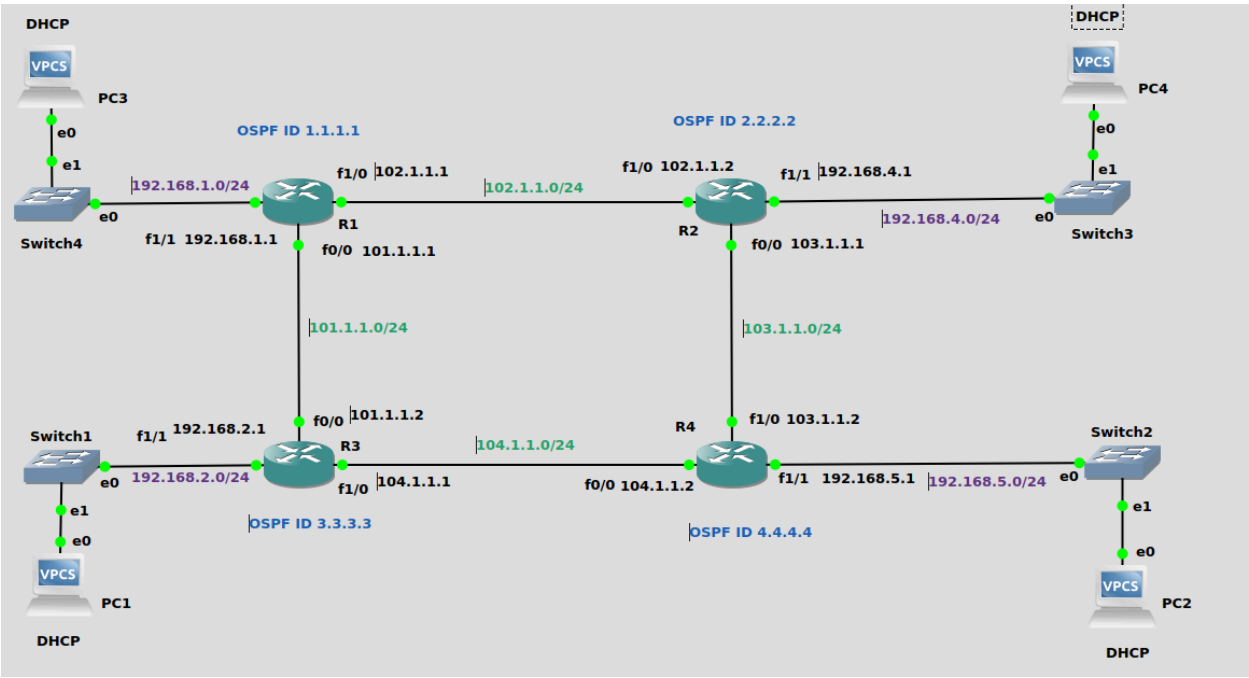
CPSC 456 Assignment 2

OSPF Configuration and Security

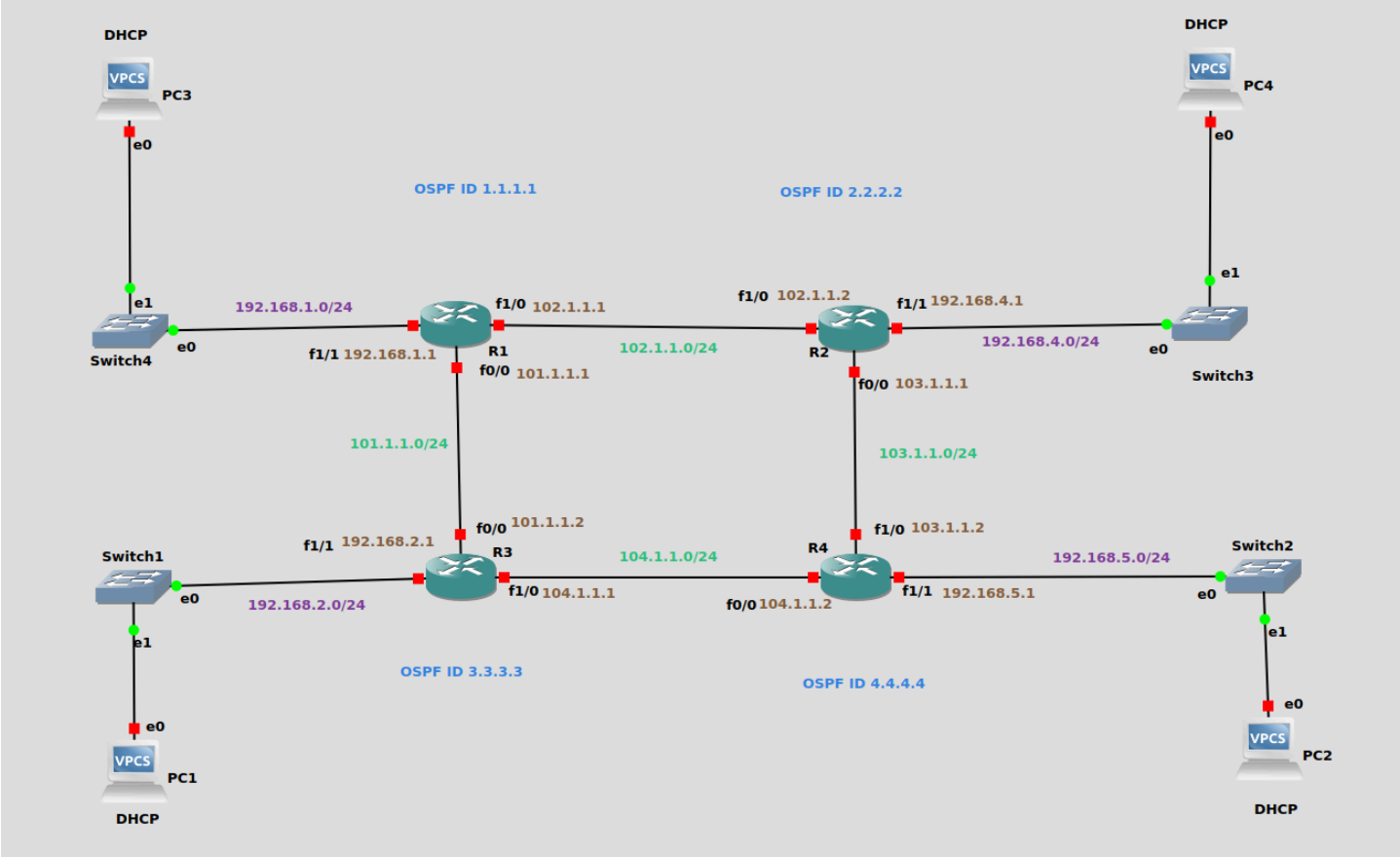
Note: please do not forget to check out the OSPF guide under [Week 5: Dynamic Routing]

Build the topology below in GNS3 and configure OSPF routing. The requirements are as follows:

