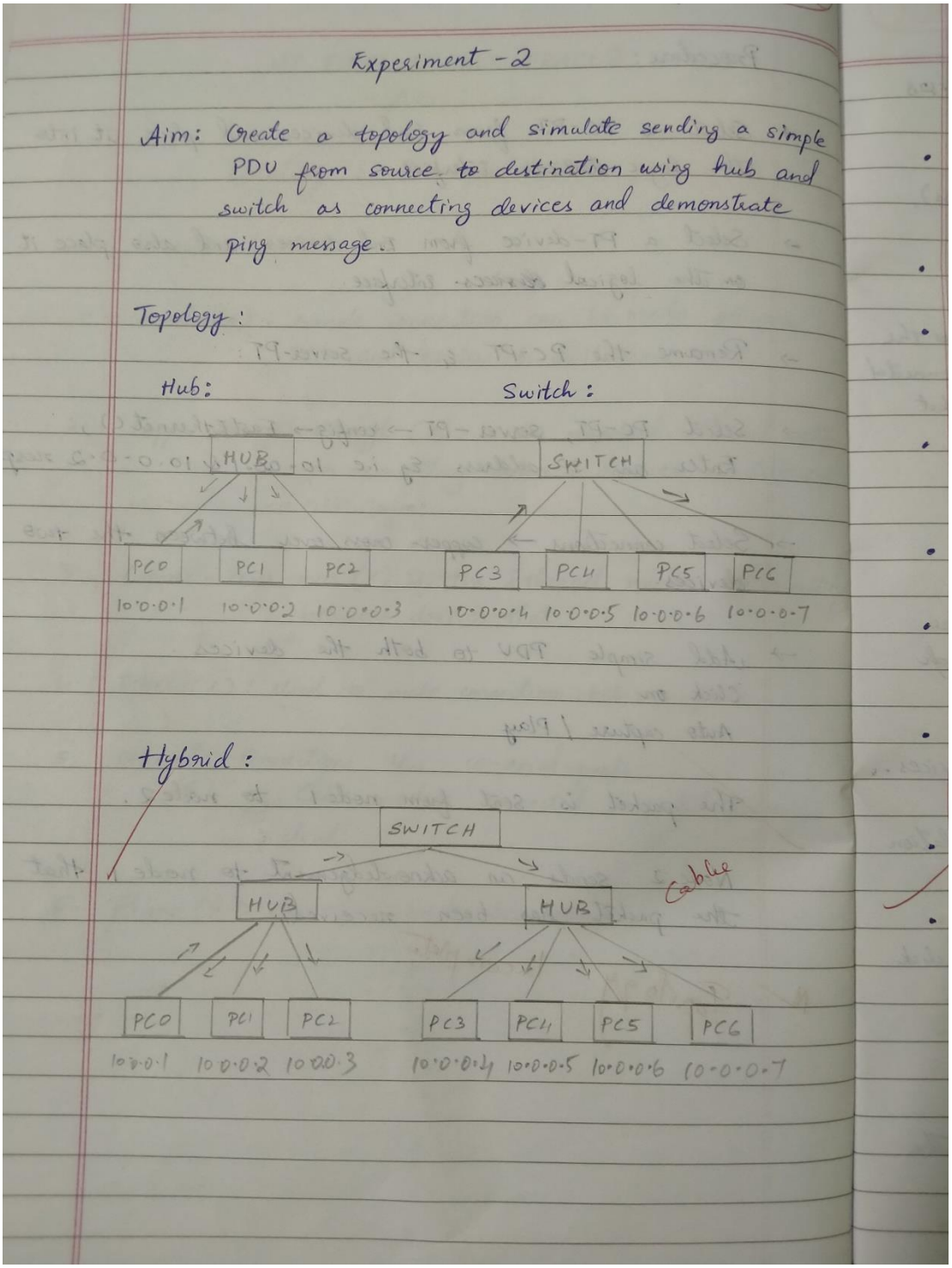
Experiment 1:

Hub and Switch Demo



Procedure : Hub Topology

- Select a hub from the bottom toolbar and place it on the logical interface.
- Place 3 end devices on the logical interface.
- Configure unique IP address and subnet mask on each end devices.
- Connect the end devices to the hub using the copper straight through wire.
- Send a packet from PC0 to PC2
- Start the simulation by clicking auto capture/play on the simulation tab.
- For realtime ping demonstration click on realtime tab and select a end device.
- Enter the command > ping <end device ip>
- The ping response can be viewed on the screen if the destination ip is valid.

