COMPUTER NETWORK

SECTION 02

PROJECT (TASK 5)

LECTURER : Ms. Hazinah Kutty Mammi

GROUP NAME : NetSecret

GROUP MEMBERS :

NAME	**MATRICS NUM**
PRAVIN SIVANATHAN	A21EC0123
SADIK AL MAHMUD	A20EC4049
ABDUL AZIM BIN ANUAR VEERA	A21EC0001
MOHAMMED HUSSEIN SALEH BA ABBAD	A21EC4015

Table of Contents:

1.0 Updated Subnets and Devices addressing

Step 1 (Dividing portions):

172.16.00100000.00000000

Network portion - Host portion

Step2 (Borrow bits):

Network lab: $2^x = 32$, x = 6 bits (Since 32 addresses are not enough because we still need 2 address for network address and broadcast address)

General purpose lab: $2^x = 31$, x = 6 bits,

Computer Security lab: $2^x = 25$, x = 5 bits.

IOT lab: $2^x = 25$, x = 5 bits.

VC1: 2 hosts, $2^x = 4$, x = 3 bits.

VC2: 2 hosts, $2^x = 4$, x = 3 bits.

RTA-RTB: 2 hosts, $2^x = 4$, x = 2 bits.

RTC-RTB: 2 hosts, $2^x = 4$, x = 2 bits.

RTB-RTF: 2 hosts, $2^x = 4$, x = 2 bits.

RTB-ISP: 2 hosts, $2^x = 4$, x = 2 bits.

RTF-ISP: 2 hosts, $2^x = 4$, x = 2 bits.

RTF-RTD: 2 hosts, $2^x = 4$, x = 2 bits.

RTF-RTE: 2 hosts, $2^x = 4$, x = 2 bits.

Staff Rooms(Floor 1) : 6 hosts, $2^x = 6$, x = 3 bits.

Staff Rooms(Floor 2) : 6 hosts, $2^x = 6$, x = 3 bits.

Step 3 (Borrow bits):

S#0 (Network Lab):

172.16.00100000.00000000 [32.0] NA

172.16.00100000.00111111 [32.63] BA

S#1 (General Purpose lab):

172.16.00100000.01000000 [32.64] NA

172.16.00100000.01111111 [32.127] BA

S#2 (Computer Security Lab):

172.16.00100000.10000000 [32.128] NA

172.16.00100000.10011111 [32.159] BA

S#3 (IOT Lab):

172.16.00100000.10100000 [32.160] NA

172.16.00100000.10111111 [32.191] BA

S#4 (VC1):

172.16.00100000.11000000 [32.192] NA

172.16.00100000.11000111 [32.199] BA

S#5 (VC2):

172.16.00100000.11001000 [32.200] NA

172.16.00100000.11001111 [32.207] BA

S#6 (RTA-RTB):

172.16.00100000.11010000 [32.208] NA

172.16.00100000.11010011 [32.211] BA

S#7 (RTC-RTB):

172.16.00100000.11010100 [32.212] NA

172.16.00100000.11010111 [32.215] BA

S#8 (RTB-RTF):

172.16.00100000.11011000 [32.216] NA

172.16.00100000.11011011 [32.219] BA

S#9 (RTB-ISP):

172.16.00100000.11011100 [32.220] NA

172.16.00100000.11011111 [32.223] BA

S#10 (RTF-ISP):

172.16.00100000.11100000 [32.224] NA

172.16.00100000.11100011 [32.227] BA

S#11 (RTF-RTD):

172.16.00100000.11100100 [32.228] NA

172.16.00100000.11100111 [32.231] BA

S#12 (RTF-RTE):

172.16.00100000.11101000 [32.232] NA

172.16.00100000.11101011 [32.235] BA

S#13 (SRf1):

172.16.00100000.11110000 [32.240] NA

172.16.00100000.11110111 [32.247] BA

S#14 (SRf2):

