



# **Qatar University**

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**College of Engineering  
Department of Computer Science and  
Engineering**

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## **CMPE 355-Project Report**

### **Task: Design and Implementation of Q-Tire Network**

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## VLAN and WAN Subnetting Table

Network	Hosts Needed	Network Address	Mask	Broadcast	Default Gateway
<b>Reception VLAN-10</b>	200	172.16.0.0	255.255.255.0	172.16.0.255	172.16.0.1
<b>Store VLAN-11</b>	120	172.16.1.0	255.255.255.128	172.16.1.127	172.16.1.1
<b>Logistics VLAN-12</b>	60	172.16.1.128	255.255.255.192	172.16.1.191	172.16.1.129
<b>Finance VLAN-20</b>	50	172.16.1.192	255.255.255.192	172.16.1.255	172.16.1.193
<b>HR VLAN-21</b>	50	172.16.2.0	255.255.255.192	172.16.2.63	172.16.2.1
<b>Sales VLAN-22</b>	50	172.16.2.64	255.255.255.192	172.16.2.127	172.16.2.65
<b>Admin VLAN-30</b>	10	172.16.2.128	255.255.255.240	172.16.2.143	172.16.2.129
<b>IT VLAN-31</b>	10	172.16.2.144	255.255.255.240	172.16.2.159	172.16.2.145
<b>WAN 1</b>	2	172.16.2.160	255.255.255.252	172.16.2.163	172.16.2.161
<b>WAN 2</b>	2	172.16.2.164	255.255.255.252	172.16.2.167	172.16.2.165
<b>WAN 3</b>	2	172.16.2.168	255.255.255.252	172.16.2.171	172.16.2.169

## Show Run for all Network Devices :

### F1-Router show run:

```
F1-Router>
F1-Router>en
F1-Router#show run
Building configuration...
```

```
Current configuration : 2038 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname F1-Router
!
!
!
```

```

!
!
ip dhcp pool Reception
network 172.16.0.0 255.255.255.0
default-router 172.16.0.1
dns-server 172.16.2.156
ip dhcp pool Store
network 172.16.1.0 255.255.255.128
default-router 172.16.1.1
dns-server 172.16.2.156
ip dhcp pool Logistics
network 172.16.1.128 255.255.255.192
default-router 172.16.1.129
dns-server 172.16.2.156
!
!
!
no ip cef
no ipv6 cef
!
!
!
username Abdulla privilege 15 password 0 123
!
!
!
!
!
!
!
!
!
ip domain-name marwan
!
!
!
!
!
!
!
!
interface GigabitEthernet0/0
description "WAN 2 Connecting F1-Router to F3-Router"
ip address 172.16.2.166 255.255.255.252
!
interface GigabitEthernet1/0
description "WAN 3 Connecting F1-Router to F2-Router"
ip address 172.16.2.170 255.255.255.252
!

```

```

interface GigabitEthernet2/0
no ip address
shutdown
!
interface GigabitEthernet3/0
description "Default gateway for F1-Switch"
no ip address
duplex auto
speed auto
!
interface GigabitEthernet3/0.10
encapsulation dot1Q 10
ip address 172.16.0.1 255.255.255.0
!
interface GigabitEthernet3/0.11
encapsulation dot1Q 11
ip address 172.16.1.1 255.255.255.128
!
interface GigabitEthernet3/0.12
encapsulation dot1Q 12
ip address 172.16.1.129 255.255.255.192
!
router ospf 1
log-adjacency-changes
network 172.16.2.164 0.0.0.3 area 0
network 172.16.2.168 0.0.0.3 area 0
network 172.16.0.0 0.0.0.255 area 0
network 172.16.1.0 0.0.0.127 area 0
network 172.16.1.128 0.0.0.63 area 0
!
ip classless
ip route 172.16.2.144 255.255.255.240 172.16.2.165
ip route 172.16.2.128 255.255.255.240 172.16.2.165
ip route 172.16.1.192 255.255.255.192 172.16.2.169
ip route 172.16.2.0 255.255.255.192 172.16.2.169
ip route 172.16.2.64 255.255.255.192 172.16.2.169
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!

```

```
line aux 0
!  
line vty 0 4
password 123
login local
transport input ssh
line vty 5 15
password 123
login local
transport input ssh
!  
!  
!  
end
```

