Компьютерные сети. Обучение в записи

Урок 4. Семинар. Технология Ethernet. Протокол IP

Оглавление

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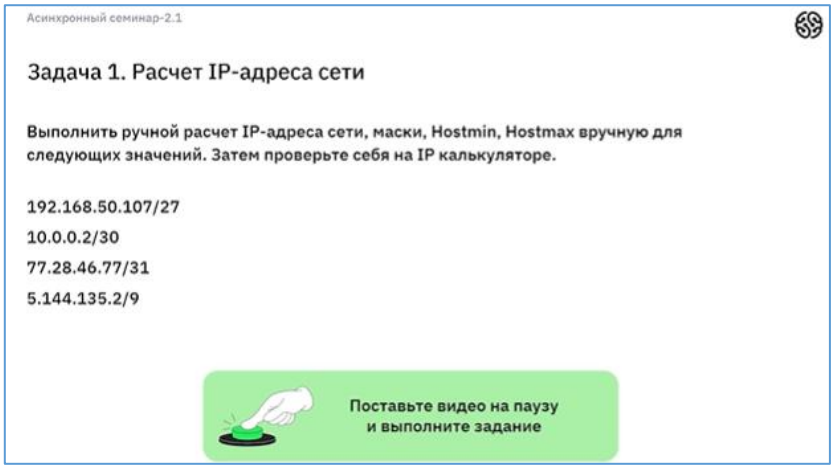
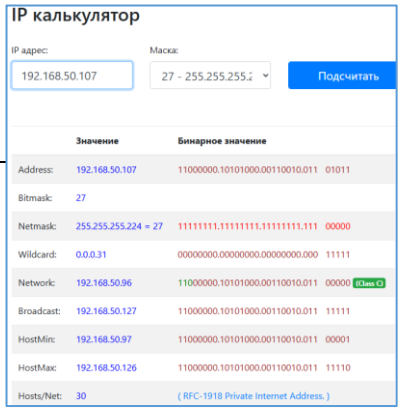
Задача 1. Работа с IP сетями



Ход выполнения задания 1:

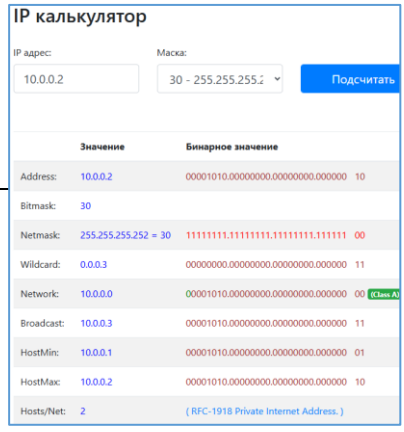


192.168.50.107/27 (255.255.255.224)

IP-адрес:	*1100 0000*	*1010 1000*	*0011 0010*	*0110 1011*
Маска:	*1111 1111*	*1111 1111*	*1111 1111*	*1110 0000*
	1100 0000	*1010 1000*	*0011 0010*	*0110 0000*

192.168.50.96 (+2^5) => 192.168.50.127

Hostmin: 192.168.50.97 /27
Hostmax: 192.168.50.126 /27

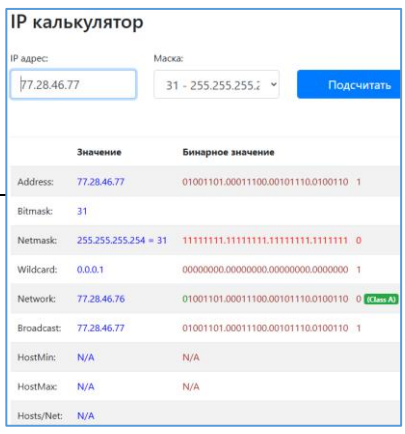


10.0.0.2/30 (255.255.255.252)

IP-адрес:	*0000 1010*	*0000 0000*	*0000 0000*	*0000 0010*
Маска:	*1111 1111*	*1111 1111*	*1111 1111*	*1111 1100*
	0000 1010	*0000 0000*	*0000 0000*	*0000 0000*

10.0.0.0 (+2^2) => 10.0.0.3

Hostmin: 10.0.0.1 /30
Hostmax: 10.0.0.2 /30



77.28.46.77/31 (255.255.255.254)

IP-адрес:	*0100 1101*	*0001 1100*	*0010 1110*	*0100 1101*
Маска:	*1111 1111*	*1111 1111*	*1111 1111*	*1111 1110*
	0100 1101	*0001 1100*	*0010 1110*	*0100 1100*

77.28.46.76 (+2^1) => 77.28.46.77

Hostmin: ——
Hostmax: ——

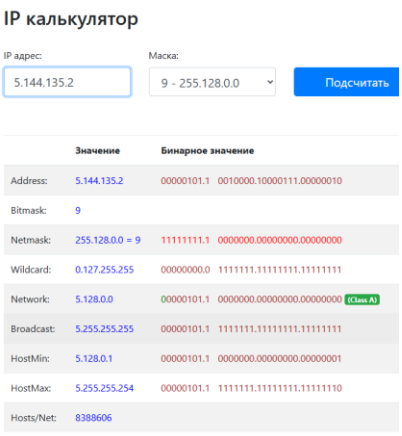
5.144.135.2/9 (255.128.0.0)

IP-адрес:	*0000 0101*	*1001 0000*	*1000 0111*	*0000 0010*
Маска:	*1111 1111*	*1000 0000*	*0000 0000*	*0000 0000*
	0000 0101	*1000 0000*	*0000 0000*	*0000 0000*

5.128.0.0 (+2^{23}) => 5.255.255.255

0000 0101	*1000 0000*	*0000 0000*	*0000 0000*
0000 0101	*1111 1111*	*1111 1111*	*1111 1111*

Hostmin: 5.128.0.1
Hostmax: 5.255.255.254



Задача 2. Работа с CPT

Задача 2. Знакомство с симуляцией

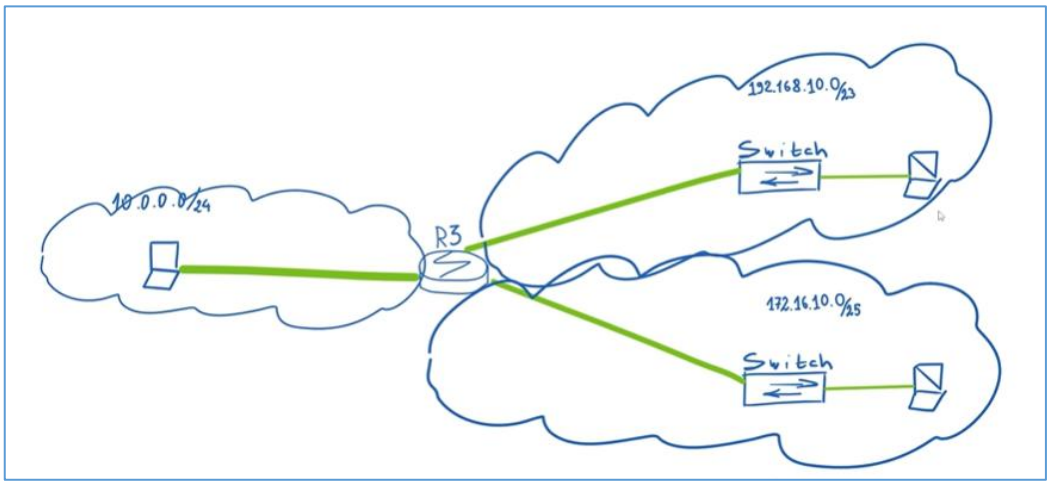
Необходимо собрать сеть по схеме.

