

# **F29DC 2024 Lab 1**

## **Connectivity, VPCs, Subnets, VLANs**

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## Part 1 - Connectivity and Virtual PCs ( VPCs )



Image 1.1: Setting up the connection between Switch1, PC1 and PC2.

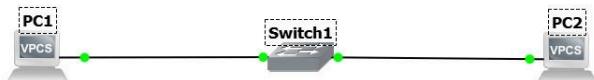


Image 1.2: Starting up all the connections.

SHYAM - PuTTY

```
Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0

PC1>
```

Image 1.3: Providing the IP address for the PC1.

```

SHYAM - PuTTY

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
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Press '?' to get help.

Executing the startup file

PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0

PC2> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=0.952 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.697 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=1.158 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=1.416 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=1.517 ms

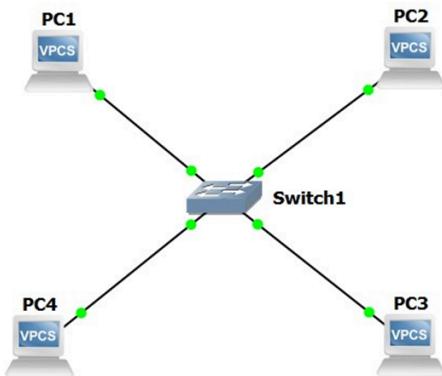
PC2>

```

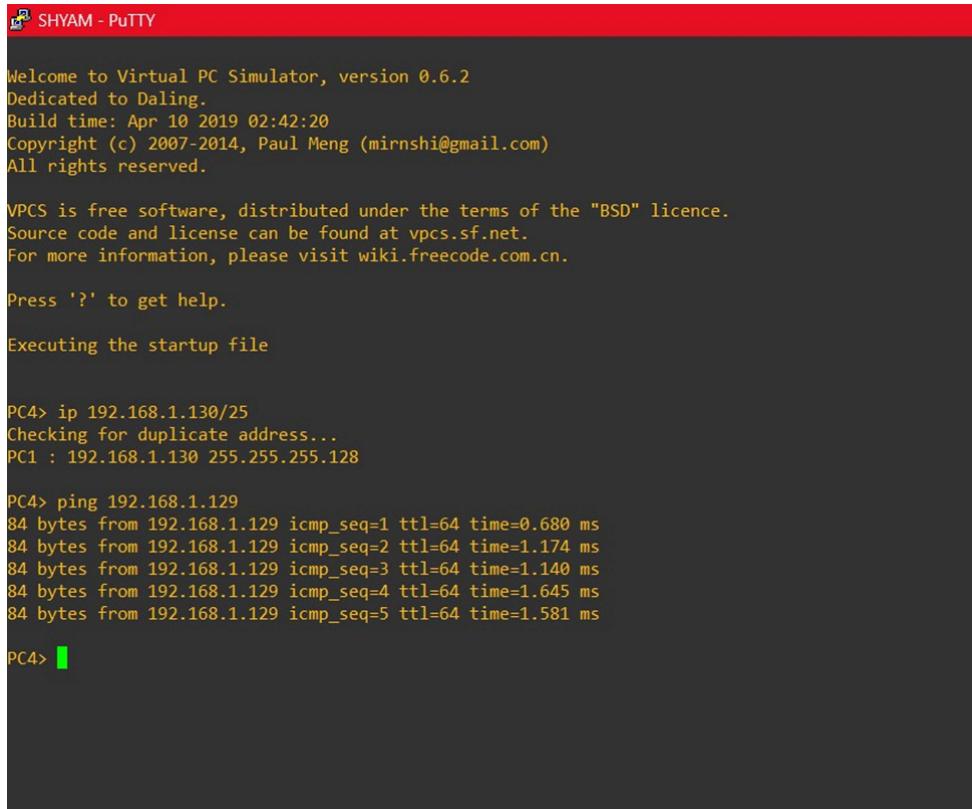
**Image 1.4: Providing IP address for PC2 and testing the connectivity by pinging 192.168.1.1 from PC2.**

