重庆交通大学信息科学与工程学院

实　　　验　　　报　　　告

班　　　　　级：　　　　　曙光 1901 班

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实验项目名称：　　计算机网络　　Cisco Packet Tracer 实验

实验项目性质：　　　　　　验证性

实验所属课程：　　　　计算机网络

实验室(中心)：　　　　计算中心三机房

指 导 教 师 ：　　　　　王勇

实验完成时间：　　2020　年　12　月　15　日

一、实验概述：

【实验目的】

1. 了解 CPT 软件使用
2. 掌握 VLSM、CIDR、RIP、OSPF、VLAN、STP、NAT 及 DHCP 等概念，以能够进行网络规划和配置。
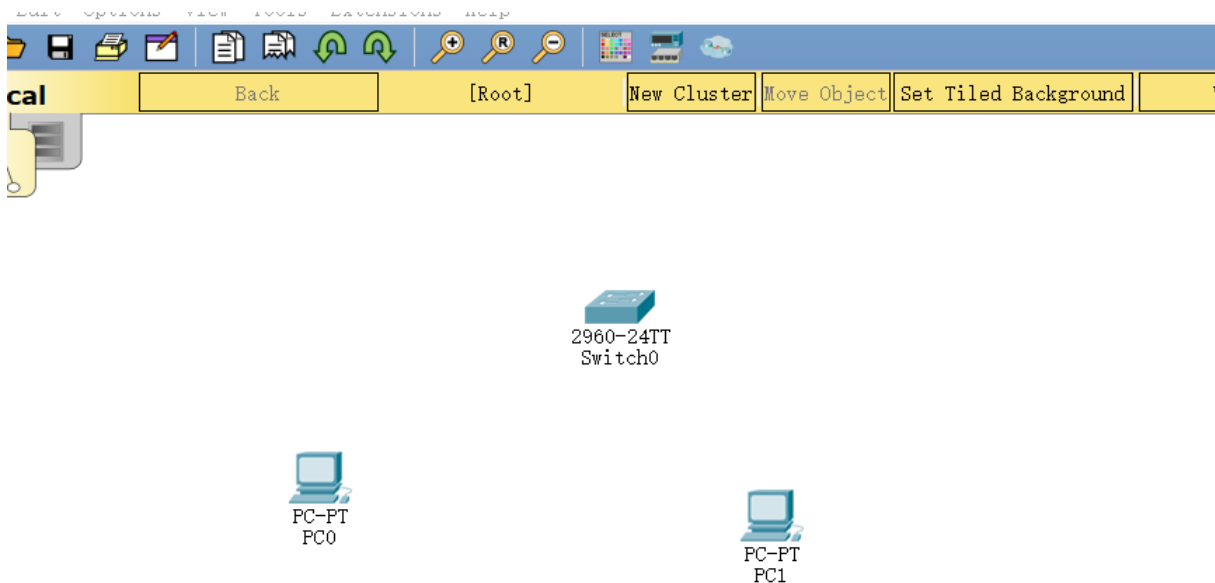3. 掌握

【实施环境】（使用的材料、设备、软件）

Windows 操作系统环境

二、实验内容

第 1 题 CPT 软件使用简介

【实验过程】（步骤、记录、数据、程序等）

第 2 题 直接连接两台 PC 构建 LAN

【实验过程】（步骤、记录、数据、程序等）
选择一个交换机和两个终端设备

2960-24TT
Switch0

PC-PT
PC0

PC-PT
PC1

Time: 00:17:55   Power Cycle Devices Fast Forward Time

Copper Cross-Over

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

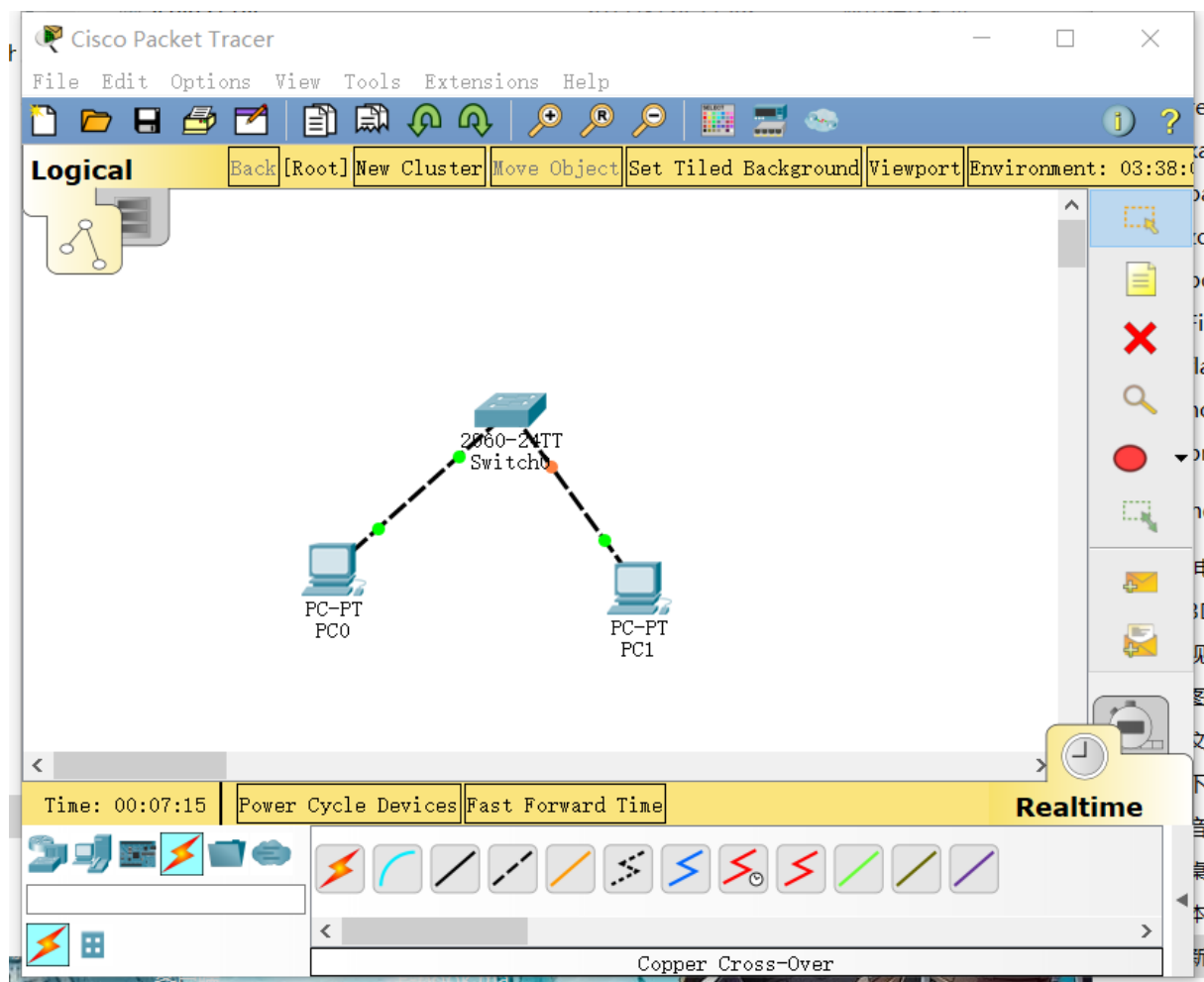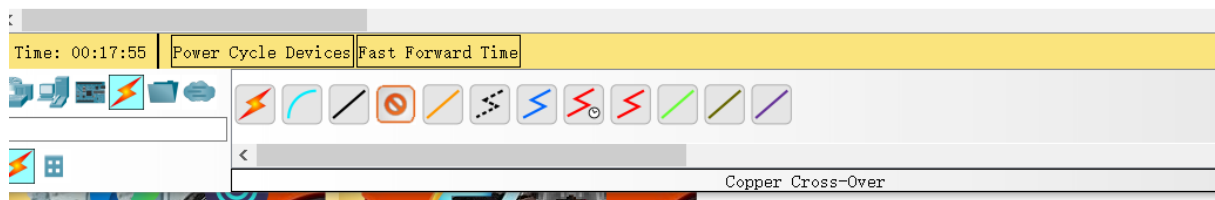Logical   Back [Root] New Cluster Move Object Set Tiled Background Viewport Environment: 03:38:0