Схема: https://disk.yandex.ru/i/AtvOy8uHJ9615w

Необходимо связать сети 192.168.10.0/23, 10.0.0.0/24 и 172.16.10.0/25 между собой, чтобы компы пинговали друг друга.Показать успешный пинг.

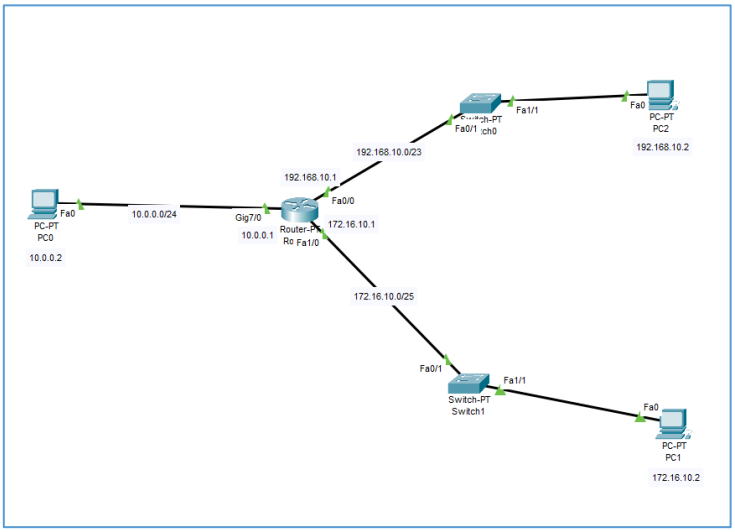
1. Поднимите интерфейсы и настройте IP адреса.
2. Пропингуйте соседние устройства.
3. Изучите таблицы ARP и MAC Address table

Поставьте видео на паузу
и выполните задание

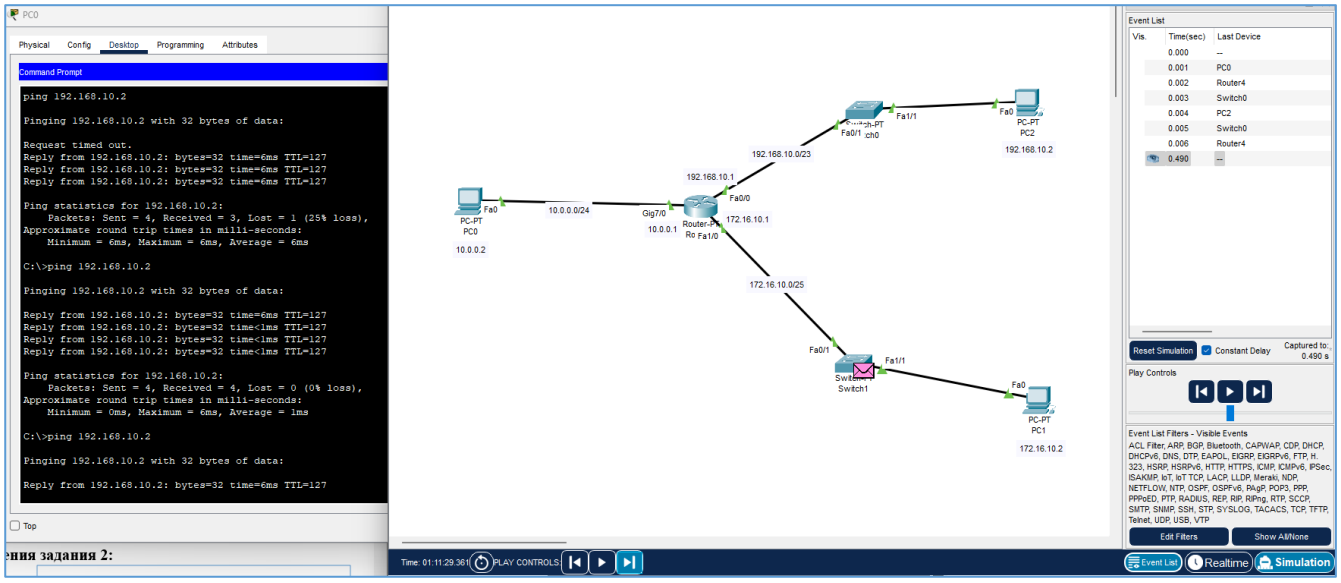


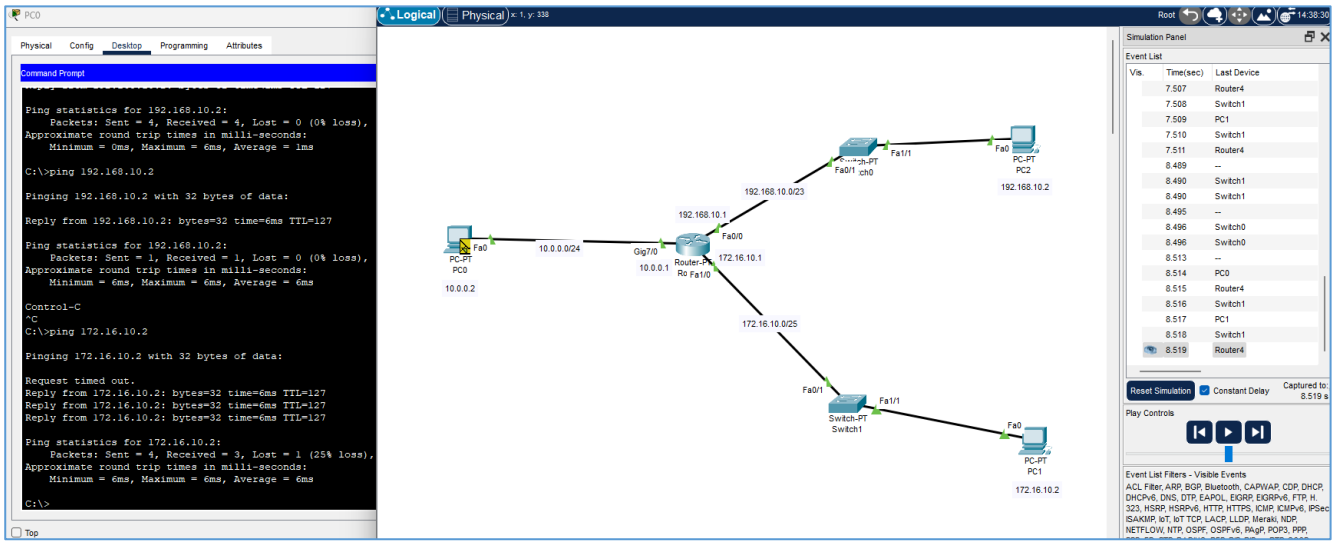
Ход выполнения задания 2:

