# *Computer Networking 9th edition Kurose Solutions Manual*

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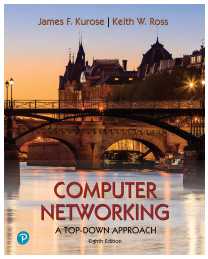
1 Multiple Answer 10 points 802.11 Q01

**802.11 (WiFi) Lab: Q01 Introduction.**
This LMS module allows you to enter answers for the questions posed in the Wireshark 802.11 (WiFi) v8.1 writeup that accompanies the textbook *Computer Networking: A Top-down Approach, 8th edition.* The Wireshark lab description, questions, context, helpful hints, and more are in the 802.11 Wireshark Lab Writeup. So that writeup is a *must-read*, before answering these questions.




The answers to the questions in this LMS module (which match those in the Wireshark lab writeup) are based on packets in the Wireshark_801_11.pcapng trace file that can be extracted from the zip file http://gaia.cs.umass.edu/wireshark-labs/wireshark-traces-8.1.zip *So make sure you have this specific trace file open in Wireshark when you answer these questions!*

**802.11 Q01. SSID Names.** What are the SSID names of the two access points that are issuing most of the beacon frames in this trace? [Hint: look at the *Info* field. To display only beacon frames, enter wlan.fc.type_subtype == 8 into the Wireshark display filter];

- [x] 30 Munroe St
- [x] Linksys12
- [ ] Cisco_Li_67:22:8d
- [ ] LinksysG_f2:08:71

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2 Multiple Choice 10 points 802.11 Q02

**802.11 Q02. Which channel?** What 802.11 channel is being used by both of these access points [Hint: you'll need to dig into the radio information in an 802.11 beacon frame]

- (●) 6
- ( ) 8
- ( ) 11
- ( ) 2

3 Multiple Choice 10 points 802.11 Q03

**802.11 Q03. Beaconing interval?** What is the interval of time between the transmissions of beacon frames from this access point (AP)? (Hint: this interval of time is contained in a field within the beacon frame itself).

- (●) .1024 secs
- ( ) .2048 secs
- ( ) .512 secs
- ( ) 1 sec

4 Multiple Choice 10 points 802.11 Q04

**802.11 Q04. *Source* MAC address on beacon frame** What (in hexadecimal notation) is the source MAC address on the beacon frame from this access point? Recall from Figure 7.13 in the text that the source, destination, and BSS are three addresses used in an 802.11 frame. For a detailed discussion of the 802.11 frame structure, see section 9.2.3-9.2.4.1in the IEEE 802.11 standards document, excerpted here.

- (●) 00:16:b6:f7:1d:51
- ( ) 00:06:25:67:22:94
- ( ) 00:54:c8:d7:19:0c
- ( ) 00:71:f8:a3:54:29

5 Multiple Choice 10 points 802.11 Q05

**802.11 Q05. *Destination* MAC address on beacon frame** What (in hexadecimal notation) is the destination MAC address on the beacon frame from this access point? Recall from Figure 7.13 in the text that the source, destination, and BSS are three addresses used in an 802.11 frame. For a detailed discussion of the 802.11 frame structure, see section 9.2.3-9.2.4.1in the IEEE 802.11 standards document, excerpted here.

- (●) ff:ff:ff:ff:ff:ff
- ( ) 00:16:b6:f7:1d:51
- ( ) 00:06:25:67:22:94
- ( ) 99:99:99:99:99:99

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6 Multiple Choice 10 points 802.11 Q06

**802.11 Q06. *BSS ID* MAC address on beacon frame** What (in hexadecimal notation) is the BSS ID MAC address on the beacon frame from this access point? Recall from Figure 7.13 in the text that the source, destination, and BSS are three addresses used in an 802.11 frame. For a detailed discussion of the 802.11 frame structure, see section 9.2.3-9.2.4.1in the IEEE 802.11 standards document, excerpted here.

