NETWORK SECURITY AND ADMINISTRATION EXERCISE

Instructions

In groups of around 5 to 6 members discuss and attempt all the questions

SUBNETTING PRACTICE

Questions

a) As a network consultant you have been given the network 192.168.10.0/24 by a university. This university is setting up a research directorate with 5 thematic areas namely Societal Implications of Technology with 29 users, Technology-enhanced learning with 17 users, e-agriculture & Environment Sustainability with 23 users, Next Generation Computing with 27 users and Cyber security with 30 users. Subnet the above network and:-

   i) Identify the number bits you borrow to take care of the needs of this organization

   ii) Compute the number of subnets the borrowed bits will yield

   iii) Enumerate the IP address ranges for these subnets indicating the Network and Broadcast address for each subnet

b) As a consultant you have been given the network 192.168.5.0/24 by an organization, The organization has 4 departments HR = 40 Users, Academic = 50 Users, Finance = 59 Users and ICT = 62 users

   i) Identify the number bits you borrow to take care of the needs of this organization

   ii) Compute the number of subnets the borrowed bits will yield

   iii) Enumerate the IP address ranges for these subnets indicating the Network and Broadcast address for each subnet

c) As a network consultant you have been given the network 192.168.2.0/24 by a university. This university is setting up a research directorate with 5 thematic areas namely Societal Implications of Technology with 29 users, Technology-enhanced learning with 17 users, e-agriculture & Environment Sustainability with 23 users, Next Generation Computing with 27 users and Cyber security with 30 users. Using the 192.168.2.0/24 network:-

    i) Determine the number bits to borrow to meet the needs of this organization and show your working

    ii) Compute the number of subnets the borrowed bits will yield

    iii) Enumerate the IP address ranges for these subnets indicating the Network and Broadcast address for each subnet

    iv) Discuss some of the security mechanisms you may need to put in place to secure this network

SUBMIT AT THE END OF THE TERM

Question Two

The research directorate intends to do DNA sequencing for 200,000 persons. The project will also create a set of publicly accessible databases with genomic data, and medical data associated with the 200,000 persons. This organization relies on grants for funding and they are planning to set up a story building lab to accommodate around 500 researchers. The network experts will be designing and implementing a new internetwork for the lab using Cisco switches and routers. These engineers are considering using EIGRP on the new routers. The new internetwork also needs to communicate with the many stakeholders, including a nearby biology lab that uses RIP and a grants office that uses OSPF. The lab also needs Internet access, which it hopes can be achieved by simply connecting the network to the university's campus network, which has Internet access. Using this narrative:-

i) Design a plan for integrating the different routing protocols into the new network design for the research directorate lab

ii) What information will you redistribute between routing protocols?

iii) What problems do you expect to encounter (Hint with different metrics, security, and so on) when you redistribute, and how will you overcome these problems?

iv) How will you provide Internet access to the research directorate?