Started on	Monday, 23 September 2019, 5:21 PM
State	Finished
Completed on	Monday, 23 September 2019, 5:29 PM
Time taken	7 mins 6 secs
Grade	**100.00** out of 100.00

Information

This quiz is designed to be completed within the first two weeks of term four, in conjunction with the fourth problem sheet: IPv4 Networking. The fourth problem sheet is available on the Learn page for COSC 264 (https://learn.canterbury.ac.nz/course/view.php?id=6916) in the section 'Problem sheets for term 4'.

This page assumes that you have read up to and including section 3.1, and done all the relevant exercises of the 'IPv4 Networking' problem sheet.

The manual pages found in a Unix operating system are a form of software documentation, providing reference information rather than a tutorial. More information on the manual pages can be found in the first problem sheet: Unix is Your Friend! from term 3. Use the **man** command to read about *traceroute*, *ping*, *route*, *ifconfig*, and *arp.* This will be assessed in the following questions.

Question **1**

Correct

Mark 2.00 out of 2.00

What information is included in the output of *ifconfig* with no parameters set?

Penalty regime (33%, 66%, 100%)

Select one:

- a. The status of the currently active interfaces. ✔
- b. The status of the machine.
- c. The status of the given interface.
- d. The status of all interfaces, even those that are down.

Your answer is correct.

The correct answer is: The status of the currently active interfaces.

Correct

Marks for this submission: 2.00/2.00.

Question **2**

Correct

Mark 3.00 out of 3.00

Select the statements that *traceroute* assumes to be true.

Penalty regime (33%, 66% 100%)

Select one or more:

- a. The destination port of the target is currently open.
- b. All routers will respond to traceroute packets ✔
- c. The path of the traceroute packets is the same every time. ✔

Your answer is correct.

The correct answers are: All routers will respond to traceroute packets, The path of the traceroute packets is the same every time.

Correct

Marks for this submission: 3.00/3.00.

Question **3**

Correct

Mark 3.00 out of 3.00

Select the correct statements about *ping* below.

Penalty regime (33%, 66%, 100%)

Select one or more:

- [ ] a. Only compatible with IPv4
- [x] b. Often used to check that routes exist. ✔
- [ ] c. Uses ICMP INFORMATION_REQUEST
- [x] d. Measures round trip latency. ✔
- [x] e. Uses ICMP ECHO_REQUEST packets. ✔

Your answer is correct.

The correct answers are: Often used to check that routes exist., Measures round trip latency., Uses ICMP ECHO_REQUEST packets.

Correct

Marks for this submission: 3.00/3.00.

Information

This page assumes that you have read up to and including section 3.1, and done all the relevant exercises in problem sheet four.

Two hosts, Host A and Host B are connected through the Internet. Host A is ten hops away from host B and wants to know what path is taken to get to Host B. Host A starts a traceroute with Host B's IP address, all other parameters remain at their default values. The following questions are in chronological order.

TTL = Time To Live which is a field in the IP packet header. For more information refer to the slideset 'IPv4 and related protocols', which can be found on Learn in section 'Lecture notes for term 3'.

Question **4**

Correct

Mark 2.00 out of 2.00

Host A sends a UDP packet with the TTL=1. What does the receiving router do with the packet?

Penalty regime (50%, 100%)

Select one:

- ( ) a. Doesn't modify the TTL field, leaving the value of TTL at 1.
- ( ) b. Increments the TTL field from 1 to 2.
- (•) c. Decrements the TTL field from 1 to 0. ✔

Your answer is correct.

The correct answer is: Decrements the TTL field from 1 to 0.

Correct

Marks for this submission: 2.00/2.00.

Question **5**

Correct

Mark 2.00 out of 2.00

What does the first router do after it changes / does not change the TTL field?

Penalty regime (33%, 66%, 100%)

Select one:

- ( ) a. Forwards the packet onto the next hop.
- ( ) b. Broadcasts the packet.
- (•) c. Drops the packet and returns an ICMP time exceeded packet ✔
- ( ) d. Drops the packet and does nothing.

Your answer is correct.

The correct answer is: Drops the packet and returns an ICMP time exceeded packet

Correct

Marks for this submission: 2.00/2.00.

Question **6**

Correct

Mark 2.00 out of 2.00

The next **new** packet Host A will send out (not counting any repetitions of the first packet) is:

Penalty regime (33%, 66%, 100%)

Select one:

- a. UDP packet with a TTL of 1.
- b. It will not send out a packet because it has already received all the information it needs.
- c. UDP packet with a TTL of 0.
- d. UDP packet with a TTL of 2. ✔

Your answer is correct.