172.16.00100000.11111000 [32.248] NA

172.16.00100000.11111111 [32.255] BA

SUBNET	NETWORK ADDRESS	BROADCAST ADDRESS	USABLE ADD. RANGE	NUMBER OF USABLE IP ADDRESSES	SUBNET MASK
0	172.16.32.0	172.16.32.63	172.16.32.1 - 172.16.32.62	62	255.255.255.192
1	172.16.32.64	172.16.32.127	172.16.32.65 - 172.16.32.126	62	255.255.255.192
2	172.16.32.128	172.16.32.159	172.16.32.129 - 172.16.32.158	30	255.255.255.224
3	172.16.32.160	172.16.32.191	172.16.32.161 - 172.16.32.190	30	255.255.255.224
4	172.16.32.192	172.16.32.199	172.16.32.193 - 172.16.32.198	6	255.255.255.248
5	172.16.32.200	172.16.32.207	172.16.32.201 - 172.16.32.206	6	255.255.255.248
6	172.16.32.208	172.16.32.211	172.16.32.209 - 172.16.32.210	2	255.255.255.252
7	172.16.32.212	172.16.32.215	172.16.32.213 - 172.16.32.214	2	255.255.255.252
8	172.16.32.216	172.16.32.219	172.16.32.217 - 172.16.32.218	2	255.255.255.252
9	172.16.32.220	172.16.32.223	172.16.32.221 - 172.16.32.222	2	255.255.255.252

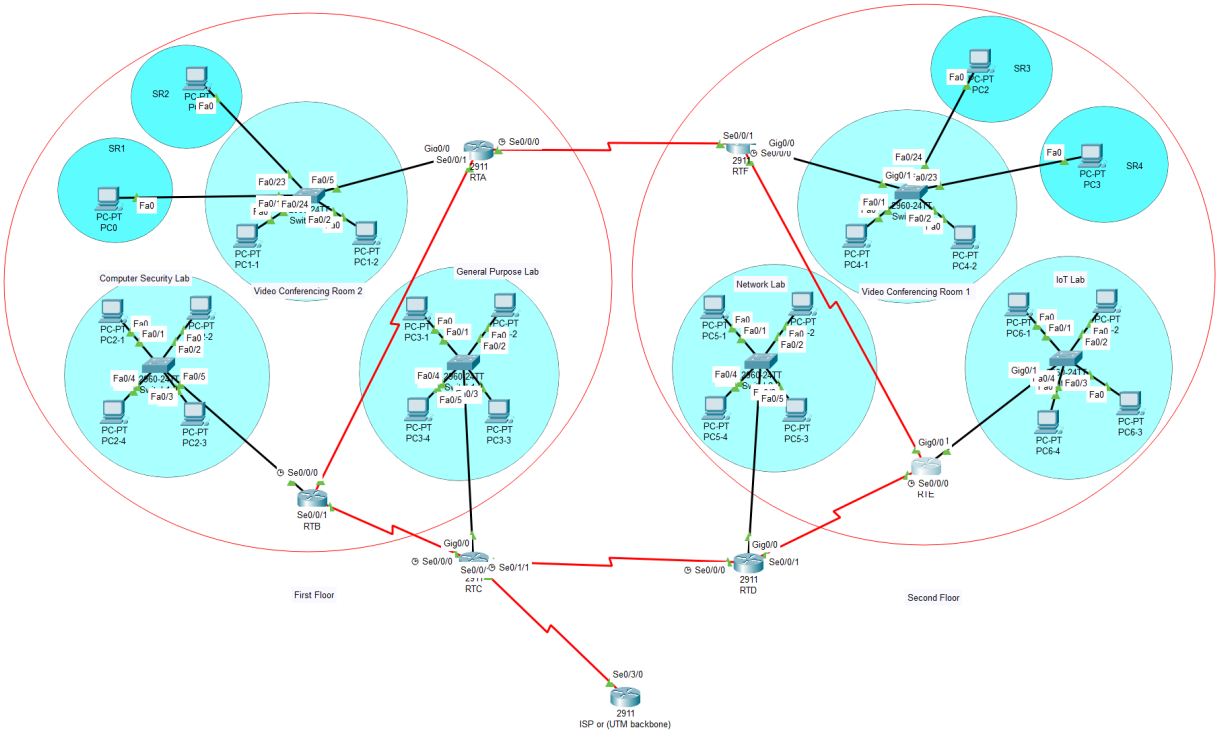
10	172.16.32.224	172.16.32.227	172.16.32.225 - 172.16.32.226	2	255.255.255.252
11	172.16.32.228	172.16.32.231	172.16.32.229 - 172.16.32.230	2	255.255.255.252
12	172.16.32.232	172.16.32.235	172.16.32.233 - 172.16.32.234	2	255.255.255.252
13	172.16.32.240	172.16.32.247	172.16.32.241- 172.16.32.246	6	255.255.255.248
14	172.16.32.248	172.16.32.255	172.16.32.249- 172.16.32.254	6	255.255.255.248