---

## **Part 2 - Subnets**



**Image 2.1: Adding two more VPCs PC3 and PC4.**



SHYAM - PuTTY

```
Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
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For more information, please visit wiki.freecode.com.cn.

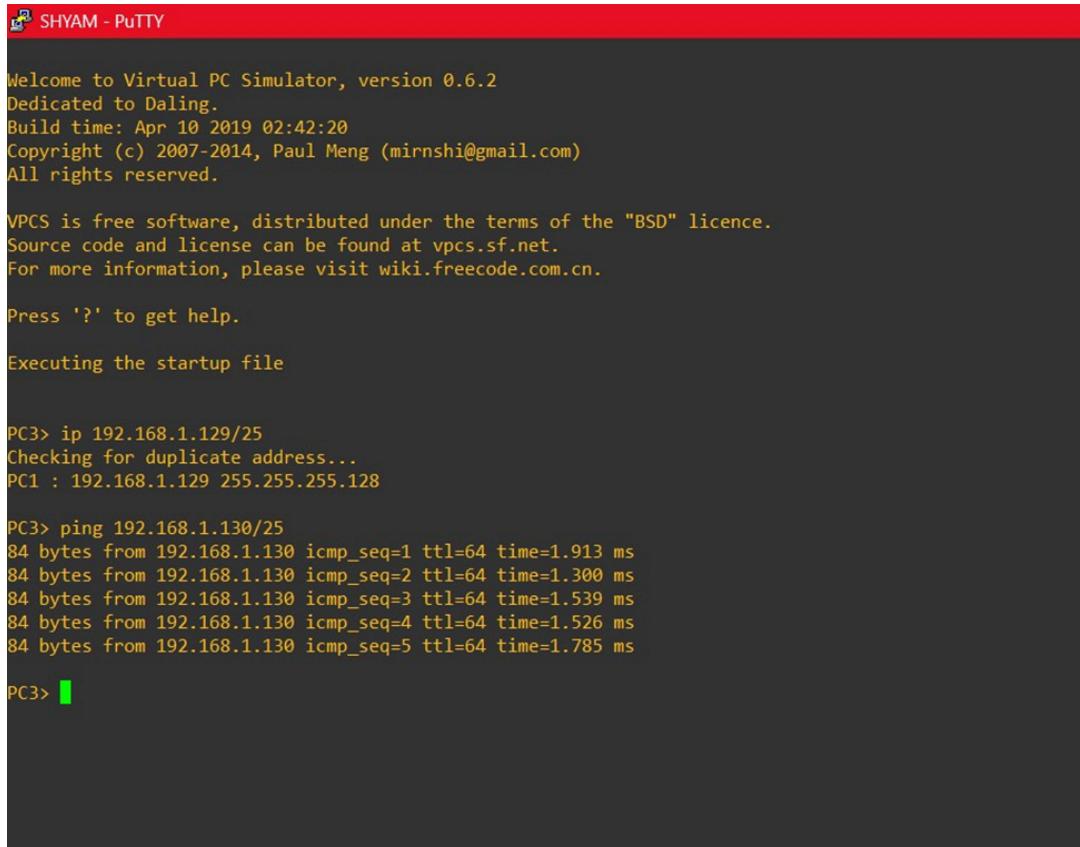
Press '?' to get help.

Executing the startup file

PC4> ip 192.168.1.130/25
Checking for duplicate address...
PC1 : 192.168.1.130 255.255.255.128

PC4> ping 192.168.1.129
84 bytes from 192.168.1.129 icmp_seq=1 ttl=64 time=0.680 ms
84 bytes from 192.168.1.129 icmp_seq=2 ttl=64 time=1.174 ms
84 bytes from 192.168.1.129 icmp_seq=3 ttl=64 time=1.140 ms
84 bytes from 192.168.1.129 icmp_seq=4 ttl=64 time=1.645 ms
84 bytes from 192.168.1.129 icmp_seq=5 ttl=64 time=1.581 ms
```

**Image 2.2: Providing IP address for PC4 and checking if it can ping PC3's IP address.**



```
SHYAM - PuTTY

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
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All rights reserved.

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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC3> ip 192.168.1.129/25
Checking for duplicate address...
PC1 : 192.168.1.129 255.255.255.128

PC3> ping 192.168.1.130/25
84 bytes from 192.168.1.130 icmp_seq=1 ttl=64 time=1.913 ms
84 bytes from 192.168.1.130 icmp_seq=2 ttl=64 time=1.300 ms
84 bytes from 192.168.1.130 icmp_seq=3 ttl=64 time=1.539 ms
84 bytes from 192.168.1.130 icmp_seq=4 ttl=64 time=1.526 ms
84 bytes from 192.168.1.130 icmp_seq=5 ttl=64 time=1.785 ms

PC3>
```

**Image 2.3: Providing IP address for PC3 and checking if it can ping PC4's IP address.**



```
SHYAM - PuTTY

show

NAME   IP/MASK          GATEWAY        MAC           LPORT  RHOST:PORT
PC1    192.168.1.1/24    0.0.0.0        00:50:79:66:68:00  10004  127.0.0.1:10005
      fe80::250:79ff:fe66:6800/64

PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0

PC1> ip 192.168.1.1/25
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.128

PC1>
```