### **F2-Router show run:**

```
2nd_Floor_Router>
2nd_Floor_Router>en
2nd_Floor_Router#show run
Building configuration...

Current configuration : 1914 bytes
!  
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!  
hostname 2nd_Floor_Router
!  
!  
!  
!  
!  
ip dhcp pool Finance
network 172.16.1.192 255.255.255.192
default-router 172.16.1.193
dns-server 172.16.2.156
ip dhcp pool HR
network 172.16.2.0 255.255.255.192
```

```

default-router 172.16.2.1
dns-server 172.16.2.156
ip dhcp pool Sales
network 172.16.2.64 255.255.255.192
default-router 172.16.2.65
dns-server 172.16.2.156
!
!
!
no ip cef
no ipv6 cef
!
!
!
username Ahmed privilege 15 password 0 123
!
!
!
!
!
!
!
!
!
ip ssh version 2
ip domain-name marwan
!
!
!
!
!
!
!
!
interface GigabitEthernet0/0
no ip address
shutdown
!
interface GigabitEthernet1/0
description "WAN 3 connection F2-Router to F1-Router"
ip address 172.16.2.169 255.255.255.252
!
interface GigabitEthernet2/0
description "WAN 1 connection F2-Router to F3-Router"
ip address 172.162.2.161 255.255.255.252
!
interface GigabitEthernet3/0
description "Default gateway for F2-Switch"
no ip address

```

```

duplex auto
speed auto
!
interface GigabitEthernet3/0.20
encapsulation dot1Q 20
ip address 172.16.1.193 255.255.255.192
!
interface GigabitEthernet3/0.21
encapsulation dot1Q 21
ip address 172.16.2.1 255.255.255.192
!
interface GigabitEthernet3/0.22
encapsulation dot1Q 22
ip address 172.16.2.65 255.255.255.192
!
router ospf 1
log-adjacency-changes
network 172.16.2.160 0.0.0.3 area 0
network 172.16.2.168 0.0.0.3 area 0
network 172.16.1.192 0.0.0.3 area 0
network 172.16.2.0 0.0.0.63 area 0
network 172.16.1.192 0.0.0.63 area 0
network 172.16.2.64 0.0.0.63 area 0
!
ip classless
ip route 172.16.2.128 255.255.255.240 172.16.2.162
ip route 172.16.2.144 255.255.255.240 172.16.2.162
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login local
transport input ssh
line vty 5 15
login local
transport input ssh
!

```

```
!  
!  
end
```

### **F3-Router show run:**

```
3rd_Floor_Router>  
3rd_Floor_Router>en  
3rd_Floor_Router#show run  
Building configuration...  
  
Current configuration : 1764 bytes  
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname 3rd_Floor_Router  
!  
!  
!  
!  
!  
ip dhcp pool IT  
network 172.16.2.144 255.255.255.240  
default-router 172.16.2.145  
dns-server 172.16.2.156  
ip dhcp pool Admin  
network 172.16.2.128 255.255.255.240  
default-router 172.16.2.129  
dns-server 172.16.2.129  
!  
!  
!  
no ip cef  
no ipv6 cef  
!  
!  
!  
username Abdulla password 0 123  
!  
!  
!  
!
```



```

!
!
!
!
ip domain-name marwan
!
!
!
!
!
!
!
!
interface GigabitEthernet0/0
description "WAN 2 Connecting F3-Router to F1-Router"
ip address 172.16.2.165 255.255.255.252
!
interface GigabitEthernet1/0
no ip address
shutdown
!
interface GigabitEthernet2/0
description "WAN 1 Connecting F3-Router to F2-Router"
ip address 172.16.2.162 255.255.255.252
!
interface GigabitEthernet3/0
description "Default gateway for F3-Switch"
no ip address
duplex auto
speed auto
!
interface GigabitEthernet3/0.30
encapsulation dot1Q 30
ip address 172.16.2.129 255.255.255.240
!
interface GigabitEthernet3/0.31
encapsulation dot1Q 31
ip address 172.16.2.145 255.255.255.240
!
router ospf 1
log-adjacency-changes
network 172.16.2.160 0.0.0.3 area 0
network 172.16.2.164 0.0.0.3 area 0
network 172.16.2.128 0.0.0.15 area 0
network 172.16.2.144 0.0.0.15 area 0
!
ip classless
ip route 172.16.1.192 255.255.255.192 172.16.2.161

```

```

ip route 172.16.2.0 255.255.255.192 172.162.2.161
ip route 172.16.2.64 255.255.255.192 172.162.2.161
ip route 172.16.1.0 255.255.255.128 172.16.2.166
ip route 172.16.1.128 255.255.255.192 172.16.2.166
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login local
transport input ssh
line vty 5 15
login local
transport input ssh
!
!
!
end

```

### **F1-Switch:**

```

1st_Floor_Switch>
1st_Floor_Switch>
1st_Floor_Switch>en
1st_Floor_Switch#
1st_Floor_Switch#show run
Building configuration...

Current configuration : 2227 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname 1st_Floor_Switch

```

```

!
!
!
ip ssh version 2
ip domain-name marwan
!
username Abdelrahman secret 5 $1$mERr$3HhIgMGBA/9qNmzccuxv0
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
description "Connection to Reception-PC"
switchport access vlan 10
switchport mode access
!
interface FastEthernet0/2
description "Connection to Reception-Printer"
switchport access vlan 10
switchport mode access
!
interface FastEthernet0/3
description "Connection to Store-printer"
switchport access vlan 11
switchport mode access
!
interface FastEthernet0/4
description "Connection to Store-PC"
switchport access vlan 11
switchport mode access
!
interface FastEthernet0/5
description "Connection to Logistic-Printer"
switchport access vlan 12
switchport mode access
!
interface FastEthernet0/6
description "Connection to Logistics-PC"
switchport access vlan 12
switchport mode access
!
interface FastEthernet0/7
description "Connection to F1-WIFI Access point"
switchport access vlan 12
switchport mode access
!