2.0 VLAN TABLE

As for the VLANs, we've divided the topology to 6 VLANs to make sure each lab or room has its own private access.

VLAN Name	Room
10	Computer Security Lab
11	NetworkLab
12	Conference Rooms
13	General Purpose Lab
14	IoT Lab
99	Staff Rooms

Updated Topology



Switches' vlans

- VC2 Switch

```
Switch>en
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gig0/2
12   ConferenceRooms                  active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22
99   StaffRooms                       active    Fa0/23, Fa0/24
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

- VC1 Switch

```
Switch>en
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gig0/2
12   ConferenceRooms                  active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22
99   StaffRooms                       active    Fa0/23, Fa0/24
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

- Network Lab Switch

```
Switch>en
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gig0/2
11   NetworkLab                       active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   StaffRooms                       active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

- IoT Lab Switch

```
Switch>en
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gig0/2
14   IOTLab                           active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   StaffRooms                       active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

- General Purpose Lab Switch

```
Switch>en
Switch#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Gig0/2
13   GeneralLab                        active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                 Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                 Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                 Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                 Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   StaffRooms                        active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

- Computer Security Lab

```
Switch>en
Switch#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Gig0/2
10   ComputerSecurity                  active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                 Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                 Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                 Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                 Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   StaffRooms                        active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

Routers' Routing table

- **RTA**

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
D	172.16.32.0/26	Serial0/0/1	172.16.32.209	90/3196416
D	172.16.32.0/26	Serial0/0/0	172.16.32.230	90/3196416
D	172.16.32.64/26	Serial0/0/1	172.16.32.209	90/2684416
D	172.16.32.128/27	Serial0/0/0	172.16.32.230	90/2684416
D	172.16.32.160/27	Serial0/0/1	172.16.32.209	90/2172416
D	172.16.32.192/29	Serial0/0/0	172.16.32.230	90/2172416
C	172.16.32.200/29	GigabitEthernet0/0.12	---	0/0
L	172.16.32.203/32	GigabitEthernet0/0.12	---	0/0
C	172.16.32.208/30	Serial0/0/1	---	0/0
L	172.16.32.210/32	Serial0/0/1	---	0/0
D	172.16.32.212/30	Serial0/0/1	172.16.32.209	90/2681856
D	172.16.32.216/30	Serial0/0/1	172.16.32.209	90/3193856
D	172.16.32.220/30	Serial0/0/0	172.16.32.230	90/3193856
D	172.16.32.224/30	Serial0/0/0	172.16.32.230	90/2681856
C	172.16.32.228/30	Serial0/0/0	---	0/0
L	172.16.32.229/32	Serial0/0/0	---	0/0
D	172.16.32.232/30	Serial0/0/1	172.16.32.209	90/3193856
C	172.16.32.240/29	GigabitEthernet0/0.99	---	0/0
L	172.16.32.241/32	GigabitEthernet0/0.99	---	0/0
D	172.16.32.248/29	Serial0/0/0	172.16.32.230	90/2172416