**Image 2.4: Changing the network mask of PC1 from 192.168.1.1/24 to 192.168.1.1/25.**



SHYAM - PuTTY

```
show

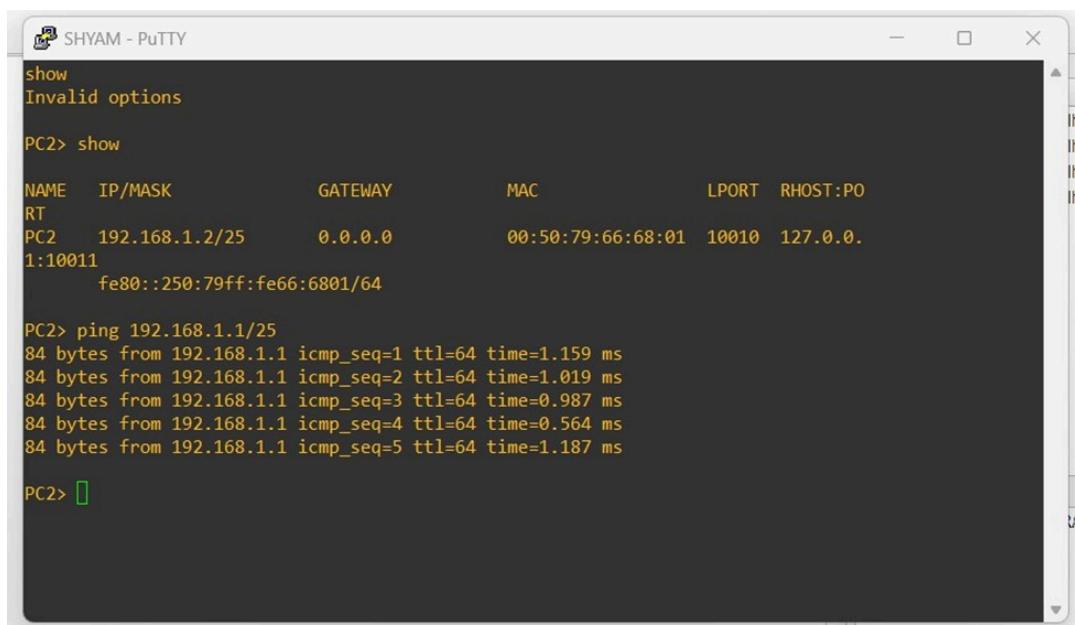
NAME    IP/MASK        GATEWAY        MAC          LPORT  RHOST:PORT
PC2     192.168.1.2/24  0.0.0.0        00:50:79:66:68:01  10006  127.0.0.1:10007
                    fe80::250:79ff:fe66:6801/64

PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0

PC2> ip 192.168.1.2/25
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.128

PC2> █
```

**Image 2.5: Changing the network mask of PC1 from 192.168.1.2/24 to 192.168.1.2/25.**



SHYAM - PuTTY

```
show
Invalid options

PC2> show

NAME    IP/MASK        GATEWAY        MAC          LPORT  RHOST:PO
RT
PC2     192.168.1.2/25  0.0.0.0        00:50:79:66:68:01  10010  127.0.0.
1:10011
                    fe80::250:79ff:fe66:6801/64

PC2> ping 192.168.1.1/25
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=1.159 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.019 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=0.987 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=0.564 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=1.187 ms

PC2> █
```

**Image 2.6: Checking if we can PC1 from PC2 after network masking changes.**

```
show
NAME    IP/MASK        GATEWAY      MAC          LPORT  RHOST:PO
RT
PC1    192.168.1.1/25   0.0.0.0       00:50:79:66:68:00  10008  127.0.0.
1:10009
fe80::250:79ff:fe66:6800/64

PC1> ping 192.168.1.2/25
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=1.306 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=1.432 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=0.840 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=1.326 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=1.439 ms

PC1> █
```

**Image 2.7: Checking if we can PC2 from PC1 after network masking changes.**

```
Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC1> show
NAME    IP/MASK        GATEWAY      MAC          LPORT  RHOST:PO
RT
PC1    0.0.0.0/0       0.0.0.0       00:50:79:66:68:00  10008  127.0.0.
1:10009
fe80::250:79ff:fe66:6800/64

PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0

PC1> show
NAME    IP/MASK        GATEWAY      MAC          LPORT  RHOST:PO
RT
PC1    192.168.1.1/24   0.0.0.0       00:50:79:66:68:00  10008  127.0.0.
1:10009
fe80::250:79ff:fe66:6800/64

PC1> ip 192.168.1.1/25
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.128

PC1> ping 192.168.1.129/25
No gateway found

PC1> ping 192.168.1.130/25
No gateway found

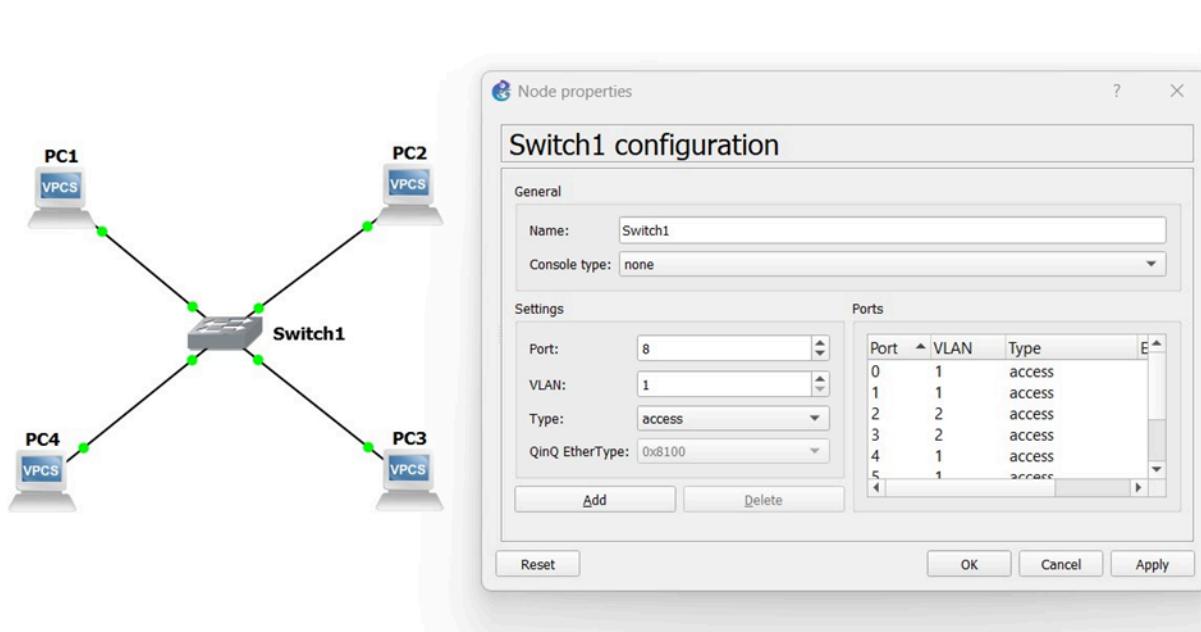
PC1> █
```

