Project – (250 Points Total):

This is an extremely detail oriented assignment! Please spend the time necessary to complete this assignment as thoroughly as you possibly can since it will be most beneficial to you in the long run!

There are a ten topics here. Each topic is worth twenty (25) points and may include multiple technologies within the topic. You may need to research certain topics and others you may have within your class notes from the labs and lectures. For each topic you should:

1. Provide a detailed description and/or explanation of what the topic is (in your own words). If there are multiple technologies in use, make sure you describe each one individually.
2. Following the description/explanation you will create an example topology that will be used for this question. (Yes, you may utilize this same topology on other questions – only if it directly relates to other questions.) Make sure you specify interfaces in use, ip addresses and subnet masks within your topology. Your topology should pertain to the topic and should not have more technologies configured within the topology than is necessary to demonstrate your mastery of the topic discussed.
3. Next, you will provide a configuration for the topic listed based upon your example topology.
   1. For the first few questions, you should provide detailed steps as to where you are within the router or switch when issuing a specific command so you demonstrate basic knowledge and manipulation of the Cisco IOS. Throughout all of the topics you should specify what each command does. (A brief example is listed below.)
4. Provide show commands for each topic. What are you looking for in order to verify this technology is working properly?
5. Provide debug commands for each topic. And, explain how you would go about troubleshooting this technology if something is not working correctly.

Please keep in mind… No assumptions are made! Some of the items have multiple steps so be sure to include **all** the steps in the configuration, etc...

**For example** *(please keep in mind this is abbreviated example):*

If you are asked to ***assign an IP Address to a router interface***, you may want to specify the following:

Create a sample topology, then write…

An IP Address is a Layer 3 logical address that is assigned to each host within a TCP/IP network. The IP Address assigned to the host is determined by the network administrator and is dependent upon the network it is directly connected to. An IP Address is a hierarchical address that consists of 4 octets, 8 bits each, 32 bits in total. An IP Address is typically written in dotted decimal notation:

* + - 1. is an example of a Class A IP Address

To assign an IP Address to a router interface you would proceed in the following manner:

|  |  |
| --- | --- |
| Router> | This prompt specifies the router is in USER mode |
| Router>***enable*** | this command is entered to go from USER mode to PRIVILEGE mode |
| Router# | You are now in PRIVILEGE mode |
| Router# ***configure terminal*** | used to enter GLOBAL CONFIGURATION mode from PRIVILEGE mode. This is needed to configure all parameters within the router |
| Router(config)# | You are now in GLOBAL CONFIGURATION mode |
| Router(config)#***interface fastethernet0/0*** | This is entered to go into INTERFACE CONFIGURATION mode to configure the fastethernet0/0 interface within the router |
| Router(config-if)# | You are now in INTERFACE CONFIGURATION mode |
| Router(config-if)#***ip address 1.1.1.1 255.0.0.0*** | This sets the IP Address to 1.1.1.1 with a subnet mask of 255.0.0.0 which is the default subnet mask for a Class A IP Address |
| Router(config-if)#***no shutdown*** | After the IP Address is set on the interface, it’s always a good idea to enable the interface and test connectivity. |

Specify the show commands, test commands to verify the configuration is working properly and move onto the next topic.

This assignment should be **printed and turned in by 9:00am, Saturday, April 29, 2017.** **In addition to your printed copy, please submit a softcopy in Microsoft Word (.docx or .doc) format via email to robert.cannistra@marist.edu.** Make sure you cite your resources and do not plagiarize! Your citations should be placed at the end of each question, not at the end of the project. **All work should be completed individually!!!** **There will not be any extensions given for this assignment**, so make sure you **SUBMIT IT ON TIME otherwise you will receive a grade of ZERO!!!**

If you have any questions or concerns, please let me know!

Topics to research, explain, provide detail and provide examples for: (make sure you provide as much detail as possible in a concise manner and make it as legible as possible! Once this is graded and turned back to you, it will provide you with a detailed study guide for your final practical.) Please feel free to copy and paste the table from above and use it as a template for each question. Please do not remove the numbers or questions/statements below. Use this as a template and add your answers under each numbered question/statement on each page.

# Project – (250 Points Total)

1. VLANs, VTP, and IEEE 802.1q (NOTE: Make sure you accomplish this ***without*** going into VLAN Database mode and show the syntax for both 2960 and 3560 switches!)
2. InterVLAN Routing with a Router-on-a-stick and SVIs
3. First Hop Redundancy Protocol with HSRP using Link Aggregation between two 3560 multilayer switches. Demonstrate your knowledge of LACP and PAgP.
4. IPv4 and IPv6 Static routing (NOTE: With AND Without the use of a default static route.)
5. EIGRP and EIGRP for IPv6 (NOTE: Make sure you utilize VLSM in your topology and configuration without the use of automatic summarization.)
6. OSPFv2 and OSPFv3 (NOTE: Make sure you utilize loopback interfaces within your topology and configuration…and make sure you specify why you are utilizing them.)
7. Extended ACLs and Extended Named ACLs for IPv4 and IPv6 (NOTE: how, where and why you applying these…)
8. Static NAT and Dynamic NAT/PAT for IPv4 (NOTE: Make sure you show a configuration with static NAT for a web server in the DMZ, then PAT using a pool of multiple addresses for internal hosts connecting to the Internet. You should also demonstrate your knowledge of using just the interface IP Address when this is the only available address presented to you.)
9. DHCP Server on the Router and a local DHCP client and a remote DHCP client (ie: using DHCP Relay.)
10. PPP using PPP CHAP