The correct answer is: UDP packet with a TTL of 2.

Correct

Marks for this submission: 2.00/2.00.

Question **7**

Correct

Mark 2.00 out of 2.00

The last packet that is returned to Host A is:

Penalty regime (33%, 66%, 100%)

Select one:

- a. TCP SYN packet to start a TCP connection.
- b. Packet that is 10000 bytes in size.
- c. ICMP destination host unreachable.
- d. ICMP destination port unreachable. ✔

Your answer is correct.

The correct answer is: ICMP destination port unreachable.

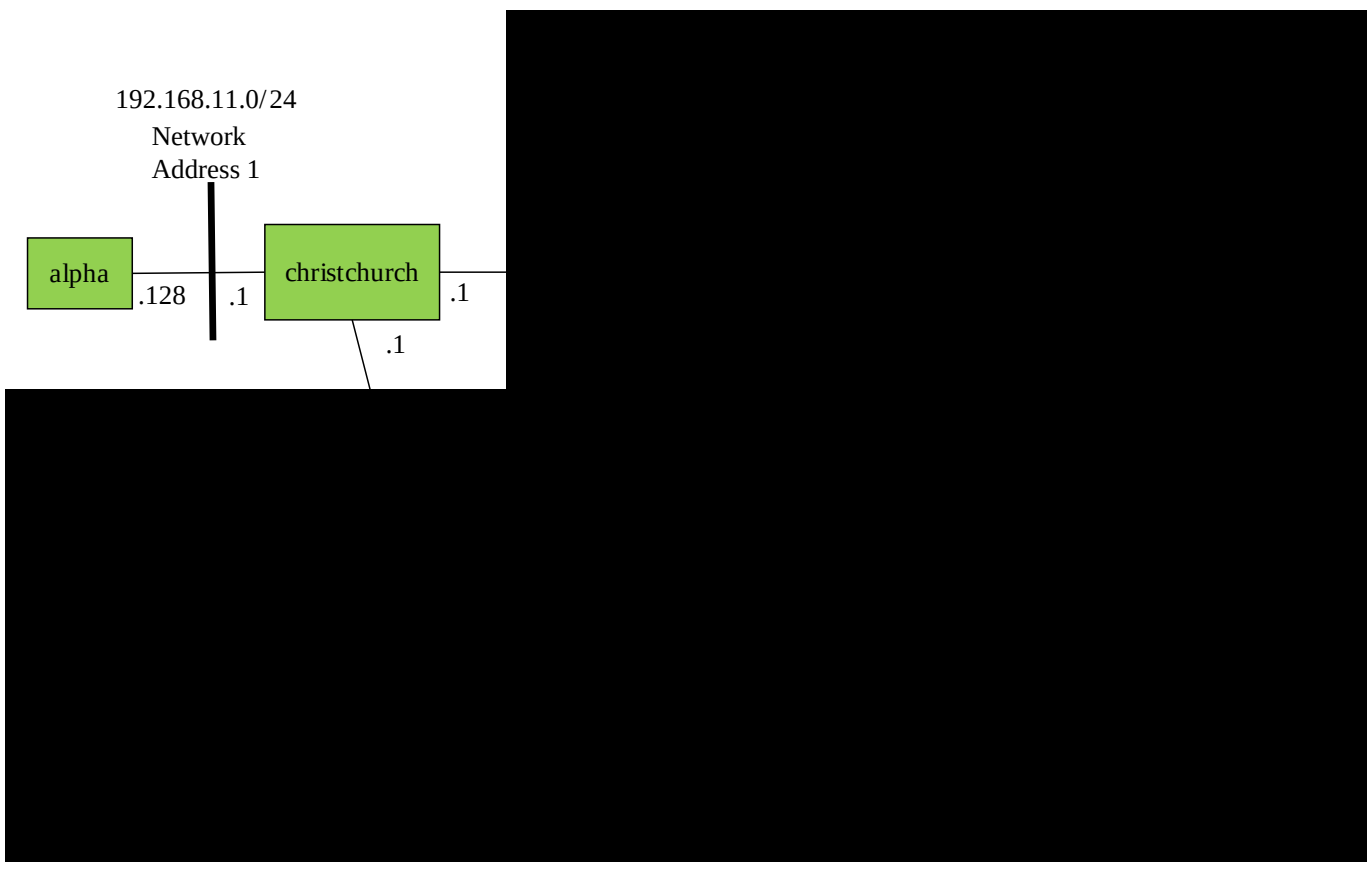
Correct

Marks for this submission: 2.00/2.00.