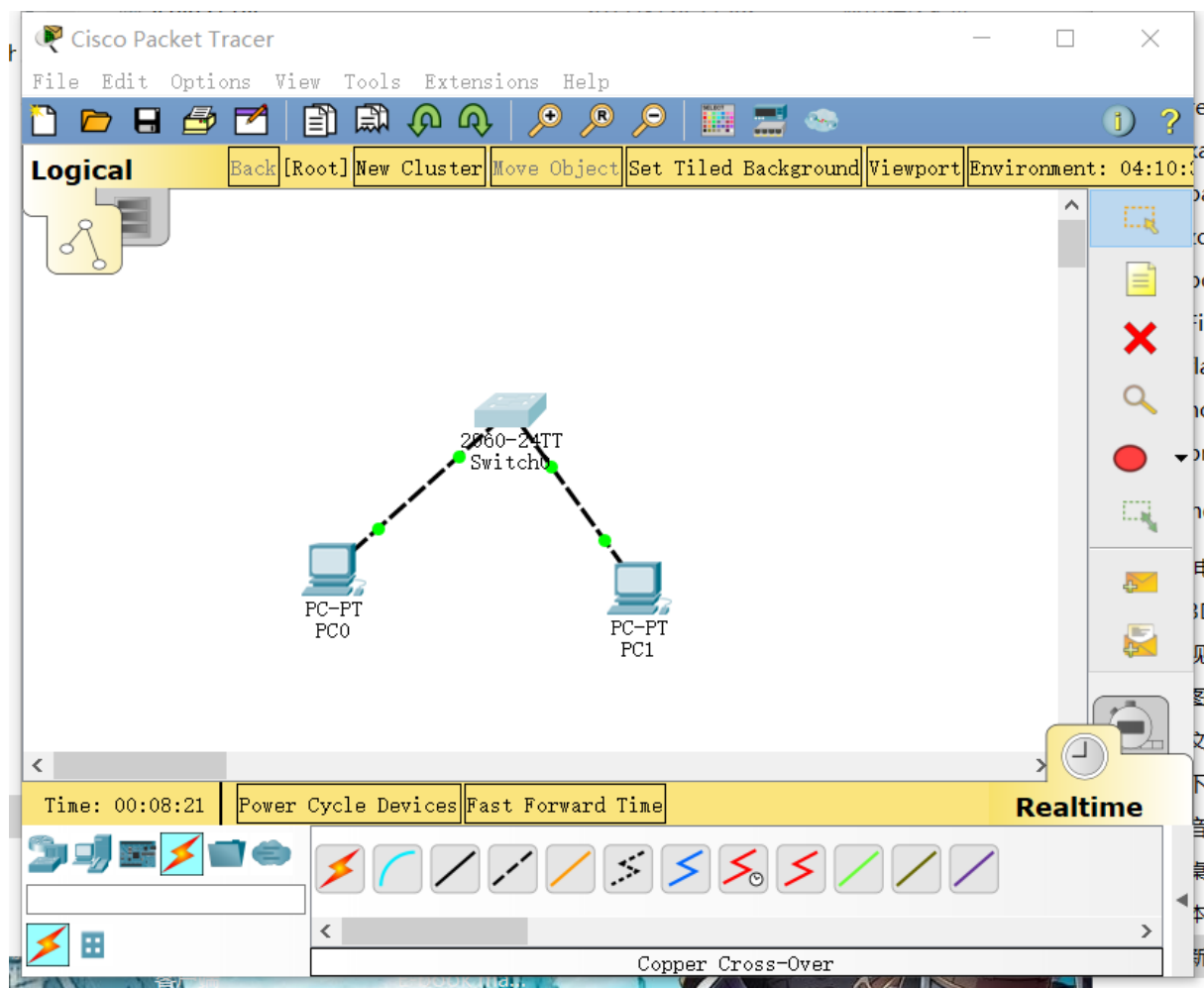2960-24TT
Switch0

PC-PT
PC0

PC-PT
PC1

Time: 00:07:15   Power Cycle Devices Fast Forward Time   Realtime

Copper Cross-Over

0   1   ip

PC1

Physical | Config | Desktop | Programming | Attributes

IP Configuration   X

Interface   FastEthernet0

IP Configuration

○ DHCP   ● Static

IPv4 Address   192.168.1.102

Subnet Mask   255.255.255.0

Default Gateway   0.0.0.0

DNS Server   0.0.0.0

IPv6 Configuration

○ Automatic   ● Static

IPv6 Address

Link Local Address   FE80::201:63FF:FE23:C68

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication   MD5

Username

Password

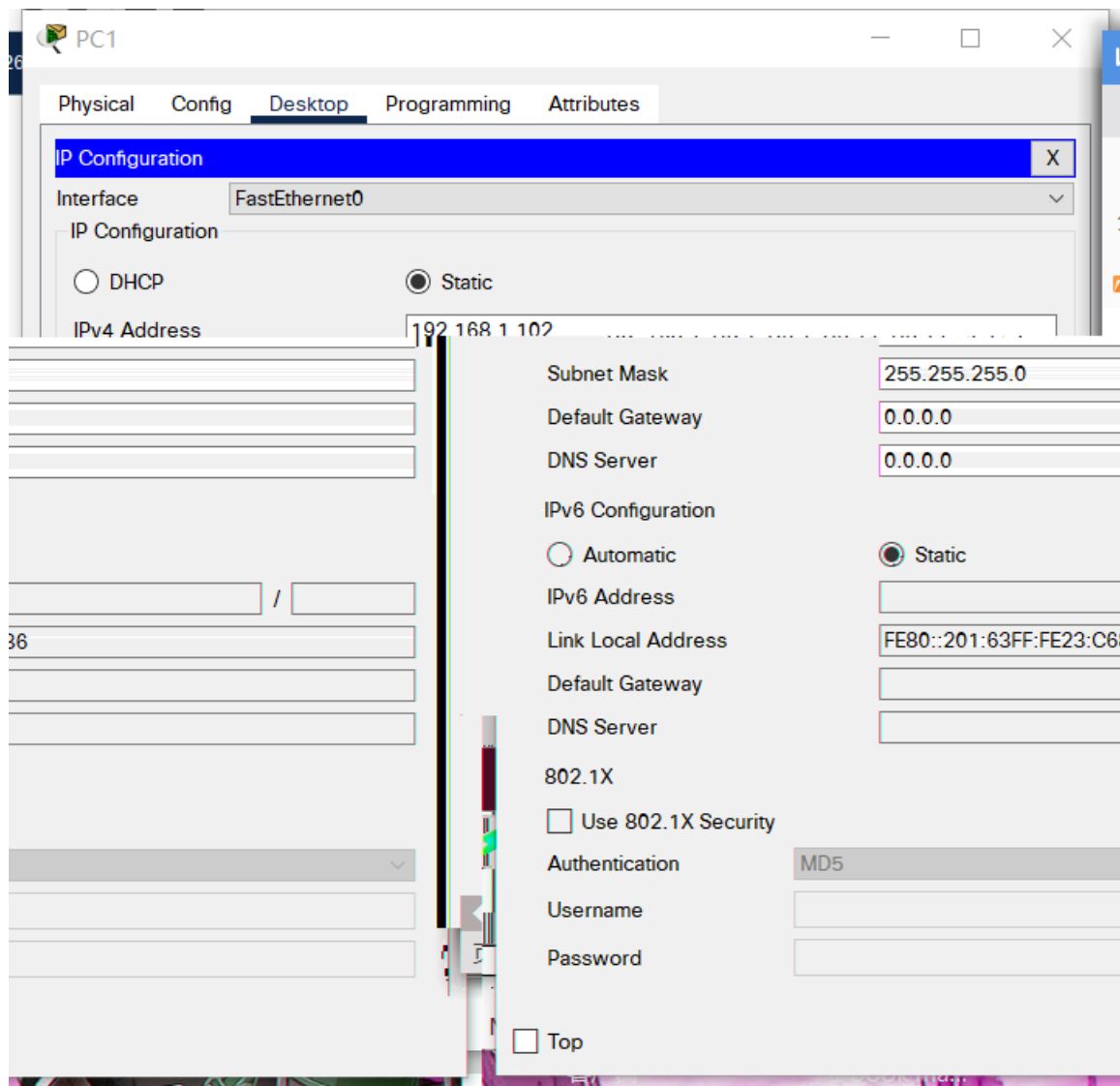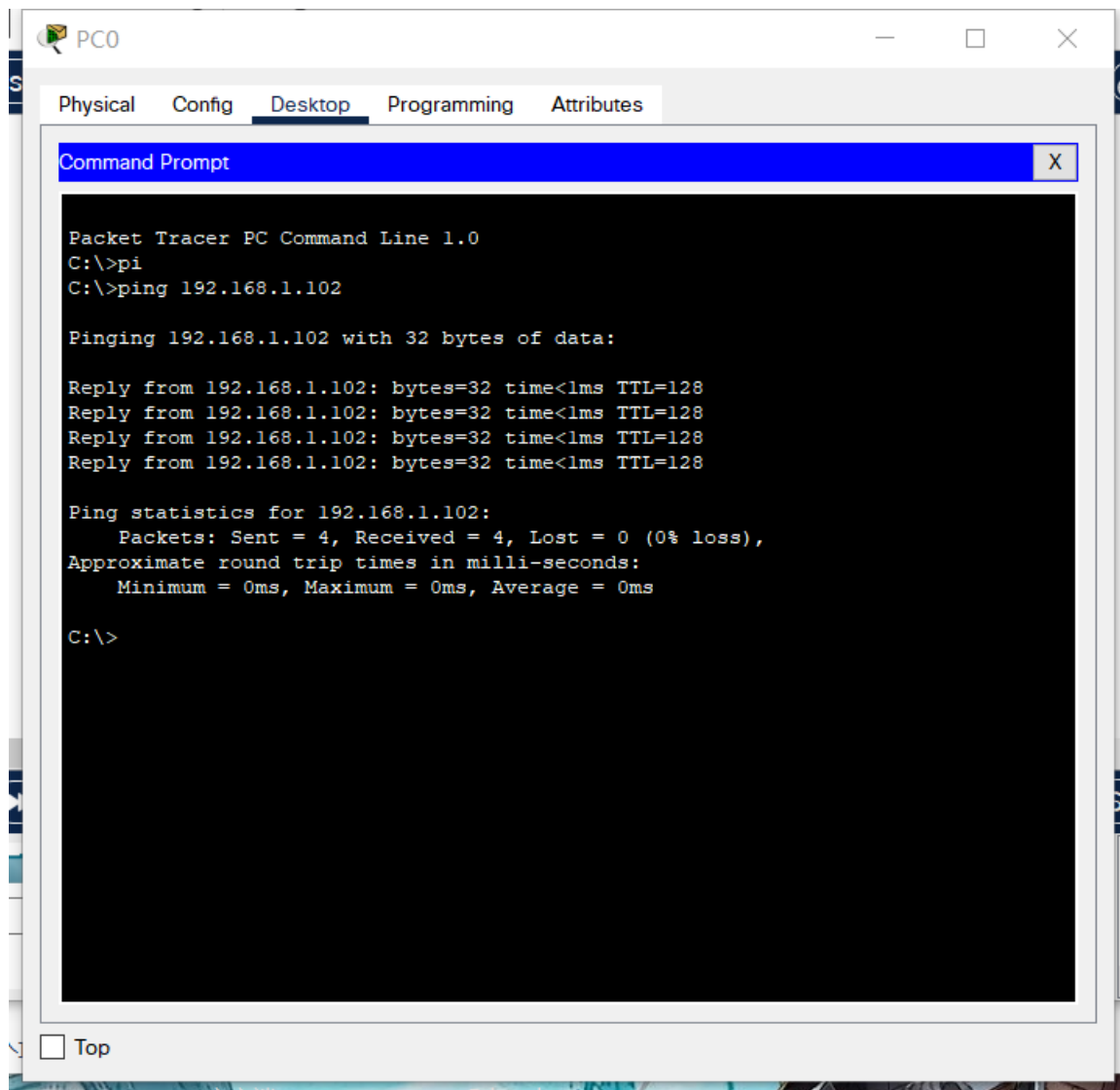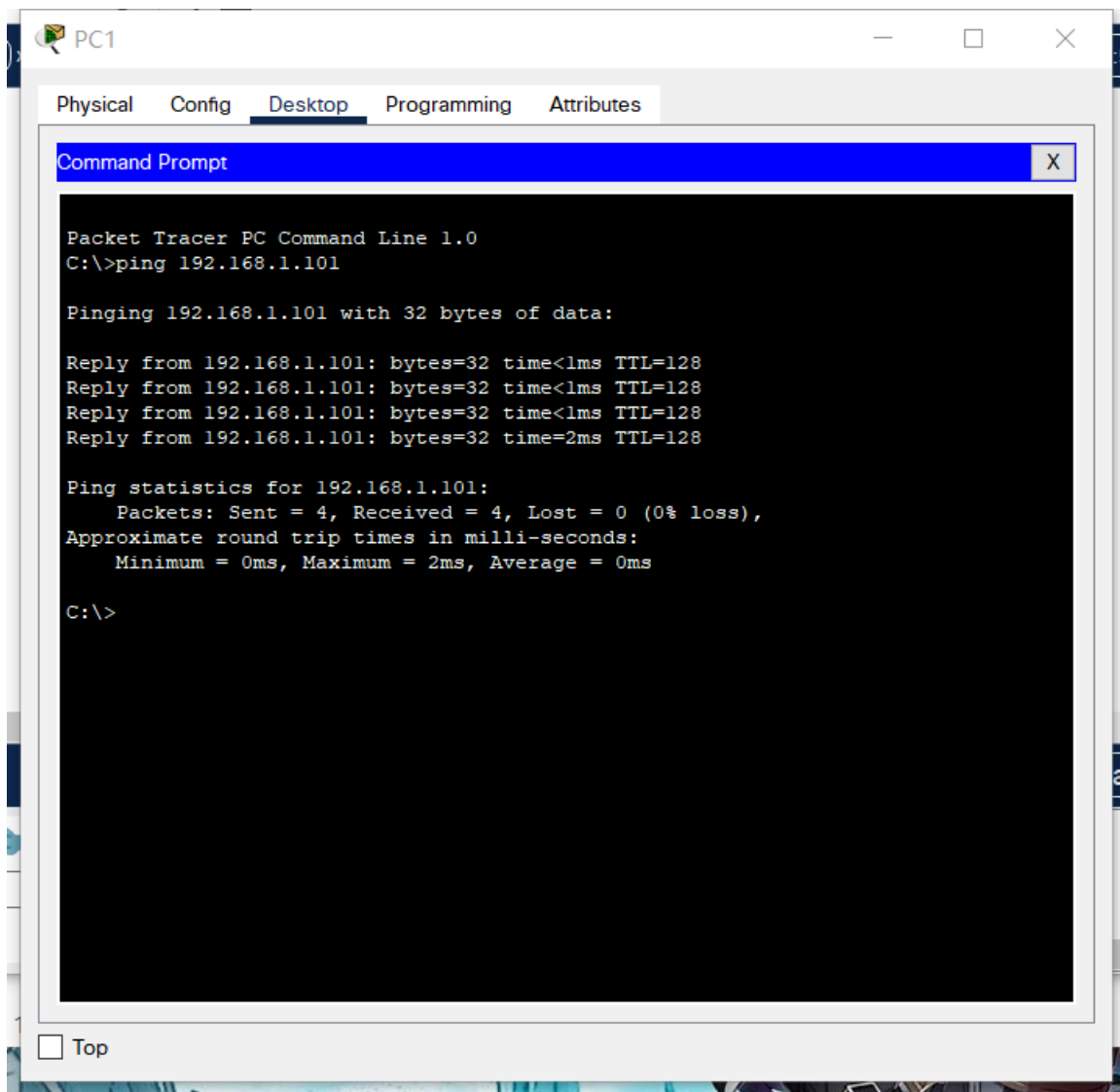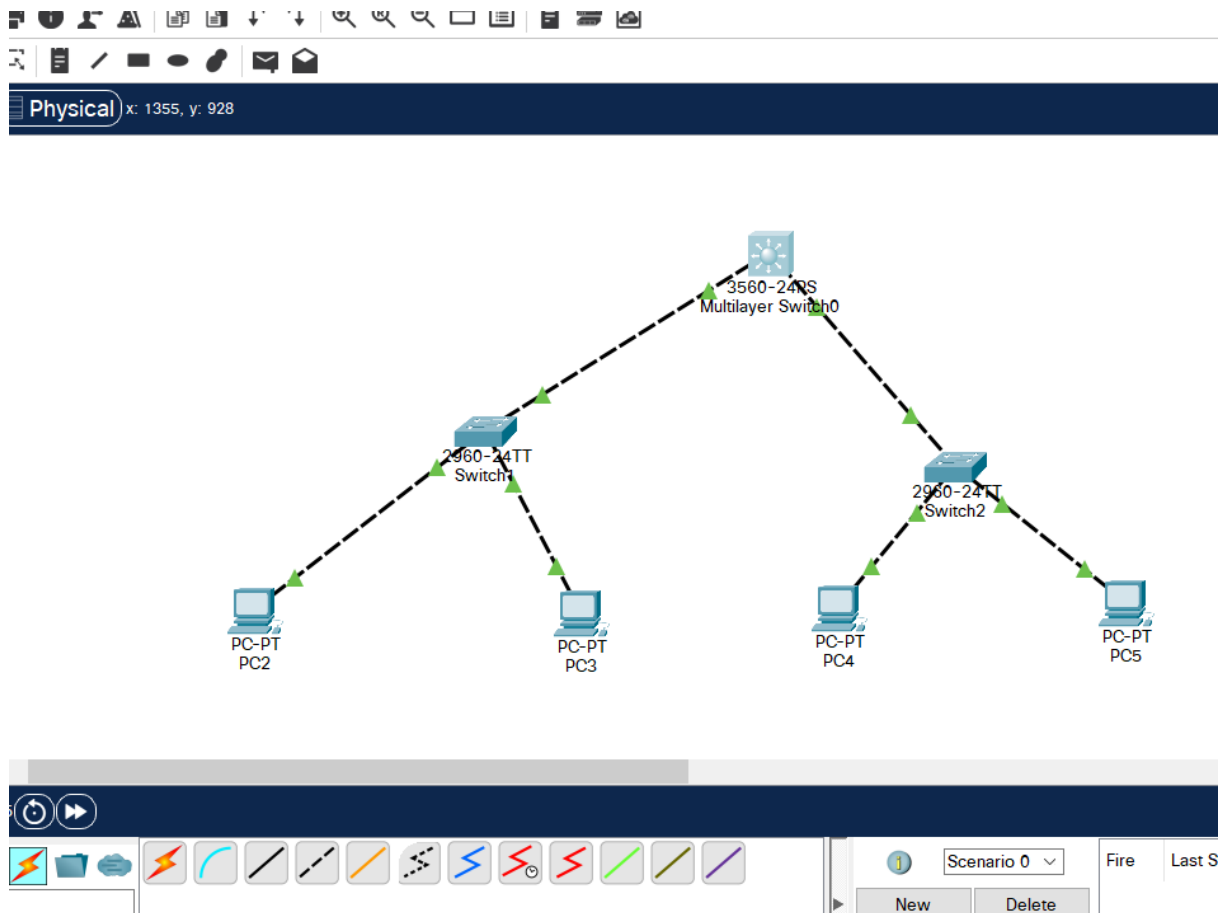☐ Top