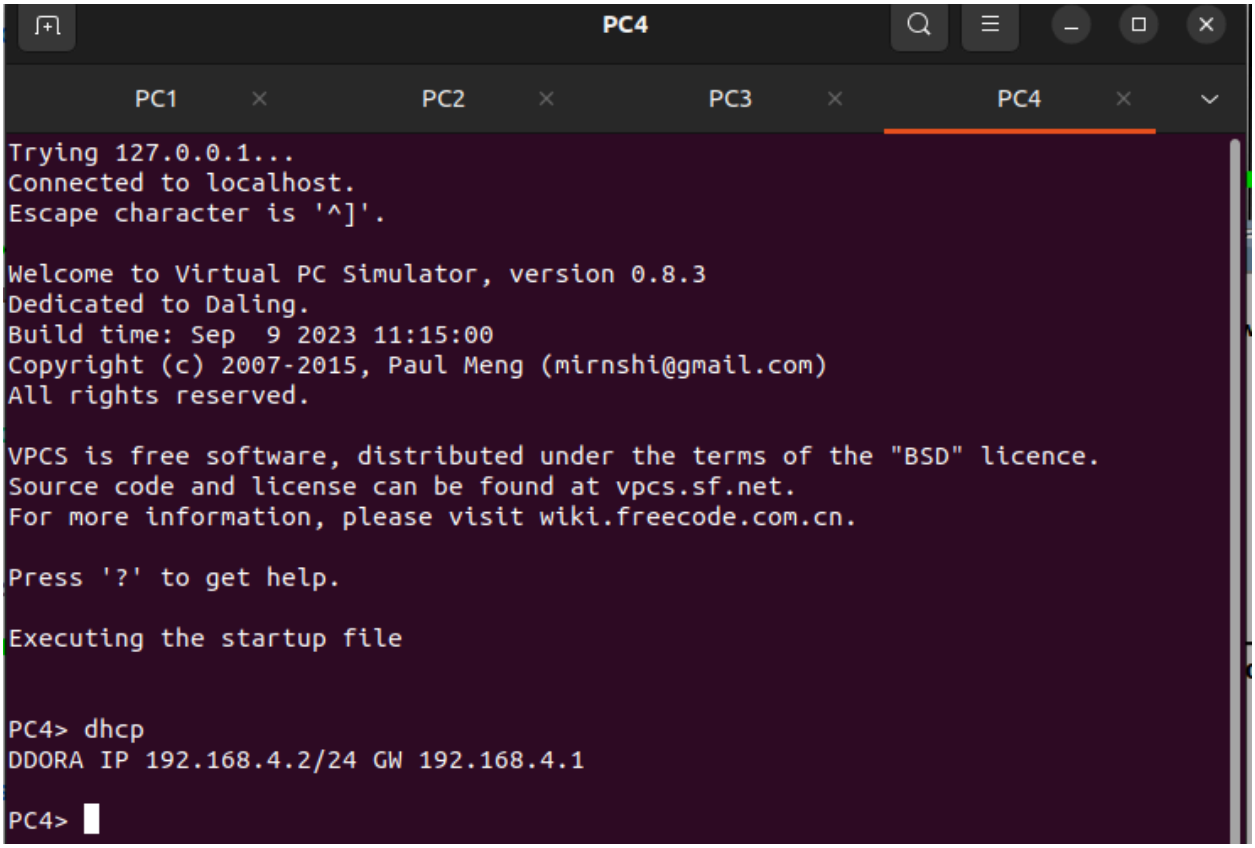
- Routing should allow any subnet to be reachable from any other subnet.
- All networks must be point-to-point.
- All interfaces facing the LANs (i.e., are not part of an OSPF network) should not be flooding the LANs with HELLO messages (i.e., they should be in passive mode).
- All OSPF messages must be authenticated.
- All passwords must be encrypted.
- IPs on all LANs must be assigned through DHCP.
- All Cisco router privileged modes must be password protected.

