FAST School of Computing,
National University of Computer & Emerging Sciences,
Islamabad Campus

Assignment # 2
IP Addressing and Subnetting
Deadline: 28th April, 2024

Consider FAST is designing a new office network for the new building under construction. They require separate subnets for the following departments:

1. Administration
2. Faculty
3. Students
4. Guest Network (isolated)

Assume the allocated network address block is 192.168.**XY**.0/24. Where **XY** are the last two digits of your Flex#.
For example, student 22i-99**83** would get 192.168.**83**.0/24.

Hosts (Devices) Counts:

Calculate the number of devices for the departments according to following formulas:

N = (X * 220) / 10

1. Students**: N + Y**
2. Faculty**: (240 - N) / 3 + Y**
3. Administration**: (240 - N) - Faculty**
4. Guest Network **(isolated): Always 10 devices.**

Fixed Length Subnet Design (50 points):

1. Determine the most appropriate subnet mask for each department considering their device count and future growth potential. Explain your reasoning for each choice.
2. Calculate the network address, broadcast address, usable host range, and number of usable hosts for each subnet.
3. Briefly explain why the guest network should be isolated and suggest an appropriate subnet mask for it.

VLSM Implementation in Packet Tracer (25 points):

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1. Considering the varying device counts, can Variable Length Subnet Mask (VLSM) be beneficial in this scenario? Justify your answer.
2. If applicable, redesign the subnets using VLSM to optimize usable host space. Show your calculations for all subnets.

Documentation (25 points):

Create a subnet table for VLSM, summarizing the information for each department subnet and the guest network. Include columns for Network Address, Subnet Mask, Broadcast Address, Usable Host Range, and Number of Usable Hosts.

Deliverables:

1. A well-structured document explaining your subnet design choices and calculations.
2. Include a subnet table summarizing all mentioned/relevant information.