Feedback on mid-term exam

ELEC-C7420 Basic Principles in Networking

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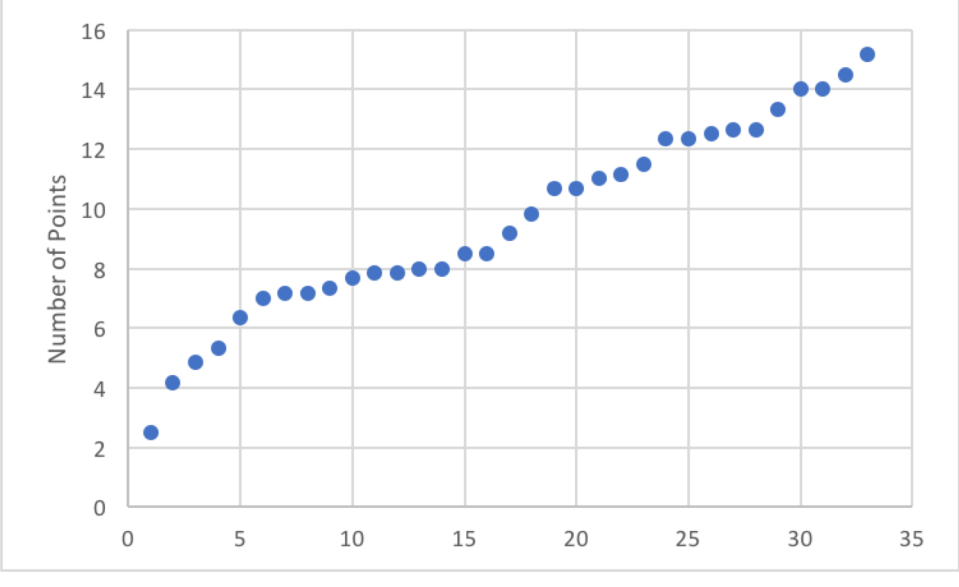
- 33 students attended the exam on Feb 21, 2022
- 16 multi-choice questions (1 point each, max 16 points in total)
- The number of points each student received from the exam:



- **Grading of multi-choice questions:**
  - **Right minus wrong** - Users receive points equal to the number of right answers they choose minus the number of incorrect answers they choose. Users can receive a minimum of zero on a question; they cannot receive a negative mark.
    To calculate how much each answer is worth, the system takes the total number of points assigned to the question and divides it by the total number of answer choices.

- **Many students failed to answer the questions (Question 8 and 9) related to network ID and subnet mask.**
  - ✓ Please review the lecture on IP (given on Jan 25, 2022). During the lecture, we did a couple of exercises related to subnet mask.

Q8. Which combination of network id and subnet mask correctly identifies all IP addresses from 102.1.128.0 through 102.1.159.255? (1 point)

A. 102.1.128.0 255.255.255.224

B. 102.1.128.0 255.255.0.0

C. 102.1.128.0 255.255.192.0

D. 102.1.128.0 255.255.224.0

E. 102.1.128.0 255.255.255.192

Answer to Q8

- Subnet mask is used for determining the network part and the host part of an IP address. **The 1s in the subnet mask represent a network part, the 0s a host part.**

102.1.128.0 10000000 11100000

102.1.159.255 10011111 subnet mask: 255.255.224.0

102.1. is for sure the common part of all the IP addresses in this range.

Red part: obviously it can be anything between 0 and 255. It cannot belong to the network part.

Green part: 100 (the first 3) are common.

Given an IP address 10.0.0.1 and subnet mask 255.0.0.0, how to calculate the network number and the range of addresses in the network?

1) **Convert the IP address to binary**
2) **Use AND operation to calculate the network number**

```
00001010.00000000.00000000.00000001 = 10.0.0.1
11111111.00000000.00000000.00000000 = 255.0.0.0
-----------------------------------------------
00001010.00000000.00000000.00000000 = 10.0.0.0
```

The range of addresses in this network is 10.0.0.0 – 10.255.255.255

Q9: Which two statements are true about the following IP configuration? (1 point)

IP address: 192.168.10.47

Subnet mask: 255.255.255.224

Default gateway: 192.168.10.1

A. The prefix of the subnet mask is /26.

B. The network on which this computer resides can have 30 hosts.

C. The computer is unable to communicate outside of the local network.

D. The address that is assigned to the computer represents private addressing.

E. The IP address that is assigned to the computer is routable on the Internet.

Subnet mask: 255.255.255.224

11100000

The 1s in the subnet mask represent a network part, the 0s a host part.

- **The number of usable IP addresses** can be calculated from the following formula:

2 to the power of host bits – 2

The first and the last address are the network address and the broadcast address, respectively. All other addresses inside the range could be assigned to Internet hosts.