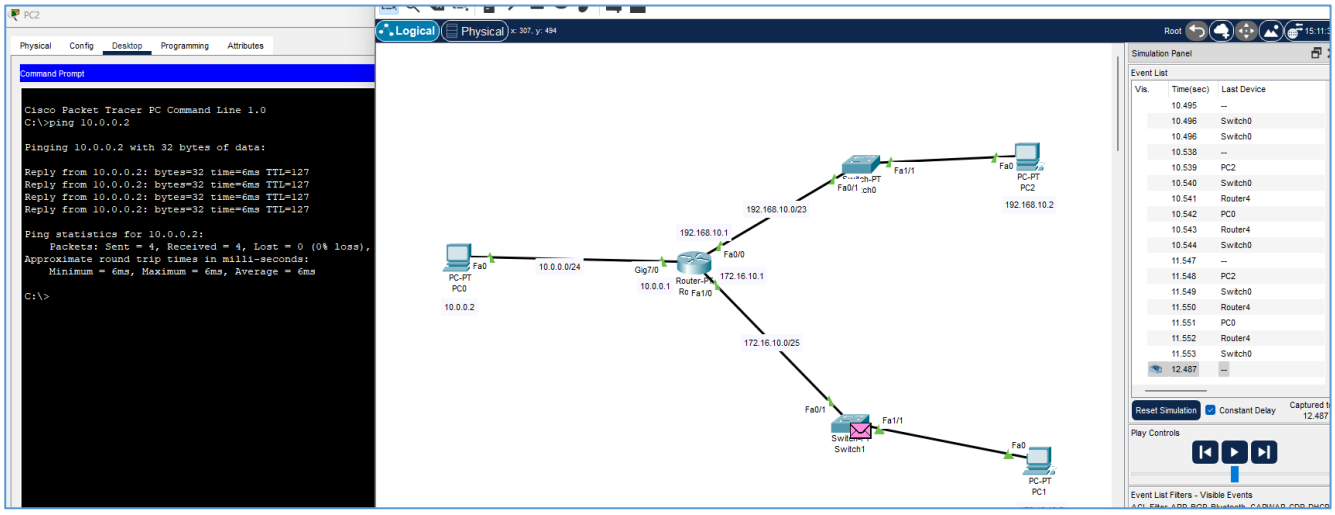
Задание 2.1

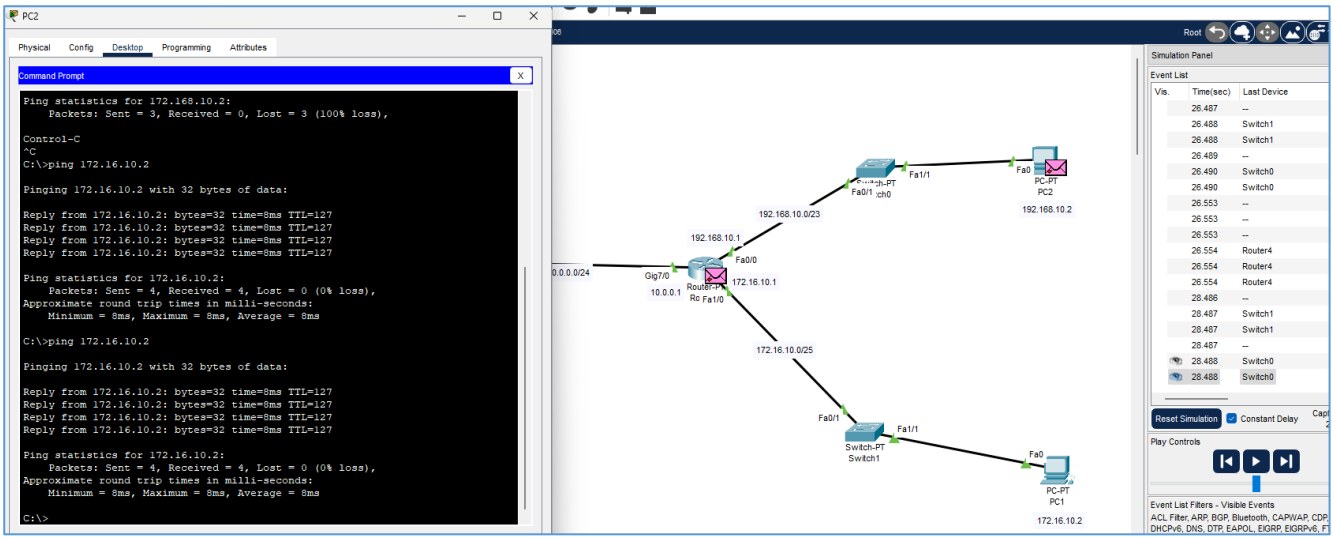


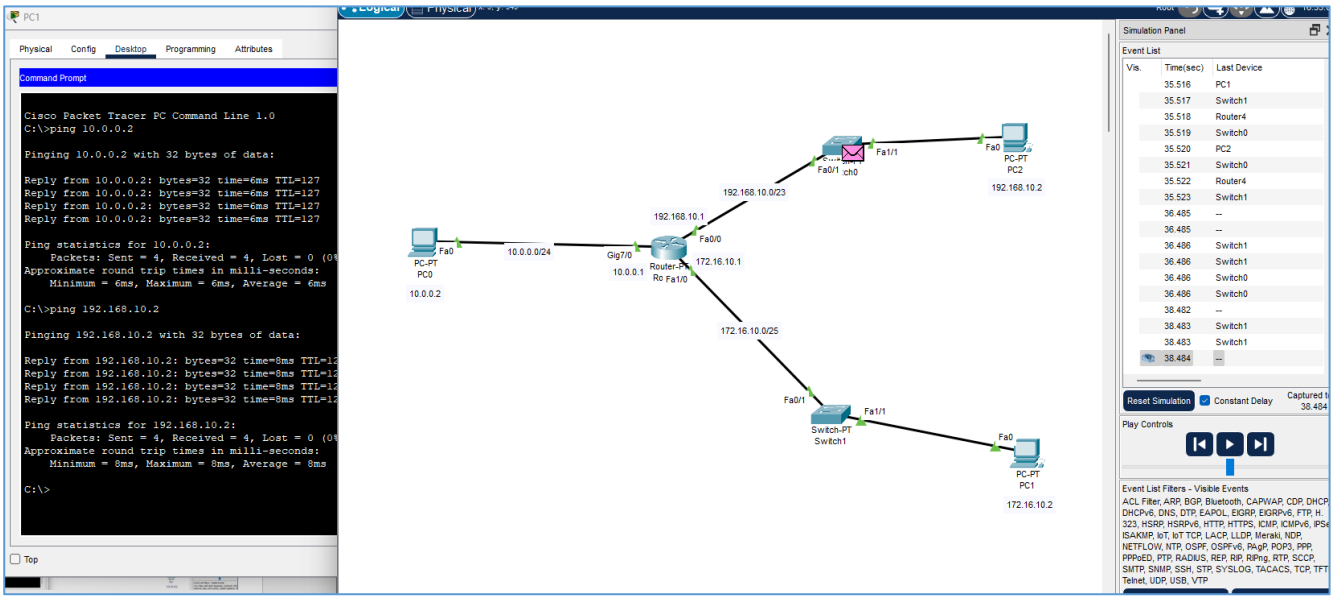
Задание 2.2


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.10.2: bytes=32 time=6ms TTL=127
Reply from 192.168.10.2: bytes=32 time=6ms TTL=127
Reply from 192.168.10.2: bytes=32 time=6ms TTL=127
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 6ms, Average = 6ms
C:\>ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=6ms TTL=127
Reply from 192.168.10.2: bytes=32 time<1ms TTL=127
Reply from 192.168.10.2: bytes=32 time<1ms TTL=127
Reply from 192.168.10.2: bytes=32 time<1ms TTL=127
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 6ms, Average = 1ms
C:\>ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=6ms TTL=127
Top
ния задания 2:
192.168.10.0/23
192.168.10.1
Fa0/0
Fa0/1
Fa1/1
Fa0
PC-PT PC2
192.168.10.2
PC-PT PC0
10.0.0.2
10.0.0.0/24
Gig7/0
10.0.0.1
Router-PT
Ro Fa1/0
172.16.10.1
172.16.10.0/25
Switch-PT
Switch1
PC-PT PC1
172.16.10.2
Event List
Vis.
Time(sec)
Last Device
0.000 --
0.001 PC0
0.002 Router4
0.003 Switch0
0.004 PC2
0.005 Switch0
0.006 Router4
0.490 --
Reset Simulation
Constant Delay
Captured to: 0.490 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Time: 01:11:29.361
PLAY CONTROLS
Event List
Realtime
Simulation