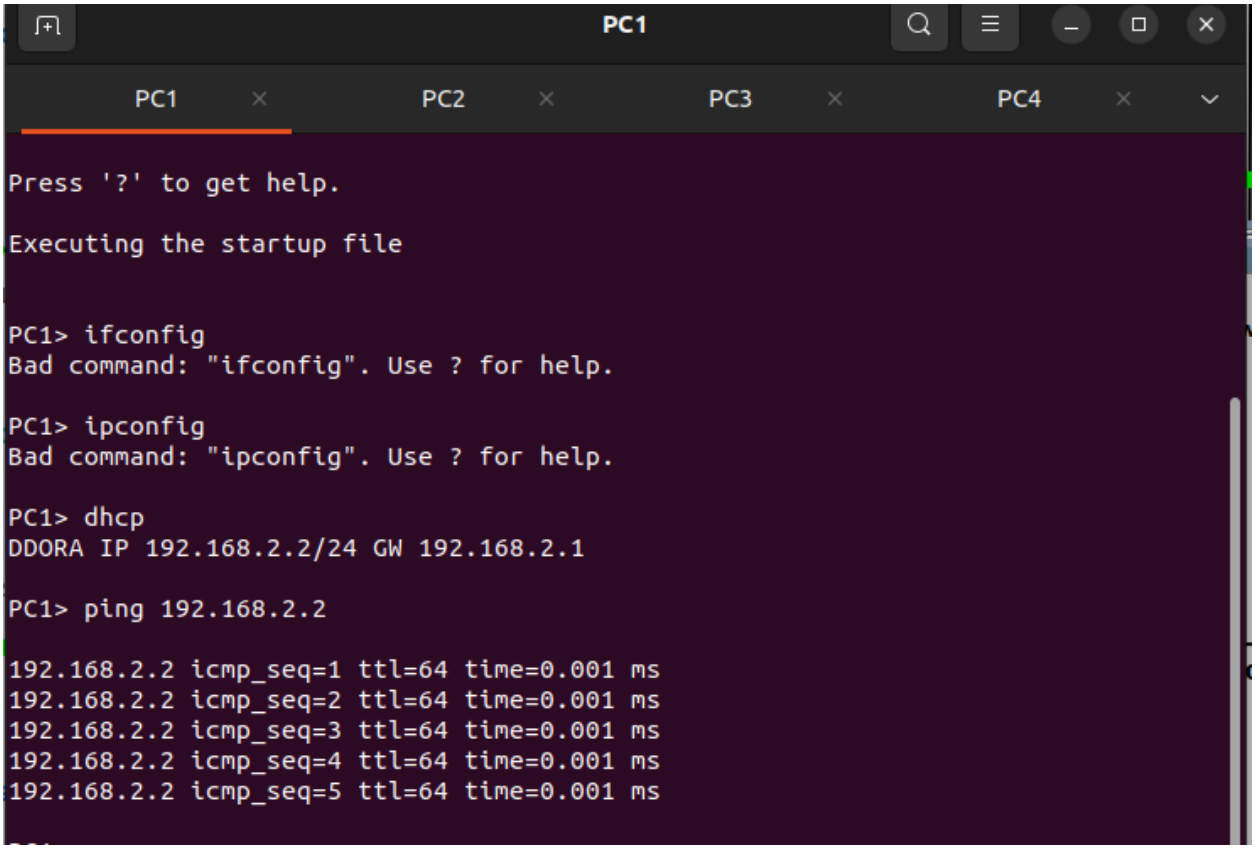


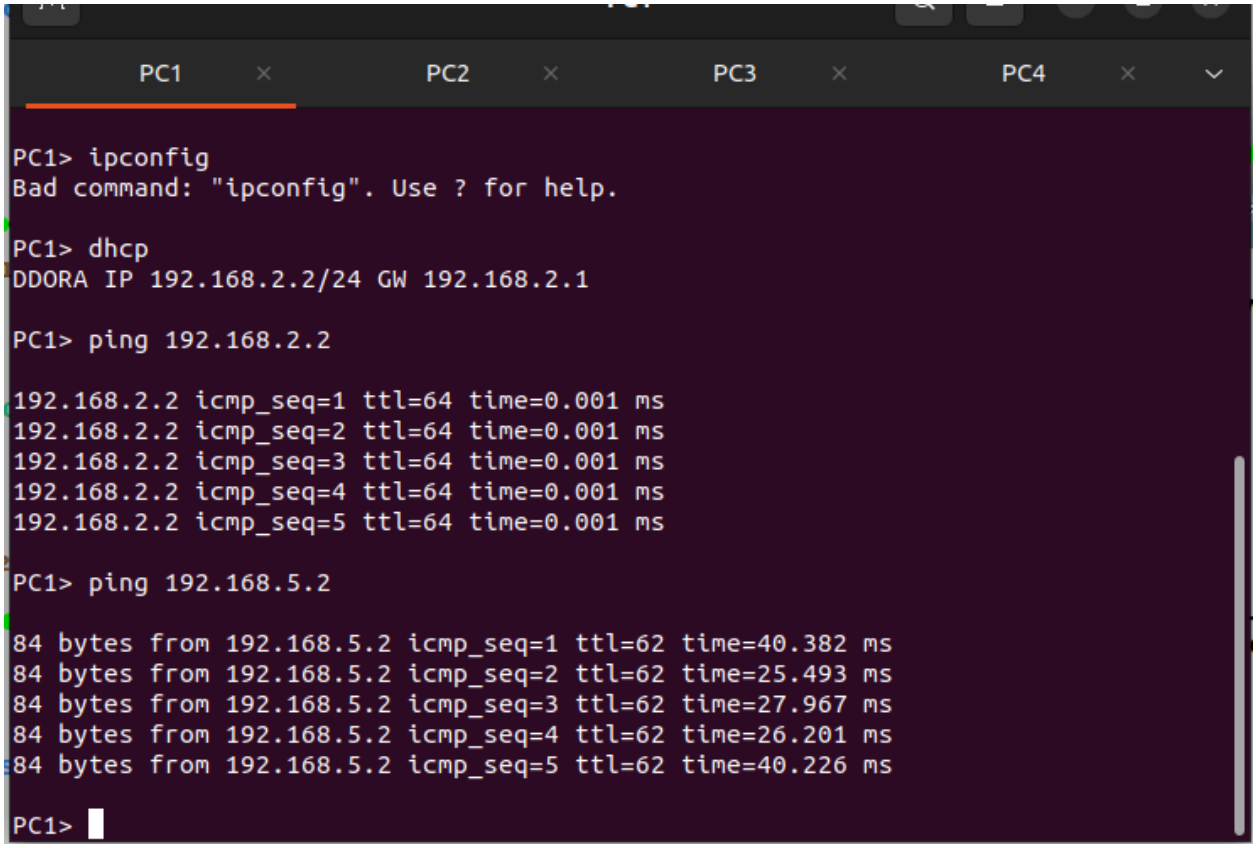
Q2:Screenshot of network topology

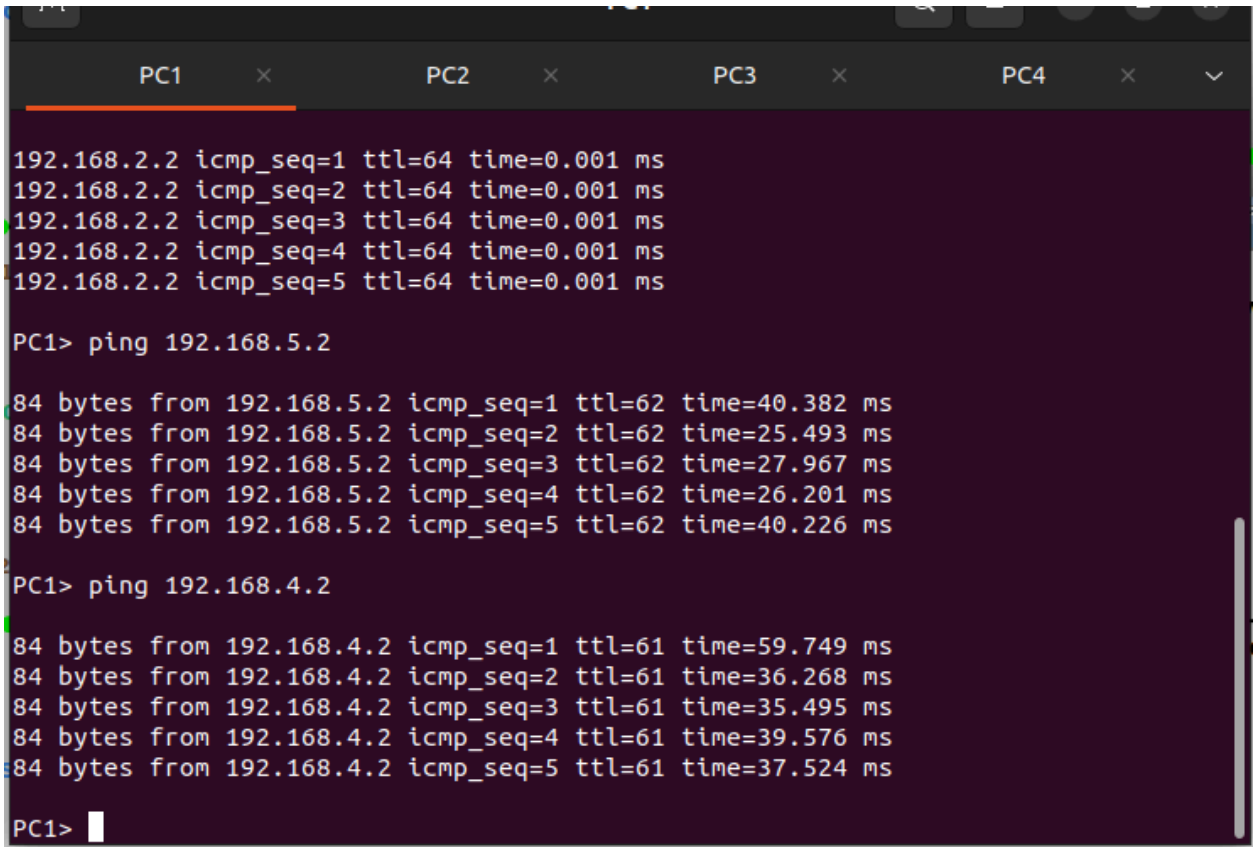


Q3:Screenshots of Pings


PC4
PC1
PC2
PC3
PC4
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
Welcome to Virtual PC Simulator, version 0.8.3
Dedicated to Daling.
Build time: Sep 9 2023 11:15:00
Copyright (c) 2007-2015, 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
PC4> dhcp
DDORA IP 192.168.4.2/24 GW 192.168.4.1
PC4>


PC1
PC1
PC2
PC3
PC4
Press '?' to get help.
Executing the startup file
PC1> ifconfig
Bad command: "ifconfig". Use ? for help.
PC1> ipconfig
Bad command: "ipconfig". Use ? for help.
PC1> dhcp
DDORA IP 192.168.2.2/24 GW 192.168.2.1
PC1> ping 192.168.2.2
192.168.2.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=5 ttl=64 time=0.001 ms


PC1
PC2
PC3
PC4
PC1> ipconfig
Bad command: "ipconfig". Use ? for help.
PC1> dhcp
DDORA IP 192.168.2.2/24 GW 192.168.2.1
PC1> ping 192.168.2.2
192.168.2.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=5 ttl=64 time=0.001 ms
PC1> ping 192.168.5.2
84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=40.382 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=62 time=25.493 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=27.967 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=26.201 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=40.226 ms
PC1>


