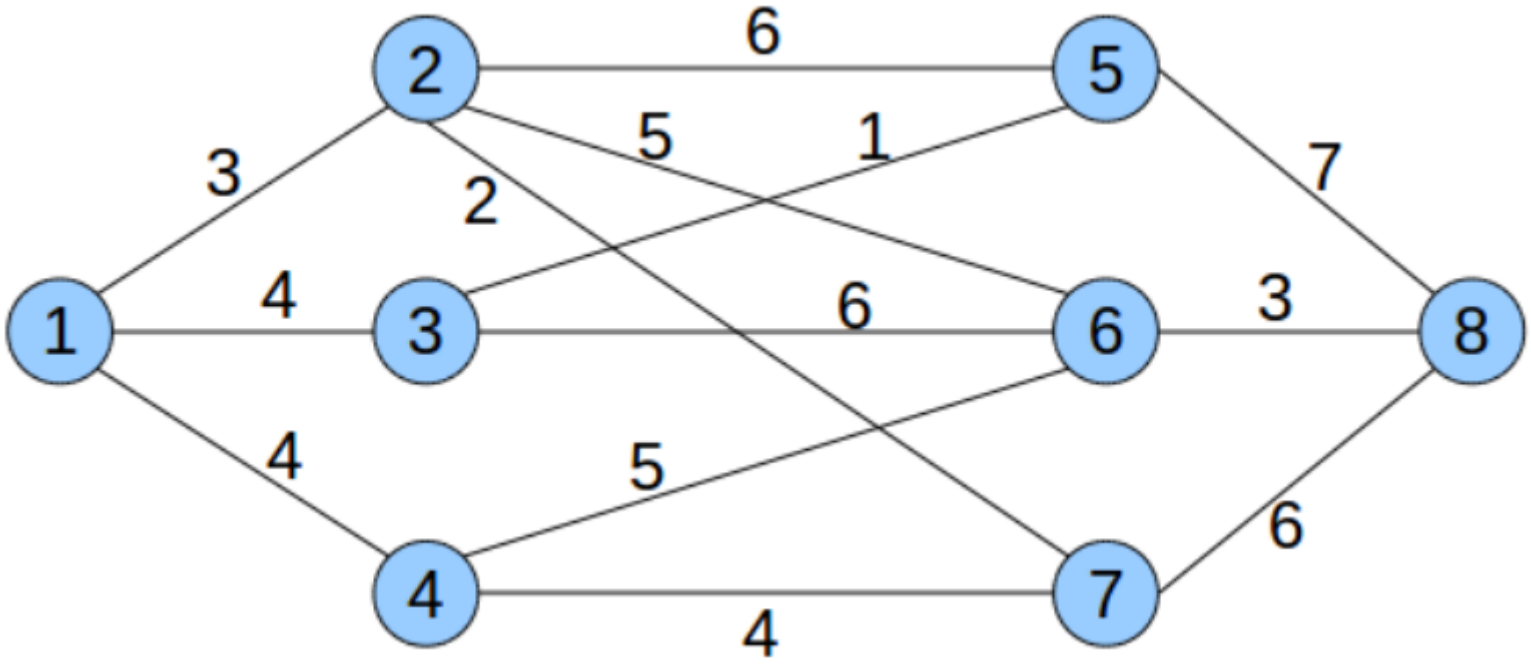
Penalty regime: 100%

Correct

Marks for this submission: 6.00/6.00.

Information

The figure below shows a network topology, where the nodes are routers and the edges mark a link between nodes. The edges are weighted to show the cost of using the link. The following questions refer to this figure.



Question **4**

Correct

Mark 4.00 out of 4.00

Is Dijkstra's algorithm link-state or distance-vector routing?

Penalty regime: 100%

Select one:

- a. Link-state routing. ✔
- b. Distance-vector routing.

Your answer is correct.

The correct answer is: Link-state routing.

Correct

Marks for this submission: 4.00/4.00.

Question **5**

Correct

Mark 12.77 out of 13.00

Apply Dijkstra's algorithm on the example network shown at the top of the page to find the minimum cost routes from station 1 to all other stations. Please fill in the following table for the values during calculation steps. S is the set of stations whose least-cost path is known; D(v) is the current cost of the path from the source (i.e., station 1) to station v; p(v) is the predecessor station along the path from the source to v, that is next to v.
Please use "inf" to specify an infinite cost and "-' to specify no predecessor.