0   ping1

1 ping0

第3题 用交换机构建 LAN

【实验过程】（步骤、记录、数据、程序等）

✎ 问题

PC0 能否 ping 通 PC1、PC2、PC3 ？

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>192.168.2.2
Invalid Command.

C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Pc1   ping   pc2,pc3   ping

PC3 能否 ping 通 PC0、PC1、PC2 ？为什么？

Pc2 能 ping 通,pc0,pc1 不能   pc3 与 pc2 网络号相同,与 pc0 pc1 的网络号不相同,不是同一个子网

将 4 台 PC 的掩码都改为 255.255.0.0 ，它们相互能 ping 通吗？为什么？

能相互 ping 通 因为最顶层是三层交换机,含有路由功能,255.255.0.0 为掩码时
4 台 pc 的网络号都相同 192.168.0.0 /16

使用二层交换机连接的网络需要配置网关吗？为什么？
不需要

交换机接口地址列表

MAC Table for Switch1

VLAN	Mac Address	Port
1	0001.C7B8.6B91	FastEthernet0/2
1	0007.EC8E.9B19	FastEthernet0/2
1	0090.2B92.66E2	FastEthernet0/1

第 4 题 生成树协议（Spanning Tree Protocol）

【实验过程】（步骤、记录、数据、程序等）
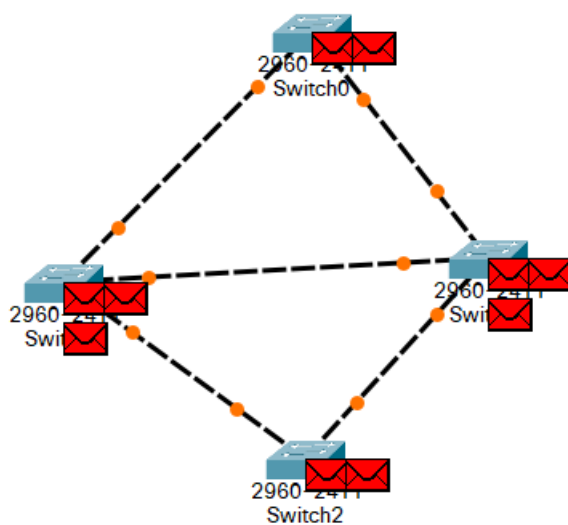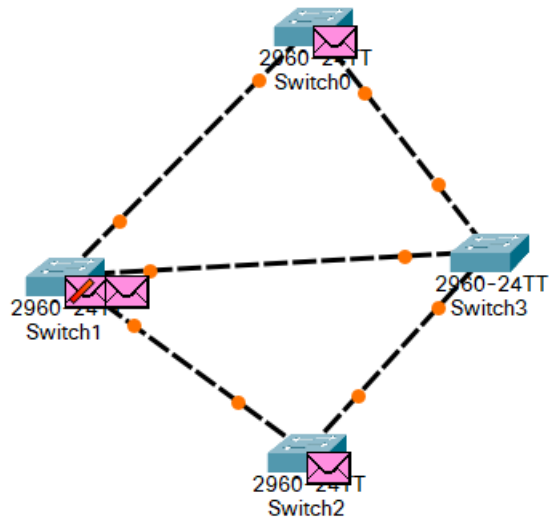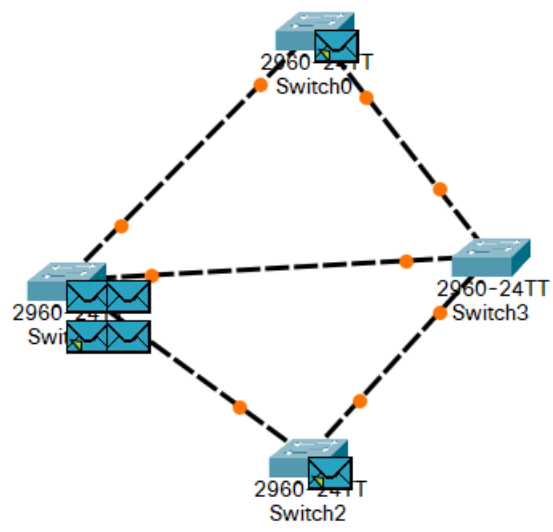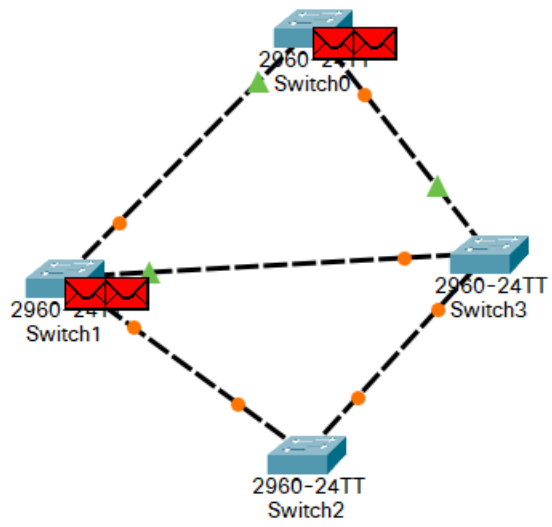
switch2
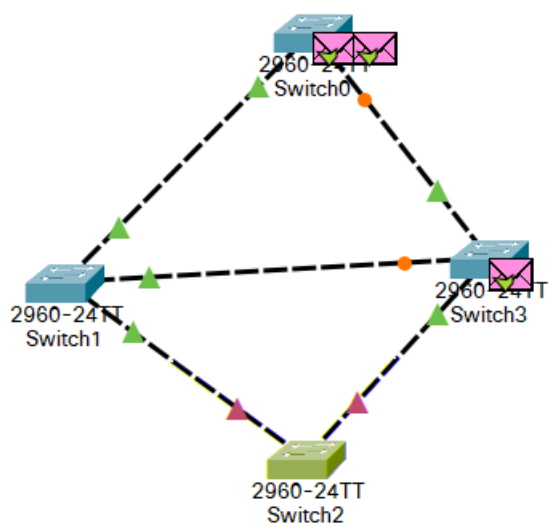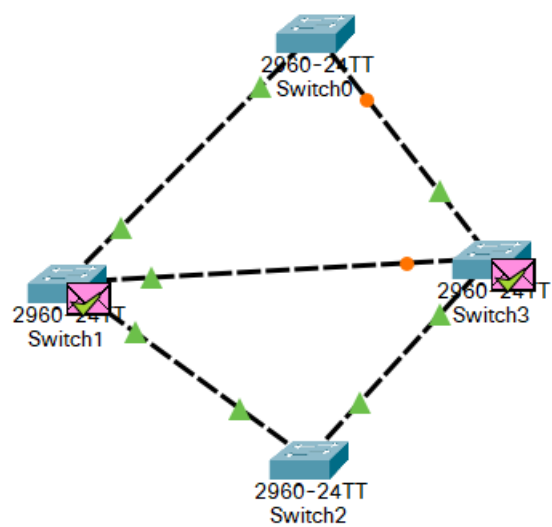
第 5 题 路由器配置初步

