SECR 1213 - 06
Network Communications

Lecturer: Dr. Ts. Raja Zahilah binti Raja Mohd Radzi

Task #5
IP ADDRESSING SCHEME

Group 4: NetLink Solutions

Name	Matric No
Abdalla Ali Abdalla Ali	A23CS3022
Mohammed Abdelgawwad Abdelghani Moustafa Hassan Daoud	A23CS4025
Nouredin Mamdouh Mohamed Eldesouky Elnamla	A23CS0020

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Introduction

1.1 Task Objectives

The ultimate aim of the Task 5 is to implement the best model for the otherwise known as IP Addressing Scheme of the network infrastructure of the given institution. This involves:

- To guarantee every device proper IP address the 192.19.0.0/16 network address has been provided and needs to be used.
- Combine the network requirements of each lab, rooms and shared device and partition the whole network into several subnets.
- To guarantee that the plan of the organization is scalable, logical, and the emergence of address conflicts can be avoided.
- Giving elaborated explanation of IP subnets, providing working and visual presentation of the Subnetting.

The deliverables for this task include:

1. Proper IP addressing of all sections of the workplace and equipment.
2. Records of the discussions in each of the meetings as a way of capturing the nature of the collaboration.
3. An explanation of how the IP addressing implementation and the assigned subnets look like.

1.2 Importance of IP Addressing

The assignment of IP addresses is an important element of network implementation with the view of making endoвpoints on a network to communicate efficiently. A well-designed IP scheme offers the following benefits:

- **Unique Identification:** Ensures that all the hosts can connect without having the same network address.

- **Logical Organization:** Now it allows for the managing of network traffic within the laboratories, rooms, and common devices.
- **Scalability:** Such a design facilitates future extension that does not have to be accomplished through significant redesign of the network.
- **Security and Control:** Gives exact control over transmission and receipt of data between the subnets. This tasks help the institution get the best IP addressing scheme that makes network to run effectively, support all the hosts and be prepared for future expansion

This task is important since it facilitates the formulation of an efficient IP addressing system within the faculty's network which in turn supports all the hosts together and prepares for future expansions.

Meeting minutes

Date/time	23/12/2024, 9:21 p.m.
Location	Google Meet (online)
Meeting discussion task	1. The task. 2. The appropriate subnetting. 3. The devices on each floor. 4. Task division. 5. Working on the project.
Meeting MC	Abdalla Ali Abdalla Ali

Attendance		
Name	**Time**	**Reason of absence**
1- Abdalla Ali Abdalla Ali	9:21	---
2- Nouredin Mamdouh	9:22	---
3- Mohammed abdelgawwad	9:22	---

Minutes			
No	**Item discussed**	**Result**	**Person in charge/Time**
1.	The task.	Mohammed and Abdalla thoroughly read the task and explained each part in details, while explaining some terms, the team had a good understanding of the overall task.	Mohammed Abdelgawwad (9:23 pm – 9:40pm) Abdalla Ali (9:42 pm - 9:50 pm)
2.	The appropriate subnetting.	Abdalla talked about what should be done in this phase, what are the appropriate subnetting divisions for each floor and room, and he explained about IP addressing, and how to divide it between the rooms.	Abdalla Ali (9:51 pm – 10:17 pm)

3.	The devices on each floor.	Nouredin suggested counting the devices that should have an IP to determine the range of usable IP addresses, subnet address and the appropriate subnet mask.	Nouredin Mamdouh (10:17 pm – 10:20 pm)
4.	Task division.	Nouredin suggested that he will take a part of the first floor and second floor IP addressing, while Mohammed will take part of the first floor and second floor IP addressing also, Abdalla will focus on the subnetting, formatting the document, and revision of the project.	Nouredin Mamdouh (10:24 pm – 10:27 pm)
5.	Working on the project	Each member started doing the task assigned to him and the meeting kept open for further collaboration and communication.	Abdalla Ali (10:27 pm – 12:39 pm) Mohammed abdelgawwad (10:27 pm – 12:39 pm) Nouredin Mamdouh (10:27 pm – 12:39 pm)
	Meeting Ended		**12:41 PM**

Subnetting Design

The assigned IP address is 192.19.0.0/23, this IP allows for efficient division of the network onto two floors, the division is performed by taking 1 bit of the host portion and adding it to the network portion for each router.

The new IP will become 192.19.0.0/24, dividing it into 192.19.0.0/24, first floor's subnet, and 192.19.1.0/24 second floor's subnet.

The IP address is a classless IP address allowing for future user's addition and allowing for more network expansion.

3.1 Assigned Network Address

The address is extended for each room to add Wireless hosts assuming approximately (23-32) people are using the Wireless Network at the same time, except for the student's lounge that can take up to 50 people, and that for maximum capacity and efficient distribution of the network.

