EE 194 Wireless InterNetworking
Assignment 7

Problem 1 - DSR Algorithm

Node 6 has no route to node 23 in its route cache. In the process of creating a route the following occurs (this assumes that no nodes along the path from 6 to 23 have a prior route established to node 23):

**Step 1**
Node 6 broadcasts a route discovery packet. The contents of this packet are listed at the right for each hop.

**Step 2**
Each node receiving the route discovery packet forwards it to each of its neighbors. The packet has a unique ID of 1. Each node checks to see that it has not already received a route discovery packet with ID 1. If it has, the packet is ignored. Packets are not sent to the nodes from which they originated.

**Step 3**

**Step 4**
Step 5

ID: 1  
Source: 6  
Hop: 4  
Hop: 3  
Hop: 12  
Hop: 17  
Destination: 23

Step 6

When node 23 receives the route discovery packet it generates a route reply packet destined for node 6, and reverses the route from the route discover packet to transmit it. The route established is $6 \rightarrow 4 \rightarrow 3 \rightarrow 12 \rightarrow 17 \rightarrow 23$.

The remainder of the route discovery packets die out in the network. Any that do reach node 23 are ignored.
Problem 2

The AODV algorithm is similar to DSV, except that the route to the destination node is not known by any one node in the network. Instead, each node stores the next hop in the route in individual route tables.

Steps 1 Through 5

In the AODV algorithm a Route Request (RREQ) Packet is broadcast, with the same retransmission rules as in DSR. Therefore these steps mimic the first five steps of the DSR algorithm. The contents of the RREQ Packet is as follows:

```
RREQ Packet
ID: 1
SEQUENCE #: 0
Source: 6
Destination: 23
```

In the next steps, the nodes build their routing tables.

Step 6

Node 23 returns a Route Reply (RREP) Packet to the node from which it first received a RREQ. It appends its route table to reflect the fact that when the final destination is node 6, it should send the packet to node 17.

```
Route Table
Dest. | Send
6     12
```

Step 7

Similarly, Node 17 appends its route table.

```
Route Table
Dest. | Send
23   23
6     12
```

Step 8

Similarly, Node 12 appends its route table.
Step 9

3

Route Table
Dest. | Send
23    | 12
6     | 4

Step 10

3

Route Table
Dest. | Send
23    | 3
6     | 6

Step 11

3

Route Table
Dest. | Send
23    | 4
Problem 3

Step 1

Node 6 broadcasts a Query (QRY) Packet and sets its route required flag.

Step 2

Step 3
Node 17 has Node 23 as a neighbor. It sets its height to $r_{23} + 1$, and broadcasts an update packet.
Step 10

At this step, node 6 has enough information to form a valid route, however, the QRY and UPD packets continue to propagate through the network.

The route is formed by forwarding packets to the node with the lowest height. Links are directed from nodes with higher heights to those with lower heights. Each route is represented by a logically separated instance of TORA.