Mid-term Sample Exam #2
CptS/EE 455
October 28, 2013

This is a **closed book, closed neighbor** exam. One page of notes (8 ½ x 11 front and back) and calculators are allowed. Answer the questions in the space provided. This is a **50 minute** exam, 10:10 – 11:00. Exams will be collected promptly at 11:00.

For best chance at partial credit, show all calculations.

1. **[15 pts]** IP Network addressing

If a host's IPv4 address and netmask are given as 13.2.0.64 and 255.255.255.128:

a) (5 pts) How many bits make up the subnet part of the address?

b) (5 pts) How many bits make up the host part of the address?

c) (5 pts) is 13.2.0.237 a valid address on this same network? Why or why not?

2. **[5 pts]** What protocol allows a host to automatically configure its IP address?

3a) **[10 pts]** Complete the table below to show how Dijkstra's link-state algorithm would build a routing table at node D for the following network. Note: the first row is **not** complete—be sure to fill in the missing entries.
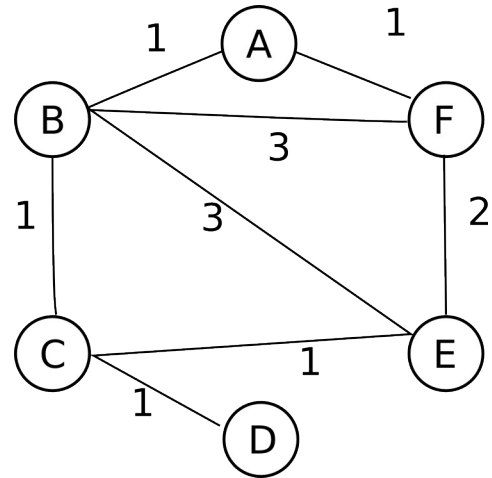

Table I: compute the distance and predecessor of each destination. At each step the N' column should contain the list of nodes whose final distance is known at that step.

Step	N'	D(A), p(A)	D(B), p(B)	D(C), p(C)	D(E), p(E)	D(F), p(F)
0	D			1,D		
1						
2						
3						
4						
5						

3b) **[5 pts]** Based on your Table I, what path would be used for a packet traveling from node D to node F? (No credit if your answer is not correctly derived from the table you computed in part a of this question.)

4. **[10 pts]** Suppose that a router using a distance-vector algorithm currently holds the following routing table (note that this is NOT the same network as used in the previous problem!):

Destination	Next-hop	Cost
A	E	6
B	B	4
C	C	3
D	E	7
E	E	1

This router now receives the following from its neighbor, B, to which it is attached by a cost 4 link.

Destination	Cost
A	1
C	1
D	2
E	2

Fill in the table below to reflect this router's routing table after processing the update above.

Destination	Next-hop	Cost
A	B	5
B	B	4
C	C	3
D	B	6
E	E	1

What specific additional action(s) will this router take after computing its new routing table?

5. Question about VC-routing table

6 Question about Datagram (connectionless) routing table; longest-prefix matching, etc.

7.Question about NAT routing tables

8. Multicast – flooding, controlled flooding, spanning tree,

9. IPv4 header/IPv6 header differences

10. Tunneling (IPv6 and multicast)

11. Reason for organizing int Ass

12. Connection-oriented service model advantages and disadvantages

13. Connection-oriented service (TCP) vs Connection Service at the Network layer

14. Router architectures: memory, bus, cross-bar. Input and output queueing. Head of line blocking.

15. Fragmentation in IPv4 and IPv6