- **RTB**

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
D	172.16.32.0/26	Serial0/0/1	172.16.32.213	90/2684416
D	172.16.32.64/26	Serial0/0/1	172.16.32.213	90/2172416
D	172.16.32.128/27	Serial0/0/1	172.16.32.213	90/3196416
D	172.16.32.128/27	Serial0/0/0	172.16.32.210	90/3196416
C	172.16.32.160/27	GigabitEthernet0/0.10	---	0/0
L	172.16.32.165/32	GigabitEthernet0/0.10	---	0/0
D	172.16.32.192/29	Serial0/0/0	172.16.32.210	90/2684416
S	172.16.32.200/29	---	172.16.32.210	1/0
C	172.16.32.208/30	Serial0/0/0	---	0/0
L	172.16.32.209/32	Serial0/0/0	---	0/0
C	172.16.32.212/30	Serial0/0/1	---	0/0
L	172.16.32.214/32	Serial0/0/1	---	0/0
D	172.16.32.216/30	Serial0/0/1	172.16.32.213	90/2681856
D	172.16.32.220/30	Serial0/0/1	172.16.32.213	90/3193856
D	172.16.32.224/30	Serial0/0/0	172.16.32.210	90/3193856
D	172.16.32.228/30	Serial0/0/0	172.16.32.210	90/2681856
D	172.16.32.232/30	Serial0/0/1	172.16.32.213	90/2681856
D	172.16.32.240/29	Serial0/0/0	172.16.32.210	90/2172416
D	172.16.32.248/29	Serial0/0/0	172.16.32.210	90/2684416

- **RTC**

Routing Table for RTC

Type	Network	Port	Next Hop IP	Metric
S	0.0.0.0/0	Serial0/1/1	---	1/0
D	172.16.32.0/26	Serial0/0/1	172.16.32.217	90/2172416
C	172.16.32.64/26	GigabitEthernet0/0.13	---	0/0
L	172.16.32.69/32	GigabitEthernet0/0.13	---	0/0
D	172.16.32.128/27	Serial0/0/1	172.16.32.217	90/2684416
D	172.16.32.160/27	Serial0/0/0	172.16.32.214	90/2172416
D	172.16.32.192/29	Serial0/0/0	172.16.32.214	90/3196416
D	172.16.32.192/29	Serial0/0/1	172.16.32.217	90/3196416
D	172.16.32.200/29	Serial0/0/0	172.16.32.214	90/2684416
D	172.16.32.208/30	Serial0/0/0	172.16.32.214	90/2681856
C	172.16.32.212/30	Serial0/0/0	---	0/0
L	172.16.32.213/32	Serial0/0/0	---	0/0
C	172.16.32.216/30	Serial0/0/1	---	0/0
L	172.16.32.218/32	Serial0/0/1	---	0/0
D	172.16.32.220/30	Serial0/0/1	172.16.32.217	90/2681856
D	172.16.32.224/30	Serial0/0/1	172.16.32.217	90/3193856
D	172.16.32.228/30	Serial0/0/0	172.16.32.214	90/3193856
C	172.16.32.232/30	Serial0/1/1	---	0/0
L	172.16.32.233/32	Serial0/1/1	---	0/0
D	172.16.32.240/29	Serial0/0/0	172.16.32.214	90/2684416
D	172.16.32.248/29	Serial0/0/0	172.16.32.214	90/3196416
D	172.16.32.248/29	Serial0/0/1	172.16.32.217	90/3196416