PC1
PC2
PC3
PC4
192.168.2.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.2.2 icmp_seq=5 ttl=64 time=0.001 ms
PC1> ping 192.168.5.2
84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=40.382 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=62 time=25.493 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=27.967 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=26.201 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=40.226 ms
PC1> ping 192.168.4.2
84 bytes from 192.168.4.2 icmp_seq=1 ttl=61 time=59.749 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=61 time=36.268 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=61 time=35.495 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=61 time=39.576 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=61 time=37.524 ms
PC1>

PC1 PC2 PC3 PC4

```
84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=40.382 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=62 time=25.493 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=27.967 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=26.201 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=40.226 ms

PC1> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=61 time=59.749 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=61 time=36.268 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=61 time=35.495 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=61 time=39.576 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=61 time=37.524 ms

PC1> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=62 time=36.324 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=62 time=34.901 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=62 time=37.509 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=62 time=36.908 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=62 time=26.422 ms

PC1>
```

PC1 PC2 PC3 PC4

```
PC2> dhcp
DDORA IP 192.168.5.2/24 GW 192.168.5.1

PC2> ping 192.168.5.2

192.168.5.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=5 ttl=64 time=0.001 ms

PC2> ping 192.1684.2
Cannot resolve 192.1684.2

PC2> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=21.686 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=26.080 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=26.562 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=26.893 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=25.319 ms

PC2>
```

PC1 PC2 PC3 PC4

```
PC2> dhcp
DDORA IP 192.168.5.2/24 GW 192.168.5.1

PC2> ping 192.168.5.2

192.168.5.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.5.2 icmp_seq=5 ttl=64 time=0.001 ms

PC2> ping 192.1684.2
Cannot resolve 192.1684.2

PC2> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=21.686 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=26.080 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=26.562 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=26.893 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=25.319 ms

PC2>
```

PC1 PC2 PC3 PC4

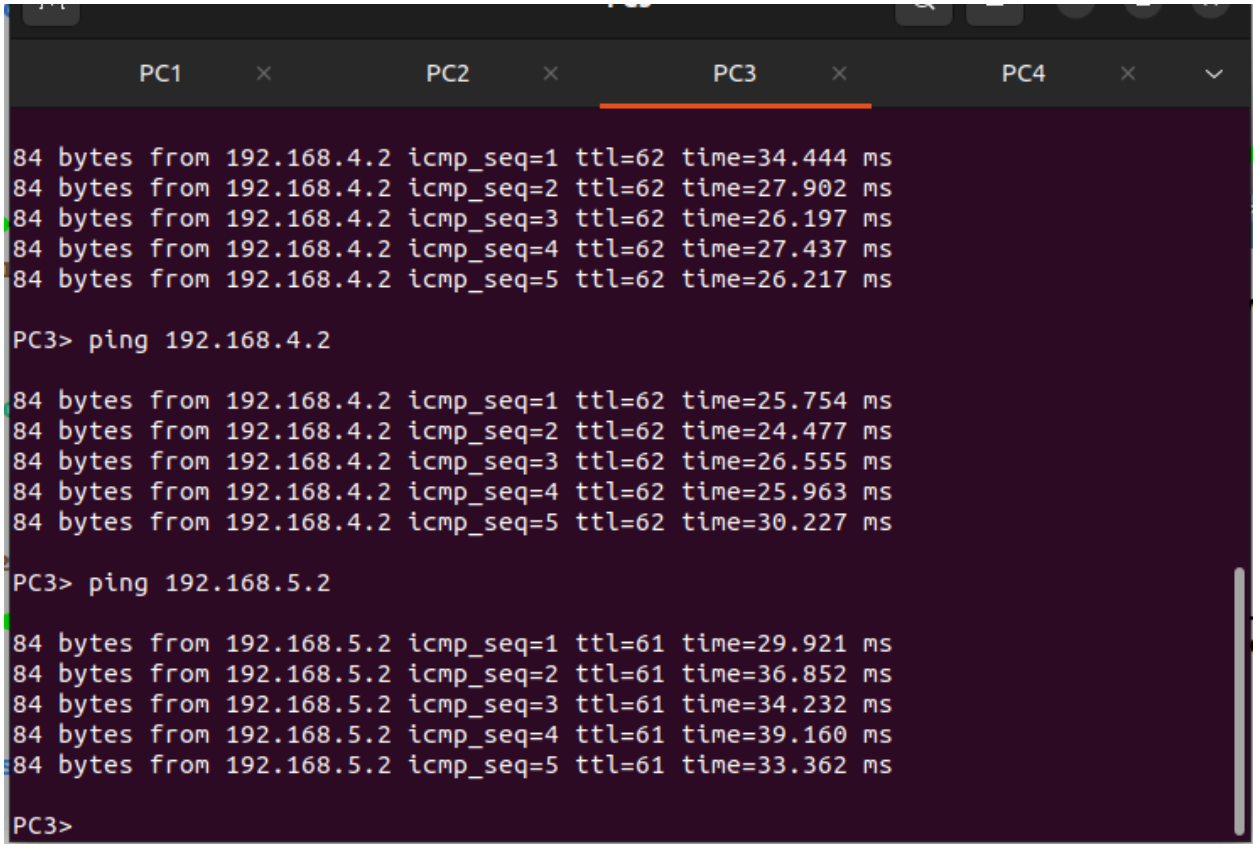
```
84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=21.686 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=26.080 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=26.562 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=26.893 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=25.319 ms

PC2> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=61 time=32.672 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=61 time=25.517 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=61 time=36.381 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=61 time=39.044 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=61 time=38.958 ms

PC2> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=62 time=59.763 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=62 time=26.750 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=26.477 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=25.280 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=26.650 ms

PC2>
```

