

Part I

This part covers the same material as the midterm exam.

- 1a Explain under which conditions it is better to follow a CSMA protocol instead of a collision-free protocol. 5pt
- 1b A pure ALOHA protocol will, at best, give a channel utilization of 18%. What does this actually mean? 5pt
- 1c Why is it not appropriate to apply CSMA for wireless communication? 10pt
- 2a Explain the *count-to-infinity* problem, and a widely deployed (not entirely complete) solution. 10pt
- 2b What is the difference between a *leaky bucket* and a *token bucket*? 5pt
- 2c Explain the difference between *circuit switching* and *packet switching*, and the difference between *connectionless service* and *connection-oriented service*. Give an example for each (*switching, service*) combination. 10pt
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Part II

- 3a Devise an algorithm for ending a connection, such that both parties agree on disconnecting. Assume that no messages are lost, but message ordering is not guaranteed. 5pt
- 3b Disconnecting should preferably be done only when both parties agree. However, guaranteeing that agreement can be reached is impossible when messages can be lost. Explain why. 10pt
- 3c Transport protocols generally use a *buffer credit grant* mechanism. Why? 5pt
- 4a If Alice wants to send a secret (legally binding) offer to Bob over a network, what should she do? Explain why your solution works. 5pt
- 4b Explain how the Diffie-Hellman shared key exchange algorithm works, and why this algorithm was invented. 10pt
- 5 Explain what happens when a Web browser has to display the data referenced by URL `ftp://ftp.cs.vu.nl/pub/steen/file.ps` 10pt

Final grade: (1) Add, per part, the total points. (2) Let T denote the total points for the midterm exam ($0 \leq T \leq 45$); $D1$ the total points for part I; $D2$ the total points for part II. The final number of points E is equal to $\max\{T, D1\} + D2 + 10$.