- **RTD**

Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
C	172.16.32.0/26	GigabitEthernet0/0.11	---	0/0
L	172.16.32.5/32	GigabitEthernet0/0.11	---	0/0
D	172.16.32.64/26	Serial0/0/0	172.16.32.218	90/2172416
D	172.16.32.128/27	Serial0/0/1	172.16.32.221	90/2172416
D	172.16.32.160/27	Serial0/0/0	172.16.32.218	90/2684416
D	172.16.32.192/29	Serial0/0/1	172.16.32.221	90/2684416
D	172.16.32.200/29	Serial0/0/0	172.16.32.218	90/3196416
D	172.16.32.200/29	Serial0/0/1	172.16.32.221	90/3196416
D	172.16.32.208/30	Serial0/0/0	172.16.32.218	90/3193856
D	172.16.32.212/30	Serial0/0/0	172.16.32.218	90/2681856
C	172.16.32.216/30	Serial0/0/0	---	0/0
L	172.16.32.217/32	Serial0/0/0	---	0/0
C	172.16.32.220/30	Serial0/0/1	---	0/0
L	172.16.32.222/32	Serial0/0/1	---	0/0
D	172.16.32.224/30	Serial0/0/1	172.16.32.221	90/2681856
D	172.16.32.228/30	Serial0/0/1	172.16.32.221	90/3193856
D	172.16.32.232/30	Serial0/0/0	172.16.32.218	90/2681856
D	172.16.32.240/29	Serial0/0/0	172.16.32.218	90/3196416
D	172.16.32.240/29	Serial0/0/1	172.16.32.221	90/3196416
D	172.16.32.248/29	Serial0/0/1	172.16.32.221	90/2684416

- **RTE**

Routing Table for RTE

Type	Network	Port	Next Hop IP	Metric
D	172.16.32.0/26	Serial0/0/0	172.16.32.222	90/2172416
D	172.16.32.64/26	Serial0/0/0	172.16.32.222	90/2684416
C	172.16.32.128/27	GigabitEthernet0/0.14	---	0/0
L	172.16.32.133/32	GigabitEthernet0/0.14	---	0/0
D	172.16.32.160/27	Serial0/0/0	172.16.32.222	90/3196416
D	172.16.32.160/27	Serial0/0/1	172.16.32.225	90/3196416
D	172.16.32.192/29	Serial0/0/1	172.16.32.225	90/2172416
D	172.16.32.200/29	Serial0/0/1	172.16.32.225	90/2684416
D	172.16.32.208/30	Serial0/0/1	172.16.32.225	90/3193856
D	172.16.32.212/30	Serial0/0/0	172.16.32.222	90/3193856
D	172.16.32.216/30	Serial0/0/0	172.16.32.222	90/2681856
C	172.16.32.220/30	Serial0/0/0	---	0/0
L	172.16.32.221/32	Serial0/0/0	---	0/0
C	172.16.32.224/30	Serial0/0/1	---	0/0
L	172.16.32.226/32	Serial0/0/1	---	0/0
D	172.16.32.228/30	Serial0/0/1	172.16.32.225	90/2681856
D	172.16.32.232/30	Serial0/0/0	172.16.32.222	90/3193856
D	172.16.32.240/29	Serial0/0/1	172.16.32.225	90/2684416
D	172.16.32.248/29	Serial0/0/1	172.16.32.225	90/2172416

