

## Exercise Sheet 6

### Computer Engineering and Communication Networks

Handout: 06.11.2019  
Discussion: 14.11.2019 (start 10:00 a.m.)

#### 1. Communication Networks

1.1. Fill in the gaps in the following sentence with one of the choices:  
A network is a set of autonomous computers that provide information ---A--- and each machine operates based on dedicated ---B--- .

A: a) exchange                      b) change                      c) manipulation

B: a) applications                      b) switches                      c) routers                      d) hardware and software

1.2. Which choice lists the necessary components to form a computer network?

- a) End systems, Intermediate Systems
- b) Intermediate systems connection, Connections (links)
- c) End systems connections (Links)
- d) Distributed systems, Links
- e) End systems, intermediate systems, Connections
- f) Distributed systems, Intermediate systems, Connections
- g) IP route intermediaries (routers), Intermediate systems, Connections

1.3. Classification of Networks: For each example, indicate which network class it is:

{LAN, MAN, PAN}

- a) A city-wide WiMAX network is being set up in Zurich:
- b) A few friends meet and network their PCs to share files.

1.4. Signals, data, information and messages:

Imagine the following example and answer the questions a, b and c by choosing the correct choices form 1 to 5 for each question:

-Anna is at home and looks at a weather report online on her PC.

- a) What are the Signals?
- b) What is Data?
- c) What is Information?

1) The statement how the weather will be

- 2) Packets transmitted by the server
  - 3) Electrical Voltage in the cable
  - 4) The symbols (characters) within the packets
  - 5) None of the above
- 1.5. Which communication pattern describe the following examples of a, b and c?  
{Unicast, Anycast, Multicast, Broadcast, Dialog, Concast}
- a) Heinz calls a support call center with an employee, who is currently free, answering the call. An end system in an Ethernet network does not know the MAC address associated with the destination address and therefore sends a message to all systems in the subnet.
  - b) Alice sends an SMS to Bob.
  - c) A supermarket chain sends brochures to registered customers in the neighborhood, with a bundle of brochures is delivered to the postman, which then serves the individual addresses.
- 1.6. Complete the following sentences about the layer model from the lecture: (multiple options may be possible)
- a) One layer offers ---A--- to one layer ---B--- .
    - A.1) A log
    - A.2) An application
    - A.3) A service
    - A.4) An entity
  
    - B.1) Above that layer in the same machine
    - B.2) At the same level on another machine
    - B.3) All other layers on another machine
  - b) Two devices communicating with each other and use ---A--- of the same layer, have to use the same ---B---.
    - A.1) logs
    - A.2) Entities
    - A.3) Services
  
    - B.1) Protocol
    - B.2) Application
    - B.3) Service
    - B.4) Entity
- 1.7. List the ISO/OSI BRM layers, starting with the lowest layer.

1.8. Calculation of Data Rates:

You've trained your Bernhard Bernie to carry a box of four 8mm ribbons instead of a bottle of schnapps (if your hard drive is full, you have an emergency and Bernie must go). These tapes hold 10 gigabytes each. The dog can reach your whereabouts at a speed of 18km / h, no matter where you are. At what distance do Bernie and a 155 Mbps ATM line reach the same data rate? (Conversions from Mega to Giga, etc. are made in factor 1000 for simplicity (1000 MB = 1 GB). Assume that the overhead on the bands and the ATM line is the same.) Results in meters and rounded to integers:

- a) 10
- b) 1290
- c) 10323
- d) 46449
- e) 371592

1.9. Assign the following protocols to the layers of the TCP / IP model:

HTTP– TCP– IP– ICMP – ARP – DHCP– PPP– RIP

A: Application Layer, B: Transport Layer, C: Networking Layer, D: Data Link Layer,

1.10. Complete the following sentences:

Compared to the OSI/ISO model, the TCP/IP model has/is ...

- 1) ...the presentation and communication control layer (session layer)
  - contained in the application layer
  - summarized to the session layer
  - unchanged
  - none of the above
- 2) ...the application and transport layer
  - omitted
  - contained in Internet layer
  - also available
  - none of the above
- 3) ...the network layer
  - omitted
  - renamed to Internet layer
  - also available
  - none of the above
- 4) ...the link and physical layer
  - omitted
  - renamed to Internet layer
  - also available
  - none of the above