

TSIN02 Internetworking

Exercise class 1 problems

Exercise 1: The data rate of 10Base5 is 10 Mbps. How long does it take to create the smallest frame?

Exercise 2: An Ethernet MAC sublayer receives 42 bytes of data from the LLC (logical link control) sublayer. How many bytes of padding must be added to the data?

Exercise 3: Compare and contrast CSMA/CD with CSMA/CA.

Exercise 4: Give some advantages and disadvantages of the connectionless service.

Exercise 5: Compare and contrast the delays in connectionless and connection-oriented services. Which service creates less delay if the message is large? Which service creates less delay if the message is small?

Exercise 6: Why we need fragmentation at each router.

Exercise 7: Find the number of addresses in a range if the first address is 146.102.29.0 and the last address is 146.102.32.255.

Exercise 8: What is the address space in each of the following systems?

- a) a system with 8-bit addresses
- b) a system with 16-bit addresses
- c) a system with 64-bit addresses

Exercise 9: An address space uses three symbols: 0, 1, and 2 to represent addresses. If each address is made of 10 symbols, how many addresses are available in this system?

Exercise 10: In fixed-length subnetting, find the number of 1s that must be added to the mask if the number of desired subnets is:

- a) 2
- b) 62
- c) 122
- d) 250

Exercise 11: An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets.

- a) Find the subnet mask.
- b) Find the number of addresses in each subnet.
- c) Find the first and the last address in the first subnet.
- d) Find the first and the last address in the last subnet (subnet 1024).

Exercise 12: In classless addressing, we know the first and the last address in the block. Can we find the prefix length? If the answer is yes, show the process and give an example.

Exercise 13: In classless addressing, can two blocks have the same prefix length? Explain.

Exercise 14: An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows:

- a) The first group has 200 medium-size businesses; each needs approximately 128 addresses.
- b) The second group has 400 small businesses; each needs approximately 16 addresses.
- c) The third group has 2000 households; each needs 4 addresses.

Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.