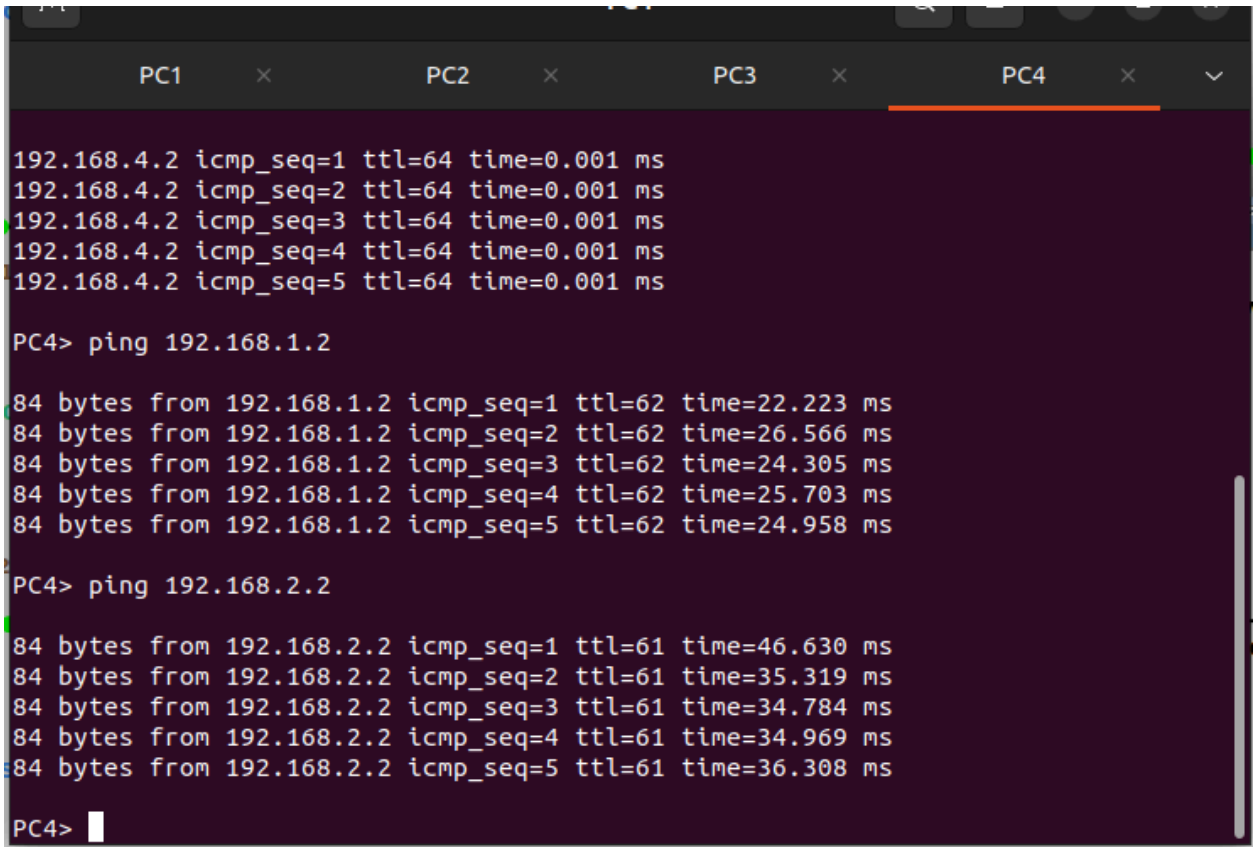
PC1 PC2 PC3 PC4

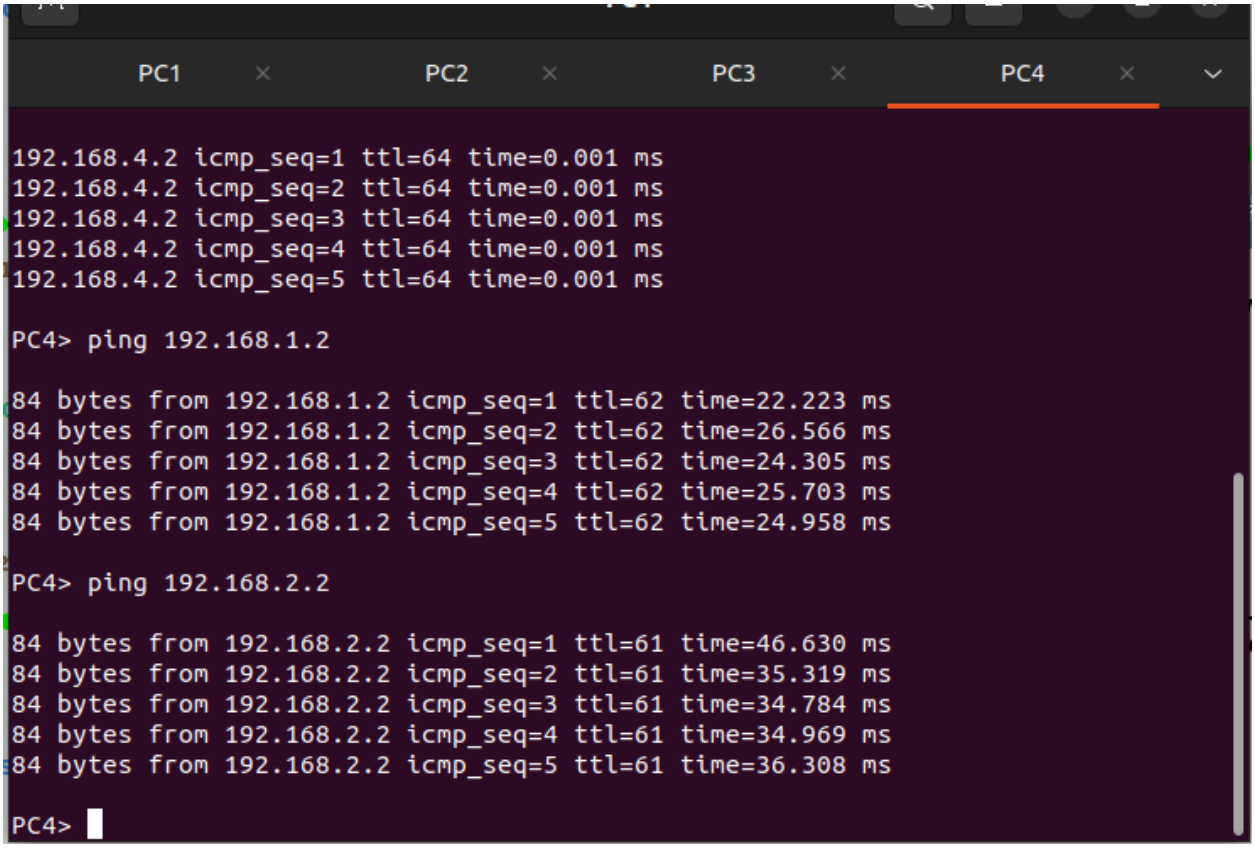
```
84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=21.686 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=26.080 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=26.562 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=26.893 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=25.319 ms

PC2> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=61 time=32.672 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=61 time=25.517 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=61 time=36.381 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=61 time=39.044 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=61 time=38.958 ms

PC2> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=62 time=59.763 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=62 time=26.750 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=26.477 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=25.280 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=26.650 ms

PC2>
```

PC1 PC2 PC3 PC4

```
PC3> dhcp
DDORA IP 192.168.1.2/24 GW 192.168.1.1

PC3> ping 192.168.1.2

192.168.1.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=5 ttl=64 time=0.001 ms

PC3> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=62 time=28.375 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=62 time=25.658 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=25.251 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=26.417 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=25.837 ms

PC3> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=34.444 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=27.902 ms
```


PC1
PC2
PC3
PC4
84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=34.444 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=27.902 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=26.197 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=27.437 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=26.217 ms
PC3> ping 192.168.4.2
84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=25.754 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=24.477 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=26.555 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=25.963 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=30.227 ms
PC3> ping 192.168.5.2
84 bytes from 192.168.5.2 icmp_seq=1 ttl=61 time=29.921 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=61 time=36.852 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=61 time=34.232 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=61 time=39.160 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=61 time=33.362 ms
PC3>


PC1
PC2
PC3
PC4
192.168.4.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=5 ttl=64 time=0.001 ms
PC4> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=62 time=22.223 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=62 time=26.566 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=62 time=24.305 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=62 time=25.703 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=62 time=24.958 ms
PC4> ping 192.168.2.2
84 bytes from 192.168.2.2 icmp_seq=1 ttl=61 time=46.630 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=61 time=35.319 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=61 time=34.784 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=61 time=34.969 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=61 time=36.308 ms
PC4>