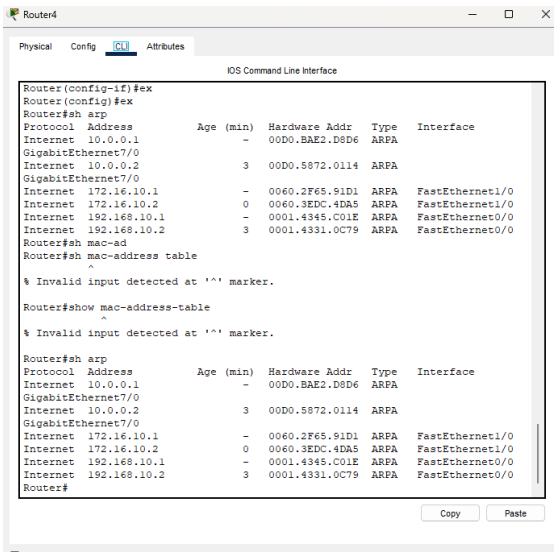

PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 6ms, Average = 1ms
C:\>ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=6ms TTL=127
Ping statistics for 192.168.10.2:
Packets: Sent = 1, Received = 1, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 6ms, Average = 6ms
Control-C
^C
C:\>ping 172.16.10.2
Pinging 172.16.10.2 with 32 bytes of data:
Request timed out.
Reply from 172.16.10.2: bytes=32 time=6ms TTL=127
Reply from 172.16.10.2: bytes=32 time=6ms TTL=127
Reply from 172.16.10.2: bytes=32 time=6ms TTL=127
Ping statistics for 172.16.10.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 6ms, Average = 6ms
C:\>
Top
Logical
Physical
Root
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
7.507 Router4
7.508 Switch1
7.509 PC1
7.510 Switch1
7.511 Router4
8.489 --
8.490 Switch1
8.490 Switch1
8.495 --
8.496 Switch0
8.496 Switch0
8.513 --
8.514 PC0
8.515 Router4
8.516 Switch1
8.517 PC1
8.518 Switch1
8.519 Router4
Reset Simulation
Constant Delay
Captured to: 8.519 s
Play Controls
Event List Filters - Visible Events
192.168.10.0/23
192.168.10.1
Fa0/0
Fa0/1
Fa1/1
Fa0
PC-PT PC2
192.168.10.2
PC-PT PC0
10.0.0.2
10.0.0.0/24
Gig7/0
10.0.0.1
Router-PT
Ro Fa1/0
172.16.10.1
172.16.10.0/25
Switch-PT
Switch1
PC-PT PC1
172.16.10.2

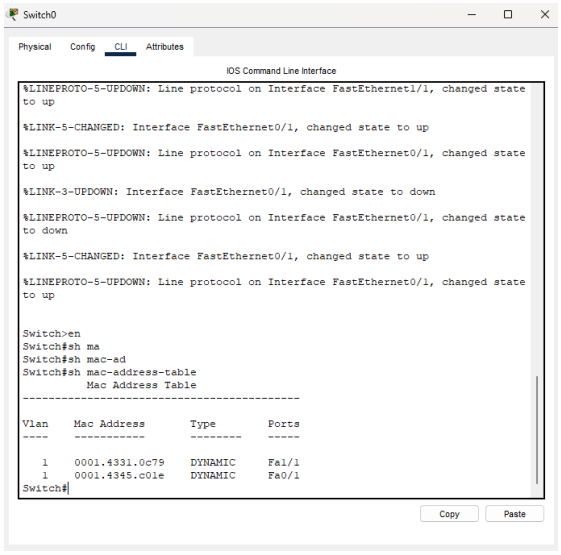

PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 6ms, Average = 6ms
C:\>
Logical
Physical
Root
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
10.495 --
10.496 Switch0
10.496 Switch0
10.538 --
10.539 PC2
10.540 Switch0
10.541 Router4
10.542 PC0
10.543 Router4
10.544 Switch0
11.547 --
11.548 PC2
11.549 Switch0
11.550 Router4
11.551 PC0
11.552 Router4
11.553 Switch0
12.487 --
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
192.168.10.0/23
192.168.10.1
Fa0/0
Fa0/1
Fa1/1
Fa0
PC-PT PC2
192.168.10.2
PC-PT PC0
10.0.0.2
10.0.0.0/24
Gig7/0
10.0.0.1
Router-PT
Ro Fa1/0
172.16.10.1
172.16.10.0/25
Switch-PT
Switch1
PC-PT PC1


PC2
Physical Config Desktop Programming Attributes
Command Prompt
Ping statistics for 172.168.10.2:
Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),
Control-C
^C
C:\>ping 172.16.10.2
Pinging 172.16.10.2 with 32 bytes of data:
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Ping statistics for 172.16.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 8ms, Average = 8ms
C:\>ping 172.16.10.2
Pinging 172.16.10.2 with 32 bytes of data:
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Reply from 172.16.10.2: bytes=32 time=8ms TTL=127
Ping statistics for 172.16.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 8ms, Average = 8ms
C:\>
Root
Simulation Panel
Event List
Vis. Time(sec) Last Device
26.487 --
26.488 Switch1
26.488 Switch1
26.489 --
26.490 Switch0
26.490 Switch0
26.553 --
26.553 --
26.553 --
26.554 Router4
26.554 Router4
26.554 Router4
28.486 --
28.487 Switch1
28.487 Switch1
28.487 --
28.488 Switch0
28.488 Switch0
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FT
192.168.10.0/23
192.168.10.1
Fa0/0
172.16.10.1
Gig7/0
10.0.0.1
Router-PT
Fa1/0
172.16.10.0/25
Fa0/1
Fa1/1
Switch-PT
Switch1
Fa0
PC-PT
PC1
172.16.10.2
Fa1/1
Fa0
PC-PT
PC2
192.168.10.2