Information

The following questions assume that you have read up to and including section 3.3, and completed all the relevant exercises in the 'IPv4 Networking' problem sheet.

The figure below shows a subset of the network topology that connects the VMs. The rest of the network topology can be built with the help of *ifconfig,* executed on the hosts and routers in the network. After completing the remainder of the network topology, answer the questions below.



Question **8**

Correct

Mark 3.00 out of 3.00

Select all of the routers/hosts directly connected to Dunedin.

Penalty regime (33%, 66%, 100%)

Select one or more:

- [ ] a. Gamma
- [ ] b. Hamilton
- [ ] c. Wellington
- [ ] d. Alpha
- [x] e. Christchurch ✔
- [ ] f. Beta
- [x] g. Auckland ✔

Your answer is correct.

The correct answers are: Auckland, Christchurch

Correct

Marks for this submission: 3.00/3.00.

Question **9**

Correct

Mark 3.00 out of 3.00

Select all of the routers/hosts directly connected to Auckland.

Penalty regime (33%, 66%, 100%)

Select one or more:

- [ ] a. Christchurch
- [x] b. Dunedin ✔
- [ ] c. Wellington
- [x] d. Beta ✔
- [x] e. Gamma ✔
- [ ] f. Alpha
- [x] g. Hamilton ✔

Your answer is correct.

The correct answers are: Beta, Gamma, Hamilton, Dunedin

Correct

Marks for this submission: 3.00/3.00.

Question **10**

Correct

Mark 8.00 out of 8.00

Select all hosts/routers that are connected to the subnet 192.168.14.0/24.

Penalty regime (33% 66% 100%)

Select one or more:

- [ ] a. Christchurch
- [ ] b. Dunedin
- [ ] c. gamma
- [x] d. Wellington ✔
- [x] e. Hamilton ✔
- [ ] f. alpha
- [ ] g. Auckland
- [ ] h. beta

Your answer is correct.

The correct answers are: Hamilton, Wellington

Correct

Marks for this submission: 8.00/8.00.

Question **11**

Correct

Mark 4.00 out of 4.00

If the ARP cache is cleared, what effect would this have on the delay measured by ping between hosts within the same subnetwork?

Penalty regime (33%, 66%, 100%)

Select one:

- ( ) a. Ping will report an error since the ARP cache is now empty.
- ( ) b. The ARP cache does not affect the delay reported by ping.
- (•) c. Since the ARP cache is empty, an ARP request must be sent, increasing the delay reported by ping for the first packets. ✔
- ( ) d. Since the ARP cache is empty, new messages are delayed by 0.1-0.5ms to slow down possible network attacks on the system.

Your answer is correct.

The correct answer is: Since the ARP cache is empty, an ARP request must be sent, increasing the delay reported by ping for the first packets.

Correct

Marks for this submission: 4.00/4.00.

Question **12**

Correct

Mark 4.00 out of 4.00

With all the VMs in their initial configuration, what error message is reported when host alpha pings host gamma?

Penalty regime (33% 66% 100%)

Select one:

- ( ) a. Destination network unknown
- (•) b. Destination network unreachable ✔ This generally means that an IP router or host has no route for a particular destination network in its forwarding table. In this particular case the problem resides with host alpha itself, since alpha does not yet have a default route entry.
- ( ) c. Destination host unreachable
- ( ) d. Destination host unknown

Your answer is correct.

The correct answer is: Destination network unreachable

Correct

Marks for this submission: 4.00/4.00.

Information

This page assumes that you have read up to and including section 3.4, and completed all the relevant exercises in the 'IPv4 Networking' problem sheet.

Before continuing re-boot all virtual machines so that they start "empty."

For the following questions consider the three end hosts: alpha, beta, and gamma.

Question **13**

Correct

Mark 10.00 out of 10.00

After configuring the missing route(s) on alpha, how does the output of a ping command towards gamma change? **Important**: this assumes that you have not yet changed **anything** in the configuration of any of the routers auckland, christchurch, dunedin, etc.

Select one:

- a. Destination host unreachable.
- b. Destination host unknown.
- c. The ping tool outputs nothing. ✔
- d. Destination network unreachable.

Correct, when host gamma is pinged from host alpha, the ping tool outputs nothing. Indeed, host alpha has sent the IP packet to gamma to its default router, which is router christchurch. Router christchurch, however, does not have IP forwarding enabled, thus it ignores the packet from alpha.

The correct answer is: The ping tool outputs nothing.

Correct

Marks for this submission: 10.00/10.00.

Question **14**

Correct

Mark 10.00 out of 10.00

What happens if alpha pings the address 192.168.11.2?

