

Homework 5

Part I. **Problems of Chapter 4** in the textbook.

P6, P14, P15

Part II. Additional problems.

- II.1 Consider a router with a switch fabric, 2 input ports (A and B), and 2 output ports (C and D). Suppose that the line speeds of all input ports and all output ports are R (packets per second).
- (a) Suppose that the switch fabric operates at a rate of $1.5R$. Suppose that all packets from A are destined to D and all packets from B are destined to C. Can a switch fabric be designed so that there is no input port queueing? Explain why or why not in one sentence.
 - (b) Suppose that the switch fabric operates at a rate of $2R$ but the output port queue operates at a rate of R . Suppose that packets from A and B are randomly destined to both C and D. Can a switch fabric be designed so that there is no input port queueing? Explain why or why not in one sentence.
- II.2 What is the problem of NAT when either having a server behind NAT (in the client-server model) or having a peer behind NAT (in the peer-to-peer model)? How can it be avoided/solved? Is there a special name for this solution?
- II.3 Suppose an ISP owns the block of addresses of the form 192.168.56.128/26. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets?