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Assignment Submission 1

Simulation of LAN (Local Area Network) using switches by Cisco Packet Tracer

Switch is a hardware network component, which is used to connect multiple devices across a network. Switch uses packet switching to receive and forward data to a given destination. It uses MAC (Media Access Control) address to forward data at the data link layer of the OSI (Open System Interconnection) model.

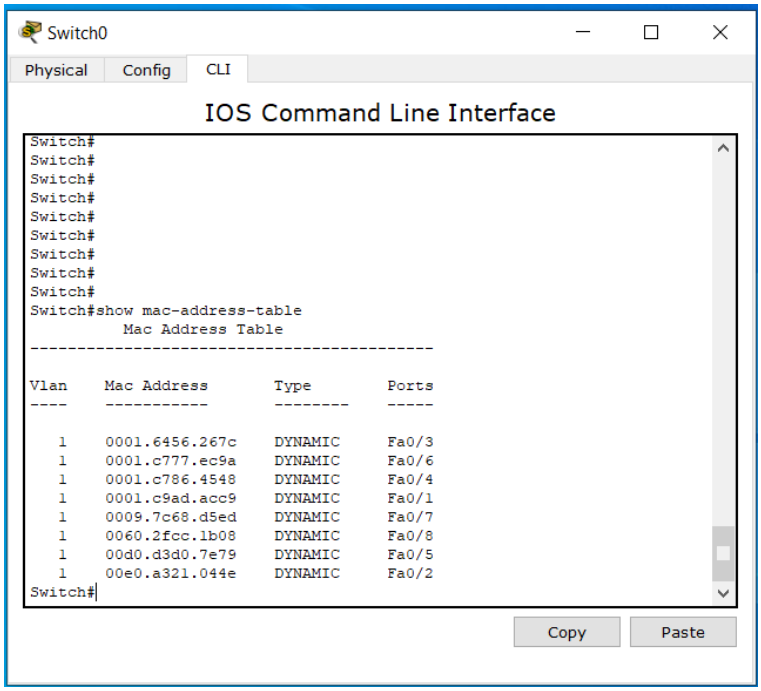
We can build a simulation of Local Area Network or LAN easily using the Cisco Packet Tracer tool. With few simple steps:

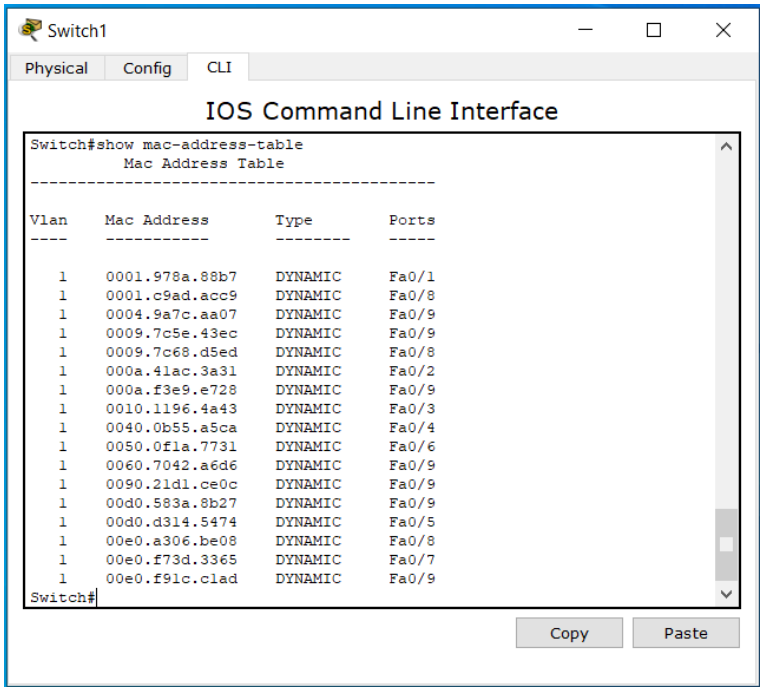
1) Drag and drop a switch on the workspace from the Cisco devices listed at the bottom menu.
2) Add end devices like computers or laptops to the workspace from the bottom menu.
3) Connect all the computers and other devices we added with the switch using Copper Straight-Through cable from the cable options listed.
4) Configure IP address for each end device we used.
5) In case if we have many devices to connect with the switch, we can just add ethernet ports by turning off the switch and add input ports.
6) Finally we can use the **ping** command to check out if the connections we created are successful.
7) If we want to connect several switches with each other we have to use the Copper Crossover cable instead of the Straight-Through cable.

