Name _____ **Networking Project – (200 Points)**

Choose one of the following projects to complete:

1. OpenFlow Module Project
    a. Develop a module using the OpenFlow protocol.
    b. The type of module is completely up to you. A few examples might be a load balancer, a firewall, a QoS module, a router, a virtual switch, or any other type of module you feel would be beneficial to the industry. You should be able to test and verify your module works using MIninet and an open source controller such as Open Daylight, NOX, Floodlight, Ryu, or any other one you feel would be appropriate.

2. SDN Controller Project
    a. Develop an SDN controller.
    b. Your SDN controller should work with the OpenFlow protocol.
    c. You will need to verify at least 2 nodes can communicate within your network if you choose this option; however more is preferred.

3. OpenFlow to "X Protocol" Translator Project
    a. Develop an OpenFlow Translator.
    b. Your translator should translate the OpenFlow protocol to another protocol such as SNMP or NETCONF.
    c. You will need to verify at least 2 nodes can communicate within your network: one running the OpenFlow protocol and one running another protocol or your choice.

4. Network Management Project
    a. Develop a network monitor that will view the configuration of network devices through telnet, ssh, snmp or netconf / yang or some other management protocol.
    b. You should be able to view and modify the configuration of a switch, router or other device on a network.
    c. A graphical topology should also be created utilizing a topological discovery protocol such as CDP.
    d. This can either be a web based application or a stand-alone application.

5. Routing Algorithm Project
    a. Develop a different routing algorithm from one that already exists. You may use properties from any current algorithm.
    b. Your algorithm should work for multiple paths and be able to re-route traffic over a less preferred path if the more preferred path is not available.
    c. You will need to simulate the algorithm works as desired.

6. IDS Sensor Project
    a. Develop a network IDS sensor that will detect security vulnerabilities within a device on the network.
    b. A graphical topology should be created of the device and points of the device that possess vulnerabilities should be highlighted in red (you may utilize a standard picture for an access point, pc, server, etc...)
    c. When the potential vulnerability is fixed, the point of the device should go back to the originated state or turn green.
    d. This can either be a web based application or a stand-alone application.

7. Network Design and Build Project
    a. Develop an idea for a business.
    b. Design the network connectivity.
    c. Design the IP address scheme.
    d. Configure the network using various protocols learned throughout the semester.
    e. Demonstrate the network is fault tolerant and redundant paths exist by providing and implementing test cases.
    f. Your network should consist of at least three locations with internet connectivity from two different service provider networks.

8. OpenFlow traffic analyzer Project
    a. Develop an OpenFlow traffic analyzer that will analyze all control traffic from the OpenFlow Controller to the OpenFlow-enabled devices.
    b. A graphical topology should be created of the device(s) and interface(s) of the device(s) that are being analyzed.
    c. This can either be a web based application or a stand-alone application.
    d. This should provide a means to troubleshoot OpenFlow controller to device communication problems.

9. Wireless Access Point Project
    a. Build a wireless access point from scratch.
    b. The specifications are completely up to you; however you should be able to test and verify the wireless access point works with an 802.11 network (ie: connect clients to it and possibly other access points)

IMPORTANT:

All of these projects require a brief write-up which should include the following:

a. Why you chose this project
b. How you went about completing this project (ie: your approach)
c. What the outcomes were (ie: was it a success? what did you learn?)