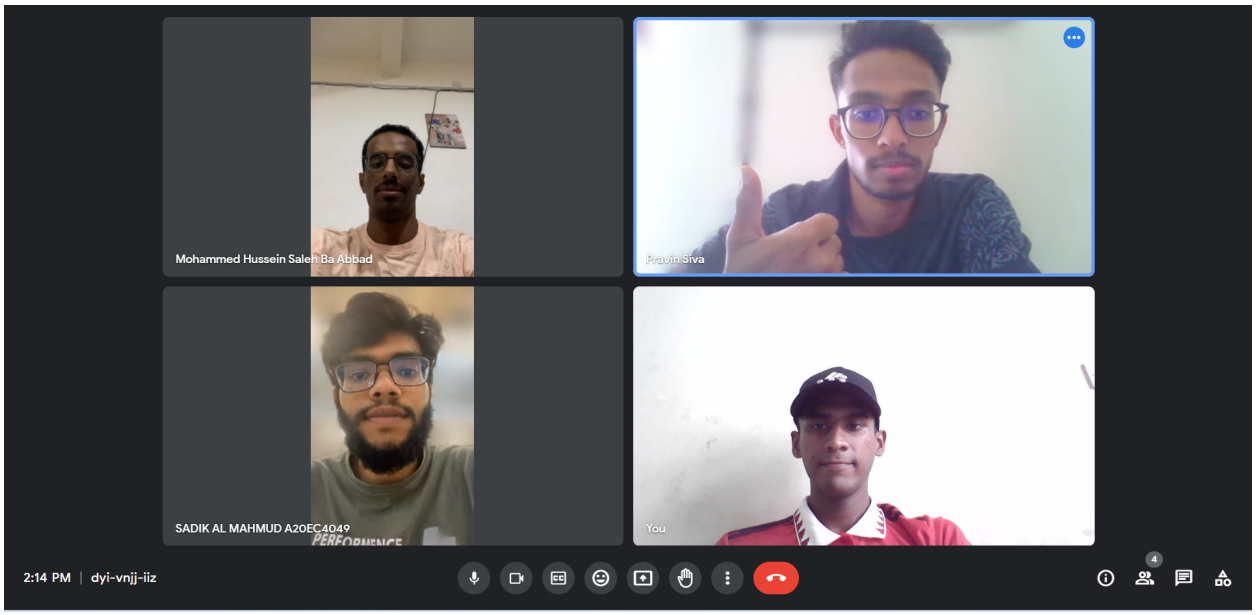
- **RTF**

Routing Table for RTF

Type	Network	Port	Next Hop IP	Metric
D	172.16.32.0/26	Serial0/0/0	172.16.32.226	90/2684416
D	172.16.32.64/26	Serial0/0/1	172.16.32.229	90/3196416
D	172.16.32.64/26	Serial0/0/0	172.16.32.226	90/3196416
D	172.16.32.128/27	Serial0/0/0	172.16.32.226	90/2172416
D	172.16.32.160/27	Serial0/0/1	172.16.32.229	90/2684416
C	172.16.32.192/29	GigabitEthernet0/0.12	---	0/0
L	172.16.32.195/32	GigabitEthernet0/0.12	---	0/0
D	172.16.32.200/29	Serial0/0/1	172.16.32.229	90/2172416
D	172.16.32.208/30	Serial0/0/1	172.16.32.229	90/2681856
D	172.16.32.212/30	Serial0/0/1	172.16.32.229	90/3193856
D	172.16.32.216/30	Serial0/0/0	172.16.32.226	90/3193856
D	172.16.32.220/30	Serial0/0/0	172.16.32.226	90/2681856
C	172.16.32.224/30	Serial0/0/0	---	0/0
L	172.16.32.225/32	Serial0/0/0	---	0/0
C	172.16.32.228/30	Serial0/0/1	---	0/0
L	172.16.32.230/32	Serial0/0/1	---	0/0
D	172.16.32.232/30	Serial0/0/1	172.16.32.229	90/3705856
D	172.16.32.232/30	Serial0/0/0	172.16.32.226	90/3705856
D	172.16.32.240/29	Serial0/0/1	172.16.32.229	90/2172416
C	172.16.32.248/29	GigabitEthernet0/0.99	---	0/0
L	172.16.32.249/32	GigabitEthernet0/0.99	---	0/0

3.0 APPENDIX

Meeting 1



DATE	09 June 2023
TIME	4:15pm-5:30pm
VENUE	Google meet
DESCRIPTION	Dividing task for subnetting Pravin - Redesign topology in the packet tracer Azim - Subnetting for staff rooms Sadik - Subnetting for staff rooms Mohommad - Configure VLANs
ATTENDANCE	4 / 4