For this assignment we will build a LAN network with 20 computers and 3 switches.

In order to get the mac address table from a particular switch we can use the following set of commands:

1) Open the switch and go the the CLI tab
2) Type *enable*
3) Then *show mac-address-table*





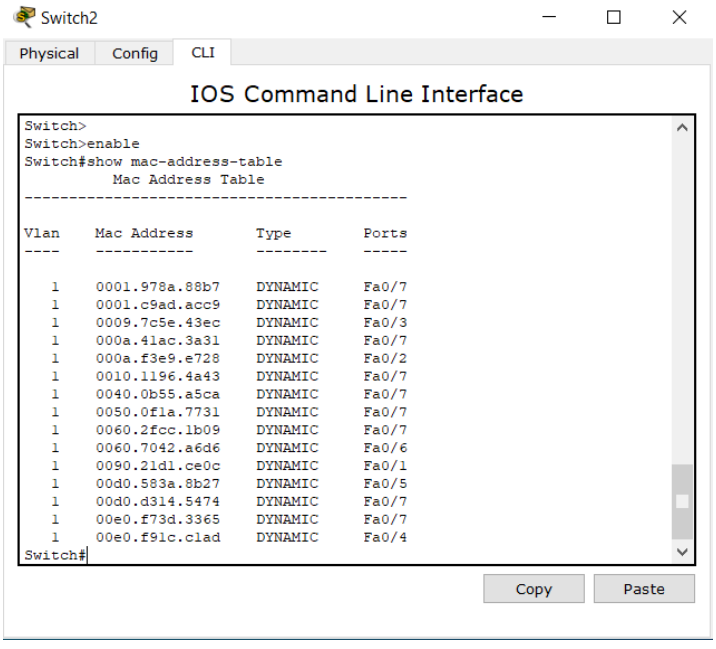
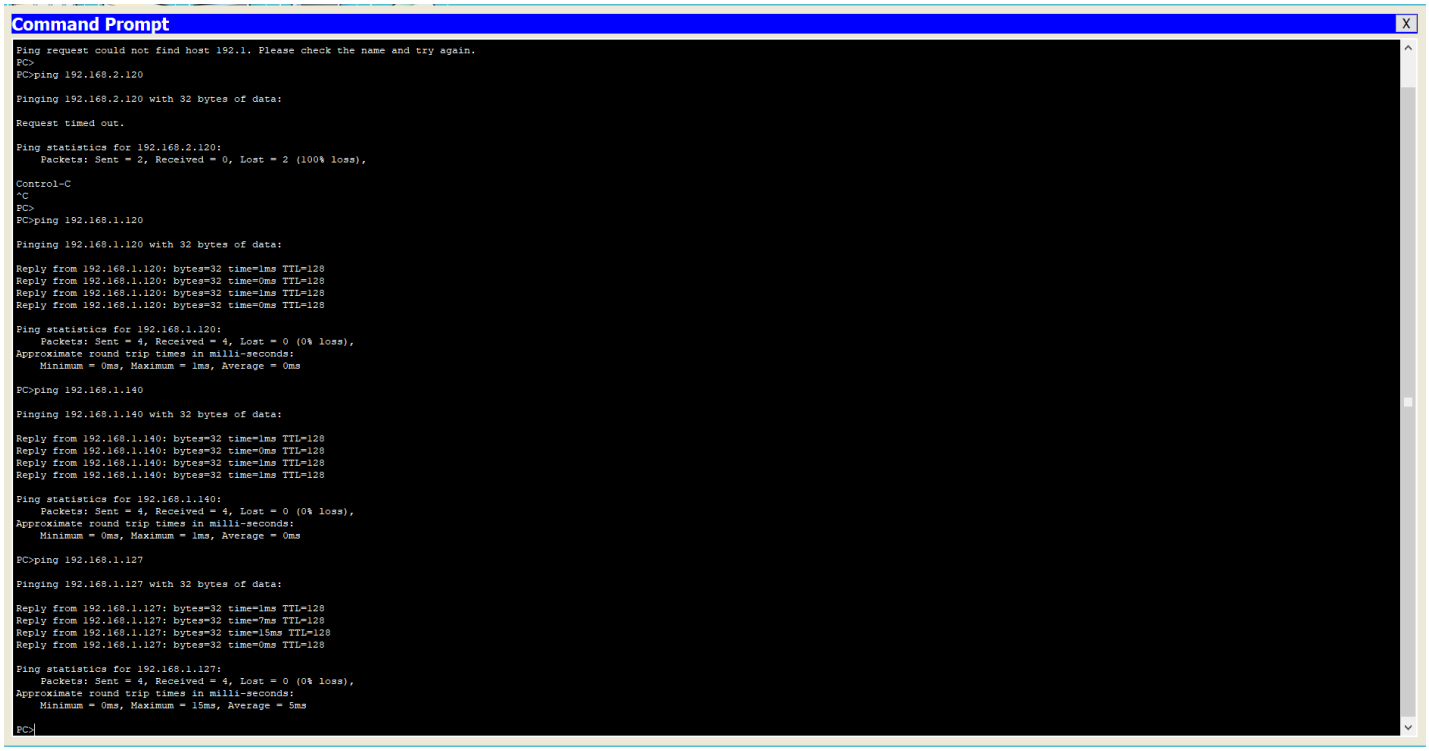
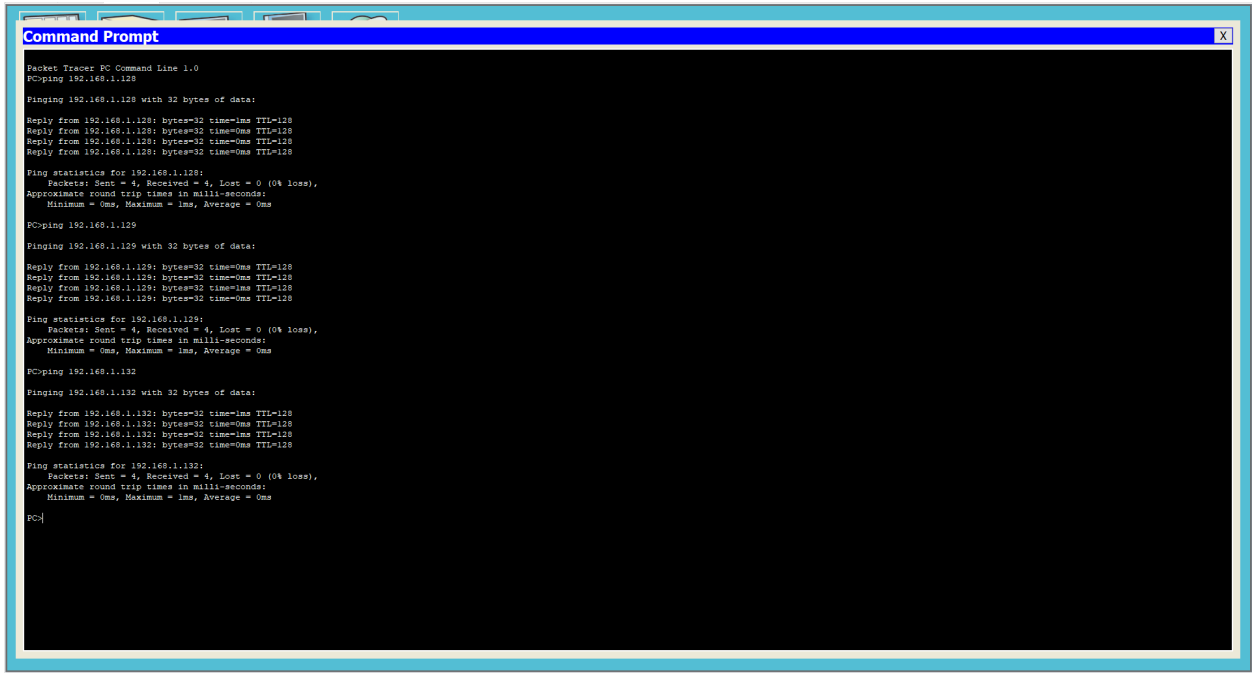


