COMPSCI 453: Computer Networking Written Homework Chap 5

1. What is the “count to infinity” problem in distance vector routing?

Answer : in distance vector routing, routing loops usually occur when an interface goes down ,for example a path between 2 nodes breaks or not available. It can also occur when two routers send updates to each other at the same time.

2. True or false: When an OSPF route sends its link state information, it is sent only to those nodes directly attached neighbors. Explain

Answer : False, OSPF route send its link state information to all other routers(in entire AS) within the same hierarchical area.

3. What is meant by an area in an OSPF autonomous system? Why was the concept of an area introduced?

Answer: OSPF AS is a collection of routers under the same administrative and technical control , and that all run the same routing protocol among themselves. Each AS, in turn, typically contains multiple subnets. Areas were introduced to limit the scope of route information distribution. It reduces the number of routes to propagate.

4. Define and contrast the following terms: subnet, prefix, and BGP route.

Answer:

Subnet : in IP terms , this network interconnecting three host interfaces and one router interface forms a subnet. A subnet also called an IP network or simply a network in the internet literature.

Prefix : a prefix is the network portion of a CDIRized address. It is written in the form a.b.c.d/x; A prefix covers one or more subnets.

BGP route: when a route advertises a prefix across a BGP session, it includes with the prefix a number of BGP attributes. In BGP jargon, a prefix along with its attributes is called a route.

5. Names four different types of ICMP messages.

Answer :

1. Echo reply 2. Timestamp 3. Tracerout(Deprecated)4. SKIP(deprecated)

6. What two types of ICMP messages are received at the sending host executing the Traceroute program?

1. destination host unreachable 2. destination port unreachable.

7. Consider the following network. With the indicated link costs, use Dijkstra’s shortest-path algorithm to compute the shortest path from x to all network nodes. Show how the algorithm works by computing a table similar to Table 5.1.

Answer :

| Step | N' | D(v) | D(z) | D(y) | D(w) | D(u) | D(t) |
|---|---|---|---|---|---|---|---|
| 1 | x | **3** | 8 | 6 | 6 | / | / |
| 2 | xv | stop | / | 6 | 6 | **6** | 7 |
| 3 | xvu | stop | / | / | **6** | stop | **7** |
| 4 | xvut | stop | / | **6** | / | stop | stop |
| 5 | xvuty | stop | **8** | stop | stop | stop | stop |

8.

Answer : x ->z =8 x->y=6 x->v=3 x->v->u =6 x->v->t=7 x->w =6

| Dest | Nest |
|---|---|
| X | X |
| V | V |
| Z | Z |
| Y | Y |
| W | W |
| U | V |
| T | V |

9.

T->Z =15  T->Y =7  T-> V=4  T->U=2  T->W=5  T->X =7

Shortest path tree would be character is nodes, and number is distance between nodes.
T U=2 , T-Y=7 , TV=4 , UW=3 XV=3 XZ=8

| Dest | Nest |
|---|---|
| X | X |
| V | V |
| Z | V |
| Y | Y |
| W | U |
| U | U |
| T | T |

Different : The routing table is pretty different ,because the root node is a opposite direction.

10.

| node Z table | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| to | Z | V | U | X | Y |
| Z | 0 | 6 | / | 2 | / |
| V | 6 | 0 | 1 | 3 | / |
| U | / | 1 | 0 | / | 2 |
| X | 2 | 3 | / | 0 | 3 |
| Y | / | / | 2 | 3 | 0 |

| | Z | Z | Z | Z | Z |
|---|---|---|---|---|---|
| to | Z | V | U | X | Y |
| | 0 | 5 | 6 | 2 | 5 |