**Networking 1A – Routing Tables and Static Routes**

**Routing Tables**

1. Routing Tables are “road maps” for each router and list the networks that router knows how to get to.
2. If a router has no entry for a destination network, it will drop the packet and not attempt delivery.
3. Once a packet is passed on to another router, the next router will examine the destination and consult its own routing table.
4. As a network administrator, you have two options for filling up a routing table”:
   1. Routing protocol –Routers automatically share network information. (Ex: RIP)
   2. Static Routes – Administrator manually tells the router how to get to destination networks.
5. When testing connectivity, make sure a route exists both to and from the destination network.

**Static Routes**

1. Static routes are manually added into a router's routing table, as opposed to being automatically discovered, like with RIP.
2. Static routes are labeled with the letter "S" in the routing table.
3. Static routes are much more time consuming to set up that RIP or other routing protocols, but they do give you absolute control over how data gets moved around your network.
4. You will add one static route for each destination network you want to be able to reach.
5. If you are reliant only on static routes to deliver packets on your network, you will need to set up static routes on every router.
6. To add a static route, you must specify the following:
   1. Destination network you want to the routing table. (Network NOT already connected)
   2. The subnet mask of that destination network.
   3. The interface we should send it out to most efficiently get to that destination network.
7. Static Route Syntax:
   1. IP ROUTE <Destination Network> <Destination Subnet Mask> <Exit-Interface>
   2. IP ROUTE 201.100.11.0 255.255.255.0 S2/0 (sends all packets for 201.100.11.0 out S2/0)
8. Default Routes
   1. A Default route is a special static route that tell the router to not ever drop a packet. It is used when it cannot find a matching route in the routing table.
   2. Typically a default route will point towards the ISP. We assume that the router know how to get everywhere in its topology, so any unknown networks must be on the "Internet", which requires us to leave our topology and forward the packet to the ISP and beyond.
   3. Default Route Syntax
      1. IP ROUTE 0.0.0.0 0.0.0.0 <Exit-Interface> (Zeroes for network and subnet mask)
      2. Each router will need a default route.