Figure 1 : Mac-address-table for switch 0, 1, 2


Command Prompt
X
Ping request could not find host 192.1. Please check the name and try again.
PC>
PC>ping 192.168.2.120
Pinging 192.168.2.120 with 32 bytes of data:
Request timed out.
Ping statistics for 192.168.2.120:
Packets: Sent = 2, Received = 0, Lost = 2 (100% loss),
Control-C
^C
PC>
PC>ping 192.168.1.120
Pinging 192.168.1.120 with 32 bytes of data:
Reply from 192.168.1.120: bytes=32 time=1ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Reply from 192.168.1.120: bytes=32 time=1ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.120:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 192.168.1.140
Pinging 192.168.1.140 with 32 bytes of data:
Reply from 192.168.1.140: bytes=32 time=1ms TTL=128
Reply from 192.168.1.140: bytes=32 time=0ms TTL=128
Reply from 192.168.1.140: bytes=32 time=1ms TTL=128
Reply from 192.168.1.140: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.1.140:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 192.168.1.127
Pinging 192.168.1.127 with 32 bytes of data:
Reply from 192.168.1.127: bytes=32 time=1ms TTL=128
Reply from 192.168.1.127: bytes=32 time=7ms TTL=128
Reply from 192.168.1.127: bytes=32 time=15ms TTL=128
Reply from 192.168.1.127: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.127:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 15ms, Average = 5ms
PC>


Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.128
Pinging 192.168.1.128 with 32 bytes of data:
Reply from 192.168.1.128: bytes=32 time=1ms TTL=128
Reply from 192.168.1.128: bytes=32 time=0ms TTL=128
Reply from 192.168.1.128: bytes=32 time=0ms TTL=128
Reply from 192.168.1.128: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.128:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 192.168.1.129
Pinging 192.168.1.129 with 32 bytes of data:
Reply from 192.168.1.129: bytes=32 time=0ms TTL=128
Reply from 192.168.1.129: bytes=32 time=0ms TTL=128
Reply from 192.168.1.129: bytes=32 time=1ms TTL=128
Reply from 192.168.1.129: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.129:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 192.168.1.132
Pinging 192.168.1.132 with 32 bytes of data:
Reply from 192.168.1.132: bytes=32 time=1ms TTL=128
Reply from 192.168.1.132: bytes=32 time=0ms TTL=128
Reply from 192.168.1.132: bytes=32 time=1ms TTL=128
Reply from 192.168.1.132: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>