【实验过程】（步骤、记录、数据、程序等）
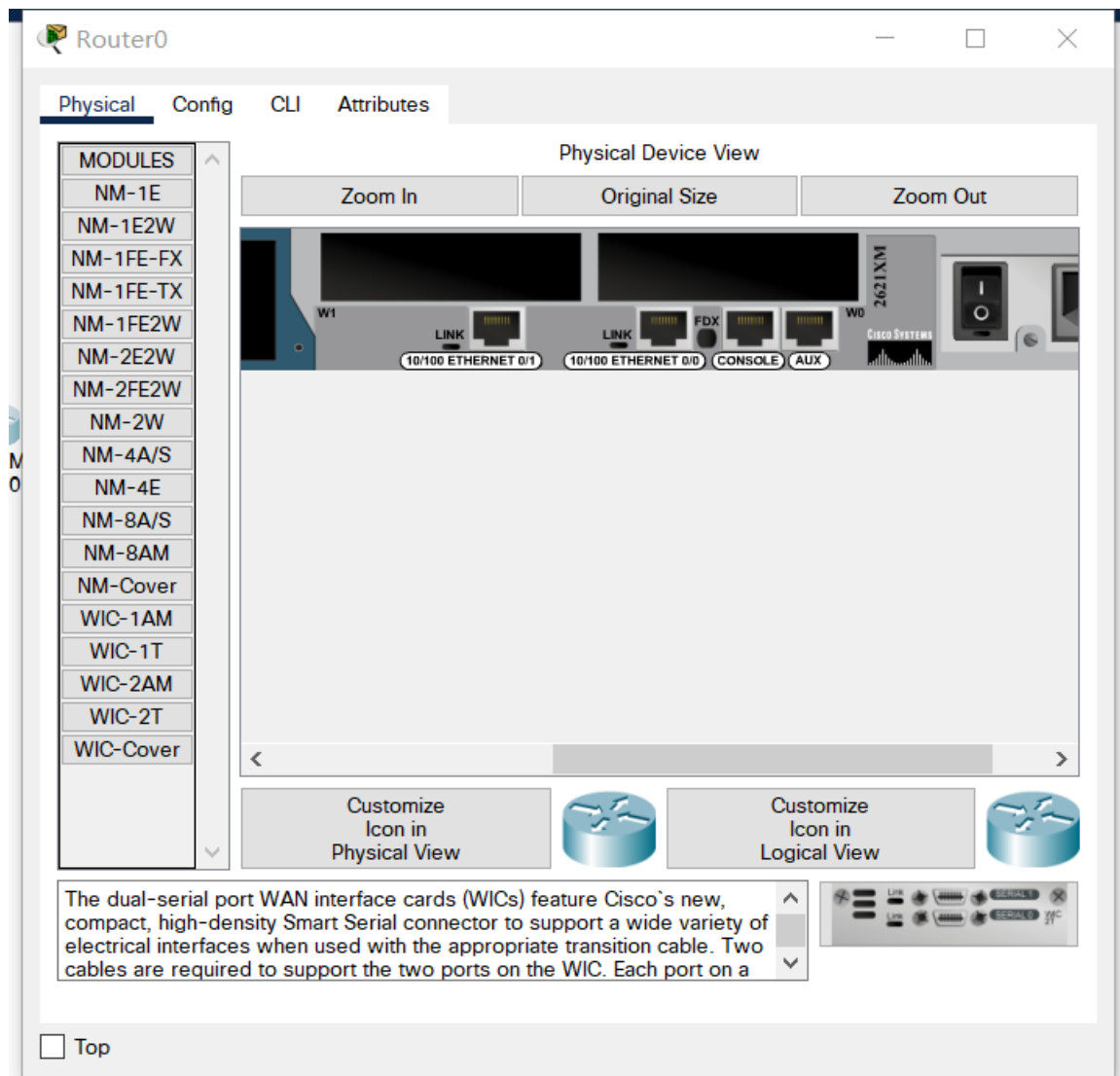
wic 2t
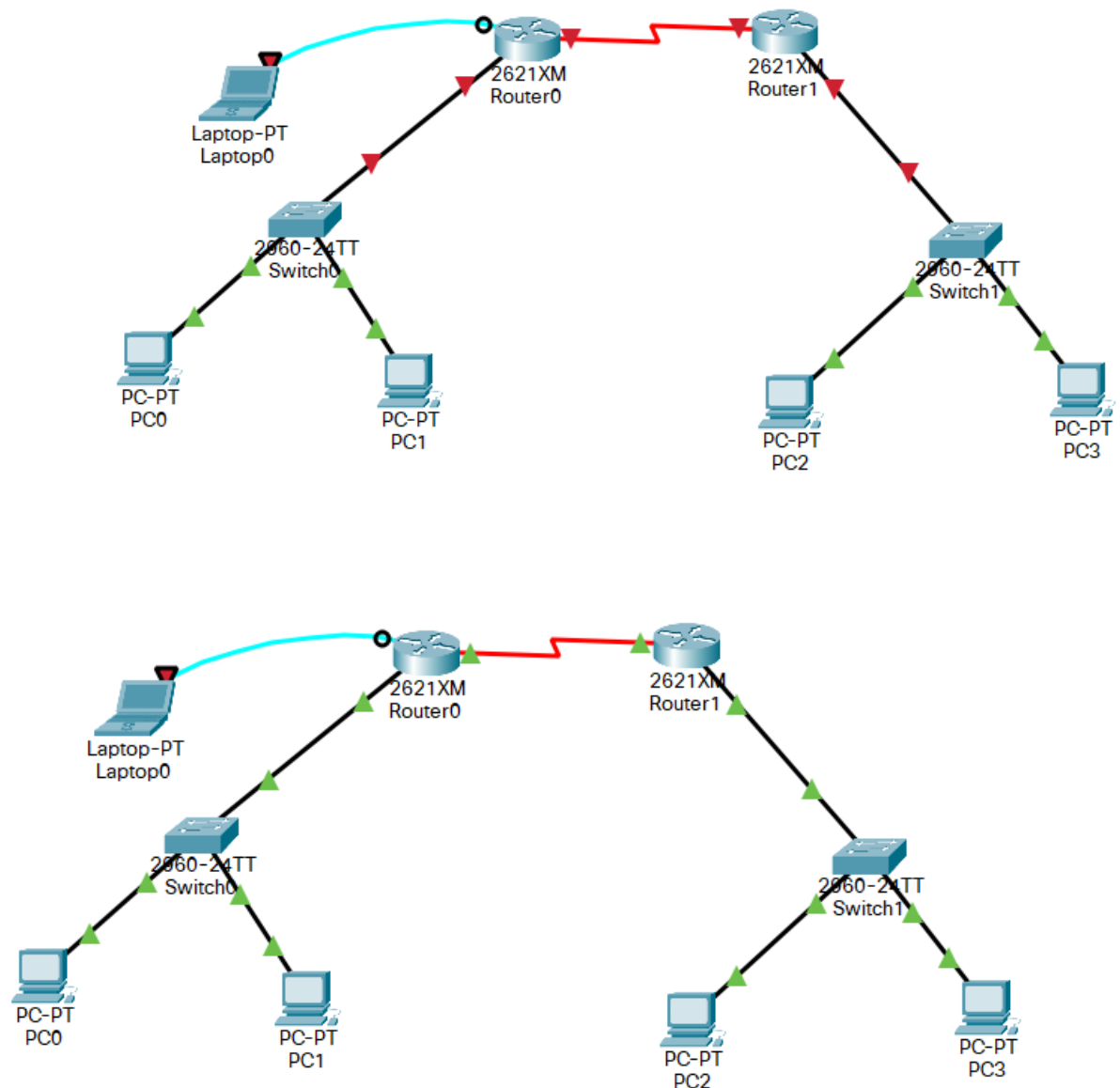
第 6 题 静态路由

【实验过程】（步骤、记录、数据、程序等）

交通大学路由器静态路由配置：

```
Router>en     //          进      权
Router#conf t    // 进
Router(config)#ip route 192.168.3.0 255.255.255.0 192.168.2.2    //  诉                    192.168.3.0 这     络
192.168.2.2
Router(config)#exit    //        权
Router#show ip route     //查
```

```
Router>en
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 192.168.3.0 255.255.255.0 192.168.2.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Ctrl+F6 to exit CLI focus   Copy   Paste

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0
S    192.168.3.0/24 [1/0] via 192.168.2.2

Router>
```
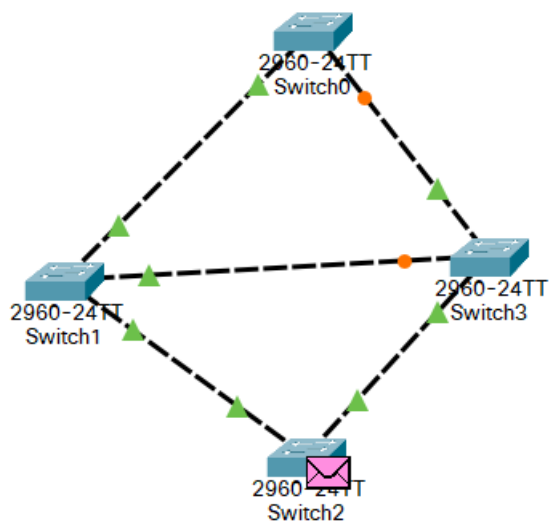
重庆大学路由器静态路由配置：

```
Router>en    //      进    权
Router#conf t    // 进
Router(config)#ip route 192.168.1.0 255.255.255.0 192.168.2.1    //   诉 庆              192.168.1.0 这    络
192.168.2.1
Router(config)#exit    //      权
Router#show ip route    //查
```
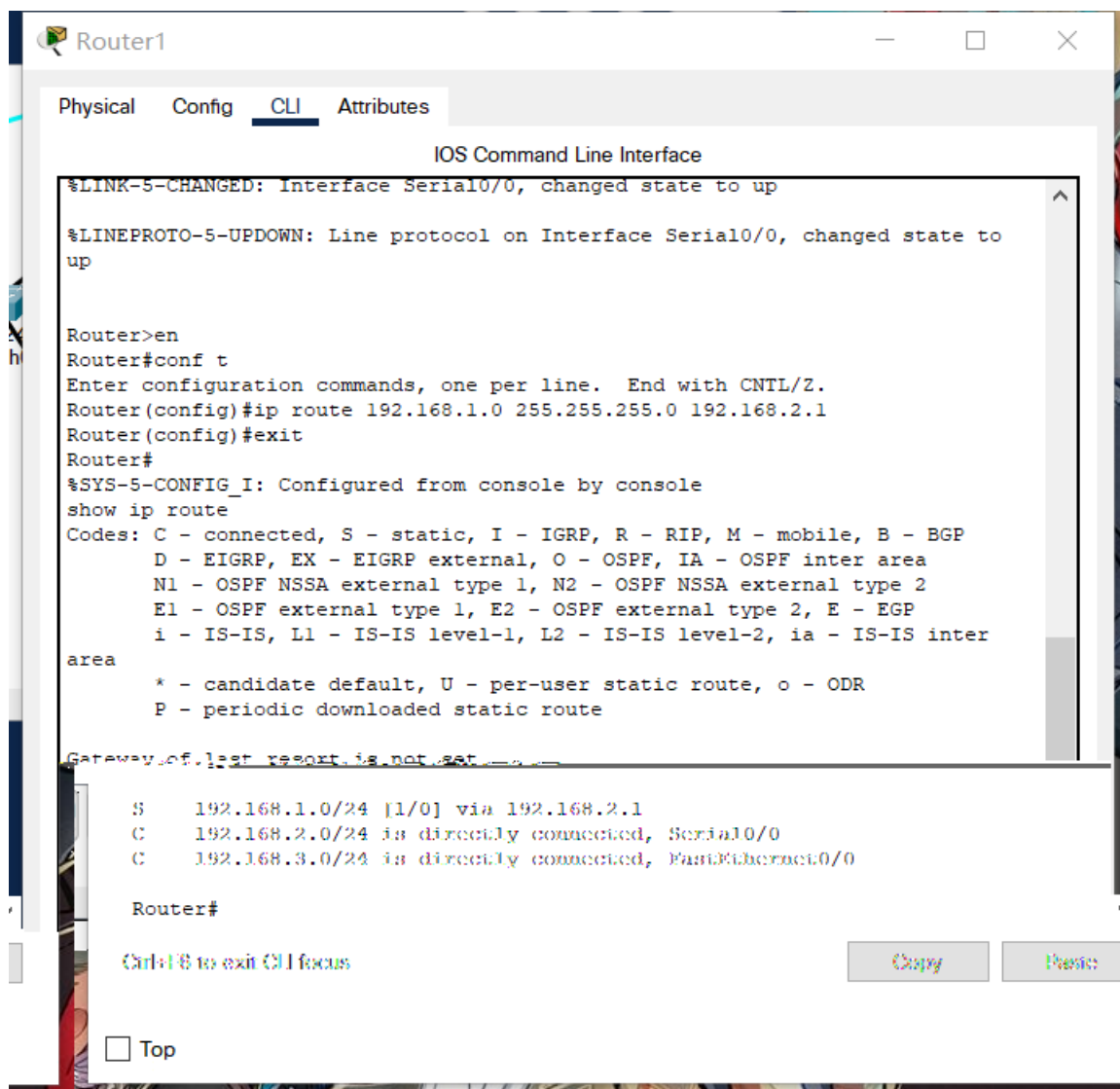
们　　　拟　3　络　　现实　　　连　　络　　　　们还

