UNIVERSITI TEKNOLOGI MALAYSIA, JOHOR BAHRU

SCHOOL OF COMPUTING,

SEMESTER 1, SESSION 2021/2022

SECR1213-02 NETWORK COMMUNICATION

GROUP PROJECT

TASK 5 : IP ADDRESSING SCHEME

GROUP NAME: M&N

NO.	NAME	MATRIC NUMBER
1	MADINA SURAYA BINTI ZHARIN	A20EC0203
2	NAYLI NABIHAH BINTI JASNI	A20EC0105
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1.0 IP Subnetting

Based on the network address that has been assigned for our group, which is, 161.139.60.0/19, in this part, we are going to divide it into several subnetworks for each room and space.

We are going to use IP address 161.139.60.0 with subnet mask 255.255.224.0 or /19.

IP address(Decimal):	161.	139.	60.	0
IP address (Binary):	10100001	10001011	00111100	00000000
Subnet Mask (Decimal):	255.	255.	224.	0
Subnet Mask (Binary):	11111111	11111111	11100000	00000000

1. The IP address will be divided into the network portion indicated by subnet mask which is, /19, and the host portion is determined by the remaining bits.

   Network portion: 19 bits
   Host portion: 32 bits - 19 bits = 13 bits

2. Subnet IP Address is calculated by performing a bitwise AND operation on the host IP address and subnet mask. AND operation works as shown below:

   1 + 1 = 1
   1 + 0 = 0
   0 + 1 = 0
   0 + 0 = 0

IP address (Decimal):	161.	139.	60.	0
IP address (Binary):	10100001	10001011	00111100	00000000
Subnet mask (Binary):	11111111	11111111	11100000	00000000
Subnet address (Binary):	10100001	10001011	00100000	00000000
Subnet address (Decimal):	161.	139.	32.	0

Subnet Address: 161.139.32.0/19

3. We will use class B address, which borrows 3 bits from the host for subnetting and we will reserve 10 bits for defining hosts.

IP Address	Network portion (19 bits)	Subnet (3 bits)	Host portion (10 bits)
Subnet address 161.139.32.0/19	10100001 10001011 001	000	00 00000000
Subnet 0 161.139.32.0/22	10100001 10001011 001	000	00 00000000
Subnet 1 161.139.36.0/22	10100001 10001011 001	001	00 00000000
Subnet 2 161.139.40.0/22	10100001 10001011 001	010	00 00000000
Subnet 3 161.139.44.0/22	10100001 10001011 001	011	00 00000000
Subnet 4 161.139.48.0/22	10100001 10001011 001	100	00 00000000
Subnet 5 161.139.52.0/22	10100001 10001011 001	101	00 00000000
Subnet 6 161.139.56.0/22	10100001 10001011 001	110	00 00000000
Subnet 7 161.139.60.0/22	10100001 10001011 001	111	00 00000000

4. Set the remaining host portion (10 bits) as all zero(0) to get network address

   10100001.1000 1011.001[000 | 00 00000000]

   Network address of Subnet 0: 161.139.32.0

   Set the remaining host portion (10 bits) as all one(1) to get broadcast address

   10100001.1000 1011.001[000 | 11 11111111]

   Broadcast address of Subnet 0: 161.139.35.255

Subnet IP Address	**Network Portion (19 bits)**	**Subnet (3 bits)**	**Host Portion (10 bits)**		**IP Address**
Subnet Address 161.139.32.0/19	10100001 1000 1011 001	000	00 00000000		
Subnet 0 161.139.32.0/22	10100001 1000 1011 001	000	00 00000000	**Network Address**	161.139.32.0
			11 11111111	**Broadcast Address**	161.139.35.255
Subnet 1 161.139.36.0/22	10100001 1000 1011 001	001	00 00000000	**Network Address**	161.139.36.0
			11 11111111	**Broadcast Address**	161.139.39.255
Subnet 2 161.139.40.0/22	10100001 1000 1011 001	010	00 00000000	**Network Address**	161.139.40.0
			11 11111111	**Broadcast Address**	161.139.43.255
Subnet 3 161.139.44.0/22	10100001 1000 1011 001	011	00 00000000	**Network Address**	161.139.44.0
			11 11111111	**Broadcast Address**	161.139.47.255
Subnet 4 161.139.48.0/22	10100001 1000 1011 001	100	00 00000000	**Network Address**	161.139.48.0
			11 11111111	**Broadcast Address**	161.139.51.255

Subnet 5 161.139.52.0/22	10100001 1000 1011 001	101	00 00000000	**Network Address**	161.139.52.0
			11 11111111	**Broadcast Address**	161.139.55.255
Subnet 6 161.139.56.0/22	10100001 1000 1011 001	110	00 00000000	**Network Address**	161.139.56.0
			11 11111111	**Broadcast Address**	161.139.59.255
Subnet 7 161.139.60.0/22	10100001 1000 1011 001	111	00 00000000	**Network Address**	161.139.60.0
			11 11111111	**Broadcast Address**	161.139.63.255

2.0 IP Assignation

Subnet addresses are assigned according to 8 areas in the building. There are 4 switches and 1 router on the first floor and 3 switches on the ground floor.

Subnet	Interface	Network Address	Broadcast Address	Range of usable address	Subnet mask
0	**First Floor** Switch 4 (IOT Lab)	161.139.32.0/22	161.139.35.255	161.139.32.1 to 161.139.35.254	/22 255.255.252.0
1	**First Floor** Switch 5 (Network Lab)	161.139.36.0/22	161.139.39.255	161.139.36.1 to 161.139.39.254	/22 255.255.252.0
2	**First Floor** Switch 6 (Staff Room)	161.139.40.0/22	161.139.43.255	161.139.40.1 to 161.139.43.254	/22 255.255.252.0
3	**First Floor** Switch 0 (WAP for north and south)	161.139.44.0/22	161.139.47.255	161.139.44.1 to 161.139.47.254	/22 255.255.252.0
4	**First Floor** Router (For north and south)	161.139.48.0/22	161.139.51.255	161.139.48.1 to 161.139.51.254	/22 255.255.252.0
5	**Ground Floor** Switch 1 (Computer Security Lab)	161.139.52.0/22	161.139.55.255	161.139.52.1 to 161.139.55.254	/22 255.255.252.0
6	**Ground Floor** Switch 2 (Computer Security Lab)	161.139.56.0/22	161.139.59.255	161.139.56.1 to 161.139.59.254	/22 255.255.252.0
7	**Ground Floor** Switch 3 (Staff Room)	161.139.60.0/22	161.139.63.255	161.139.60.1 to 161.139.63.254	/22 255.255.252.0