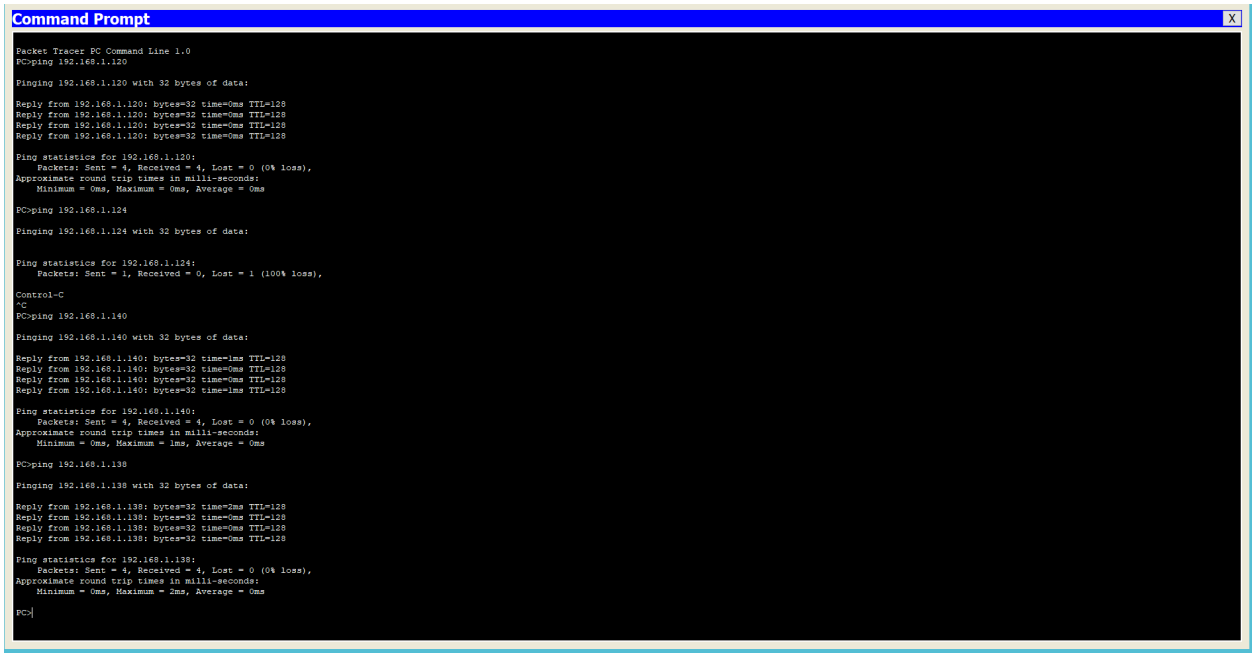