Private Addresses

- **Private addresses are IPv4 addresses intended only for site internal use**
- **Reserved private IPv4 network ranges**
  - 10.0.0.0/8
  - 172.16.0.0/12
  - 192.168.0.0/16

IPv6 address

Q5. Which are valid IPv6 addresses? (multichoice, 1 point)

A. **2001:db8:2333:4444:CCCC:DDDD:EEEE:FFFF**

B. **::1234:5678**

C. **2001:db8::**

D. 2001:db8::1234::1234

One IPv6 address cannot have more than one ::

IPv6 addresses

- **IPv6 address consists of 16 octets (128 bits). IPv6 separates pairs of octets with a colon.**

  [octet] [octet] : [octet] [octet] :::::: [octet] [octet]

  For example, fedc:13:1654:310:fedc:bc37:61:3210

- If an address contains a long run of 0's, "::" should be used to represent many blocks of 0000. The substitution may only be applied once in the address, since multiple occurrences would create an ambiguous representation.

- **Differences between AnyCast and Multicast**

Q1: Which two are characteristics of an IPv6 anycast address? (1 point)

A. One-to-many communication model

B. One-to-nearest communication model

C. Any-to-many communication model

D. A unique IPv6 address for each device in the group

E. The same address for multiple devices in the group

AnyCast

IPv6 has introduced Anycast mode of packet routing. In this mode, multiple interfaces over the Internet are assigned same Anycast IP address. Routers, while routing, send the packet to the nearest destination.

IPv6 does not support broadcast

What is BSSID? What is SSID?

Q15: You are using a wireless scanner that reports the basic SSID (BSSID) of each of the wireless networks. What does the BSSID represent?

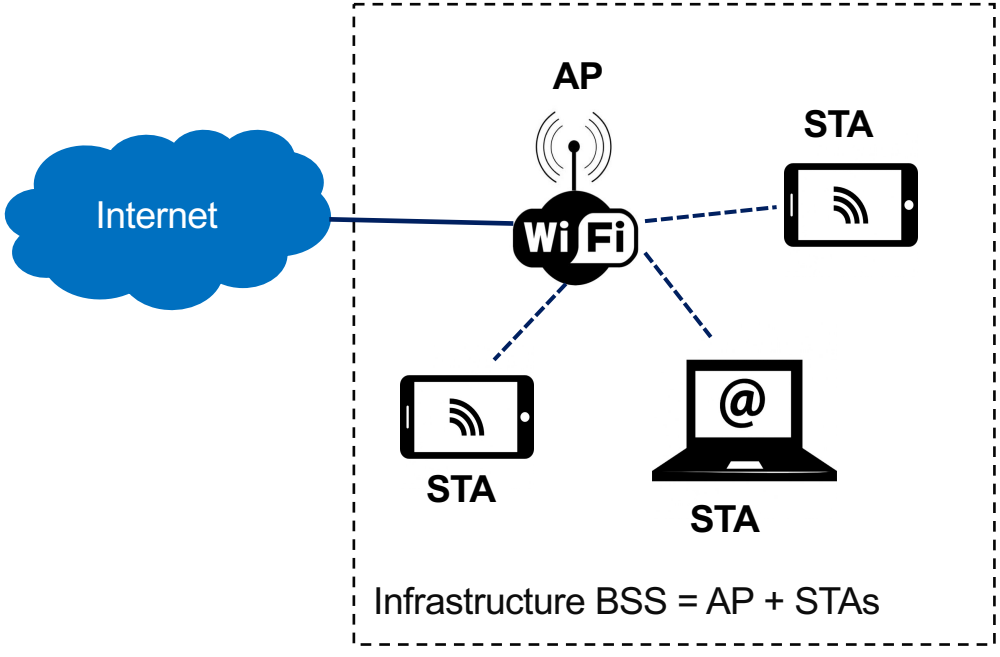
A. The MAC address of the access point

B. The name of the wireless network

C. The channel for the wireless network

D. The IP address of the access point

Wi-Fi Architecture



- An AP has at least one antenna used for receiving and transmitting signals from and to clients
- AP converts modulated RF signals into Ethernet data, and vise versa (layer 2 translation between 802.11 and 802.3)
- An AP may have multiple MAC addresses. BSSID refers to the one of the radio interface the STA is currently connected to.

BSSID: BSS Identifier
SSID: name of the network

If you did not attend this exam or want to improve your grade, you can attend the retake exam on May 9. You need to register on Sisu during March 10, 9.00 and May 2, 23.59.

How to prepare for the retake exam

- All the questions came from the content of the lectures including the exercises done during the lectures
- If you did not attend the lectures, please watch the recorded video available in the Teams group (Lectures Channel->Files -> Recordings)
- The key points have also been summarized during the last lecture
- The questions for the retake exam will be similar but not exactly the same