**Image 2.8: Checking if we can ping PC3 and PC4 from PC1 by providing the IP address.**

**There was no gateway found between PC3 - PC1 and PC4 - PC1 as the subnets of PC1 and PC2 is different from PC3 and PC4.**

---

## **Part 3 - VLANs**



**Image 3.1: Configuring the VLAN's by changing the PC3 and PC4 from 1 - 2**

```
PC1> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=1.296 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=0.934 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=1.549 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=1.352 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=1.527 ms
```

```
PC1> [green prompt]
```

**Image 3.2: Checking if we can ping PC2 from PC1 after changes.**

```

PC2> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=1.434 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.351 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=1.834 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=1.746 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=1.396 ms

PC2>

```

**Image 3.3: Checking if we can ping PC1 from PC2 after changes.**

The image displays four PuTTY windows, each titled "SHYAM - PuTTY", showing network configuration and ping results for different PCs (PC1, PC2, PC3, and PC4) under a single network setup.

- PC1:** Shows configuration details like IP/MASK (0.0.0.0/0), GATEWAY (0.0.0.0), MAC (00:50:79:66:68:00), LPORT (10008), RHOST (127.0.0.1:10009), and a MAC address (fe80::250:79ff:fe66:6801/64). It also shows ping results for 192.168.1.2 and 192.168.1.1.
- PC2:** Shows configuration details for 192.168.1.1 and ping results for 192.168.1.1 and 192.168.1.2.
- PC3:** Shows configuration details for 192.168.1.3 and ping results for 192.168.1.4.
- PC4:** Shows configuration details for 192.168.1.4 and ping results for 192.168.1.3.

**Image 3.4: Configuring all the PCs under same network in the IP address ranging from 192.168.1.1-4/24.  
So the new IP's will be:**

**PC1 – 192.168.1.1/24**  
**PC2 – 192.168.1.2/24**  
**PC3 – 192.168.1.3/24**  
**PC4 – 192.168.1.4/24**

```
PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0

PC1> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=0.636 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=1.467 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=1.700 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=1.713 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=1.342 ms

PC1> █
```

```
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0

PC2> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=1.476 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.512 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=1.643 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=1.822 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=0.713 ms

PC2> █
```

**Image 3.5: Trying to Ping PC1 from PC2.**

```
PC1> ping 192.168.1.3
host (192.168.1.3) not reachable

PC1> █
```

```
PC3> ping 192.168.1.1
host (192.168.1.1) not reachable

PC3> █
```

**Image 3.6: Trying to Ping PC3 from PC1.**

```
PC2> ping 192.168.1.4  
host (192.168.1.4) not reachable  
PC2> █
```

```
PC4> ping 192.168.1.2  
host (192.168.1.2) not reachable  
PC4> █
```

**Image 3.7:** Trying to ping PC4 from PC2.

```
PC3> ping 192.168.1.4  
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=1.113 ms  
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=1.529 ms  
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=1.337 ms  
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=0.722 ms  
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=0.726 ms  
PC3> █
```

```
PC4> ping 192.168.1.3  
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=1.734 ms  
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=1.499 ms  
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=1.932 ms  
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=1.523 ms  
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=1.408 ms  
PC4> █
```

**Image 3.8:** Trying to ping PC4 from PC3.

The pinging between PC4 - PC3 and PC1 - PC2 were successful while PC3 - PC1 and PC2 - PC4 were not successful because of different VLAN connections. The VLAN connection for PC1 and PC2 is 1 , while PC3 and PC4 are 2.