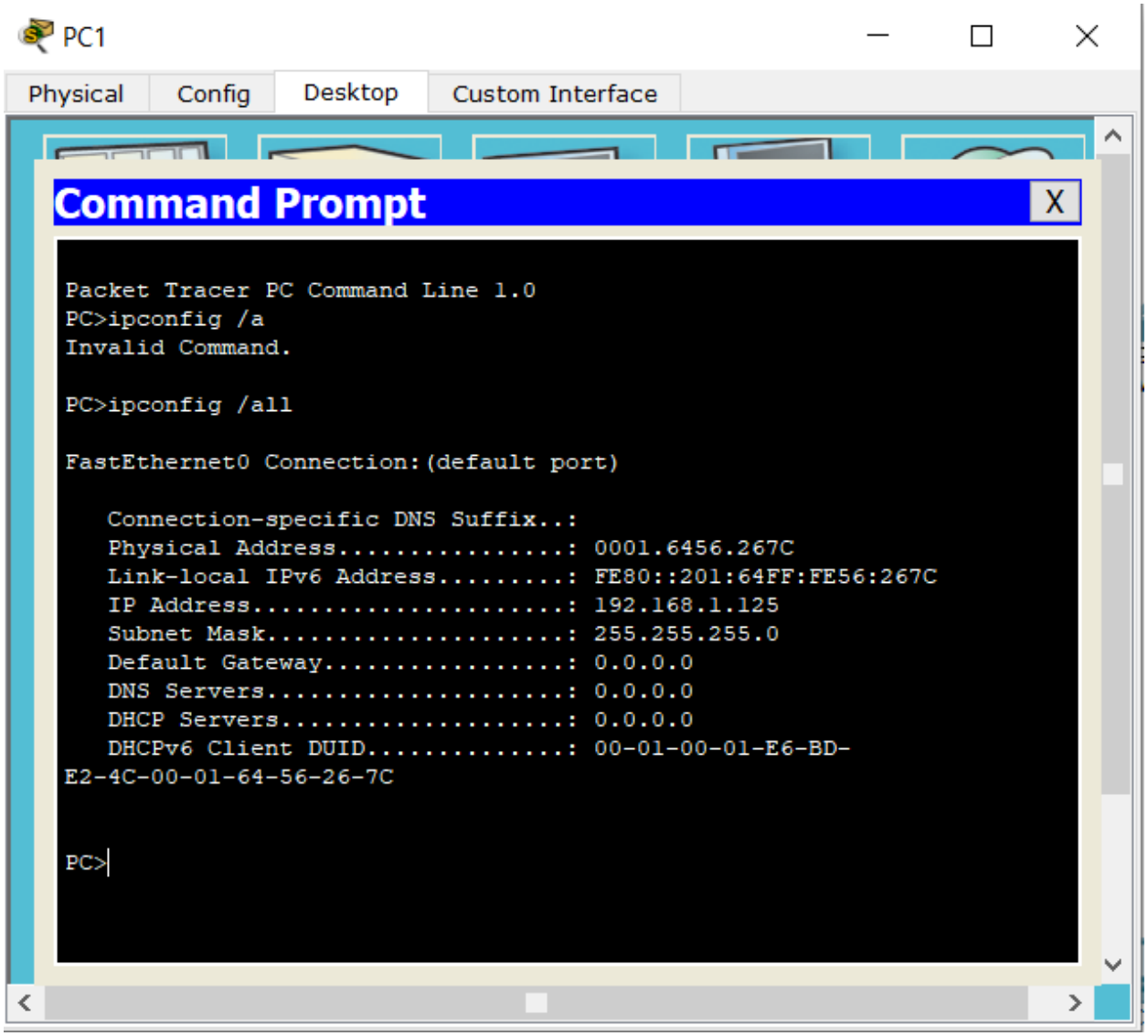