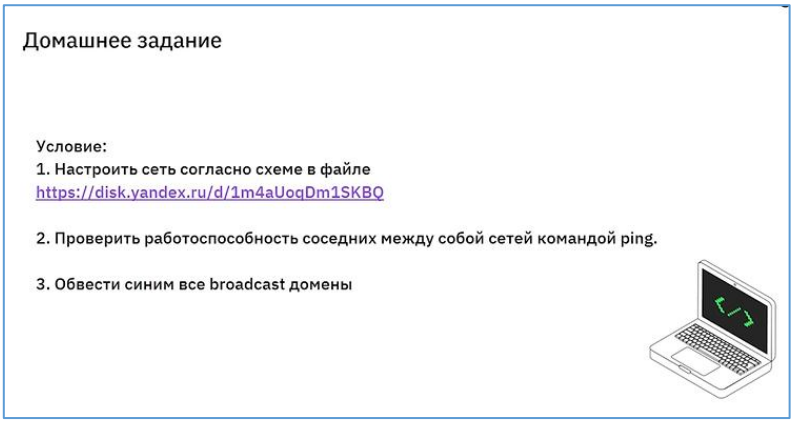

PC1
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Reply from 10.0.0.2: bytes=32 time=6ms TTL=127
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0%
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 6ms, Average = 6ms
C:\>ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=8ms TTL=12
Reply from 192.168.10.2: bytes=32 time=8ms TTL=12
Reply from 192.168.10.2: bytes=32 time=8ms TTL=12
Reply from 192.168.10.2: bytes=32 time=8ms TTL=12
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0%
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 8ms, Average = 8ms
C:\>
Top
Simulation Panel
Event List
Vis. Time(sec) Last Device
35.516 PC1
35.517 Switch1
35.518 Router4
35.519 Switch0
35.520 PC2
35.521 Switch0
35.522 Router4
35.523 Switch1
36.485 --
36.485 --
36.486 Switch1
36.486 Switch1
36.486 Switch0
36.486 Switch0
38.482 --
38.483 Switch1
38.483 Switch1
38.484 --
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
10.0.0.0/24
PC-PT
PC0
10.0.0.2
Fa0
Gig7/0
10.0.0.1
Router-PT
Fa1/0
192.168.10.1
Fa0/0
172.16.10.1
192.168.10.0/23
Fa0/1
Fa1/1
ch0
PC-PT
PC2
192.168.10.2
172.16.10.0/25
Switch-PT
Switch1
PC-PT
PC1
172.16.10.2

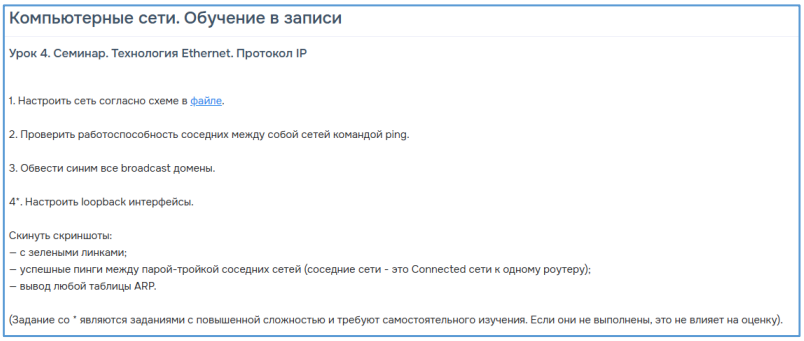
Задание 2.3


Router4
Physical Config CLI Attributes
IOS Command Line Interface
Router(config-if)#ex
Router(config)#ex
Router#sh arp
Protocol Address Age (min) Hardware Addr Type Interface
Internet 10.0.0.1 - 00D0.BAE2.D8D6 ARPA
GigabitEthernet7/0
Internet 10.0.0.2 3 00D0.5872.0114 ARPA
GigabitEthernet7/0
Internet 172.16.10.1 - 0060.2F65.91D1 ARPA FastEthernet1/0
Internet 172.16.10.2 0 0060.3EDC.4DA5 ARPA FastEthernet1/0
Internet 192.168.10.1 - 0001.4345.C01E ARPA FastEthernet0/0
Internet 192.168.10.2 3 0001.4331.0C79 ARPA FastEthernet0/0
Router#sh mac-ad
Router#sh mac-address table
^
% Invalid input detected at '^' marker.
Router#show mac-address-table
^
% Invalid input detected at '^' marker.
Router#sh arp
Protocol Address Age (min) Hardware Addr Type Interface
Internet 10.0.0.1 - 00D0.BAE2.D8D6 ARPA
GigabitEthernet7/0
Internet 10.0.0.2 3 00D0.5872.0114 ARPA
GigabitEthernet7/0
Internet 172.16.10.1 - 0060.2F65.91D1 ARPA FastEthernet1/0
Internet 172.16.10.2 0 0060.3EDC.4DA5 ARPA FastEthernet1/0
Internet 192.168.10.1 - 0001.4345.C01E ARPA FastEthernet0/0
Internet 192.168.10.2 3 0001.4331.0C79 ARPA FastEthernet0/0
Router#
Copy
Paste


Switch0
Physical Config CLI Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Switch>en
Switch#sh ma
Switch#sh mac-ad
Switch#sh mac-address-table
Mac Address Table
Vlan Mac Address Type Ports
1 0001.4331.0c79 DYNAMIC Fa1/1
1 0001.4345.c01e DYNAMIC Fa0/1
Switch#
Copy
Paste

Домашнее задание

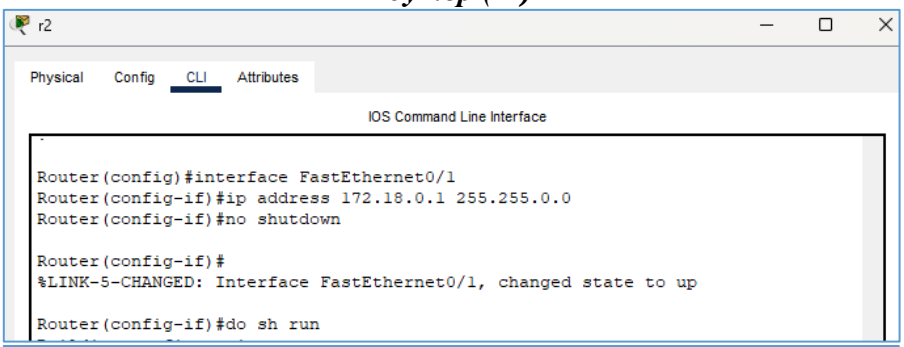




Ход выполнения домашнего задания:

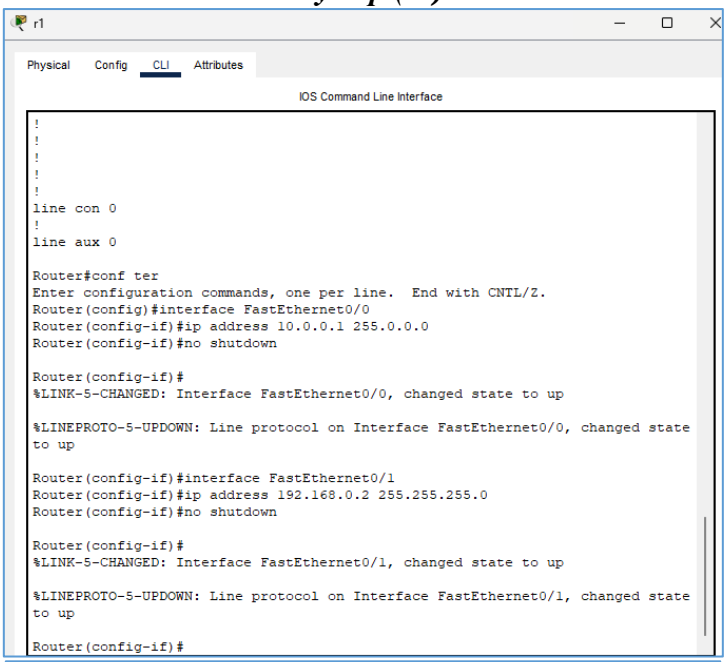
Задание 1: настройка сети и IP-адресов

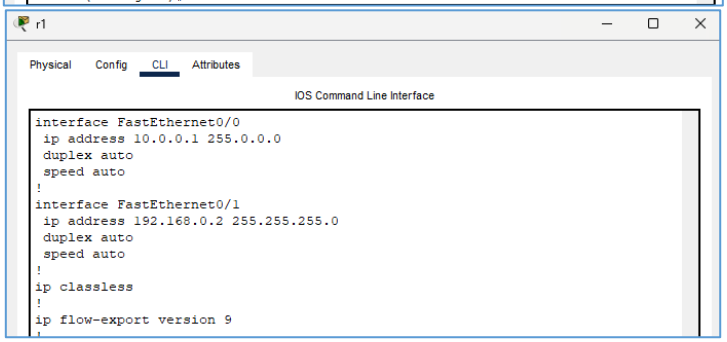
Роутер (r2)




```
interface FastEthernet0/0
 ip address 192.168.0.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 ip address 172.18.0.1 255.255.0.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 192.168.4.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/1
 ip address 192.168.20.1 255.255.255.0
 duplex auto
 speed auto
```