则　　络　　　　　们　　　虑

Router(config)#ip route 0.0.0.0 0.0.0.0 *.*.*.* //　　　　转发给 *.*.*.* 这　IP

第 7 题 动态路由 RIP

【实验过程】（步骤、记录、数据、程序等）

态

1. 　　闭　　　电

　　　　　　　IP

2. 　　no　　　　　态　　　　　　　　　　　　　　　no ip

route 192.168.3.0 255.255.255.0 192.168.2.2　　庆　　　　　　no ip route

192.168.1.0 255.255.255.0 192.168.2.1　　　　　　no　　刚

态　　　给

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set
```

Ctrl+F6 to exit CLI focus　　　　　　Copy　　　Paste

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#no ip route 192.168.1.0 255.255.255.0 192.168.2.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Ctrl+F6 to exit CLI focus　　　　　　Copy　　　Paste

RIP

Router>en　//　　　进　权

```
Router#conf t    // 进
Router(config)#router rip    //        RIP        协议        router
Router(config-router)#network 192.168.1.0    //    络 192.168.1.0        连
Router(config-router)#network 192.168.2.0    //    络 192.168.2.0        连
Router(config-router)#^z    //              权
Router#show ip route    //查
```

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0
R    192.168.3.0/24 [120/1] via 192.168.2.2, 00:00:14, Serial0/0
```

庆   RIP

```
Router>en    //              进    权
Router#conf t    // 进
Router(config)#router rip    //        RIP        协议        router
Router(config-router)#network 192.168.3.0    //    络 192.168.3.0        连
Router(config-router)#network 192.168.2.0    //    络 192.168.2.0        连
Router(config-router)#^z    //              权
Router#show ip route    //查
```

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.1.0/24 [120/1] via 192.168.2.1, 00:00:05, Serial0/0
C    192.168.2.0/24 is directly connected, Serial0/0
C    192.168.3.0/24 is directly connected, FastEthernet0/0

Router>
```

第 8 题 动态路由 OSPF

【实验过程】（步骤、记录、数据、程序等）

使用 no 命令清除 RIP 路由。在全局配置模式下，各路由器都使用：no router rip 命令进行清除

OSPF

```
Router>en    //        进   权
Router#conf t    // 进
Router(config)#router ospf 1    //        OSPF        协议   进    为 1    暂        进
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0    //        0            192.168.1.0/24    络                码
    OSPF
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0    //        0            192.168.2.0/24    络                码
    OSPF
Router(config-router)#^z    //            权
Router#show ip route    //查
```

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0
O    192.168.3.0/24 [110/65] via 192.168.2.2, 00:01:21, Serial0/0

Router>
```

庆   OSPF

```
Router>en    //        进   权
Router#conf t    // 进
Router(config)#router ospf 1    //        OSPF        协议   进    为 1
Router(config-router)#network 192.168.3.0 0.0.0.255 area 0    //        0            192.168.3.0/24    络                码
    OSPF
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0    //        0            192.168.2.0/24    络                码
    OSPF
Router(config-router)#^z    //            权
Router#show ip route    //查
```

```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS int
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

O    192.168.1.0/24 [110/65] via 192.168.2.1, 00:00:25, Serial0/0
C    192.168.2.0/24 is directly connected, Serial0/0
C    192.168.3.0/24 is directly connected, FastEthernet0/0

Router#
```

第 9 题 基于端口的网络地址翻译 PAT

【实验过程】（步骤、记录、数据、程序等）

们　　　庆　　　庆　　　　　　　进　PAT 实验　　们　　　证

　　　　　经　　　　　论　态　还　动态　　　们给

过　设　这　　　　　OSPF 协议　拟　　　　　IP

192.168.1.0/24　　拟　庆　　　IP　　8.8.8.0/24

间　　IP　202.202.240.0/24　　　　　　实　PAT

图　PC

节		IP		码	
	PC0	192.168.1.2	255.255.255.0	192.168.1.1
	PC1	192.168.1.3	255.255.255.0	192.168.1.1
庆	PC2	8.8.8.2	255.255.255.0	8.8.8.1
庆	PC3	8.8.8.3	255.255.255.0	8.8.8.1

```
Router>en    //        进    权
Router#conf t    // 进
Router(config)#int f0/0    // 进
```

```
Router(config-if)#ip address 192.168.1.1 255.255.255.0    //        IP
Router(config-if)#no shutdown    //
```

```
Router>en    //           进    权
Router#conf t    // 进
Router(config)#int s0/0    // 进
Router(config-if)#ip address 202.202.240.1 255.255.255.0    //        IP
Router(config-if)#clock rate 64000    //    为 DCE         时钟频
Router(config-if)#no shutdown    //
```

庆

```
Router>en    //           进    权
Router#conf t    // 进
Router(config)#int f0/0    // 进
Router(config-if)#ip address 8.8.8.1 255.255.255.0    //        IP
Router(config-if)#no shutdown    //
```

```
Router>en    //           进    权
Router#conf t    // 进
Router(config)#int s0/0    // 进
Router(config-if)#ip address 202.202.240.2 255.255.255.0    //        IP
Router(config-if)#no shutdown    //
```

OSPF

```
Router>en    //           进    权
Router#conf t    // 进
Router(config)#router ospf 1    //        OSPF      协议  进    为 1    暂        进
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0    //        0              192.168.1.0/24    络                        码
    OSPF
Router(config-router)#network 202.202.240.0 0.0.0.255 area 0    /
```

Ping

Internet   /

IP   ACL

IP


```
Router>en
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#access-list 1 deny 192.168.1.0 0.0.0.255
Router(config)#access-list 1 permit any
Router(config)#int s0/0
Router(config-if)#ip access-group 1 in
Router(config-if)#exit
Router(config)#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

Router>en   //   进   权

Router#conf t   // 进

Router(config)#access-list 1 deny 192.168.1.0 0.0.0.255   // 创   ACL 1   丢   /   转发   192.168.1.0/24   络

Router(config)#access-list 1 permit any   //   ACL 1   规则   转发   络

Router(config)#int s0/0 //					
Router(config-if)#ip access-group 1 in //	对进	实 ACL 1	规则 实际		
192.168.1.0/24 IP	丢				

此时，再使用交通大学内部的 **PC0（192.168.1.2）**来 **ping** 重庆大学的 **PC2（8.8.8.2）**就不成功了，会显示目的主机不可到达（**Destination host unreachable**）信息。

```
Physical    Config    Desktop    Programming    Attributes

Command Prompt                                                    X

Packet Tracer PC Command Line 1.0
C:\>ping 8.8.8.2

Pinging 8.8.8.2 with 32 bytes of data:

Reply from 202.202.240.2: Destination host unreachable.
Reply from 202.202.240.2: Destination host unreachable.
Reply from 202.202.240.2: Destination host unreachable.
Reply from 202.202.240.2: Destination host unreachable.

Ping statistics for 8.8.8.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

们　　　实　 **PAT**　　　们　　　　　　　　　　　　　　　　/　　 *IP*

转换为　　/　　 *IP*　　　　　 *IP* 发　　　变　　　庆　　　丢

络连

PAT

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

%LINK-5-CHANGED: Interface Serial0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to
up

00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 202.202.240.2 on Serial0/0 from
LOADING to FULL, Loading Done


Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#access-list 1 permit 192.168.1.0 0.0.0.255
Router(config)#ip nat inside source list 1 interface s0/0 overload
Router(config)#int f0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int s0/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