Each device will be given a unique IP address and the rest of unused IP addresses will be vacant for wireless connection in each of the rooms and labs, and the number of vacant IP addresses varies on the number of possible users in the room.

Area	Hosts Needed	Subnet Mask	Subnet Size (IPs)	Hosts Available
General Lab 1	• 32 Workstations • 2 Wireless access points • 1 Projector	192.19.0.0/24	62	60
General Lab 2	• 32 Workstations • 1 Wireless access points • 1 Projector	192.19.0.62/24	62	60
Embedded Lab	• 32 Workstations • 1 Wireless access points • 1 Projector	192.19.0.124/24	62	60
Cisco Lab	• 32 Workstations • 2 Wireless access points • 1 Projector • 1 Printer	192.19.0.186/24	62	60
Hybrid Classroom	• 1 Workstations • 2 Wireless access points • 1 Camera • 1 Projector	192.19.1.0/24	38	36
Video Conference Room	• 1 Workstations • 1 Wireless access points • 1 Camera • 1 Projector • 1 screen	192.19.1.38/24	23	21
Student Lounge	• 2 Wireless Access Points	192.19.1.61/24	52	50
Waiting Room, Lecturer's Room, Prayer Room	• 1 Wireless Access Points	192.19.1.113/24	32	30

Area	Subnet Address	Usable IP Range	Broadcast Address
General Lab 1	192.19.0.0/24	192.19.0.1 - 192.19.0.60	192.19.0.61
General Lab 2	192.19.0.62/24	192.19.0.63 - 192.19.0.122	192.19.0.123
Embedded Lab	192.19.0.124/24	192.19.0.125 - 192.19.0.184	192.19.0.185
Cisco Lab	192.19.0.186/24	192.19.0.187 - 192.19.0.246	192.19.0.247
Hybrid Classroom	192.19.1.0/24	192.19.1.1 - 192.19.1.36	192.19.1.37
Video Conference Room	192.19.1.38/24	192.19.1.39 - 192.19.0.59	192.19.1.60
Student Lounge	192.19.1.61/24	192.19.1.62 - 192.19.0.111	192.19.1.112
Waiting Room Lecturer's Room Prayer Room	192.19.1.113/24	192.19.1.114 - 192.19.0.143	192.19.1.144

IP ADDRESS ASSIGNATION

First Floor IP Subnetting
First floor Router : 192.19.0.254

General Lab 1

Subnet Address: 192.19.0.0/24

Broadcast Address: 192.19.0.61

Devices	IP Address
PC1 (Lecturer's PC)	192.19.0.1
PC2 (Technician's PC)	192.19.0.2
PC3	192.19.0.3
PC4	192.19.0.4
PC5	192.19.0.5
PC6	192.19.0.6
PC7	192.19.0.7
PC8	192.19.0.8
PC9	192.19.0.9
PC10	192.19.0.10
PC11	192.19.0.11
PC12	192.19.0.12
PC13	192.19.0.13
PC14	192.19.0.14
PC15	192.19.0.15
PC16	192.19.0.16
PC17	192.19.0.17
PC18	192.19.0.18
PC19	192.19.0.19
PC20	192.19.0.20

Devices	IP Address
PC21	192.19.0.21
PC22	192.19.0.22
PC23	192.19.0.23
PC24	192.19.0.24
PC25	192.19.0.25
PC26	192.19.0.26
PC27	192.19.0.27
PC28	192.19.0.28
PC29	192.19.0.29
PC30	192.19.0.30
PC31	192.19.0.31
PC32	192.19.0.32
Wireless access point 1	192.19.0.33
Wireless access point 2	192.19.0.34
Projector	192.19.0.35

General Lab 2

Subnet Address: 192.19.0.62/24

Broadcast Address: 192.19.0.123

Devices	IP Address
PC1 (Lecturer's PC)	192.19.0.64
PC2 (Technician's PC)	192.19.0.65
PC3	192.19.0.66
PC4	192.19.0.67
PC5	192.19.0.68
PC6	192.19.0.69
PC7	192.19.0.70
PC8	192.19.0.71
PC9	192.19.0.72
PC10	192.19.0.73
PC11	192.19.0.74
PC12	192.19.0.75
PC13	192.19.0.76
PC14	192.19.0.77
PC15	192.19.0.78
PC16	192.19.0.79
PC17	192.19.0.80
PC18	192.19.0.81
PC19	192.19.0.82
PC20	192.19.0.83

Devices	IP Address
PC21	192.19.0.84
PC22	192.19.0.85
PC23	192.19.0.86
PC24	192.19.0.87
PC25	192.19.0.88
PC26	192.19.0.89
PC27	192.19.0.90
PC28	192.19.0.91
PC29	192.19.0.92
PC30	192.19.0.93
PC31	192.19.0.94
PC32	192.19.0.95
Wireless Access Point	192.19.0.96
Projector	192.19.0.97