---

## Part 4 - Wireshark

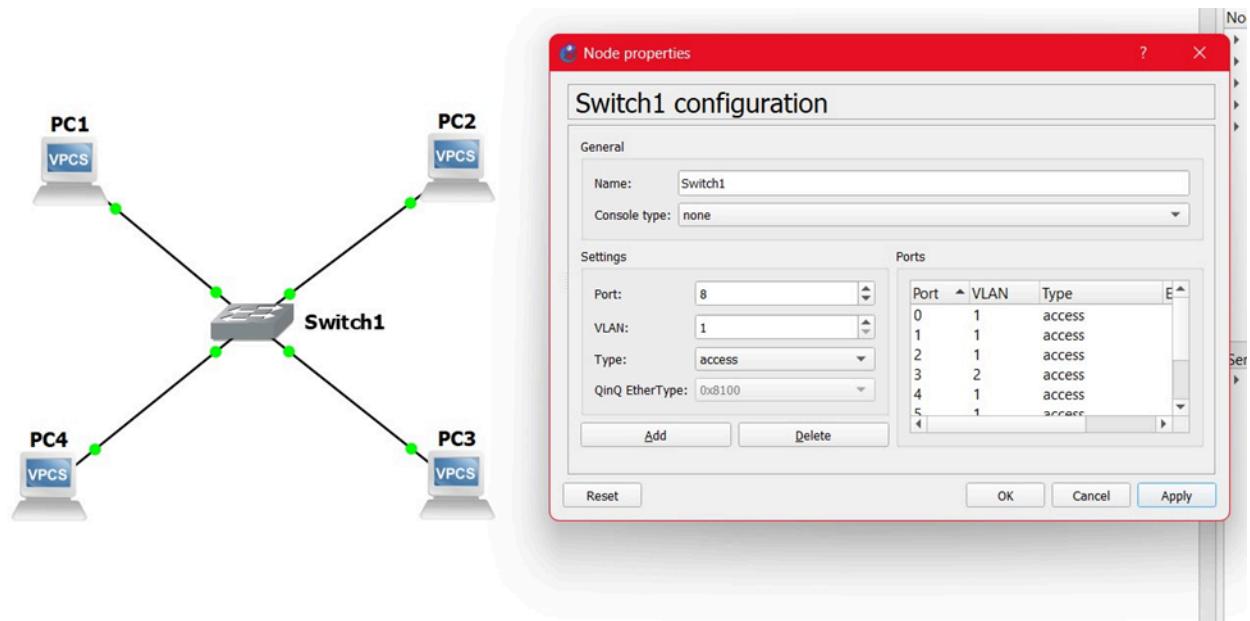


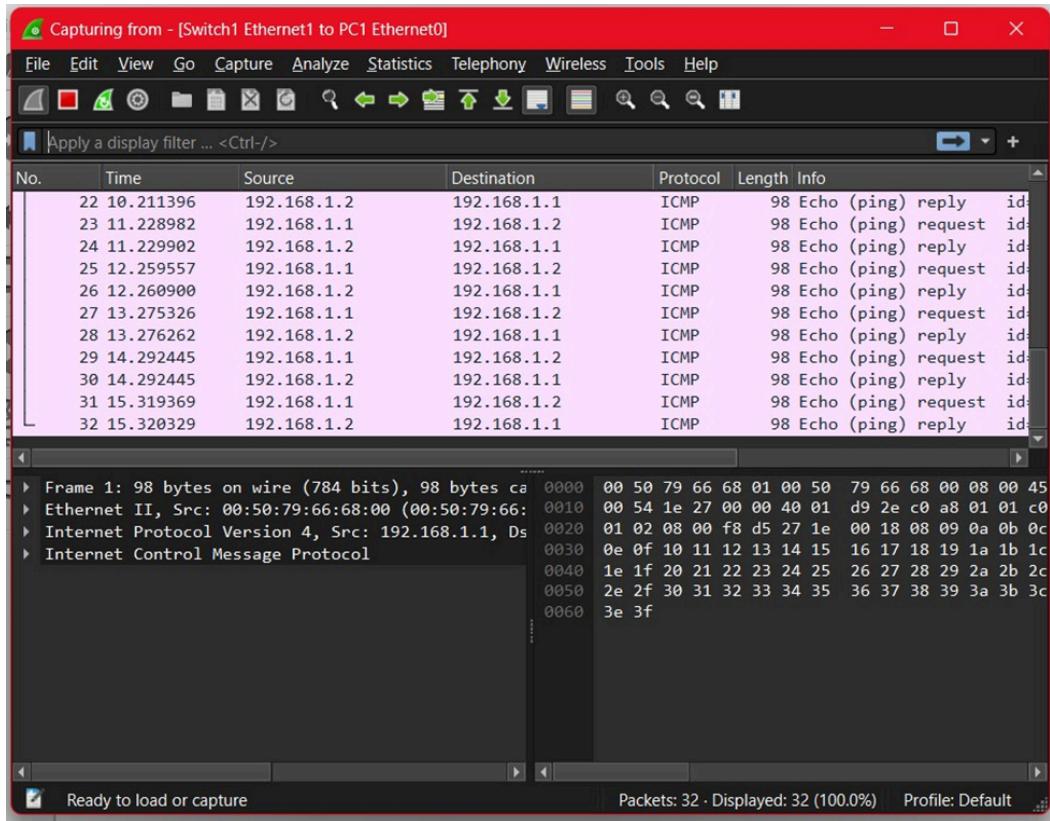
Image 4.1: Reconfigure the connections of PC1 , PC2 & PC3 to the same network.

```
show

NAME   IP/MASK        GATEWAY      MAC          LPORT  RHOST:PO
RT
PC1    192.168.1.1/24  0.0.0.0      00:50:79:66:68:00  10008  127.0.0.
1:10009
               fe80::250:79ff:fe66:6800/64

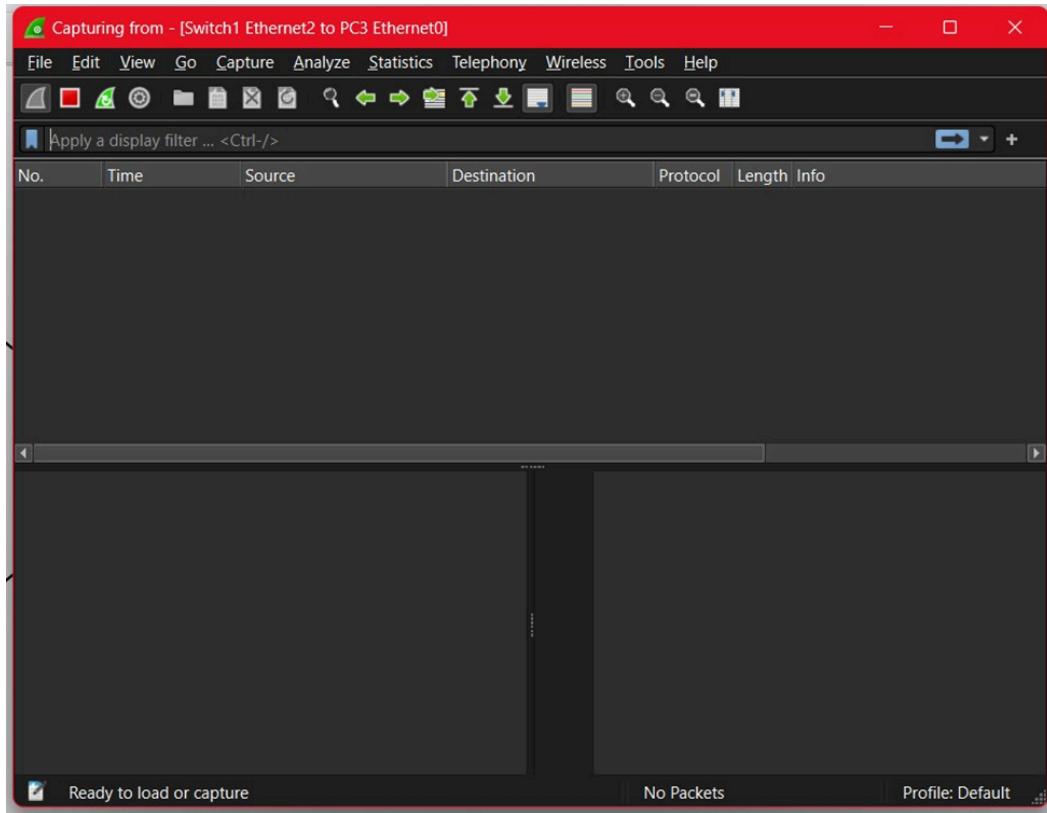
PC1> ping 192.168.1.2 -t
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=1.422 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=1.490 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=1.513 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=1.494 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=1.575 ms
84 bytes from 192.168.1.2 icmp_seq=6 ttl=64 time=0.978 ms
84 bytes from 192.168.1.2 icmp_seq=7 ttl=64 time=1.668 ms
84 bytes from 192.168.1.2 icmp_seq=8 ttl=64 time=1.543 ms
84 bytes from 192.168.1.2 icmp_seq=9 ttl=64 time=1.586 ms
84 bytes from 192.168.1.2 icmp_seq=10 ttl=64 time=1.571 ms
84 bytes from 192.168.1.2 icmp_seq=11 ttl=64 time=1.592 ms