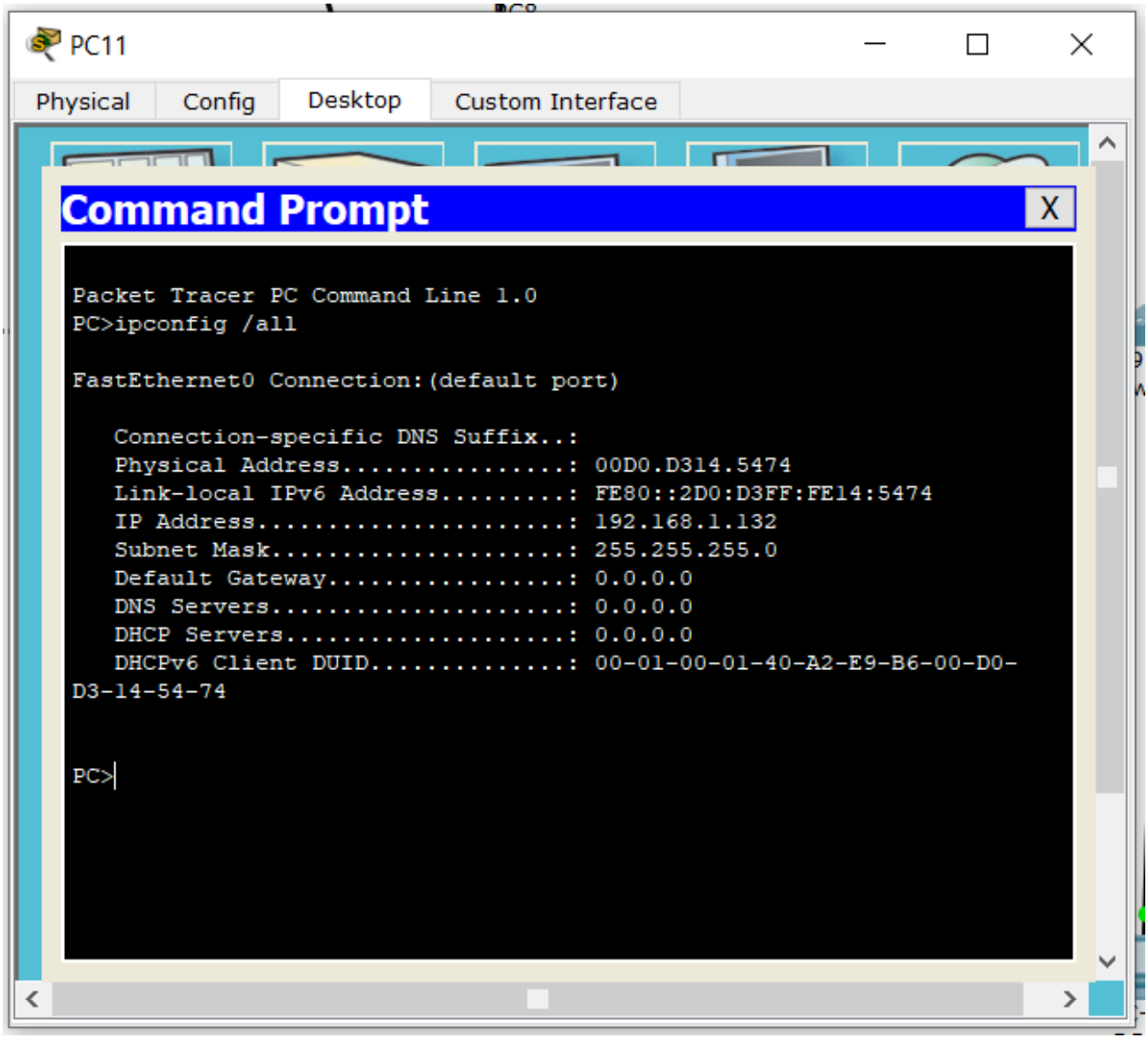