- (●) 00:16:b6:f7:1d:51
- ( ) 00:06:25:67:22:94
- ( ) 00:54:c8:d7:19:0c
- ( ) 00:71:f8:a3:54:29

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7 Multiple Answer 10 points 802.11 Q07

**802.11 Q07. Supported data rates.** The beacon frames from the *30 Munroe St* access point advertise that the access point can support four data rates and eight additional "extended supported rates." Indicate which of the follow rates below ***are*** supported among the base set of four rate or are in the set of sight extended supported rates? [Note: the traces were taken on a rather old AP].

- [x] 1 Mbps
- [x] 5.6 Mbps
- [x] 6 Mbps
- [x] 11 Mbps
- [x] 12 Mbps
- [x] 24 Mbps
- [x] 48 Mbps
- [x] 54 Mbps
- [ ] 32 Mbps
- [ ] 64
- [ ] 300 Mbps
- [ ] 8 Mbps

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8 Matching 10 points 802.11 Q08

**802.11 Q08. IP address of TCP SYN segment from host to gaia.cs.umass.edu, and MAC address in frame carrying the TCP segments leaving the wireless host.** Consider the 802.11 frame sent at *t = 24.8110*, containing the SYN TCP segment for the TCP session (that will download the file alice.txt) Match the IP source and destination addresses of the IP datagram containing the TCP segment with their values, and match the host MAC source address, the MAC destination address with their values. [Hint: review Figure 6.19 in the text if you are unsure of how to answer this question. It's particularly important that you understand this.]

| | |
|---|---|
| IP source address of datagram carrying the TCP SYN segment. | 192.119.245.12 |
| IP destination address of datagram carrying the TCP SYN segment. | 128.119.245.12 |
| Mac address of interface on host sending the frame containing the TCP SYN segment | 00:16:b6:f7:1d:51 |
| MAC address of router interface that is the destination of the 802.11 frame containing the TCP SYN segment.  This router will forward to IP datagram within the frame towards it final destination. | 00:13:02:d1:b6:4f |
| MAC address of gaia.cs.umass.edu  | This information is not know |

Possible answers

- 192.119.245.12
- 128.119.245.12
- 00:16:b6:f7:1d:51
- 00:13:02:d1:b6:4f
- This information is not knowable from the trace file.
- 68.87.71.226
- 192.168.1.1
- ff:ff:ff:ff:ff:ff:ff
- 00:c4:61:ba:d8:93

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9 Multiple Choice 10 points 802.11 Q09

**802.11 Q09.** ***Who is the destination?*** Does the destination IP address of the IP datagram containing this TCP SYN segment correspond to the host, access point, first-hop router, or the destination web server?

- ○ Host
- ○ Access Point
- ○ First-hop router
- ● Web server.

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10 Matching 10 points 802.11 Q10

**802.11 Q10. IP address of TCP SYNACK segment from gaia.cs.umass.edu to host, and MAC address in frame carrying the TCP segment arriving at the wireless host.** Consider the 802.11 frame the 802.11 frame containing the SYNACK segment for this TCP session received at t=24.8277 Match the IP source and destination addresses of the IP datagram containing the TCP segment with their values, and match the host MAC source address, the MAC destination address in the frame with their values. [Hint: review Figure 6.19 in the text if you are unsure of how to answer this question. It's particularly important that you understand this.]

| | |
|---|---|
| IP source address of datagram carrying the TCP SYNACK segment. | 128.119.245.12 |
| IP destination address of datagram carrying the TCP SYNACK segment. | 192.119.245.12 |
| MAC address of router interface that is sending the frame containing the TCP SYNACK segment. | 00:13:02:d1:b6:4f |
| MAC address of host interface that is the destination of the 802.11 frame containing the SYNACK segment.  | 00:16:b6:f7:1d:51 |
| MAC address of gaia.cs.umass.edu  | This information is not know |

Possible answers

- 128.119.245.12
- 192.119.245.12
- 00:13:02:d1:b6:4f
- 00:16:b6:f7:1d:51
- This information is not knowable from the trace file.
- 68.87.71.226
- 192.168.1.1
- ff:ff:ff:ff:ff:ff:ff
- 00:c4:61:ba:d8:93

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11 Multiple Answer 10 points 802.11 Q11

**802.11 Q11. Disassociation.** What two actions are taken (i.e., 802.11 frames are sent) by the host in the trace just after *t=49*, to **end** the association with the *30 Munroe St* AP that was initially in place when trace collection began? Choose these two actions below (and make sure you can find these actions in the trace!) [Hint: one is an 802.11-layer action and one is a higher-layer action.].