84 bytes from 192.168.1.2 icmp_seq=12 ttl=64 time=1.547 ms
84 bytes from 192.168.1.2 icmp_seq=13 ttl=64 time=1.533 ms
84 bytes from 192.168.1.2 icmp_seq=14 ttl=64 time=1.440 ms
84 bytes from 192.168.1.2 icmp_seq=15 ttl=64 time=1.671 ms
84 bytes from 192.168.1.2 icmp_seq=16 ttl=64 time=1.382 ms
84 bytes from 192.168.1.2 icmp_seq=17 ttl=64 time=1.638 ms
84 bytes from 192.168.1.2 icmp_seq=18 ttl=64 time=0.860 ms
84 bytes from 192.168.1.2 icmp_seq=19 ttl=64 time=1.422 ms
84 bytes from 192.168.1.2 icmp_seq=20 ttl=64 time=1.510 ms
84 bytes from 192.168.1.2 icmp_seq=21 ttl=64 time=0.716 ms
84 bytes from 192.168.1.2 icmp_seq=22 ttl=64 time=1.497 ms
84 bytes from 192.168.1.2 icmp_seq=23 ttl=64 time=1.450 ms
84 bytes from 192.168.1.2 icmp_seq=24 ttl=64 time=1.566 ms
84 bytes from 192.168.1.2 icmp_seq=25 ttl=64 time=1.382 ms
84 bytes from 192.168.1.2 icmp_seq=26 ttl=64 time=0.689 ms
84 bytes from 192.168.1.2 icmp_seq=27 ttl=64 time=1.682 ms
84 bytes from 192.168.1.2 icmp_seq=28 ttl=64 time=1.545 ms
```

Image 4.2: Starting a continuous ping from PC1 to PC2.