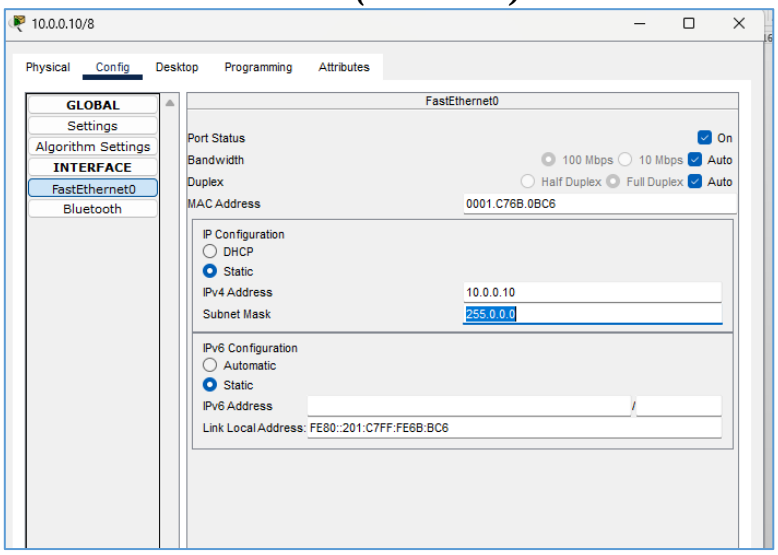
Роутер (r1)





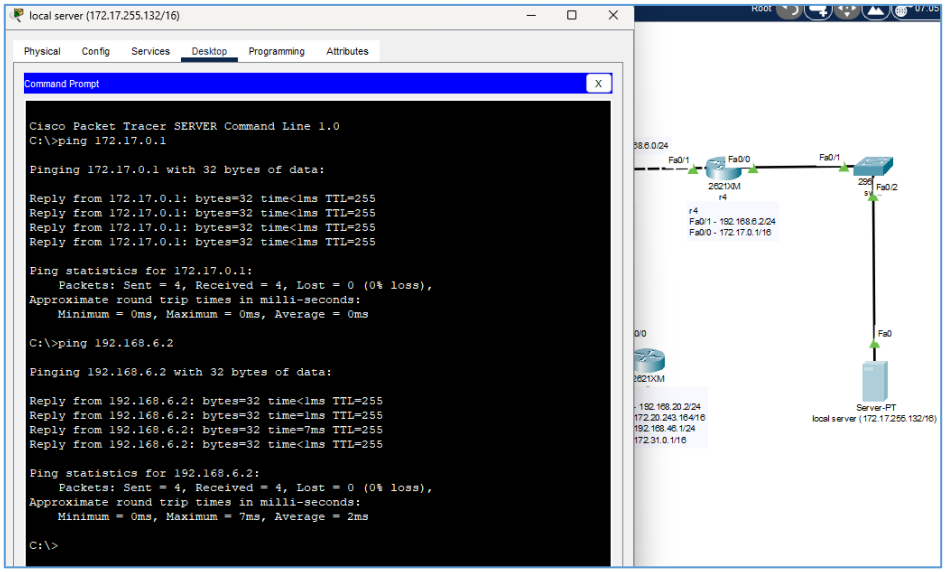
и т.д. …

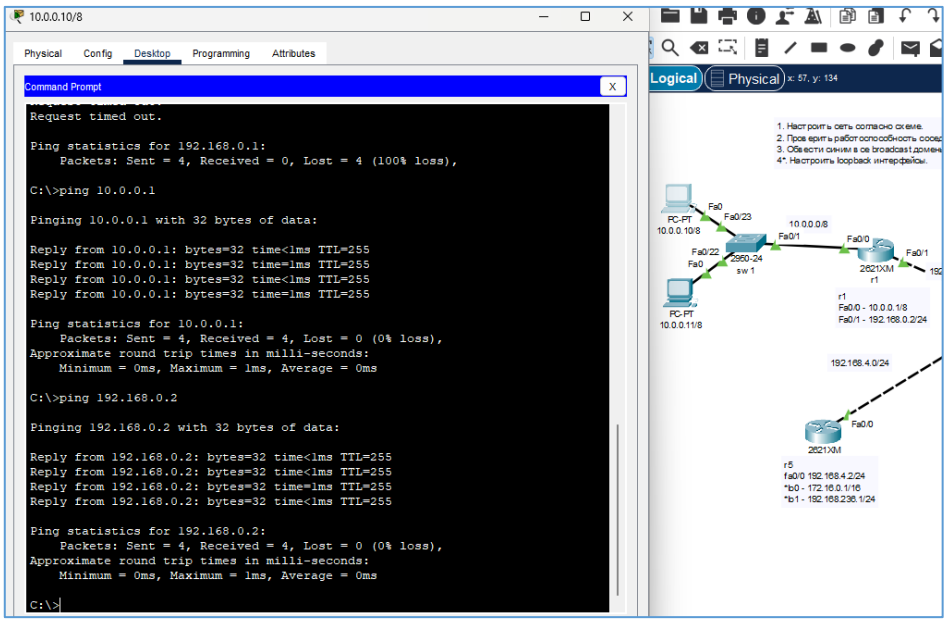
PC-PT (10.0.0.10/8)