PC0   192.168.1.2   ping   PC2   8.8.8.2   OK

```
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 8.8.8.2

Pinging 8.8.8.2 with 32 bytes of data:

Reply from 202.202.240.2: Destination host unreachable.
Reply from 202.202.240.2: Destination host unreachable.
Reply from 202.202.240.2: Destination host unreachable.
Reply from 202.202.240.2: Destination host unreachable.

Ping statistics for 8.8.8.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 8.8.8.2

Pinging 8.8.8.2 with 32 bytes of data:

Request timed out.
Reply from 8.8.8.2: bytes=32 time=5ms TTL=126
Reply from 8.8.8.2: bytes=32 time=7ms TTL=126
Reply from 8.8.8.2: bytes=32 time=6ms TTL=126

Ping statistics for 8.8.8.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 7ms, Average = 6ms

C:\>
```

show ip nat translations

```
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip nat translations
Pro  Inside global      Inside local      Outside local     Outside global
icmp 202.202.240.1:5    192.168.1.2:5     8.8.8.2:5         8.8.8.2:5
icmp 202.202.240.1:6    192.168.1.2:6     8.8.8.2:6         8.8.8.2:6
icmp 202.202.240.1:7    192.168.1.2:7     8.8.8.2:7         8.8.8.2:7
icmp 202.202.240.1:8    192.168.1.2:8     8.8.8.2:8         8.8.8.2:8

Router#
```
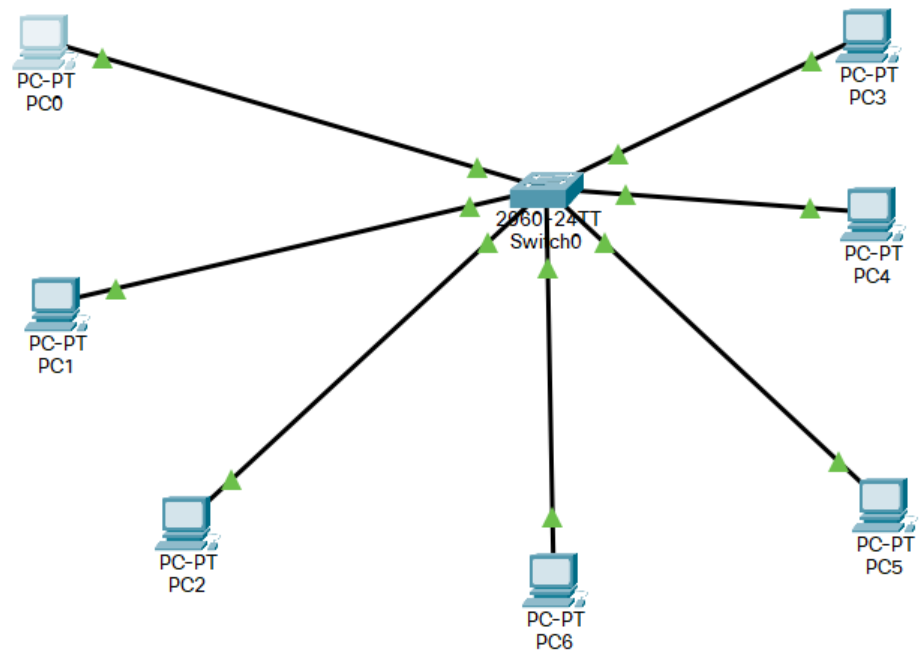
第 10 题 虚拟局域网 VLAN

【实验过程】（步骤、记录、数据、程序等）
VLAN（Virtual Local Area Network）即虚拟局域网。通过划分 VLAN，我们可以把一个物理网络划分为多个逻辑网段即多个子网。

划分 VLAN 后可以杜绝网络广播风暴，增强网络的安全性，便于进行统一管理等。

在 CPT 中构建如下图所示拓扑：

换   VLAN

```
Switch#conf t
Enter configuration commands, one per line.  End with CN
Switch(config)#
Switch(config)#vlan 10
Switch(config-vlan)#name computer
Switch(config-vlan)#exit
Switch(config)#int vlan 10
Switch(config-if)#ip address 192.168.0.1 255.255.255.0
Switch(config-if)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name communication
Switch(config-vlan)#exit
Switch(config)#int vlan 20
Switch(config-if)#ip addr 192.168.1.1 255.255.255.0
Switch(config-if)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name electronic
Switch(config-vlan)#exit
Switch(config)#int vlan 30
Switch(config-if)#ip add 192.168.2.1 255.255.255.0
Switch(config-if)#exit
Switch(config)#int range f0/1-8
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#exit
Switch(config)#int range f0/9-16
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#exit
Switch(config)#int range f0/17-24
```
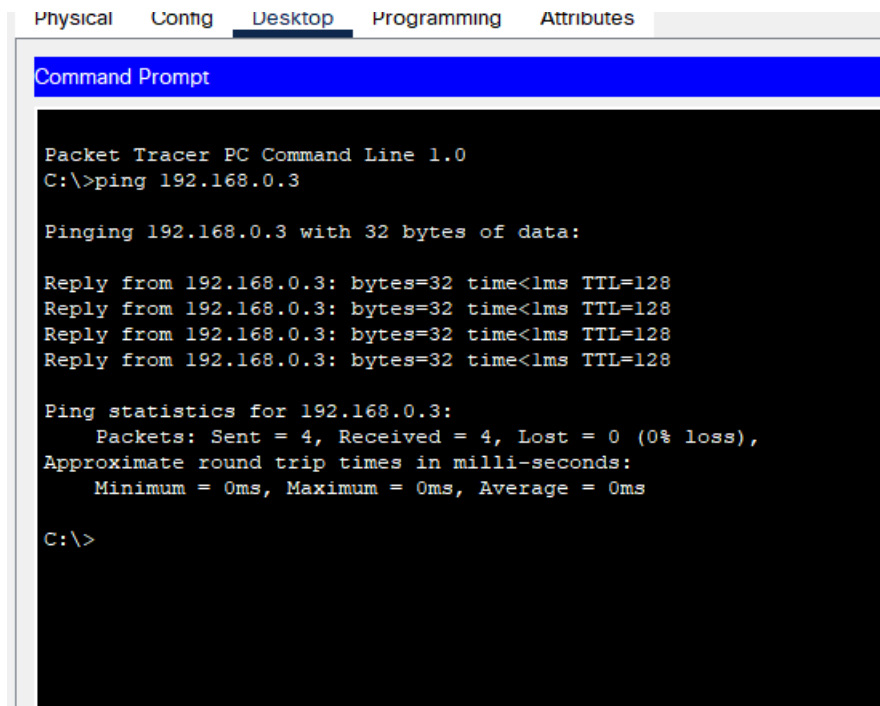
IOS Command Line Interface

```
Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- ---------
--------------------------------
1    default                          active    Gig0/1, Gig0/2
10   computer                         active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
20   communication                    active    Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15,
Fa0/16
30   electronic                       active    Fa0/17, Fa0/18, Fa0/19,
Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23,
Fa0/24
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------
------
1    enet  100001     1500  -      -      -        -    -        0     0
10   enet  100010     1500  -      -      -        -    -        0     0
20   enet  100020     1500  -      -      -        -    -        0     0
30   enet  100030     1500  -      -      -        -    -        0     0
1002 fddi  101002     1500  -      -      -        -    -        0     0
 --More--
```

Pc0 ping pc1

Pc0 ping pc6

VLAN　　　PC

VLAN

第 11 题 虚拟局域网管理 VTP

【实验过程】（步骤、记录、数据、程序等）
前一个实验我们在交换机上进行了 VLAN 的规划和划分。但在实际应用中，我们绝不允许在这些支持 VLAN 的交换机上进行随意的 VLAN 划分，如此将造成管理混乱！VLAN 的划分必须得到统一的规划和管理，这就需要 VTP 协议。
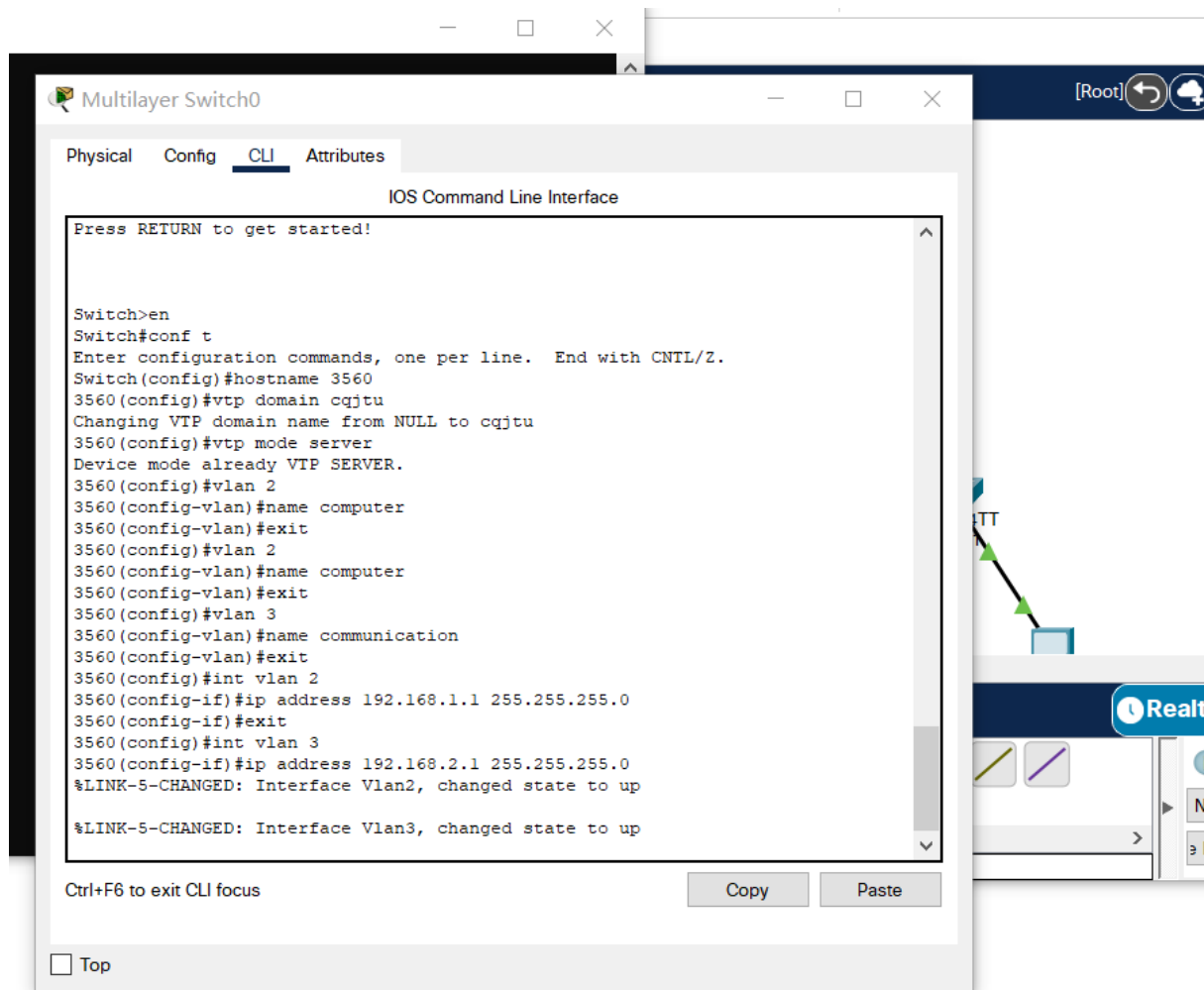
VTP（VLAN Trunk Protocol）即 VLAN 中继协议。VTP 通过 ISL 帧或 Cisco 私有 DTP 帧（可查阅相关资料了解）保持 VLAN 配置统一性，也被称为虚拟局域网干道协议，它是思科私有协议。 VTP 统一管理、增加、删除、调整 VLAN，自动地将信息向网络中其它的交换机广播。