Result : > ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL=128
Reply from 10.0.0.5 : bytes = 32 time = 0ms TTL=128
Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL=128

Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL = 128

Ping statistics for 10.0.0.3 :

Packets : Sent = 4 , Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds :

Minimum = 0ms, Maximum = 0ms, Average = 0ms.

Observation: It is observed that hub broadcasts the packet from the source to all the devices connected to the hub. The end devices reject the packet except to which the packet was sent.

Procedure : Switch

- Select a switch and 4 end devices and place it on the logical interface and connect using copper through wire.
- Configure ip address and subnet mask on each end devices.
- Send a packet b/w two devices and start the simulation to visualize data/packet flow.
- For realtime ping, open realtime option and click on an end device and navigate to command prompt.
- Enter the command > ping <end device ip>
- The ping response can be viewed on the screen if the destination ip is valid.

Result :

>ping 10.0.0.8

Pinging 10.0.0.8 with 32 bytes of data:

Reply from 10.0.0.8 : bytes=32 time=1ms TTL=128
Reply from 10.0.0.8 : bytes=32 time=0ms TTL=128
Reply from 10.0.0.8 : bytes=32 time=0ms TTL=128
Reply from 10.0.0.8 : bytes=32 time=0ms TTL=128

Ping statistics for 10.0.0.8:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds.
Minimum = 0ms, Maximum = 1ms, Average = 0ms.

Observation: It is observed that unlike a hub, a switch does not broadcast the packets each and every time instead broadcasts the packets once and sends the packet to the intended user on further communications.

Procedure : Hybrid

- Select a switch and two hubs and place it on the logical interface
- Connect 3 end devices to one hub and 4 end devices to another hub.
- Connect these two hubs to the switch.
- Once ip addresses and subnet masks are configured, send a data packet from PC0 to PC6

- The packet gets broadcasted among the hub networks while it also gets transmitted from the switch to the hub to which PC6 is connected.

- For realtime simulation of ping, click on realtime and select a device and navigate to command prompt

- Enter the command > ping <end device ip>

- The ping response can be viewed if the destination ip is valid.

Observation: It is observed that by following a hybrid structure more flexibility can be acheived as few devices can be connected to hub which does not have much security issue while different hubs can be connected to switch which allows more number of end devices to be present in a network while ensuring security. The packets get transmitted within a hub network while the switch transmits the packets to the hub to which the intended end device is connected.