Dijkstra Algorithm Results for station 1

Step	S	D(2), p(2)	D(3), p(3)	D(4), p(4)	D(5), p(5)	D(6), p(6)	D(7), p(7)	D(8), p(8)
0	{1}	3 , 1	4 , 1	4 , 1	inf , -	inf , -	inf , -	inf , -
1	{12}	3 , 1	4 , 1	4 , 1	9 , 2	8 , 2	5 , 2	inf , -
2	{123}	3 , 1	4 , 1	4 , 1	5 , 3	8 , 2	5 , 2	inf , -
3	{1234}	3 , 1	4 , 1	4 , 1	5 , 3	8 , 2	5 , 2	inf , -
4	{12345}	3 , 1	4 , 1	4 , 1	5 , 3	8 , 2	5 , 2	12 , 5
5	{123457}	3 , 1	4 , 1	4 , 1	5 , 3	8 , 2	5 , 2	11 , 7
6	{1234576}	3 , 1	4 , 1	4 , 1	5 , 3	8 , 2	5 , 2	11 , 7
7	{12345768}	3 , 1	4 , 1	4 , 1	5 , 3	8 , 2	5 , 2	11 , 7

Penalty regime: 100%

Correct

Marks for this submission: 13.00/13.00. Accounting for previous tries, this gives **12.77/13.00**.

Question **6**

Correct

Mark 5.00 out of 5.00

With reference to the previous question, complete the forwarding table for station 1 after Dijkstra's algorithm has converged.

Destination	Next hop
2	2 ✔
3	3 ✔
4	4 ✔
5	3 ✔
6	2 ✔
7	2 ✔
8	2 ✔

Penalty regime: 100%

Correct

Marks for this submission: 5.00/5.00.

Question **7**

Correct

Mark 5.00 out of 5.00

Select the items that apply to an autonomous system.

Penalty regime: 33%, 66%, 100%

Select one or more:

- [ ] a. A set of routers that are owned by multiple organisations that in order to communicate use a common routing protocol.
- [x] b. None of these. ✔
- [ ] c. A set of routers managed by a single organisation, and if it has a Autonomous System Number (ASN), it does not need to have a common routing protocol.
- [ ] d. A set of routers that in order to stay fully connected have Ethernet cables directly connecting all hosts and routers.

Your answer is correct.

The correct answer is: None of these.

Correct

Marks for this submission: 5.00/5.00.

Question **8**

Correct

Mark 1.67 out of 5.00

Imagine a university that runs its own autonomous system (AS) and buys 100,000,000 GB of internet traffic from a single Internet service provider (ISP), which also runs its own AS, to supply to their students at a fixed charge of $5 per 50GB. What type of AS is the university?

Penalty regime: 33%, 66%, 100%

Select one:

- ( ) a. The university is not an AS as they are not an Internet Service Provider (ISP).
- (•) b. A stub AS, as it only has one connection with one ISP. ✔
- ( ) c. A multi-homed AS as it connects thousands of students.
- ( ) d. A transit AS as the students run peer-to-peer applications allowing traffic to pass between the students

Your answer is correct.

The correct answer is: A stub AS, as it only has one connection with one ISP.

Correct

Marks for this submission: 5.00/5.00. Accounting for previous tries, this gives **1.67/5.00**.

Question **9**

Correct

Mark 1.67 out of 5.00

What is a benefit of a multi-homed Autonomous System (AS) that is not available in a non-multihomed (stub) AS?

Select one:

- a. Being able to send your own traffic to other AS.
- b. Remain connected to the Internet even when one of the connections fails. ✔ Correct. An additional benefit besides improved fault tolerance is that having multiple connections also allows to better balance traffic load, e.g. by routing excess traffic to a certain destination through an alternative path if the primary path becomes overloaded.
- c. Reduced fees for internet connection.

Your answer is correct.

The correct answer is: Remain connected to the Internet even when one of the connections fails.

Correct

Marks for this submission: 5.00/5.00. Accounting for previous tries, this gives **1.67/5.00**.

Question **10**

Correct

Mark 3.33 out of 5.00

Which of the following would be expected to own a transit AS?

Select one or more:

- a. University of Auckland
- b. Verizon ✔
- c. Netflix
- d. Vodafone ✔

Your answer is correct.

The correct answers are: Vodafone, Verizon

Correct

Marks for this submission: 5.00/5.00. Accounting for previous tries, this gives **3.33/5.00**.

Question **11**

Correct

Mark 5.00 out of 5.00

A packet arrives at a router, the router performs a table lookup to discover where to send it. This is:

Penalty regime: 33%, 66%, 100%

Select one:

- a. Neither.
- b. *Forwarding* as this decision applies to only this packet. ✔
- c. *Routing* as a table is consulted.
- d. *Routing* as this decision has a lot of latency.

Your answer is correct.

The correct answer is: *Forwarding* as this decision applies to only this packet.