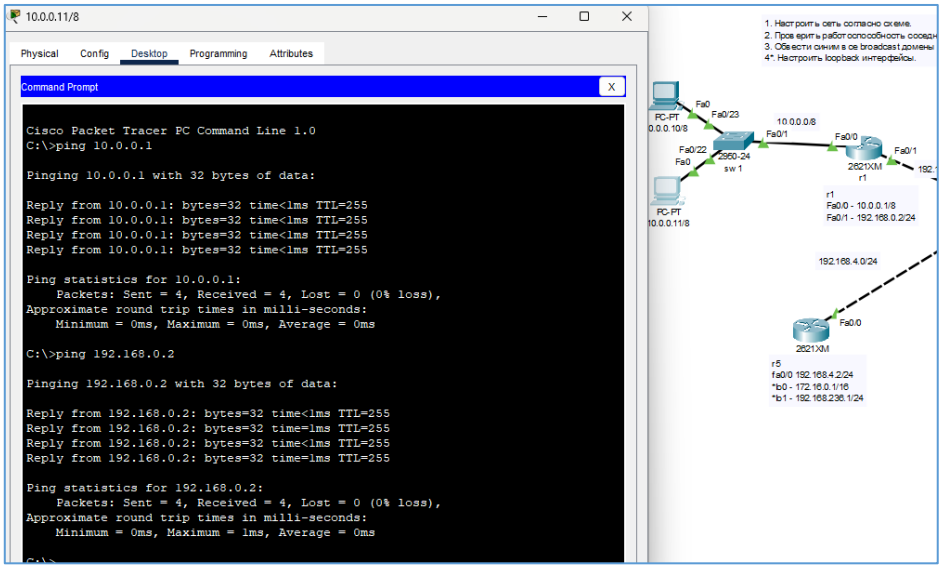


и т.д. …

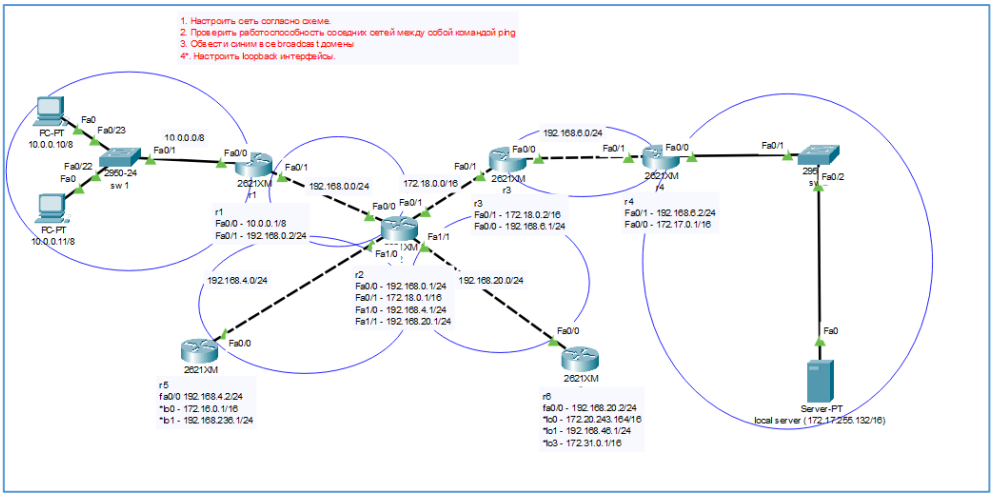
Задание 2: Проверить работоспособность соседних сетей между собой командой ping





