

9. Problem Sheet

Out	Due	Discussion
14.06.17	20.06.17	23.06.17 - 27.06.17

MSc. Marian Buschsieweke	MSc. Kai Kientopf
marian.buschsieweke@ovgu.de	kai.kientopf@ovgu.de

Please solve the problems in groups with two people and submit your solutions before the lecture. The discussion of the problem sheet is in the exercise course after the submission.

Problem 9.1: Routing

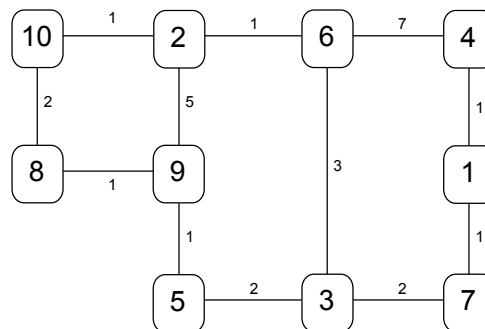
$1+1+1 = 3$ points

- Discuss the terms routing and forwarding.
- Where are the corresponding services implemented in an hierarchical network architecture?
- Which devices that are between a source and destination node participate in the routing?

Problem 9.2: Spanning Tree

$1+1+3 = 5$ points

- The spanning tree is an important connected graph of a computer network. On which layer of the ISO/OSI reference model is it created?
- Why do we need to create a spanning tree? What is the important property?
- Create the spanning tree for following network. The numbers at the edges specify the cost of each path; the number in the vertices specify the switch ID.



Problem 9.3: Network Components

2 points

Discuss the function(-s) of the following network components: Repeater, hub, switch, bridge, router, and gateway. Which “data” do they handle and on which layer of the ISO/OSI reference model do they operate?

Problem 9.4: MTU

1 point

What is the *Maximum Transfer Unit* (MTU) and why is it relevant for bridging and routing?

Problem 9.5: Structured Cabling

3 points

How would you connect the computers in a company building given the following assumptions?

- Each department owns its own floor.
- Each department consists of groups whose members shall belong to the same broadcast domain.
- Departments shall not be in the same broadcast domain.
- A central unit in the cellar shall provide access to the Internet.
- A building on the other side of the road houses an additional department. A wired connection is not possible.

Problem 9.6: Protocol Stack

1+2+1 = 4 points

Answer the following question short but meaningful!

- Typically TCP/IP (IPv4) is used over Ethernet. How many checksums are there used in total and what do they protect?
- Ethernet as well as TCP use acknowledgements to signal the reception. Is this redundant? Could one of these be omitted?
- How is a virtual LAN on layer 2 constructed? How does it work? What is achieved?

Problem 9.7: IPv4 vs. IPv6

2 points

List differences between the IPv4 and the IPv6 packet format. Your comparison must include the differences in header fields, header size, address size and the MTU requirements of the two IP versions.

a total of 20 points