```

```

interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
description "Default Gateway to F1-Router"
switchport trunk allowed vlan 10-12
switchport mode trunk
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
interface Vlan10
ip address 172.16.0.254 255.255.255.0
!

```

```

interface Vlan11
ip address 172.16.1.126 255.255.255.128
!
interface Vlan12
ip address 172.16.1.190 255.255.255.192
!
ip default-gateway 172.16.1.129
!
!
!
!
line con 0
!
line vty 0 4
login local
transport input ssh
line vty 5 15
login local
transport input ssh
!
!
!
!
end

```

### **F2-Switch:**

```

2nd_Floor_Switch>en
2nd_Floor_Switch#show run
Building configuration...

Current configuration : 2210 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname 2nd_Floor_Switch
!
!
!
ip ssh version 2
ip domain-name marwan
!

```

```
username Abdelrahman secret 5 $1$mERr$3HhIgMGBA/9qNmgzccuxv0
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
description "Connection to Finance-PC"
switchport access vlan 20
switchport mode access
!
interface FastEthernet0/2
description "Connection to Finance-Printer"
switchport access vlan 20
switchport mode access
!
interface FastEthernet0/3
description "Connection to HR-Printer"
switchport access vlan 21
switchport mode access
!
interface FastEthernet0/4
description "Connection to HR-PC"
switchport access vlan 21
switchport mode access
!
interface FastEthernet0/5
description "Connection to Sales-Printer"
switchport access vlan 22
switchport mode access
!
interface FastEthernet0/6
description "Connection to Sales-PC"
switchport access vlan 22
switchport mode access
!
interface FastEthernet0/7
description "Connection to F2-WIFI Access point"
switchport access vlan 22
switchport mode access
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
```

```

interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
description "Default Gateway to F2-Router"
switchport trunk allowed vlan 20-22
switchport mode trunk
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
interface Vlan20
ip address 172.16.1.254 255.255.255.192
!
interface Vlan21
ip address 172.16.2.62 255.255.255.192
!
interface Vlan22
ip address 172.16.2.126 255.255.255.192
!

```

```

ip default-gateway 172.16.2.65
!
!
!
!
line con 0
!
line vty 0 4
login local
transport input ssh
line vty 5 15
login local
transport input ssh
!
!
!
!
end

```

### **F3-Switch:**

```

3rd_Floor_Switch>en
3rd_Floor_Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
3rd_Floor_Switch(config)#show run
^
% Invalid input detected at '^' marker.
3rd_Floor_Switch(config)#exit
3rd_Floor_Switch#
%SYS-5-CONFIG_I: Configured from console by console

```

```

3rd_Floor_Switch#show run
Building configuration...

```

```

Current configuration : 2188 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname 3rd_Floor_Switch
!
!
!

```



```

ip ssh version 2
ip domain-name marwan
!
username Abdelrahman secret 5 $1$mERr$3HhIgMGBA/9qNmgezccuxv0
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
description "Connection to Admin-PC"
switchport access vlan 30
switchport mode access
!
interface FastEthernet0/2
description "Connection to Admin-Printer"
switchport access vlan 30
switchport mode access
!
interface FastEthernet0/3
description "Connection to IT-Printer"
switchport access vlan 31
switchport mode access
!
interface FastEthernet0/4
description "Connection to Testing PC1 in IT Department"
switchport access vlan 31
switchport mode access
!
interface FastEthernet0/5
description "Connection to F3-WIFI Access Point"
switchport access vlan 31
switchport mode access
!
interface FastEthernet0/6
description "Connection to ONE Server"
switchport access vlan 31
switchport mode access
!
interface FastEthernet0/7
description "Connection to Testing PC2 in IT Department"
switchport access vlan 31
switchport mode access
!
interface FastEthernet0/8
!
interface FastEthernet0/9

```

```

!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
description "Default gateway to F3-Router"
switchport trunk allowed vlan 30-31
switchport mode trunk
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
interface Vlan30
ip address 172.16.2.142 255.255.255.240
!
interface Vlan31
ip address 172.16.2.158 255.255.255.240
!

```

```
ip default-gateway 172.16.2.145
!  
!  
!  
!  
line con 0  
!  
line vty 0 4  
login local  
transport input ssh  
line vty 5 15  
login local  
transport input ssh  
!  
!  
!  
!  
end
```