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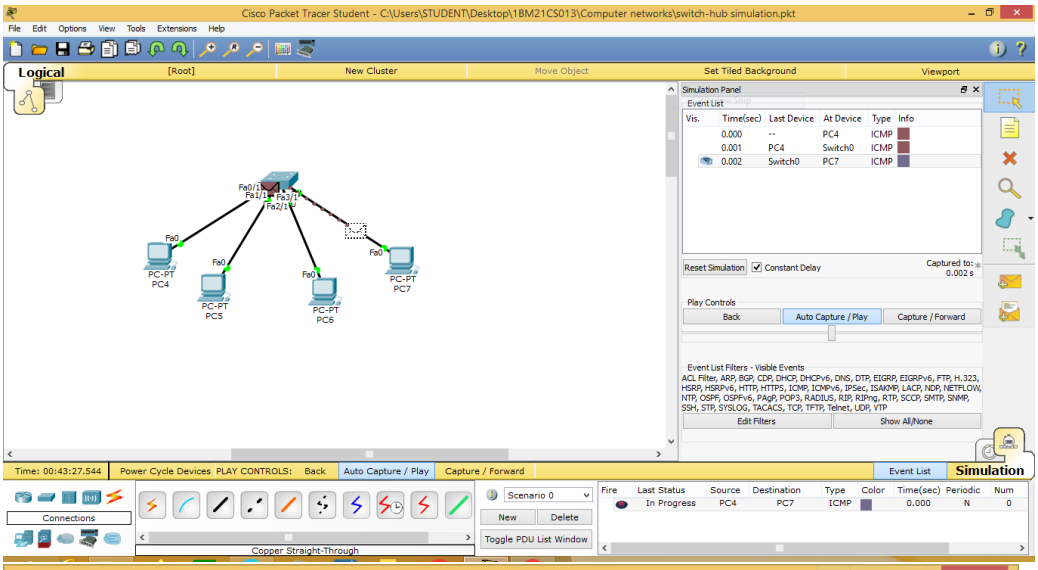
