



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**SECR1213 NETWORK COMMUNICATIONS  
SECTION 08 20242025/1**

**TASK 5**

**LECTURER'S NAME: DR. MUHAMMAD ZAFRAN BIN MUHAMMAD ZALY SHAH**

**GROUP NAME: 4G**

**GROUP MEMBERS :**

<b>NAME</b>	<b>MATRIC NO.</b>
CHANG WEN XUEN	A23CS5012
LIM CHEN XI	A23CS0103
FARAH NABILA BINTI WAN ISMAIL	A23CS0077
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## 1. Subnet Mask

Given IP address: 192.18.0.0/8

### Ground Floor Subnets

Work Area	No of Workstation	Subnet Required	Reasons for Subnets
Hybrid Classroom 1&2, Library & Student Lounge	$1 + 1 + 2 + 4 = 8$	1	High-quality video and audio streaming and multiple device connections
Video Conferencing Room 1&2, Server Room	$1 + 1 + 3 = 5$	1	Stable video and audio streaming, high-speed, secure network for core building infrastructure
Meeting Room 1&2	$1 + 1 = 2$	1	Meeting monitoring and recording
<b>Total</b>	<b>12</b>	<b>3</b>	

### First Floor Subnets

Work Area	No of Workstation	Subnet Required	Reasons for Subnets
Cisco Network Lab 1	31	1	High-speed dedicated network for simulations
Cisco Network Lab 2	31	1	High-speed dedicated network for simulations
Embedded Lab 1&2	$31 + 31 = 62$	1	Low-latency network for real-time IoT and machine learning
General Lab 1&2	$31 + 31 = 62$	1	Moderate bandwidth for general-purpose activities

General Lab 3&4	$31 + 31 = 62$	1	Moderate bandwidth for general-purpose activities
<b>Total</b>	<b>248</b>	<b>5</b>	

Total no of Subnets =  $3 + 5 = 8$   $2^n \geq$  Number of Subnets

$$\Rightarrow 2^n \geq 8$$

$$\Rightarrow 2^n \geq 2^3$$

$$\Rightarrow n = 3$$

We need to borrow 3 bits from the host portion of the IP address. Our given IP address is 192.18.0.0/8. The original subnet mask has 8 bits reserved for the network.

Borrowing 3 bits means the network portion now uses:  $8+3=11$  bits. The remaining host bits are:  $32-11=21$  bits.

The first 11 bits are 1s(Network portion), and the remaining 21 bits are 0s(Host portion).

Binary: 11111111.11100000.00000000.00000000

Dotted Decimal: 255.224.0.0

So, the new subnet mask is /11 or 255.224.0.0

By borrowing 3 bits, we create  $2^3 = 8$  subnets where each subnet has  $2^{21} - 2 = 2,097,150$  usable IP addresses, excluding the network and broadcast addresses. So, the given IP address space has been divided efficiently among different departments or networks while accommodating the anticipated 15% growth of users.

## 2. Range of IP address, Network and Broadcast address for the subnet

<b>Subnet no</b>	<b>Area</b>	<b>Network Address</b>	<b>Broadcast Address</b>	<b>Range of IP address</b>
0	Hybrid classroom 1&2, Library, Student Lounge	192.0.0.0	192.31.255.255	192.0.0.1-192.31.255.254 1100 0000.0000 0000.0000 0000.0000 0001 - 1100 0000.0001 1111.1111 1111.1111 1110
1	Meeting Room 1&2	192.32.0.0	192.63.255.255	192.32.0.1-192.63.255.254 1100 0000.0010 0000.0000 0000.0000 0001 - 1100 0000.0011 1111.1111 1111.1111 1110
2	Video Conferencing Room 1&2, Server Room	192.64.0.0	192.95.255.255	192.64.0.1-192.95.255.254 1100 0000.0100 0000.0000 0000.0000 0001 - 1100 0000.0101 1111.1111 1111.1111 1110
3	CISCO Network Lab 1	192.96.0.0	192.127.255.255	192.96.0.1-192.127.255.254 1100 0000.0110 0000.0000 0000.0000 0001 - 1100 0000.0111 1111.1111 1111.1111 1110
4	CISCO Network Lab 2	192.128.0.0	192.159.255.255	192.128.0.1-192.159.255.254 1100 0000.1000 0000.0000 0000.0000 0001 - 1100 0000.1001 1111.1111 1111.1111 1110
5	Embedded Lab 1&2	192.160.0.0	192.191.255.255	192.160.0.1-192.191.255.254 1100 0000.1010 0000.0000 0000.0000 0001 - 1100 0000.1011 1111.1111 1111.1111 1110
6	General Lab 1&2	192.192.0.0	192.223.255.255	192.192.0.1-192.223.255.254 1100 0000.1100 0000.0000 0000.0000 0001 - 1100 0000.1101 1111.1111 1111.1111 1110

