${\rm Midterm\ exam}$

February 28, 2007

Duration: 50 minutes

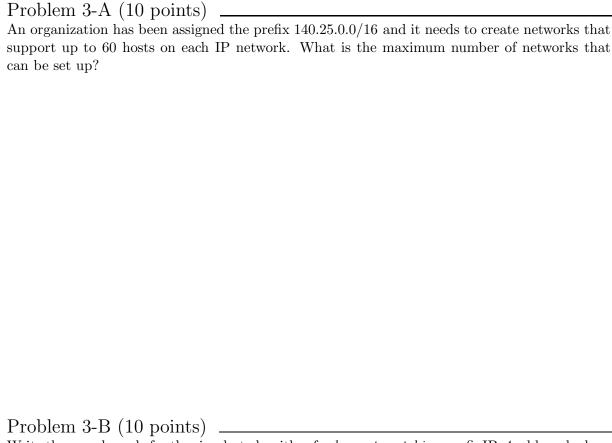
Name:		
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Part	Maximum	Obtained
I	20	
II	20	
III	20	
IV	20	
V	20	

Final grade:

Problem 1 (20 points) An Autonomous System X receives three types of interdomain routes: Customer routes, Provider routes, and Peer routes. Suppose that you are configuring the "route export filters" of the border routers in X. Which routes would you export to the customers of X?
Which routes would you export to the peers of X?
Which routes would you export to the providers of X?

Problem 2-A (10 points)			
Explain how <i>ping</i> works in 2-3 sentences. Make sure that your answer addresses the following questions. What type of packets does the sender transmit? What type of packets does the receiver reply with? What happens when you try to ping a host that is in a NATted network from the public Internet?			
Problem 2-B (10 points)			
Explain how traceroute works in 3-4 sentences. Make sure that your answer addresses the			



Problem 4-A (10 points)
Suppose that a router is connected to two networks X and Y. A host in network X sends a
packet to a host in network Y. What happens when <i>Proxy ARP</i> is disabled at the router? What
is different when $Proxy\ ARP$ is enabled?
Problem 4-B (10 points)

Problem 5 (20 points)
Consider the following bus-based router architecture. Packets arrive and depart from N interface
cards. The router also has M forwarding engines with $M < N$. Each forwarding engine has a
CPU, a route cache and some memory. Each interface card has some local memory for packet
buffers. The router also has a Route Processor card, which includes a CPU and the routing table.
The interface cards, the forwarding engines and the Route Processor communicate through three
buses: a control bus CB (for the communication of request and response signals), a forwarding
bus FB for communicating IP headers, and a data bus DB for the transfer of IP packets.
Draw the schematic diagram of this router architecture.

Describe what happens to a packet from the time it arrives at an interface card A until it departs from an interface card B, assuming that the forwarding engine that the packet is assigned to does not have the appropriate route in its cache.