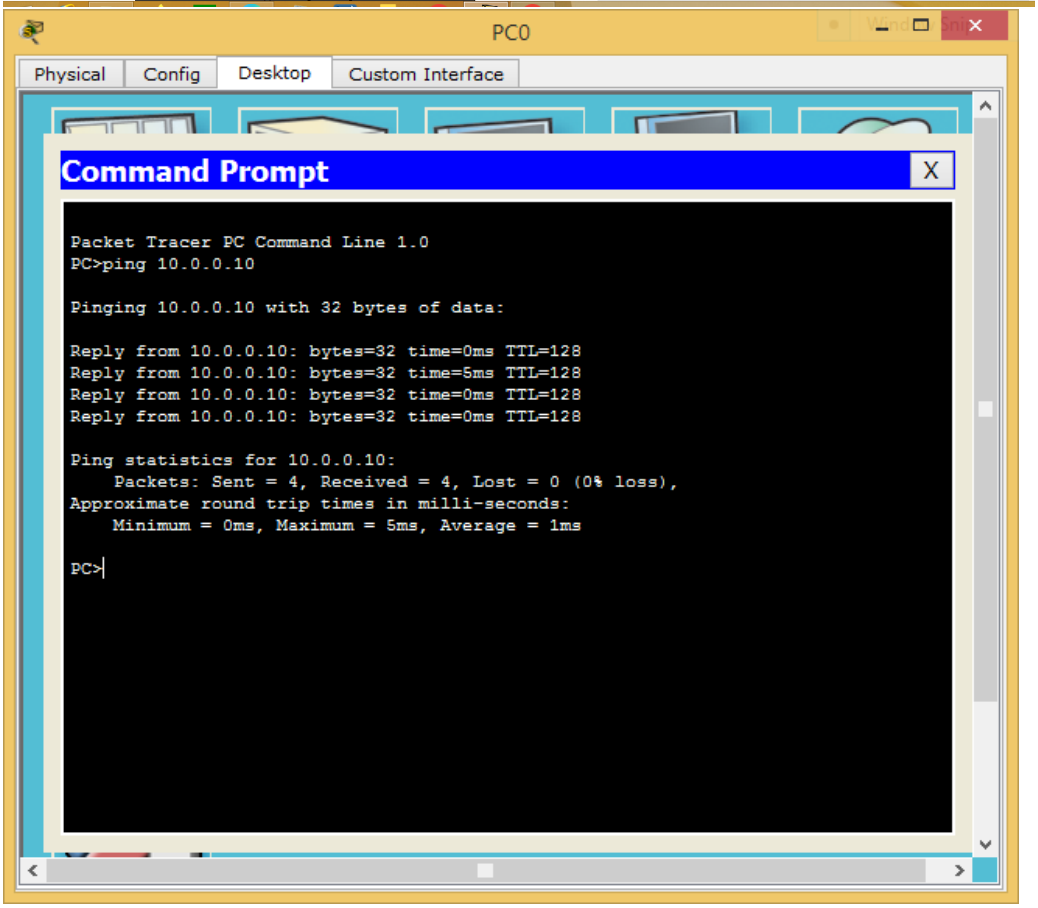
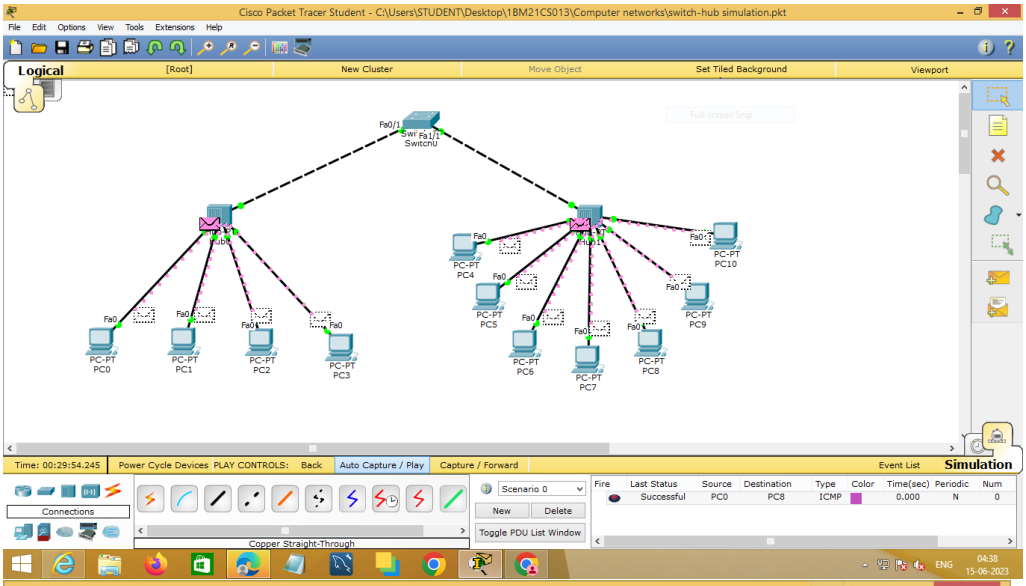