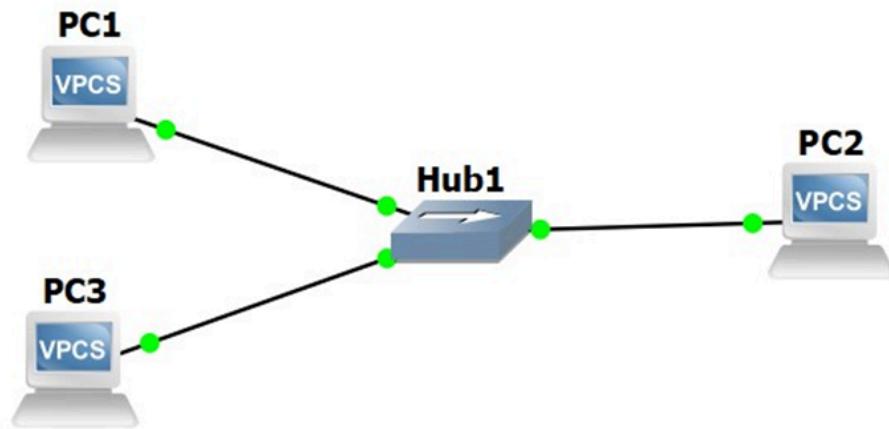
**Image 4.3: Start sniffing on PC1 link using wireshark.**

**The protocol used for pinging was ICMP (Internet Control Message Protocol)**



**Image 4.4:** Start sniffing on PC3 link using wireshark.

We cannot see a ping as PC3 does not have a continuous ping with any other PCs.



**Image 4.5:** Replacing the switch with a hub.

```
PC1> ping 192.168.1.2 -t
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=1.096 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=0.968 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=1.424 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=0.886 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=1.061 ms
84 bytes from 192.168.1.2 icmp_seq=6 ttl=64 time=1.415 ms
84 bytes from 192.168.1.2 icmp_seq=7 ttl=64 time=1.611 ms
84 bytes from 192.168.1.2 icmp_seq=8 ttl=64 time=1.718 ms
84 bytes from 192.168.1.2 icmp_seq=9 ttl=64 time=1.452 ms
84 bytes from 192.168.1.2 icmp_seq=10 ttl=64 time=1.857 ms
84 bytes from 192.168.1.2 icmp_seq=11 ttl=64 time=1.772 ms
84 bytes from 192.168.1.2 icmp_seq=12 ttl=64 time=1.677 ms
84 bytes from 192.168.1.2 icmp_seq=13 ttl=64 time=1.403 ms
84 bytes from 192.168.1.2 icmp_seq=14 ttl=64 time=1.845 ms
84 bytes from 192.168.1.2 icmp_seq=15 ttl=64 time=1.775 ms
84 bytes from 192.168.1.2 icmp_seq=16 ttl=64 time=0.567 ms
84 bytes from 192.168.1.2 icmp_seq=17 ttl=64 time=1.918 ms
84 bytes from 192.168.1.2 icmp_seq=18 ttl=64 time=1.100 ms
```