此外，VTP 减小了那些可能导致安全问题的配置，只要在 VTP Server 做相应设置，VTP Client 会自动学习 VTP Server 上的 VLAN 信息。
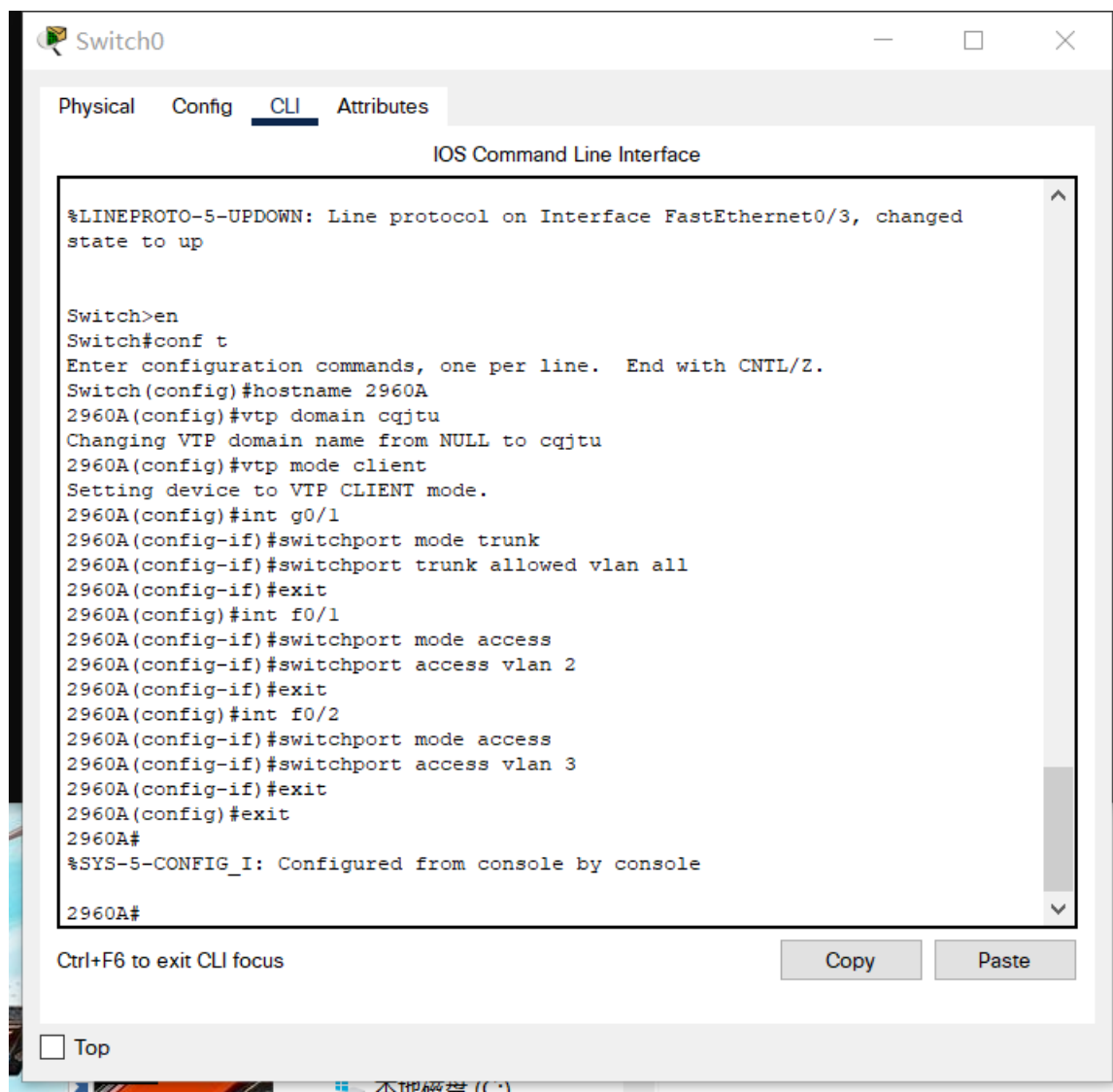
为演示 VTP，重新构建如下拓扑结构：
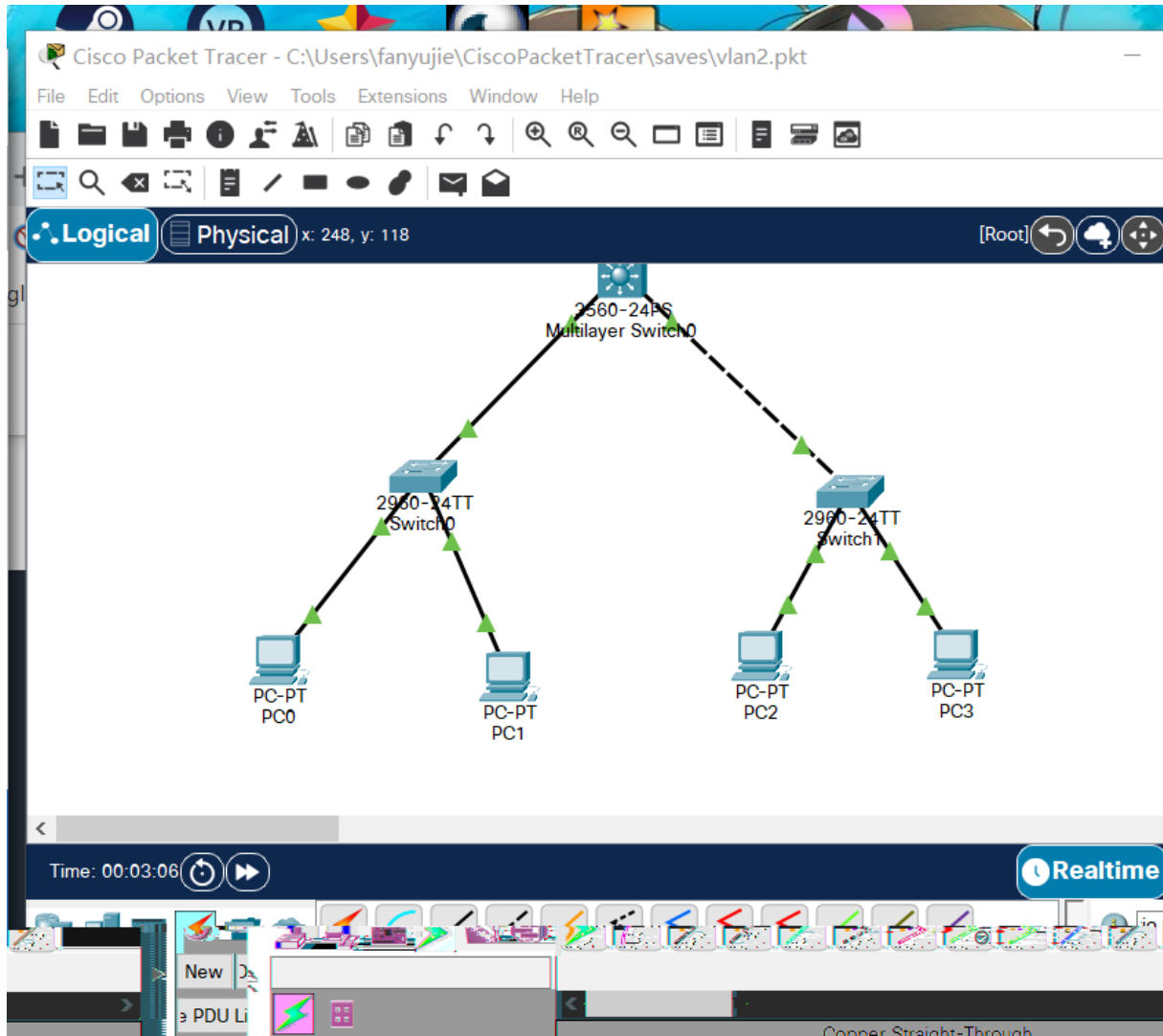
3560 VTP Server

2960A 边 VTP Client

```
Switch0                                          —    □    ×

Physical   Config   CLI   Attributes
                    IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up


Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname 2960A
2960A(config)#vtp domain cqjtu
Changing VTP domain name from NULL to cqjtu
2960A(config)#vtp mode client
Setting device to VTP CLIENT mode.
2960A(config)#int g0/1
2960A(config-if)#switchport mode trunk
2960A(config-if)#switchport trunk allowed vlan all
2960A(config-if)#exit
2960A(config)#int f0/1
2960A(config-if)#switchport mode access
2960A(config-if)#switchport access vlan 2
2960A(config-if)#exit
2960A(config)#int f0/2
2960A(config-if)#switchport mode access
2960A(config-if)#switchport access vlan 3
2960A(config-if)#exit
2960A(config)#exit
2960A#
%SYS-5-CONFIG_I: Configured from console by console

2960A#

Ctrl+F6 to exit CLI focus                    Copy      Paste

□ Top
```

2960B   边   VTP Client

PC 连   换   络

连 换		VLAN	IP		码	
PC0	2960A-F0/1	VLAN 2	192.168.1.2	255.255.255.0	192.168.1.1	
PC1	2960A-F0/2	VLAN 3	192.168.2.2	255.255.255.0	192.168.2.1	
PC2	2960B-F0/1	VLAN 2	192.168.1.3	255.255.255.0	192.168.1.1	
PC3	2960B-F0/2	VLAN 3	192.168.2.3	255.255.255.0	192.168.2.1	

VTP   VLAN   ping   VLAN   换   PC0   PC1   够
统   规

使用 show vlan 命令查看 VLAN 状态：

```
Multilayer Switch0                                    —    □    ✕

Physical    Config    CLI    Attributes

                    IOS Command Line Interface

VLAN Name                             Status    Ports
---- -------------------------------- ---------
--------------------------------
1    default                          active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13,
Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17,
Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21,
Fa0/22
                                                Fa0/23, Fa0/24, Gig0/1,
Gig0/2
2    computer                         active
3    communication                    active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------
------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
 --More--

Ctrl+F6 to exit CLI focus                         Copy         Paste


□ Top
                        Automatically Choose Connection Type
```
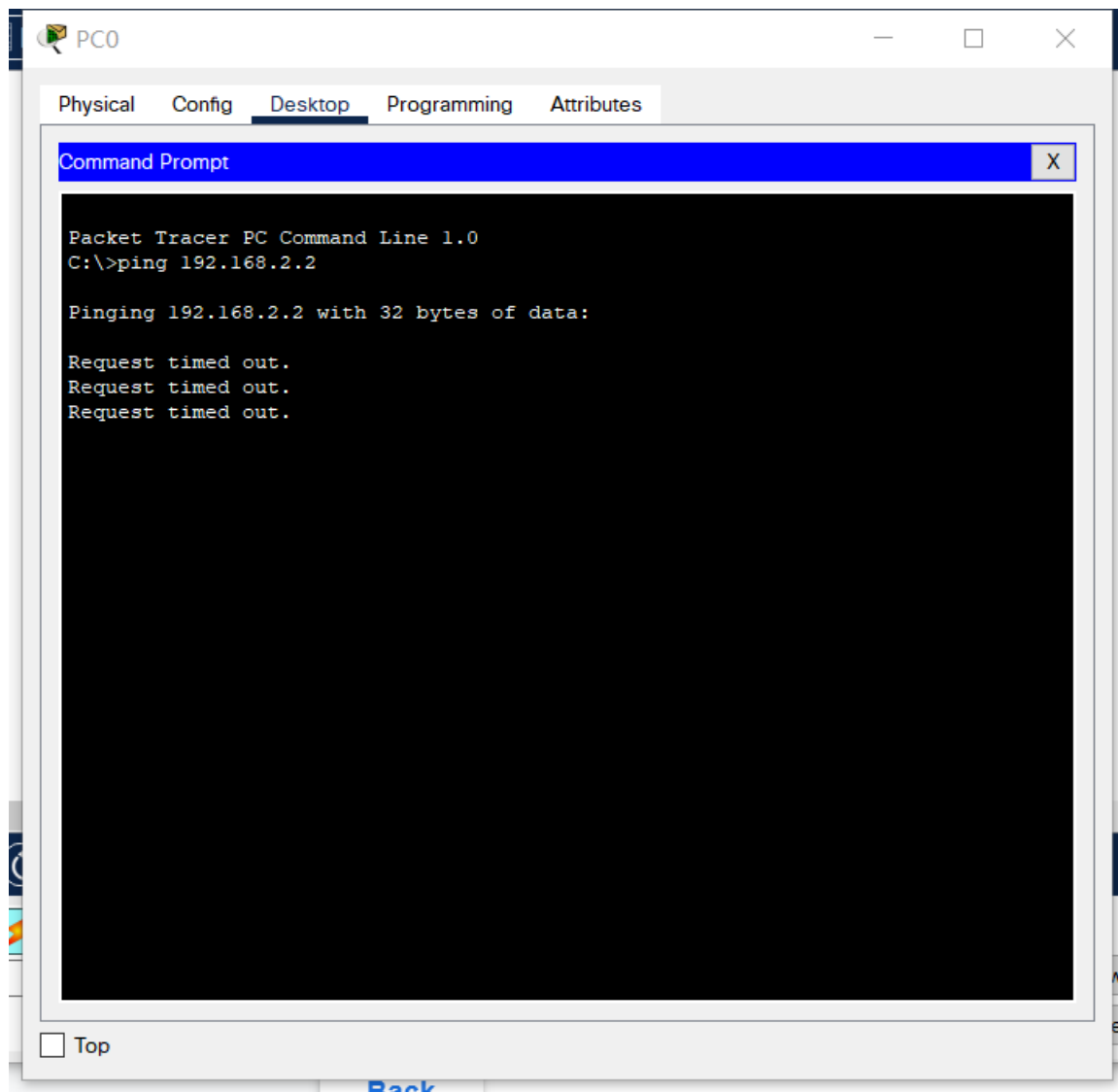
```
Switch0                                                    —    □    ×

Physical    Config    CLI    Attributes

                    IOS Command Line Interface
2960A>show vlan

VLAN Name                             Status     Ports
---- -------------------------------- ---------
--------------------------------
1    default                          active     Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13,
Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17,
Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21,
Fa0/22
                                                 Fa0/23, Fa0/24, Gig0/2
2    computer                         active     Fa0/1
3    communication                    active     Fa0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------
------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
 --More--

Ctrl+F6 to exit CLI focus                          Copy          Paste

□ Top
```