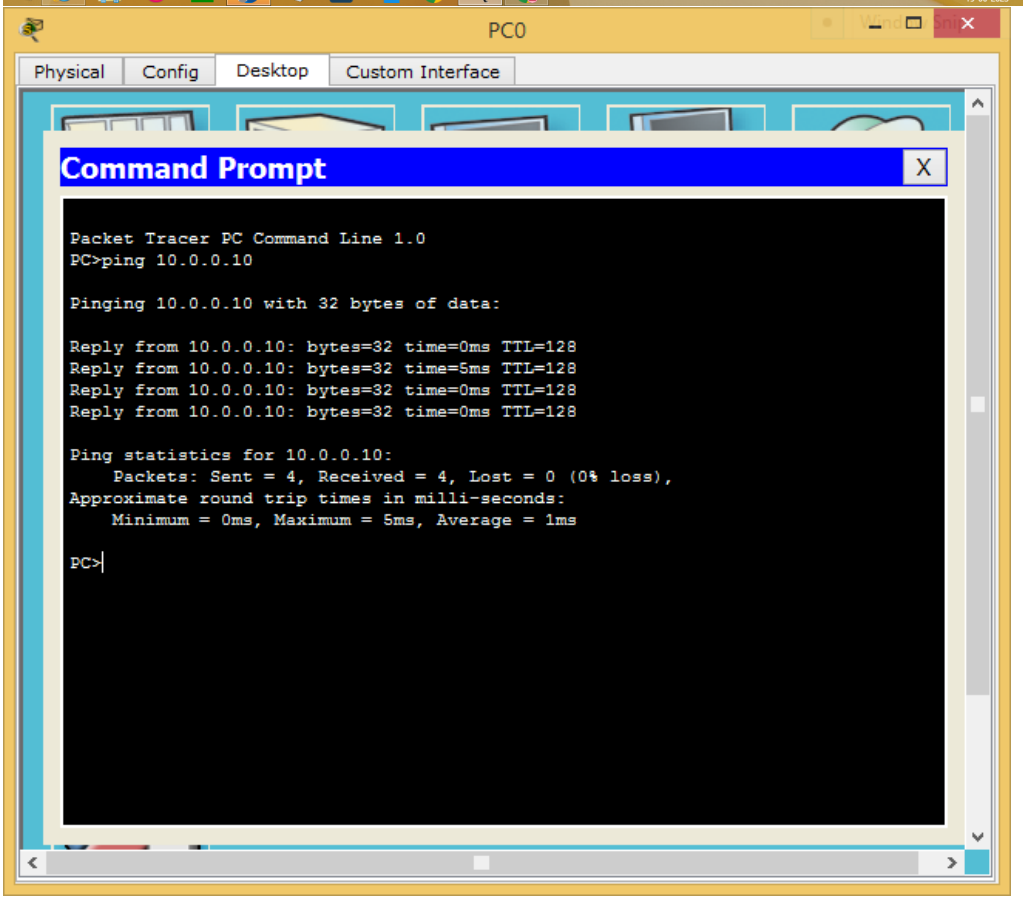
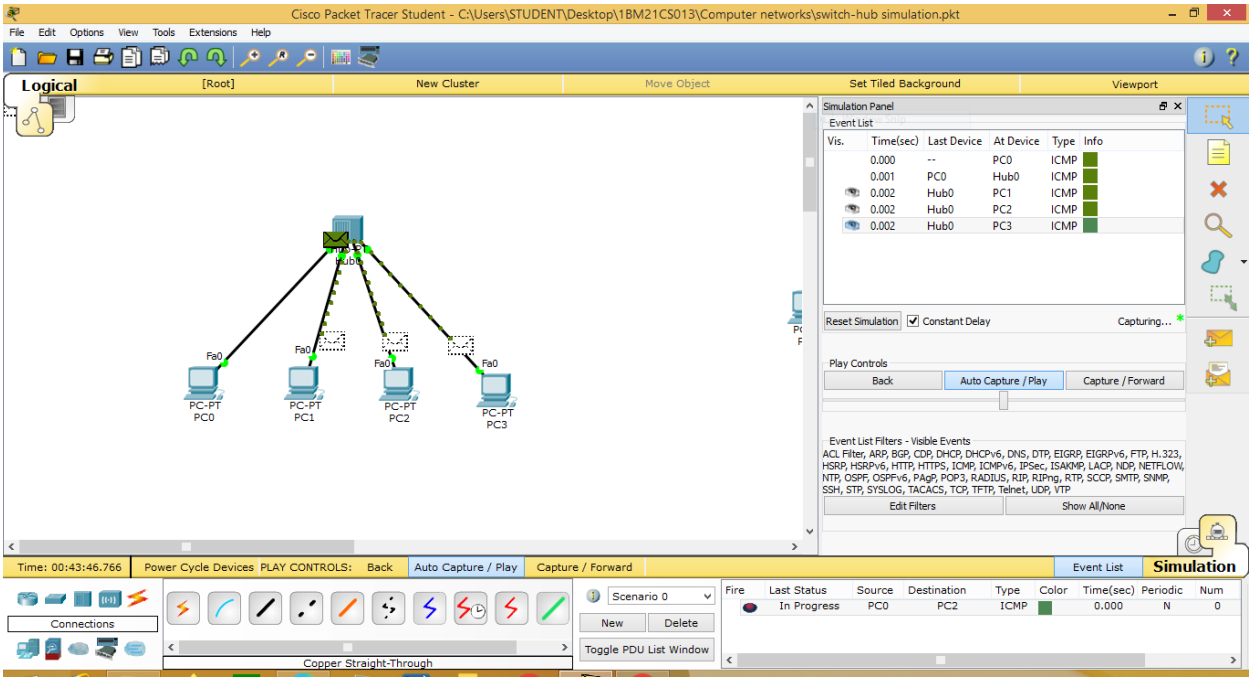
Topology and output screenshots:

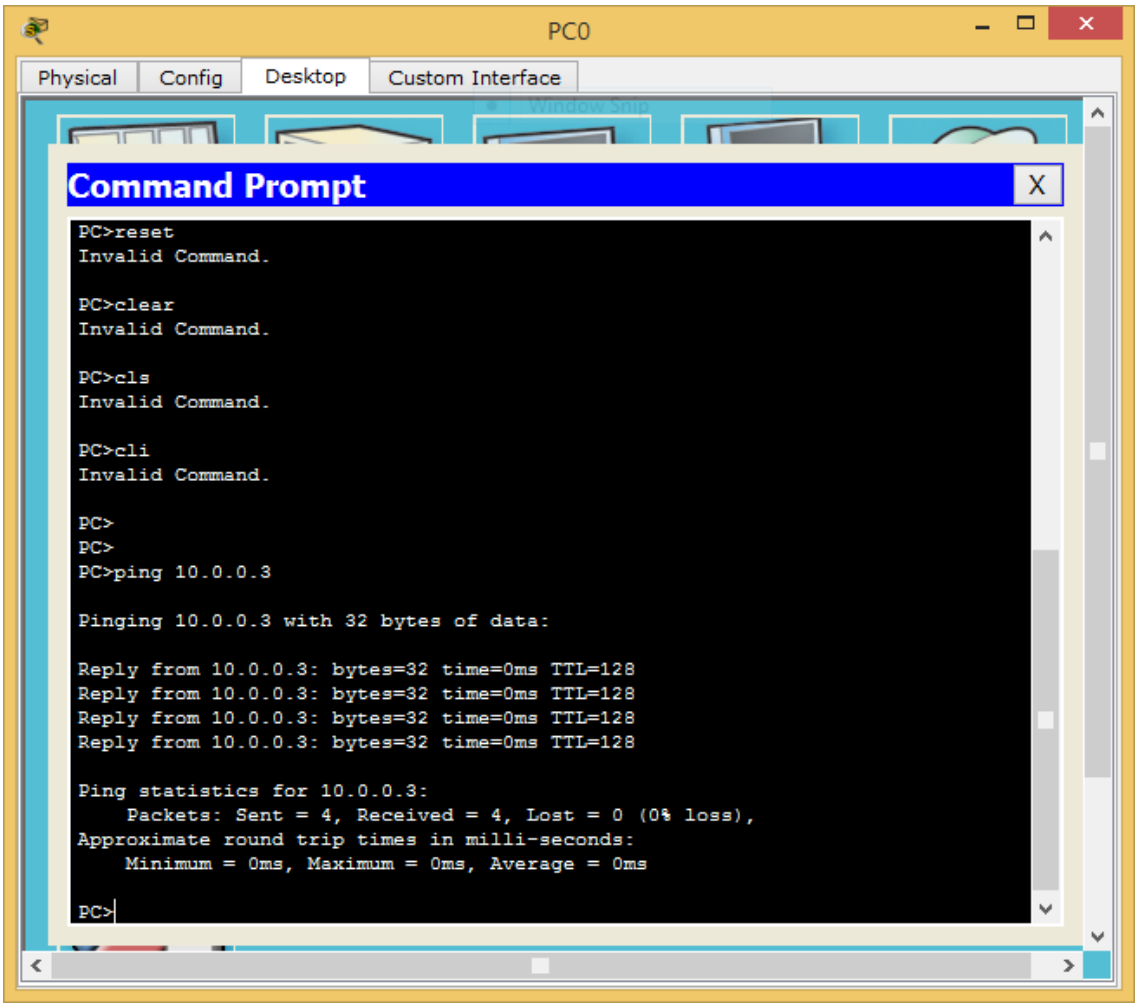





Cisco Packet Tracer Student - C:\Users\STUDENT\Desktop\1BM21CS013\Computer networks\switch-hub simulation.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Switch0
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
Time: 00:29:54.245
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Successful
PC0
PC8
ICMP
0.000
N
0


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=0ms TTL=128
Reply from 10.0.0.10: bytes=32 time=5ms TTL=128
Reply from 10.0.0.10: bytes=32 time=0ms TTL=128
Reply from 10.0.0.10: bytes=32 time=0ms TTL=128
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 1ms
PC>


Cisco Packet Tracer Student - C:\Users\STUDENT\Desktop\1BM21CS013\Computer networks\switch-hub simulation.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Hub0 ICMP
0.002 Hub0 PC1 ICMP
0.002 Hub0 PC2 ICMP
0.002 Hub0 PC3 ICMP
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
Fa0
Time: 00:43:46.766
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
In Progress PC0 PC2 ICMP 0.000 N 0


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>reset
Invalid Command.
PC>clear
Invalid Command.
PC>cls
Invalid Command.
PC>cli
Invalid Command.
PC>
PC>
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>