Figure 2 : Ping results from different computer to other end points


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ipconfig /a
Invalid Command.
PC>ipconfig /all
FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix..:
Physical Address.....: 0001.6456.267C
Link-local IPv6 Address.....: FE80::201:64FF:FE56:267C
IP Address.....: 192.168.1.125
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 0.0.0.0
DNS Servers.....: 0.0.0.0
DHCP Servers.....: 0.0.0.0
DHCPv6 Client DUID.....: 00-01-00-01-E6-BD-
E2-4C-00-01-64-56-26-7C
PC>


PC11
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ipconfig /all
FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix..:
Physical Address.....: 00D0.D314.5474
Link-local IPv6 Address.....: FE80::2D0:D3FF:FE14:5474
IP Address.....: 192.168.1.132
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 0.0.0.0
DNS Servers.....: 0.0.0.0
DHCP Servers.....: 0.0.0.0
DHCPv6 Client DUID.....: 00-01-00-01-40-A2-E9-B6-00-D0-
D3-14-54-74
PC>

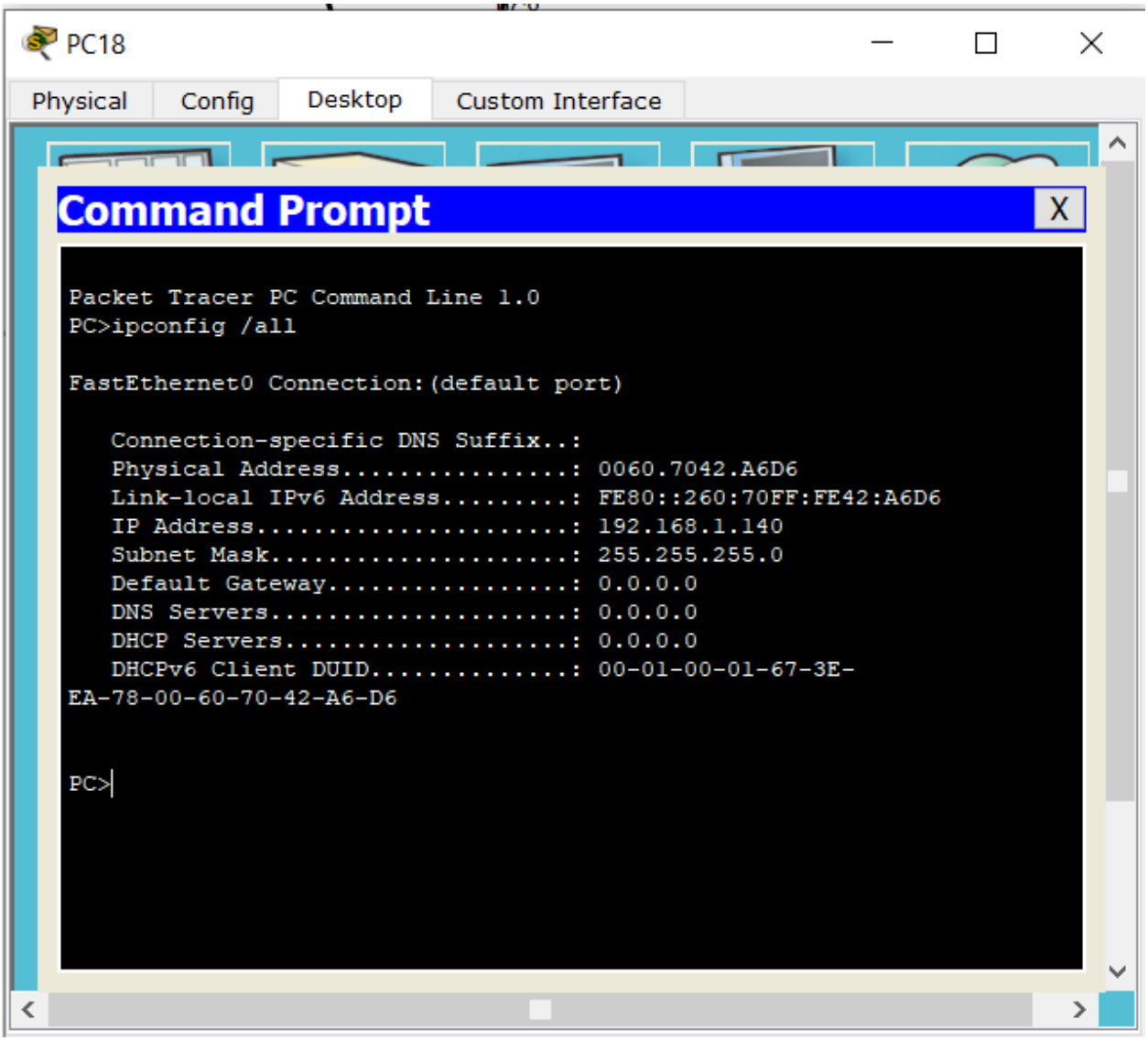


Figure 3: IP address and MAC address config of different computers

```
PC>arp -a
  Internet Address      Physical Address      Type
  192.168.1.120         0009.7c68.d5ed        dynamic
  192.168.1.137         0009.7c5e.43ec        dynamic
  192.168.1.138         00e0.f91c.clad        dynamic
  192.168.1.140         0060.7042.a6d6        dynamic

PC>
```

```
PC>arp -a
  Internet Address      Physical Address      Type
  192.168.1.120         0009.7c68.d5ed        dynamic
  192.168.1.140         0060.7042.a6d6        dynamic

PC>
```

```
Packet Tracer PC Command Line 1.0
PC>arp -a
  Internet Address      Physical Address      Type
  192.168.1.137         0009.7c5e.43ec        dynamic

PC>
```

Figure 4 : ARP table of different computers

The packet file (pkt) of this assignment can be found here
https://github.com/mikias21/NADC/tree/main/assignment_1