7	General Lab 3&4	192.224.0.0	192.255.255.255	192.224.0.1-192.255.255.254 1100 0000.1110 0000.0000 0000.0000 0001 - 1100 0000.1111 1111.1111 1111.1111 1110
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### 3. Range of IP address for user types based on the area

#### 3.1 Hybrid classroom 1&2, Library, Student Lounge

User	IP range
Hybrid classroom 1	192.0.0.1
Hybrid classroom 2	192.0.0.2
Library	192.0.0.3-192.0.0.4
Student Lounge	192.0.0.5-192.0.0.8

#### 3.2 Meeting Room 1&2

User	IP range
Meeting Room 1	192.32.0.1
Meeting Room 2	192.32.0.2

#### 3.3 Video Conferencing Room 1&2, Server Room

User	IP range
Video Conferencing Room 1	192.64.0.1
Video Conferencing Room 2	192.64.0.2
Server Room	192.64.0.3-192.64.0.5

### 3.4 CISCO Network Lab 1

User	IP range
Student (PCs)	192.96.0.1-192.96.0.30
Lecturer (PCs)	192.96.0.31

### 3.5 CISCO Network Lab 2

User	IP range
Student (PCs)	192.128.0.1-192.128.0.30
Lecturer (PCs)	192.128.0.31

### 3.6 Embedded Lab 1&2

User	IP range	
Embedded Lab 1	Student (PCs)	192.160.0.1-192.160.0.30
	Lecturer (PCs)	192.160.0.31
Embedded Lab 2	Student (PCs)	192.160.0.32-192.160.0.61
	Lecturer (PCs)	192.160.0.62

### 3.7 General Lab 1&2

User	IP range	
General Lab 1	Student (PCs)	192.192.0.1-192.192.0.30
	Lecturer (PCs)	192.192.0.31
General Lab 2	Student (PCs)	192.192.0.32-192.192.0.61
	Lecturer (PCs)	192.192.0.62

### 3.8 General Lab 3&4

User	IP range
General Lab 3	Student (PCs) 192.224.0.1-192.224.0.30
	Lecturer (PCs) 192.224.0.31
General Lab 4	Student (PCs) 192.224.0.32-192.224.0.61
	Lecturer (PCs) 192.224.0.62

## Minute Meeting

<b>Date/Time</b>	4/1/2025 7:00 p.m.
<b>Agenda</b>	Network Communications 4G Meeting
<b>Minutes prepared by:</b>	Lim Chen Xi
<b>Location</b>	Google Meet
<b>1. Meeting Objectives</b>	
Task 5 Discussion Meeting	
<b>2. Attendance</b>	
1. Chang Wen Xuen	A23CS5012
2. Lim Chen Xi	A23CS0103
3. Farah Nabila Binti Wan Ismail	A23CS0077
4. Anisa Chowdhury	A23CS0288
<b>3. Minutes</b>	
<b>Introduction to the Task</b>	Chang Wen Xuen explains the task that needs to be done for Task 5 and discusses assigning the task.
<b>Assignation of task</b>	1. Chang Wen Xuen Range of IP address for user types based on the area  2. Lim Chen Xi Range of IP address for user types based on the area and Meeting minute  3. Farah Nabila Binti Wan Ismail Range of IP address, Network and Broadcast address for the subnet  4. Anisa Chowdhury Subnet mask
<b>Due date to finish</b>	18/1/2025