**Image 4.6: Starting a continuous ping from PC1 to PC2.**

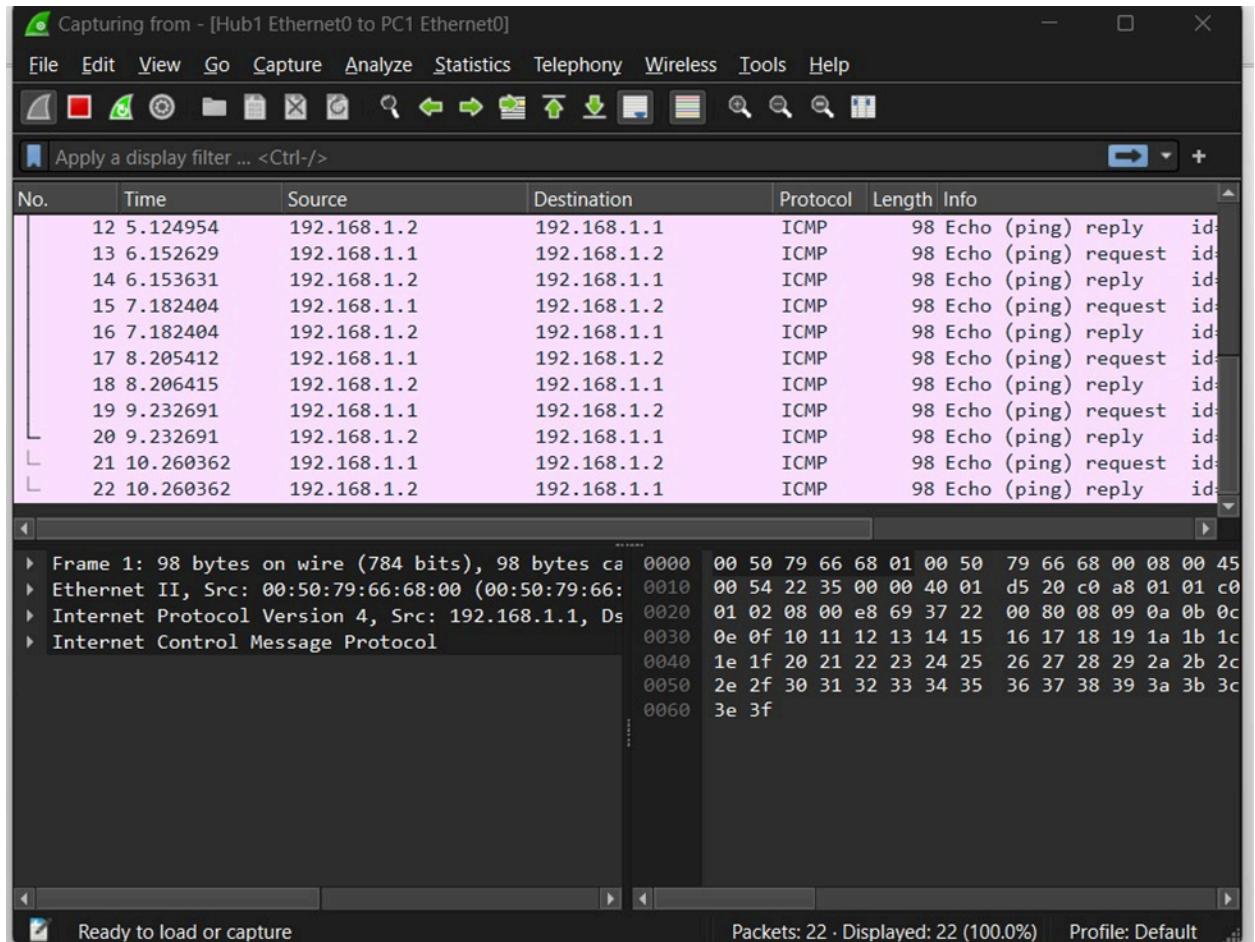
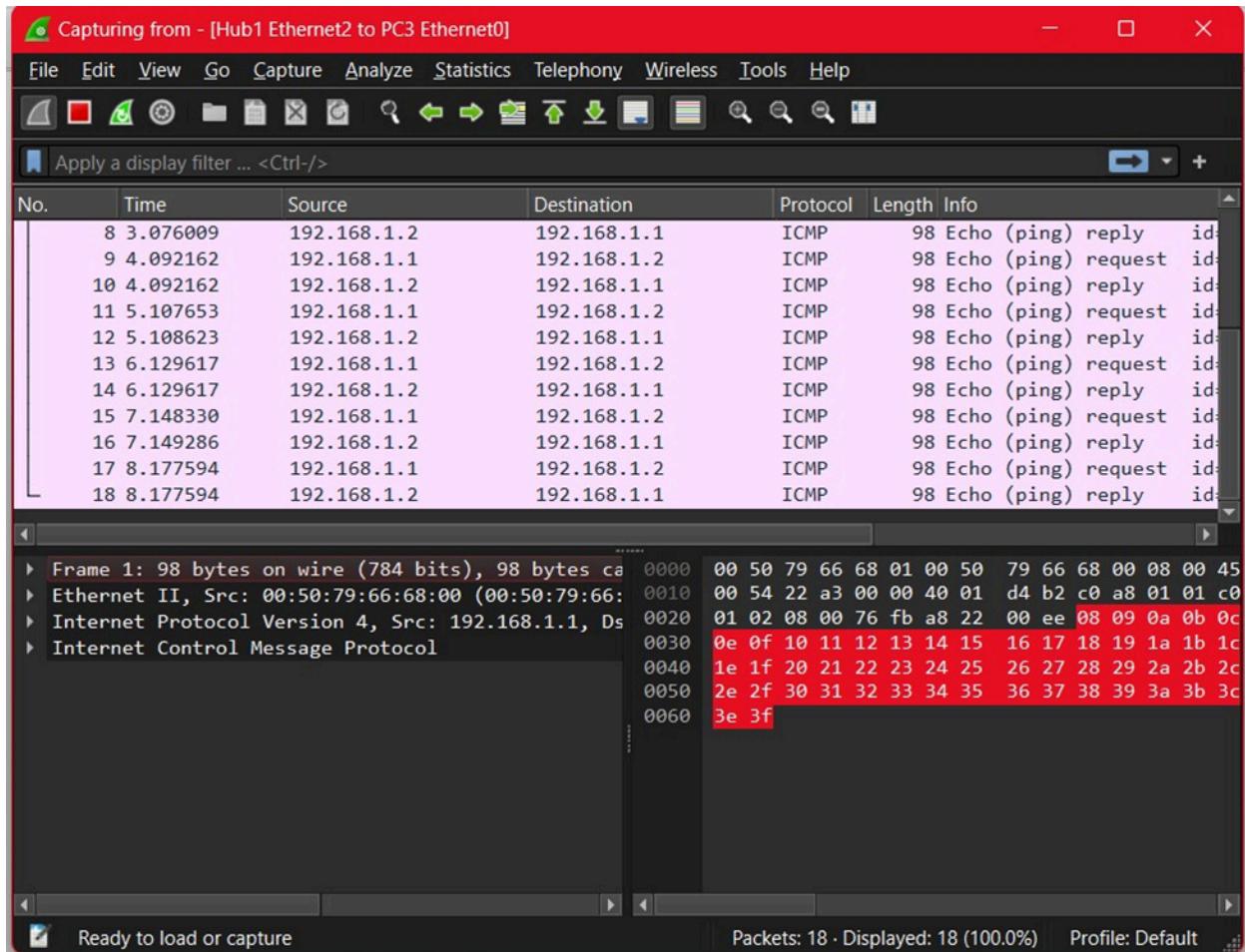


Image 4.7: Start sniffing on PC1 link using wireshark.

The protocol used for pinging was ICMP (Internet Control Message Protocol)



**Image 4.8: Start sniffing on PC3 link using wireshark.**

**The protocol used for pinging was ICMP (Internet Control Message Protocol)**

**Here we can see the pings present in PC3 are able to link as well with all the other PC's connected as the Hub sends data to each other simultaneously.**

---