PC1
PC2
PC3
PC4
192.168.4.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=5 ttl=64 time=0.001 ms
PC4> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=62 time=22.223 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=62 time=26.566 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=62 time=24.305 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=62 time=25.703 ms
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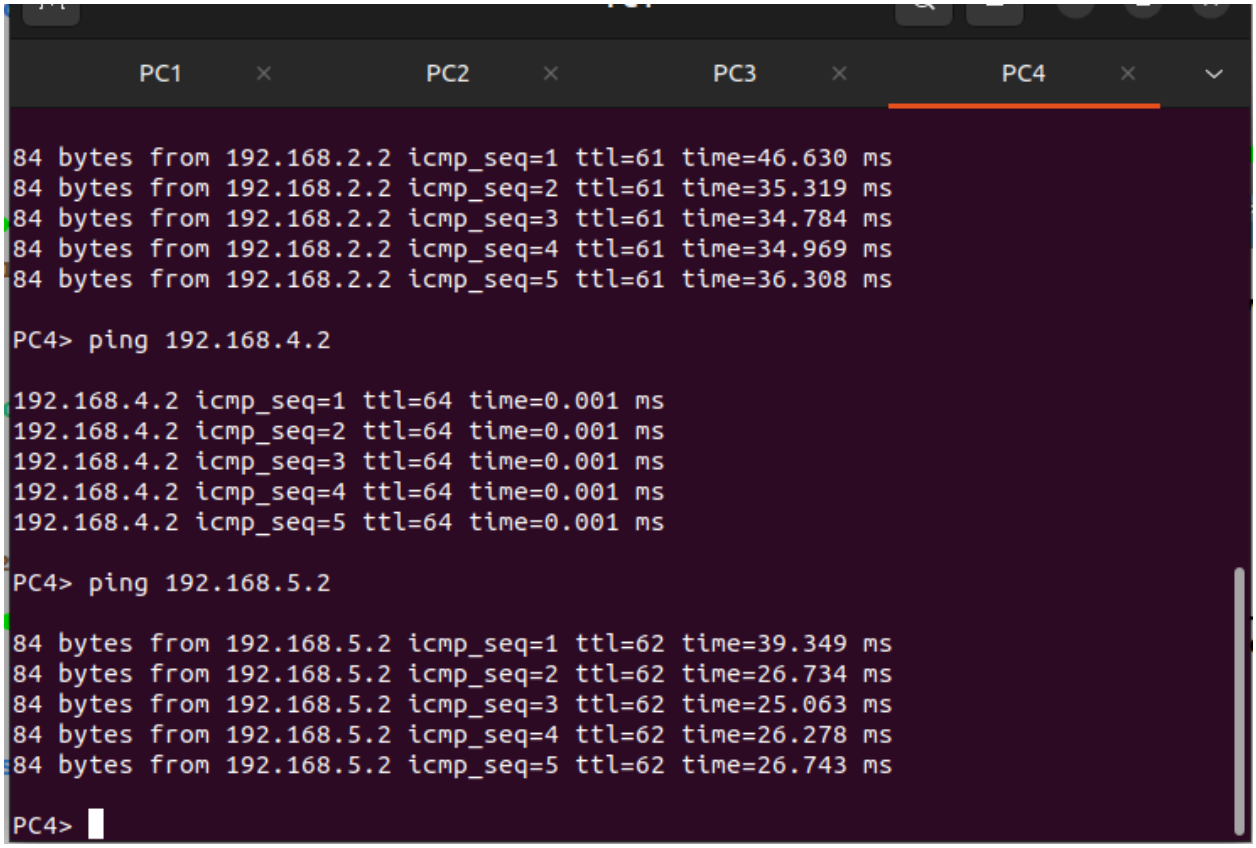
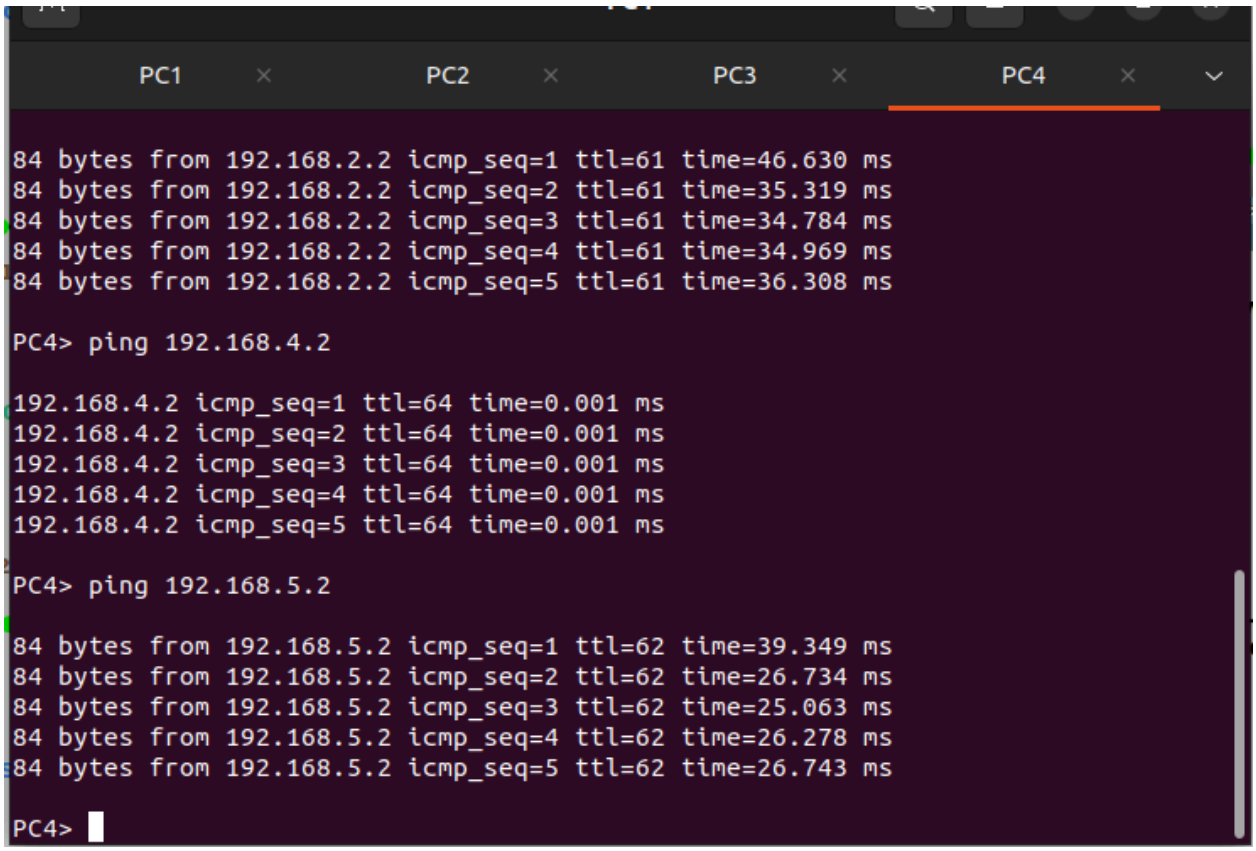
PC4> ping 192.168.2.2
84 bytes from 192.168.2.2 icmp_seq=1 ttl=61 time=46.630 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=61 time=35.319 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=61 time=34.784 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=61 time=34.969 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=61 time=36.308 ms
PC4>

