DELFT UNIVERSITY OF TECHNOLOGY
Faculty of Electrical Engineering, Mathematics and Computer Science

ET3505A Telecommunication Networking

9.00 - 12.00 hr, April 11, 2011

Lecturer:
Dr.ir. Fernando Kuipers

Material:
This examination covers chapters 1-6 of the book *Data Communications Networking*, by Prof. Piet Van Mieghem.
This is a closed book examination. The use of books, readers or lecture notes is not allowed. The use of non-graphical calculators is permitted.

Questions and points:
This examination has 12 open questions, 1 small and 1 large question per chapter of the material of the book *Data Communications Networking*.

Question	Points
1 (Ch. 1)	5
2 (Ch. 1)	10
3 (Ch. 2)	5
4 (Ch. 2)	10
5 (Ch. 3)	5
6 (Ch. 3)	10
7 (Ch. 4)	5
8 (Ch. 4)	10
9 (Ch. 5)	5
10 (Ch. 5)	10
11 (Ch. 6)	5
12 (Ch. 6)	20
Total	100

Answers:
Specify your name, student number and degree programme.
Write clearly and avoid verbose explanations.
Explain your answers. The use of drawings may help.

1. Explain what connection oriented (CO) forwarding is and explain what connectionless (CL) forwarding is. For both CO and CL forwarding, give at least one advantage and disadvantage.

2. The OSI model contains 7 layers, with the presentation layer on layer 6 and the session layer on layer 5. Present the 7 layers in the correct order and explain the purpose of layers 1, 2, 3, 4, and 7.

3. Explain why, in a broadcast medium, we need multiple access control (MAC).

4. Carrier Sense Multiple Access (CSMA) can be operated with different sending rules. Explain non-persistent CSMA, p-persistent CSMA, and the exponential back-off policy.

5. A message C = 100110011001 has been received that contains a Cyclic Redundancy Check (CRC) at the end that was made with generator G = 11011. Compute the CRC. Has the message been received correctly?

6. Explain the Go Back n ARQ protocol and the purpose of ARQ.

7. Do the addresses 130.140.192.160 and 130.140.194.160 that have the same subnet mask 255.255.192.0 also belong to the same subnet? Instead of only a yes or no, also motivate your answer.

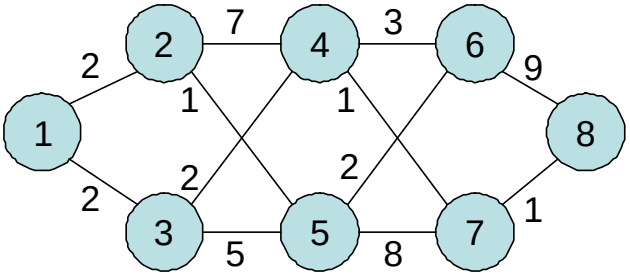
8. Give three differences between the headers of IPv4 and IPv6 and explain the motivation behind these differences.

9. Contrary to TCP, UDP has no mechanism to provide reliable and in-sequence delivery of packets. Can you explain in which cases, if any, UDP is better suited than TCP?

10. Explain slow start and congestion avoidance in TCP. Why was this mechanism proposed?

11. Explain what routing is and discuss the difference between routing and forwarding.

12. On the following network, compute with via the Bellman-Ford algorithm the shortest paths from the source node 1 to all other nodes in the network. Give an activity table of your calculations.



End of examination