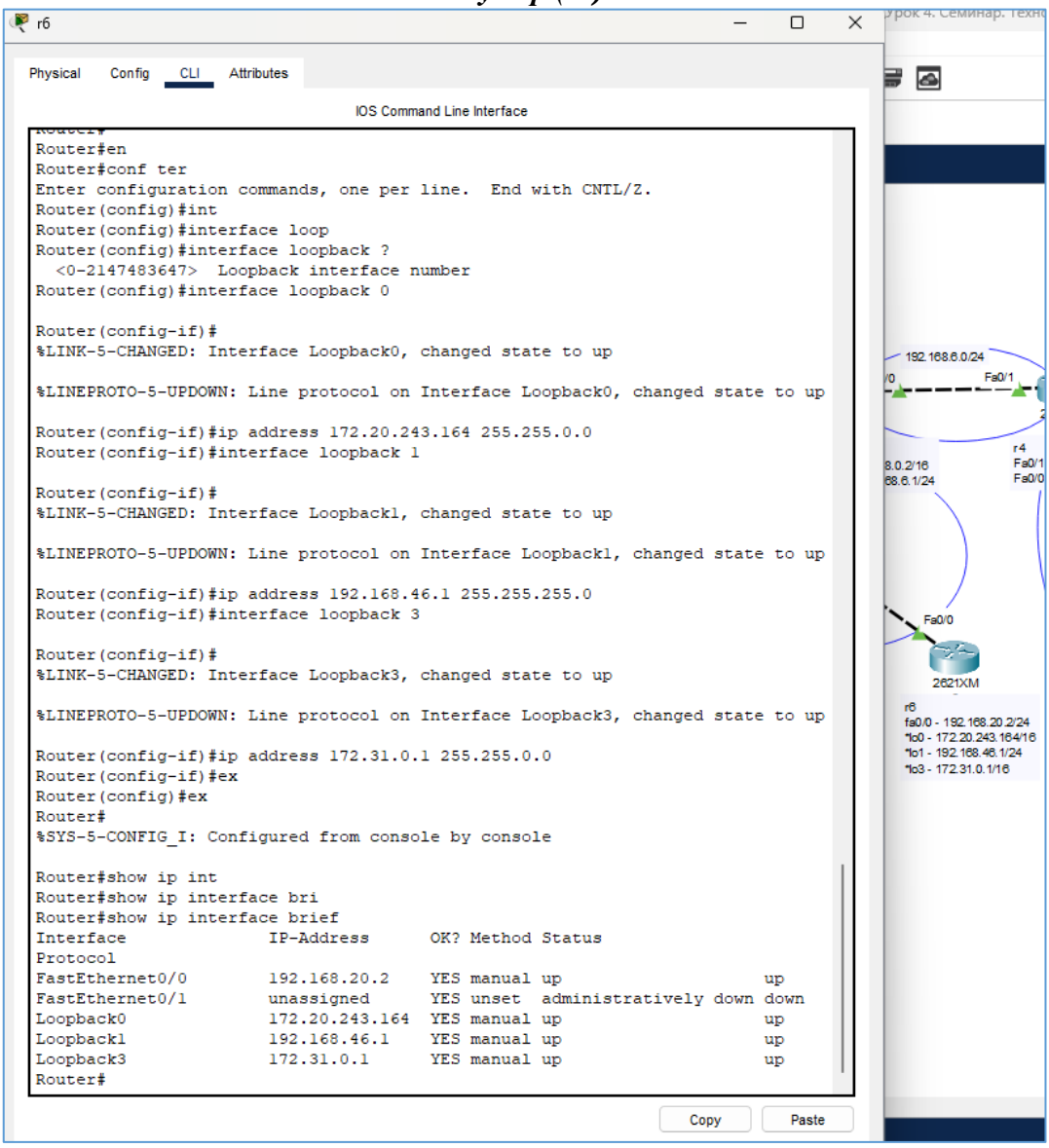


Задание 3: Обвести синим все broadcast домены

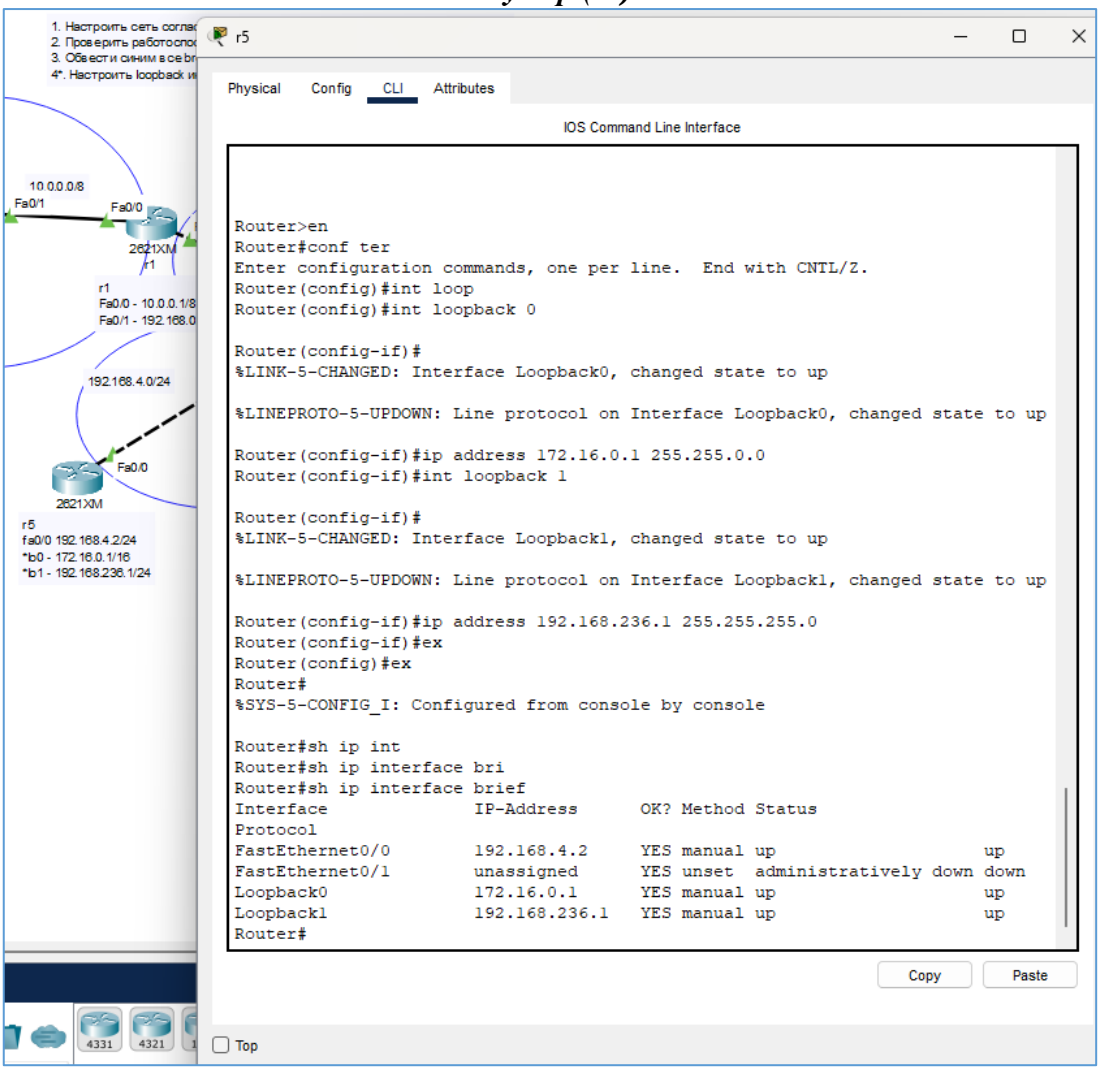


Задание 4: Настроить loopback-интерфейсы.*

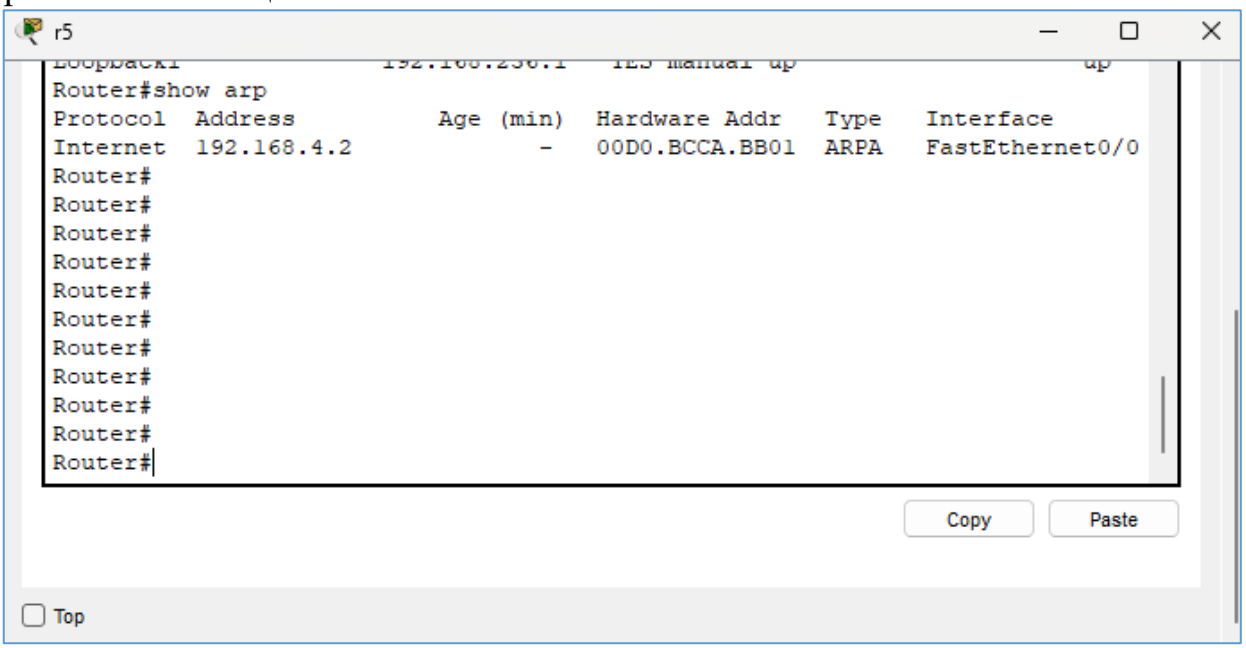
Роутер (r6)

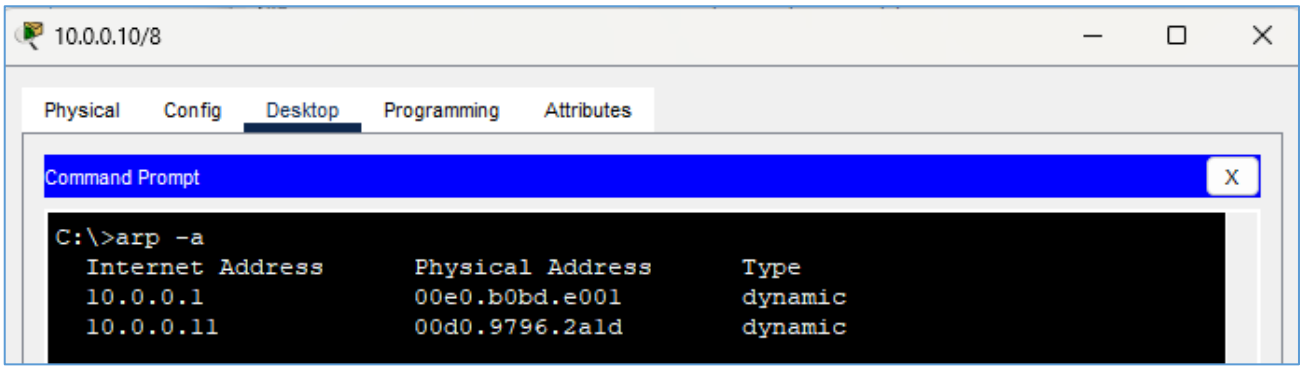


Роутер (r5)



Скриншоты таблицы ARP:





Ссылка на репозиторий:
https://github.com/olgashenkel/GeekBrains-specialization-ELECTIVES/tree/main/08.%20Computer%20networks