- [x] A DHCP release message is sent
- [x] An 802.11 DEAUTHENTICATE frame is sent
- [ ] An 802.11 DISASSOCIATION frame is sent
- [ ] An 802.11 DISASSOCIATION frame is sent
- [ ] *A TCP FIN segment is sent*

12 Multiple Choice 10 points 802.11 Q12

**802.11 Q12. AUTHENTICATION.** Let's look first at AUTHENTICATION frames. At *t = 63.1680*, our host tries to associate with the *30 Munroe St* AP. Use the Wireshark display filter wlan.fc.subtype == 11 to show AUTHENICATION frames sent from the host to and AP and vice versa. What form of authentication is the host requesting?

- (●) Open system (0)
- ( ) Shared Key (1)
- ( ) RSA(2)
- ( ) WEP (3)

13 Multiple Choice 10 points 802.11 Q13

**802.11 Q13. AUTHENTICATION sequence number.** What is the Authentication SEQ value (authentication sequence number) of this authentication frame from host to AP?

- (●) 0x0001
- ( ) 0x0002
- ( ) 0x0010
- ( ) 0x000A

14 Multiple Choice 10 points 802.11 Q14

**802.11 Q14. Form of AUTHENTICATION accepted?** The AP response to the authentication request is received at $t = 63.1690$. Has the AP accepted the form of authentication requested by the host?

- (●) Yes
- ( ) No
- ( ) The answer to this question isn't contained in this frame.

15 Multiple Choice 10 points 802.11 Q15

**802.11 Q15. AUTHENTICATION RESPONSE sequence number.** Consider again the AP *response* to the authentication request that is received at $t = 63.1690$. What is the Authentication SEQ value of this authentication frame from AP to Host?

- ( ) 0x0001
- (●) 0x0002
- ( ) 0x0010
- ( ) 0x000A

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16 Multiple Answer 10 points 802.11 Q16

**802.11 Q16. Supported data rates.** Now let's look at the ASSOCIATION REQUEST sent at *t = 63.1699* and ASSOCIATION RESPONSE received at *t = 66.1921*. Note that you can use the filter expression wlan.fc.subtype < 2 and wlan.fc.type == 0 to display ASSOCIATION REQUEST and RESOONSE frames.
Indicate which of the follow rates below are indicated in the frame as **SUPPORTED RATES.** Do ***not*** include in your answers below any rates that are indicates as EXTENDED SUPPORTE RATES.

- [x] 1 Mbps
- [x] 5.5 Mbps
- [x] 6 Mbps
- [x] 11 Mbps
- [x] 12 Mbps
- [ ] 24 Mbps
- [ ] 48 Mbps
- [ ] 54 Mbps
- [ ] 32 Mbps
- [ ] 64
- [ ] 300 Mbps
- [ ] 8 Mbps

17 Multiple Choice 10 points 802.11 Q17

**802.11 Q17. AUTHENTICATION response successful?** Does the ASSOCIATION RESPONSE indicate a Successful or Unsuccessful association response?

- (●) Successful
- ( ) Unsuccessful
- ( ) The answer to this question isn't contained in this frame.

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18 Multiple Choice 10 points 802.11 Q18

**802.11 Q18. Largest Extended Supported Rate.** Does the fastest (largest) Extended Supported Rate the host has offered match the fastest (largest) Extended Supported Rate the AP is able to provide?

- (●) Yes
- ( ) No
- ( ) The answer to this question isn't contained in this frame.