Select one:

- a. Destination network unreachable
- b. Destination network unknown
- c. The ping tool outputs nothing
- d. Destination host unreachable ✔

Correct, the host is unreachable as there is no host in the subnet 192.168.11.0/24 with the address 192.168.11.2.

In steps, alpha would match the entry

Destination	Gateway	Genmask
192.168.11.0	*	255.255.255.0

in its routing table. The * in the gateway column means that it is a local subnetwork. Therefore, alpha will issue an ARP request for 192.168.11.2, which fails (after some re-tries). As a result, the destination host is unreachable and the packet cannot be delivered.

The correct answer is: Destination host unreachable

Correct

Marks for this submission: 10.00/10.00.

Information

This page assumes that you have read up to and including section 3.5, and completed all the relevant exercises in the 'IPv4 Networking' problem sheet.

Question **15**

Correct

Mark 2.00 out of 2.00

Why is it necessary to enable IP forwarding in the routers?

Select one:

- a. The hosts will not use the routers as a default gateway.
- b. Otherwise the router cannot operate at the IP level.
- c. Otherwise the routers will just drop packets not intended for them. ✔
- d. Otherwise the routers will respond with an error as the packets are not intended for them.

Your answer is correct.

The correct answer is: Otherwise the routers will just drop packets not intended for them.

Correct

Marks for this submission: 2.00/2.00.

Question **16**

Correct

Mark 30.00 out of 30.00

Please give complete routing tables for **all** the routers, such that each host/router can reach all of the given networks, each router has only one entry per destination network, all routes require the minimum number of hops, and the routing tables of the hosts have just two entries.

Enter the only the last two bytes of the address of the next hop gateway, e.g for Christchurch to 15.0 enter: 13.2

If the two places exist in the same network enter *, e.g for Christchurch to 11.0 enter: *

Enter these into the following tables with the header corresponding to the router

Akl

Destination	Next hop gateway
.11.0	15.1 ✔
.12.0	16.1 ✔
.13.0	15.1 ✔
.14.0	16.1 ✔
.15.0	* ✔
.16.0	* ✔
.17.0	* ✔

Ham

Destination	Next hop gateway
.11.0	14.1 ✔
.12.0	14.1 ✔
.13.0	14.1 ✔
.14.0	* ✔
.15.0	16.2 ✔
.16.0	* ✔
.17.0	16.2 ✔

Well

Destination	Next hop gateway
.11.0	12.1 ✔
.12.0	* ✔
.13.0	12.1 ✔
.14.0	* ✔
.15.0	14.2 ✔
.16.0	14.2 ✔
.17.0	14.2 ✔

Chch

Destination	Next hop gateway
.11.0	*
.12.0	* ✔
.13.0	* ✔
.14.0	12.2 ✔
.15.0	13.2
.16.0	13.2 ✔
.17.0	13.2 ✔

Dun

Destination	Next hop gateway
.11.0	13.1 ✔
.12.0	13.1 ✔
.13.0	* ✔
.14.0	13.1 ✔
.15.0	* ✔
.16.0	15.2 ✔
.17.0	15.2 ✔

(penalty regime for each text box: 100 %)

Correct

Marks for this submission: 30.00/30.00.

Question **17**

Correct

Mark 5.00 out of 5.00

Select all items that are true for static routing.

Select one or more:

- a. Built automatically with the help of routing protocols.
- b. Maintainable with large network sizes.
- c. Can recover from link or node failure.
- d. Setup and modified manually. ✔
- e. Can easily debug routing issues. ✔

Your answer is correct.

The correct answers are: Setup and modified manually., Can easily debug routing issues.

Correct

Marks for this submission: 5.00/5.00.

Question **18**

Correct

Mark 5.00 out of 5.00

This question assumes that all the routes have been added and alpha can successfully ping gamma.

Turn off the Dunedin VM. Now when alpha pings gamma, what happens?

Select one:

- a. Now that Dunedin is down there is a direct link between Christchurch and Auckland, so packets still get delivered.
- b. Christchurch still tries to send packets to Dunedin, which is no longer available, so the packets do not arrive at their destination. ✔
- c. Christchurch detects Dunedin is no longer available and stops sending packets to Dunedin.
- d. Christchurch detects Dunedin is no longer available and routes packets through Wellington instead.

Your answer is correct.

The correct answer is: Christchurch still tries to send packets to Dunedin, which is no longer available, so the packets do not arrive at their destination.

Correct

Marks for this submission: 5.00/5.00.

◄ Mid-term test 2018

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Quiz: IPv4 Networking (Practice copy) ►