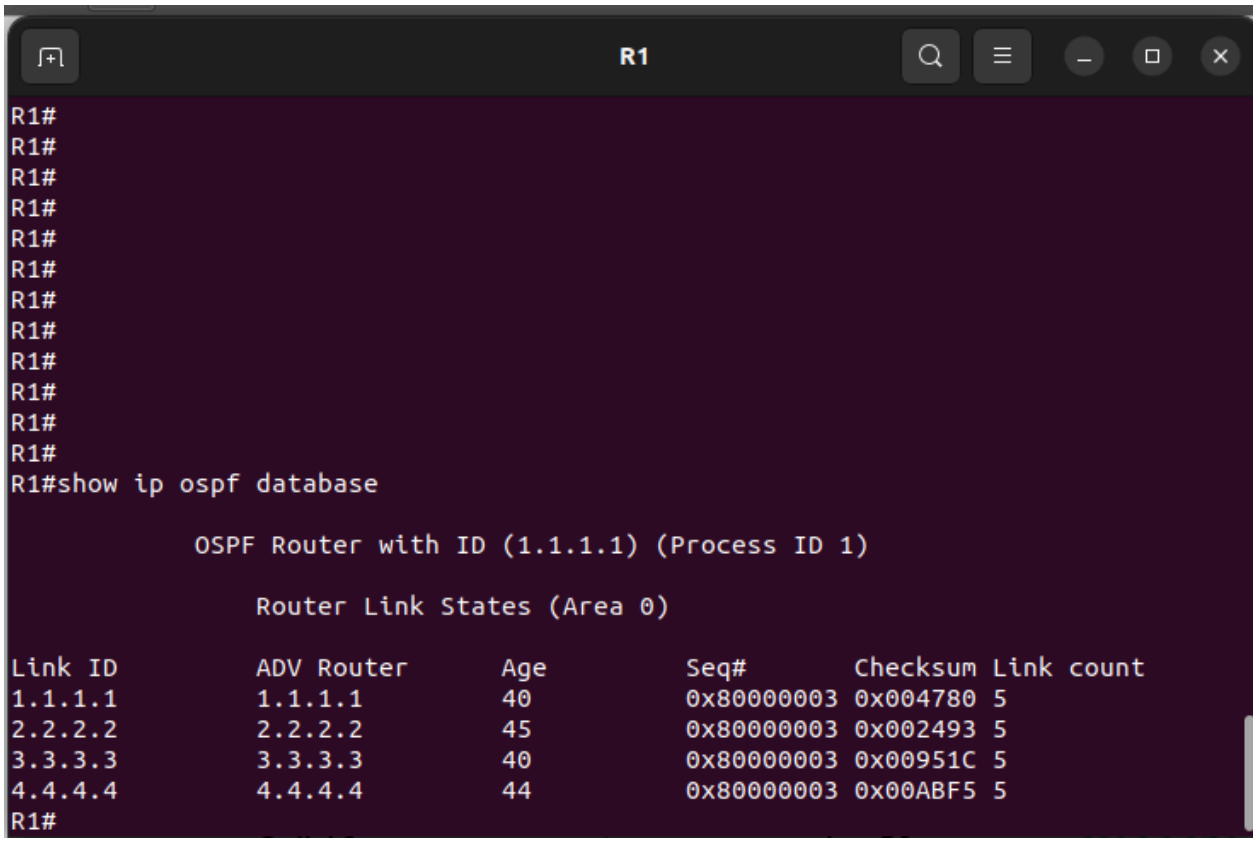

PC1
PC2
PC3
PC4
84 bytes from 192.168.2.2 icmp_seq=1 ttl=61 time=46.630 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=61 time=35.319 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=61 time=34.784 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=61 time=34.969 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=61 time=36.308 ms
PC4> ping 192.168.4.2
192.168.4.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=5 ttl=64 time=0.001 ms
PC4> ping 192.168.5.2
84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=39.349 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=62 time=26.734 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=25.063 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=26.278 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=26.743 ms
PC4>


PC1
PC2
PC3
PC4
84 bytes from 192.168.2.2 icmp_seq=1 ttl=61 time=46.630 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=61 time=35.319 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=61 time=34.784 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=61 time=34.969 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=61 time=36.308 ms
PC4> ping 192.168.4.2
192.168.4.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.4.2 icmp_seq=5 ttl=64 time=0.001 ms
PC4> ping 192.168.5.2
84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=39.349 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=62 time=26.734 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=25.063 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=26.278 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=26.743 ms
PC4>

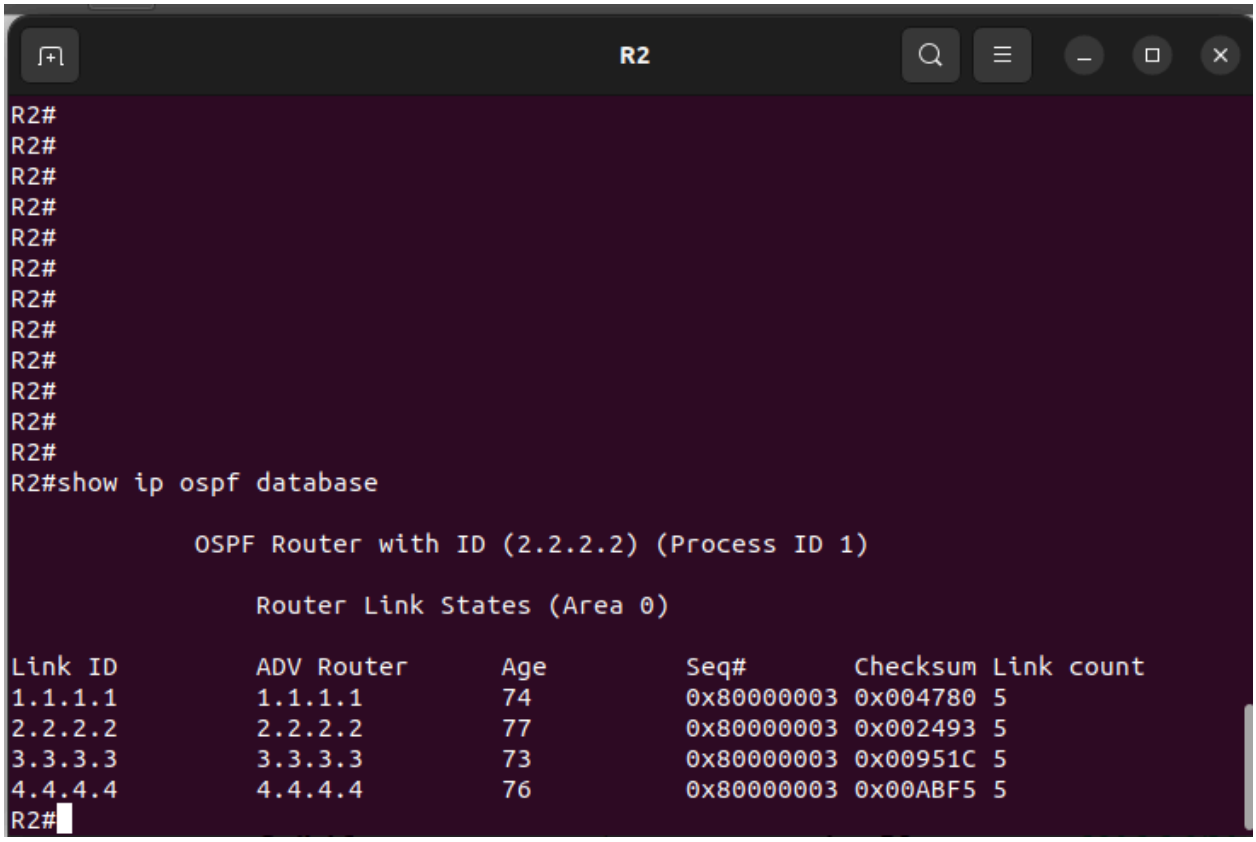
Q4:Router Configurations (.cfg)

