CS 640 Introduction to Computer Networks

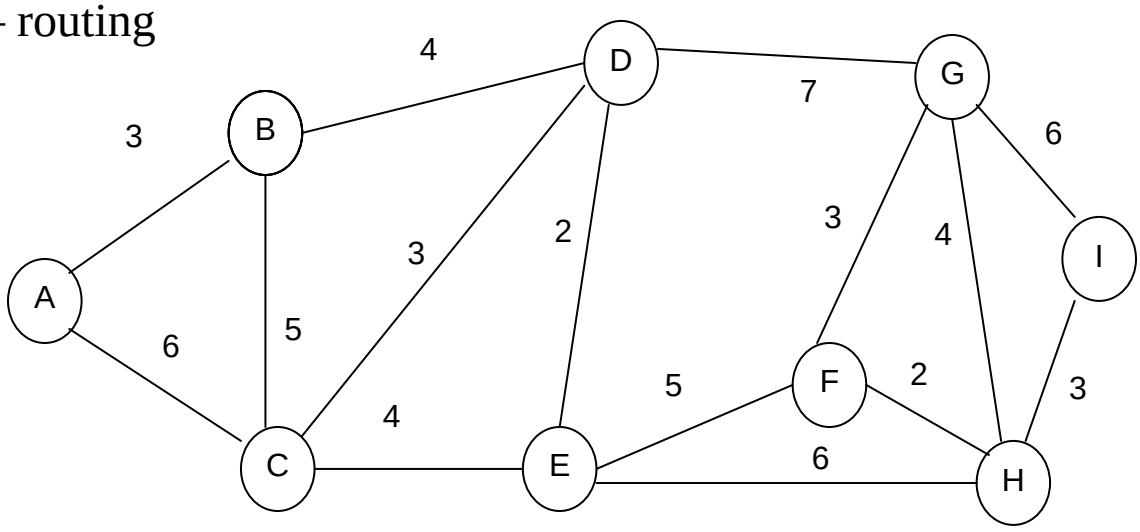
Quiz 3

Write your name on the exam. Write something for every question. Students who do not write something for everything lose out over students who write down wild guesses. You will get some points if you attempt a solution but nothing for a blank sheet of paper. Write something down, even wild guesses. Problems take long to read but can be answered concisely.

Question	Maximum	Score
1	15	
2	5	
Total	20	

Question 1 – routing

This figure shows the topology of an ISP's backbone. The ISP uses a link state IGP with weights for the links as shown. If the cost of two paths is the same, the IGP uses a random "coin flip" to break the tie.



a) What are the shortest paths from C to H, B to G, and A to I?

C-E-H; B-D-G; A-B-D-E-H-I

b) Due to a bug, router E's link state database got corrupted. It "thinks" that the distance from G to I is 1 instead of 6, from G to F is 1 instead of 3, from G to D 1 instead of 7, and from G to H 1 instead of 4. Packets from A to some destinations will be affected by this bug. List all those destinations and how the path of the packets is affected (only for packets entering the network at A).

F, H, and I would be affected. For example the packets sent from A to F would go from E to D and D would send them back to E (they would loop until their TTL reached 0).

c) Routers A and H both receive through BGP routing advertisements for prefix x/y. Which path will packets for prefix x/y entering at C take through the network for the following three cases of BGP advertisements? Assume the ISP has a simple BGP policy.

Advertisement received by A	Advertisement received by H	Path from C to x/y
Prefix x/y, ASPATH = 2 8 6	Prefix x/y, ASPATH = 2 8 6	*C->A->x/y*
Prefix x/y, ASPATH = 2 8 6	Prefix x/y, ASPATH = 2 7 6	*C->A->x/y*
Prefix x/y, ASPATH = 2 8 6	Prefix x/y, ASPATH = 2 6	*C->E->H->x/y*

Question 2 – Network address translation

Using a network address translation box instead of a router to connect your home LAN to the Internet gives you more security. Explain why.

A NAT allows only the incoming packets that are part of a connection initiated by a client behind the NAT. This protects clients behind the NAT that also run vulnerable services from being taken over by someone from outside the NAT exploiting that vulnerability.