**Class A Solo Project**

**100 Points**

Project Details: There are five parts to this project.

**Part I. Building the IP Addressing Scheme**

1. You will be given a unique, Class A network that you must use on this project. Mr. Dixon will assign to you the first octet value of your network. (X Value) Write this value at the top of this document.
2. Your topology must have ten LANs and 10 WAN links.
3. You get to pick the sizes of your LANs. However, you must use at least eight different subnet masks in your topology.
4. You must first fill out an IP Addressing table and submit it to Mr. Dixon for approval before you move onto Part II.

**Part II. Building the Packet Tracer Topology**

1. You will create a packet tracer topology that has nine routers, ten LANs and ten WAN links.
2. Be sure to give names to all devices. Pick a theme and stick with it. (Teams, Colors, etc…)
3. Use the note tool to document the size, network address and subnet mask of each LAN.
4. Use the note tool to label your WAN link numbers (WAN1 to WAN10) and their network address.
5. Eight of your LANs will have only a PC connected to the router through a FastEthernet interface.
   1. First usable IP address goes to the router interface.
   2. Second usable IP address goes to the PC
6. Two of your LANs will be built with a switch, a server and five PCs. These LANs will have their PCs receive their IP addresses from the DHCP server. The DHCP server should get the last usable IP address from that LAN. Use the cluster feature to keep your topology organized and uncluttered.
7. At least one router must have two LANs directly connected to it.
8. You will have one additional router called ISP with two servers connected to it that is not considered part of your class A network. In other words, this router, the LAN connected to it and the WAN link connecting it to the rest of your topology does **NOT** count toward your totals.

**Part III. Router Configuration**

1. Each router, with one exception, will only require you to configure its IP addresses, its routing protocol and assign to it a hostname.
2. You get to choose the routing protocol, however, if you choose RIP or EIGRP, your maximum grade on the project is 87%, a "B+".
3. If you choose OSPF or static routing, your maximum grade is 100%, a straight "A".
4. If you choose OSPF, you will have a few additional tasks to accomplish;
   1. You must put accurate bandwidth statements on all serial interfaces.
   2. You must utilize at least five different clock rates on your WAN links.
   3. You must use the note tool to label the speed of all of your WAN links.
5. On the **ONE** router that connects to ISP, you will need to perform several "housekeeping" tasks:
   1. Protect privilege mode with a password of "class".
   2. Set up telnet and protect user mode with a password of "cisco"
   3. Encrypt the above passwords.
   4. Set up interface descriptions on all serial interfaces on this router.
   5. Create a banner message of the day on this router. ("Authorized personnel only")
   6. Create an appropriate hostname for the router.
   7. Create a default route that points to the ISP router.
   8. Distribute the default route to all other routers through your routing protocol. (DIO)
   9. Save the configuration on the router.
6. ISP Router details
   1. The WAN link between the border router (explained in #5) and the ISP router will have the clock rate set on the ISP side. This WAN link will use 199.6.13.240 /30. Set the clock rate to the maximum.
   2. The ISP router will only need 1 static route for your entire class A network. Use the default subnet mask when you build this route and wherever it needs to go on your network, it will pass it on to the border router.
   3. The servers off of ISP will be called DNS and Web and each will connect to a different FastEthernet interface on the ISP router. The details for each is as follows:
      1. DNS server details
         1. This server is responsible for providing the IP address for a specific domain name to the PCs in your topology.
         2. The DNS server will be given the last usable IP address from 150.88.72.0 /21.
         3. The ISP FastEthernet interface DNS connects gets the first usable IP address.
         4. This server will create a DNS entry for a domain name of "your last name".com and will use the IP address assigned to the Web server (details follow)
         5. The IP address that you assign to this server will need to be either manually entered on the PCs in the topology or distributed using DHCP.
      2. Web server details
         1. This server is hosting a website, "yourlastname".com
         2. The Web server will get the last usable IP address from 220.141.78.128 /26
         3. The ISP FastEthernet interface Web connects gets the first usable IP address.
         4. You will use the config tab, HTTP feature, to change only the text following "Welcome" to read, "Welcome to "yourlastname".com!"

**Part IV. DHCP Configuration**

1. On the two cluster LANs, you will need to set up DHCP
2. Statically assign the last usable IP address to the DHCP server on each of these LANs.
3. Using the DHCP option on the config tab, use DHCP to assign the following things to the PCs:
   1. IP Address
   2. Subnet mask
   3. Default gateway
   4. DHCP server
4. Each of the five PCs need only click on the DHCP feature for their IP configuration.

**Part V. Connectivity Tests**

1. You will need to test connectivity between all LANs.
2. You will save the connectivity tests for each LAN too all other LANs in separate scenarios.
3. Each scenario will have 11connectivity tests (To 9 other LANs, DNS and Web) and be named after the router it connects to. If the router has two LANs, use RouterA and RouterB when naming the Scenarios.
4. This will be a total of 110 connectivity tests in ten different scenarios.
5. You will also test for web connectivity by using the PC browser to visit "yourlastname".com

This project should be called Class A Solo Project and must be saved into your home directory. It is okay to use a flash drive to transport it back and forth from school, but always put a copy into your home directory.

**Solo Project Rubric**

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| **Grading Criteria** | **Points Possible** | **Points Earned** |
| IP Addressing Scheme correct and approved | 5 |  |
| LANs have 8 different subnet masks | 3 |  |
| Topology contains all LANs, WANs, ISP, PCs and servers (27 Devices) | 9 |  |
| All LANs are labeled with note tool (Network address, Subnet Mask, Size) | 3 |  |
| WANs are labeled (Network address, SM, WAN #, \*WAN Link speed) | 3 |  |
| At least one router has two LANs connected | 1 |  |
| DHCP LANs are built properly and clustered (5 PCs, 1 Switch, 1 Server) | 4 |  |
| ISP Router has two LANs, with each connected to a server (DNS and Web) | 2 |  |
| All devices are thematically named | 2 |  |
| IP Addresses, subnet masks and default gateways properly assigned | 9 |  |
| Routing Protocol Properly Configured(RIP/EIGRP or OSPF/Static) | 13 |  |
| Default route created and distributed from border router to other 8 routers | 2 |  |
| Static route created on ISP | 2 |  |
| Border router housekeeping tasks performed | 5 |  |
| DNS server properly configured | 3 |  |
| Web server properly configured (domain name is last name) | 3 |  |
| DHCP servers and PCs are properly configured | 6 |  |
| Connectivity Tests | 20 |  |
| Web Connectivity Tests | 5 |  |
| **Total** |  |  |