download router cofngiurations

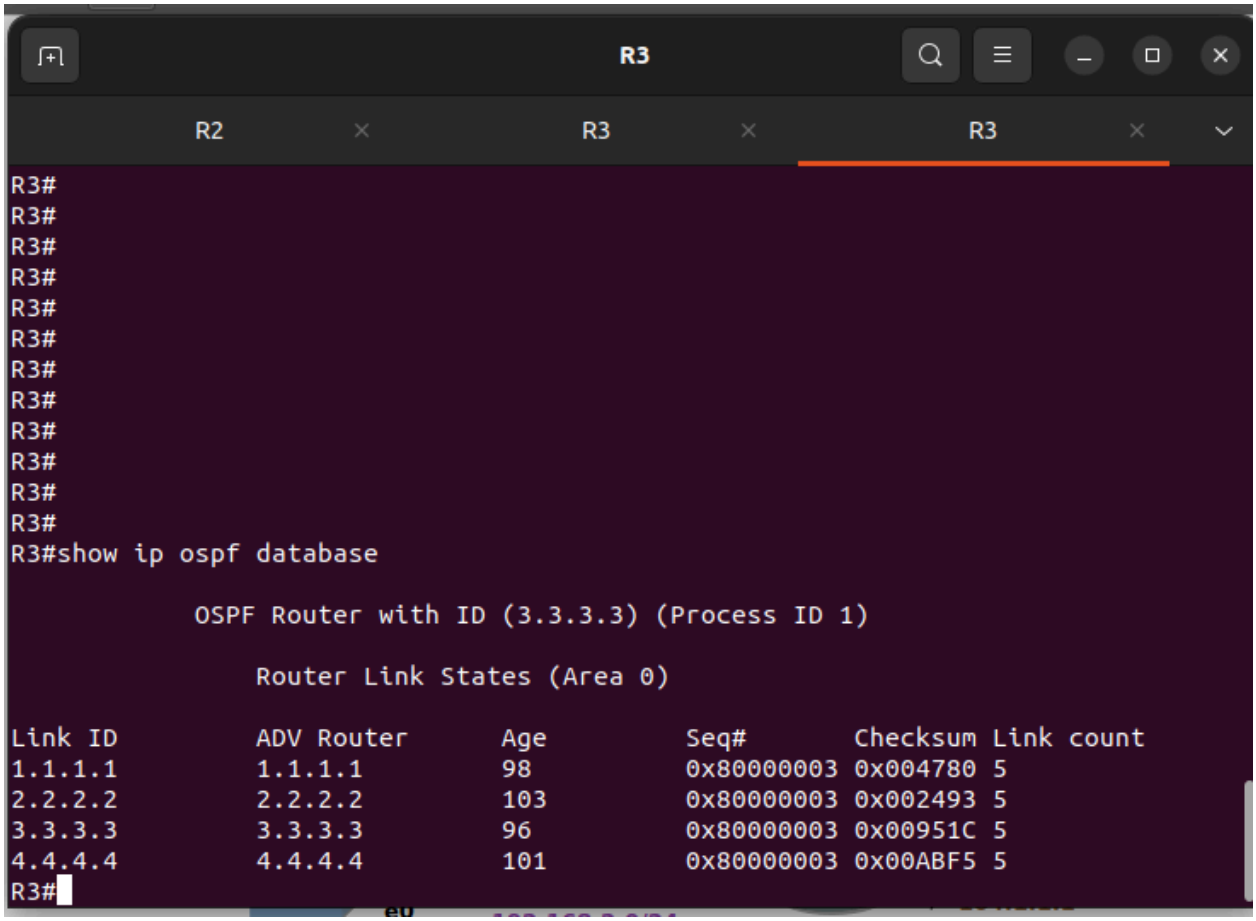
Q5:Show and explain the output of the `show ip ospf database`.



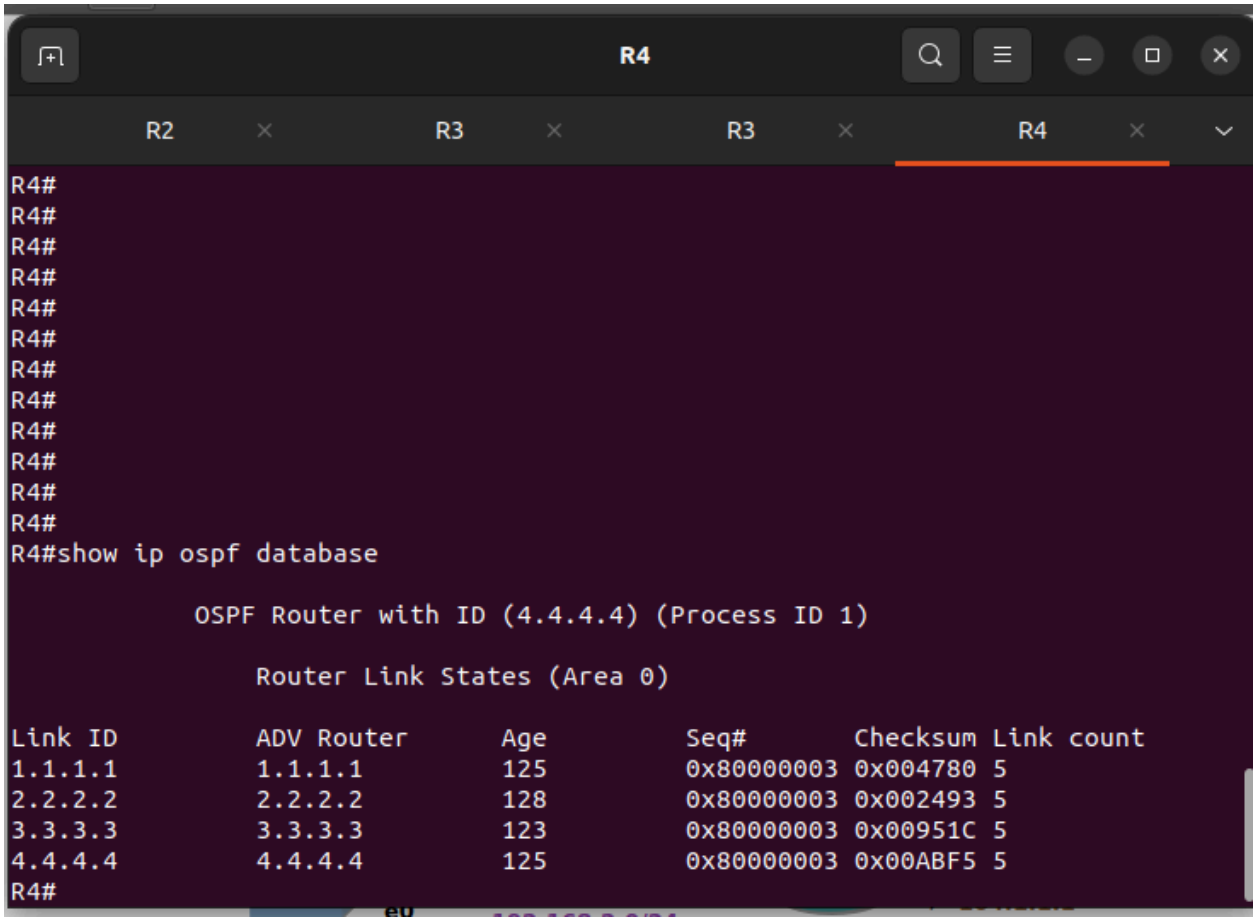
When I run “show ip ospf database on router one” it shows that there are 4 routers in the area each of them connected with 5 links and their link ids, they have all of the same sequence numbers but their ages are different and their checksum are different which indicates that everything was set up properly but at different times



When I run “show ip ospf database on router two” it shows that there are 4 routers in the area each of them connected with 5 links and their link ids, they have all of the same sequence numbers but their ages are different and their checksum are different which indicates that everything was set up properly but at different times



When I run “show ip ospf database on router three” it shows that there are 4 routers in the area each of them connected with 5 links and their link ids, they have all of the same sequence numbers but their ages are different and their checksum are different which indicates that everything was set up properly but at different times



When I run “show ip ospf database on router four” it shows that there are 4 routers in the area each of them connected with 5 links and their link ids, they have all of the same sequence numbers but their ages are different and their checksum are different which indicates that everything was set up properly but at different times