Correct

Marks for this submission: 5.00/5.00.

Question **12**

Correct

Mark 4.00 out of 4.00

Match up the terminology with the correct definitions. AS = Autonomous System.

Penalty regime: 100%

Intra-AS routing is: routing within an AS ✔

Inter-AS routing is: routing from one AS to another AS ✔

Your answer is correct.

The correct answer is: Intra-AS routing is: → routing within an AS, Inter-AS routing is: → routing from one AS to another AS

Correct

Marks for this submission: 4.00/4.00.

Question **13**

Correct

Mark 2.67 out of 4.00

A router operates a routing protocol that collects knowledge required for routing from only adjacent routers. Select the items that are true for this routing protocol.

Penalty regime: 33%, 66%, 100%

Select one or more:

- [x] a. Dynamic (adaptive) routing. ✔
- [x] b. Decentralized routing. ✔
- [ ] c. Global (centralized) routing.
- [ ] d. Static routing.

Your answer is correct.

The correct answers are: Decentralized routing., Dynamic (adaptive) routing.

Correct

Marks for this submission: 4.00/4.00. Accounting for previous tries, this gives **2.67/4.00**.

Question **14**

Correct

Mark 0.00 out of 4.00

Suppose we have a network whose routers have a low processing and/or low memory capacity. What would be the best type of routing protocol?

Penalty regime: 100%

Select one:

- ( ) a. Link-state (Dijkstra's algorithm)
- (•) b. Distance-vector (Bellman-Ford) ✔

Your answer is correct.

The correct answer is: Distance-vector (Bellman-Ford)

Correct

Marks for this submission: 4.00/4.00. Accounting for previous tries, this gives **0.00/4.00**.

Question **15**

Correct

Mark 1.67 out of 5.00

Suppose we have a network with faulty links that may disconnect and reconnect at any time. Which routing protocol would be the best and why?

Penalty regime: 33%, 66%, 100%

Select one:

- a. Link-state, since specific updates to the link table can be flooded ✔
- b. Link-state, since flooding won't be stopped after losing a single link
- c. Distance-vector, since this update only effects hosts connected by that link
- d. Distance-vector, since routing information is only shared among neighbors, thus less information is lost.

Your answer is correct.

The correct answer is: Link-state, since specific updates to the link table can be flooded

Correct

Marks for this submission: 5.00/5.00. Accounting for previous tries, this gives **1.67/5.00**.

Question **16**

Correct

Mark 5.00 out of 5.00

Suppose we have a large network of routers (greater than 1000). What would be the best type of routing protocol and why?

Penalty regime: 33%, 66%, 100%

Select one:

- a. Distance-vector, because link failure has fast convergence over the network.
- b. Link-state with hierarchy, because this creates smaller networks. ✔
- c. Link-state, because having the full topology allows faster recovery from link/node failure.
- d. Distance-vector, because information is shared only among neighbors.

Your answer is correct.

The correct answer is: Link-state with hierarchy, because this creates smaller networks.

Correct

Marks for this submission: 5.00/5.00.

Question **17**

Correct

Mark 4.00 out of 4.00

With respect to distance-vector routing algorithms, what is the count to infinity problem?

Penalty regime: 33%, 66%, 100%

Select one:

- a. Routers cannot count higher than 2^5 and so cannot count to infinity.
- b. After a new path is found in the network, it takes a very long (infinite) time for other routers to learn about the new route.
- c. After a path becomes unreachable, it takes a very long (infinite) time for other routers to learn about the missing router. ✔
- d. Routers more than 10 hops away are considered infinitely away and are isolated from the rest of the network

Your answer is correct.

The correct answer is: After a path becomes unreachable, it takes a very long (infinite) time for other routers to learn about the missing router.

Correct

Marks for this submission: 4.00/4.00.

Question **18**

Correct

Mark 1.33 out of 4.00

Routing Information Protocol (RIP) is limited to small networks because:

Penalty regime: 33%, 66%, 100%

Select one or more:

- [ ] a. None of these reasons.
- [ ] b. RIP does not consider the count to infinity problem.
- [ ] c. RIP can not adapt to errors such as failed links or routers.
- [x] d. RIP has a large convergence time in large networks. ✔
- [x] e. Every router and host can be no more than 15 hops away. ✔

Your answer is correct.

The correct answers are: Every router and host can be no more than 15 hops away., RIP has a large convergence time in large networks.

Correct

Marks for this submission: 4.00/4.00. Accounting for previous tries, this gives **1.33/4.00**.

◄ Quiz: IPv4 Networking (Practice copy) Jump to... Quiz: Routing (Practice copy) ►