Embedded Lab

Subnet Address: 192.19.0.124/24

Broadcast Address: 192.19.0.185

Devices	IP Address
PC1 (Lecturer's PC)	192.19.0.127
PC2 (Technician's PC)	192.19.0.128
PC3	192.19.0.129
PC4	192.19.0.130
PC5	192.19.0.131
PC6	192.19.0.132
PC7	192.19.0.133
PC8	192.19.0.134
PC9	192.19.0.135
PC10	192.19.0.136
PC11	192.19.0.137
PC12	192.19.0.138
PC13	192.19.0.139
PC14	192.19.0.140
PC15	192.19.0.141
PC16	192.19.0.142
PC17	192.19.0.143
PC18	192.19.0.144
PC19	192.19.0.145
PC20	192.19.0.146

Devices	IP Address
PC21	192.19.0.147
PC22	192.19.0.148
PC23	192.19.0.149
PC24	192.19.0.150
PC25	192.19.0.151
PC26	192.19.0.152
PC27	192.19.0.153
PC28	192.19.0.154
PC29	192.19.0.155
PC30	192.19.0.156
PC31	192.19.0.157
PC32	192.19.0.158
Wireless access point	192.19.0.159
Projector	192.19.0.160

Cisco Lab

Subnet Address: 192.19.0.186/24

Broadcast Address: 192.19.0.247

Devices	IP Address
PC1 (Lecturer's PC)	192.19.0.190
PC2 (Technician's PC)	192.19.0.191
PC3	192.19.0.192
PC4	192.19.0.193
PC5	192.19.0.194
PC6	192.19.0.195
PC7	192.19.0.196
PC8	192.19.0.197
PC9	192.19.0.198
PC10	192.19.0.199
PC11	192.19.0.200
PC12	192.19.0.201
PC13	192.19.0.202
PC14	192.19.0.203
PC15	192.19.0.204
PC16	192.19.0.205
PC17	192.19.0.206
PC18	192.19.0.207
PC19	192.19.0.208
PC20	192.19.0.209

Devices	IP Address
PC21	192.19.0.210
PC22	192.19.0.211
PC23	192.19.0.212
PC24	192.19.0.213
PC25	192.19.0.214
PC26	192.19.0.215
PC27	192.19.0.216
PC28	192.19.0.217
PC29	192.19.0.218
PC30	192.19.0.219
PC31	192.19.0.220
PC32	192.19.0.221
Wireless access point 1	192.19.0.222
Wireless access point 2	192.19.0.223
Projector	192.19.0.224
Printer	192.19.0.225

Second Floor IP Subnetting

second floor Router : 192.19.1.254

Hybrid Classroom

Subnet Address: 192.19.1.0/24

Broadcast Address: 192.19.1.37

Devices	IP Address
PC	192.19.1.1/17
Wireless Access Point 1	192.19.1.2/17
Wireless Access Point 2	192.19.1.3/17
Camera	192.19.1.4/17
Projector	192.19.1.5/17

Student Lounge

Subnet Address: 192.19.1.61/24

Broadcast Address: 192.19.1.112

Devices	IP Address
Wireless Access Point 1	192.19.1.64/17
Wireless Access Point 2	192.19.1.65/17

Video Conference Room

Subnet Address: 192.19.1.38/24

Broadcast Address: 192.19.1.60

Devices	IP Address
PC	192.19.1.40/17
Wireless Access Point 1	192.19.1.41/17
Camera	192.19.1.42/17
Projector	192.19.1.43/17
Screen	192.19.1.44/17

Waiting Room, Lecturer's Room ,Prayer Room

Subnet Address: 192.19.1.113/24

Broadcast Address: 192.19.1.144

Devices	IP Address
Wireless Access Point	192.19.1.117

Summary

Task 5 of the project aimed at designing and configuring an optimized IP addressing in a structured network in an academic environment. As per the promoted 192.19.0.0/23 network address, this project was able to subnet the network with maximum scalability, logical division and optimal use of IPs. Every floor, laboratory and functional space was designed to eliminate possible IP collisions and incorporate the necessary equipment, including PCs, patch panels, wireless network access points, cameras and projectors.

The rationale followed in implementing the subnetting design entailed proper segmentation and allocation of subnet masks and the details of the IP range, broadcast addresses, and specific IP allocation to devices. To provide clear paths of communication between all devices, addressing schemes gave focus on identification, organization, scalability and security for future expansion.

In written detailed meeting minutes, members report that teamwork supported cooperative efforts in achieving clarity of tasks functions and implementation. The design effect also achieves the current load and additionally lays the groundwork for the network structure of the institution. This makes this network strong and effective for the future calls because it is generalized with capacity to absorb any incoming traffic.