Switch1   — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
2960B#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- ---------
--------------------------------
1    default                          active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13,
Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17,
Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21,
Fa0/22
                                                Fa0/23, Fa0/24, Gig0/2
2    computer                         active    Fa0/1
3    communication                    active    Fa0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------
------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
 --More--
```

Ctrl+F6 to exit CLI focus   Copy   Paste

☐ Top

✎ 试 试

pc0 和 pc1 不处于同一个 vlan;pc0 和 pc2 处于同一个 vlan;

第 12 题 VLAN 间的通信

【实验过程】（步骤、记录、数据、程序等）

VTP 只是给我们划分和管理 VLAN 提供了方便，由上面的测试得知，目前我们仍然不能在 VLAN 间通信。

因为默认的，VLAN 间是不允许进行通信，此时我们需要所谓的独臂路由器在 VLAN 间为其进行转发！

我们使用的核心交换机 3560 是个 3 层交换机，可工作在网络层，也称路由交换机，即具有路由功能，能进行这种转发操作。

3560 交换机配置：

```
3560#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
3560(config)#int g0/1
3560(config-if)#switchport trunk encapsulation dotlq
3560(config-if)#switchport mode trunk
3560(config-if)#switchport trunk allowed vlan all
3560(config-if)#exit
3560(config)#int g0/2
3560(config-if)#switchport trunk encapsulation dotlq
3560(config-if)#switchport mode trunk
3560(config-if)#switchport trunk allowed vlan all
3560(config-if)#exit
3560(config)#ip routing
3560(config)#exit
3560#
%SYS-5-CONFIG_I: Configured from console by console

3560#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

✎ 试 试
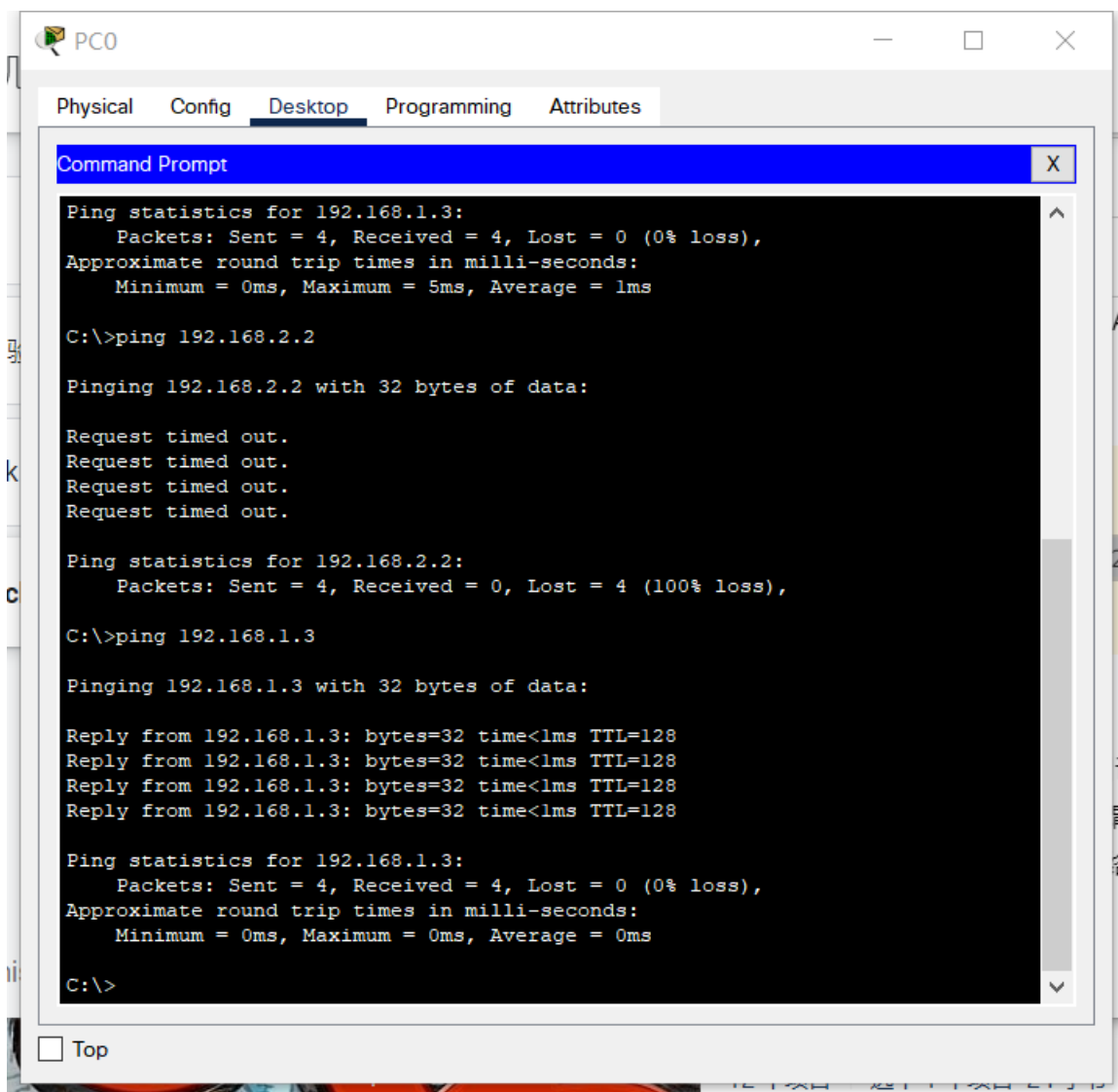
pc0 和 pc1 不处于同一个 vlan;pc0 和 pc2 处于同一个 vlan;

第 13 题 DHCP、DNS 及 Web 服务器简单配置

【实验过程】（步骤、记录、数据、程序等）
拓扑结构:

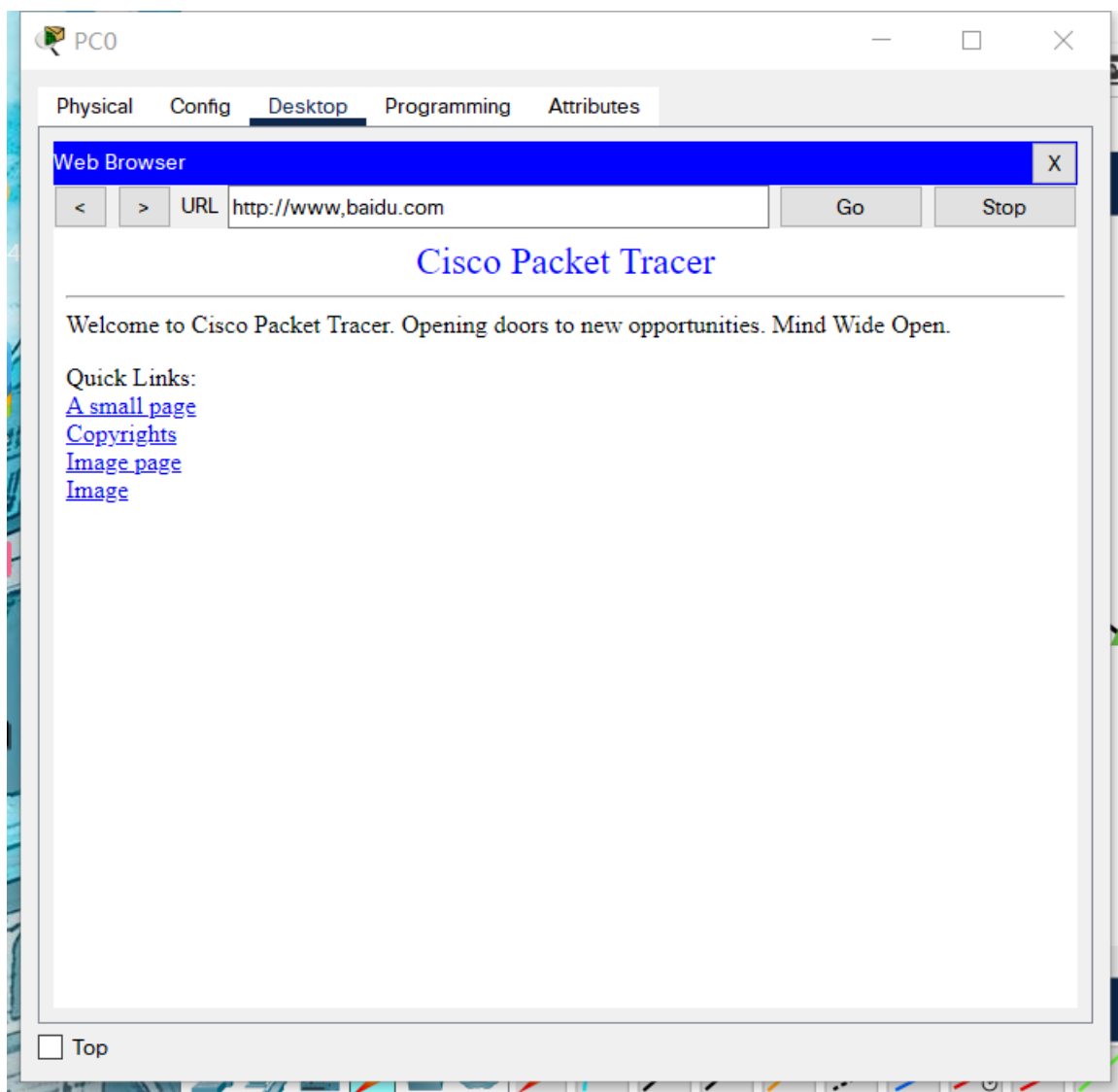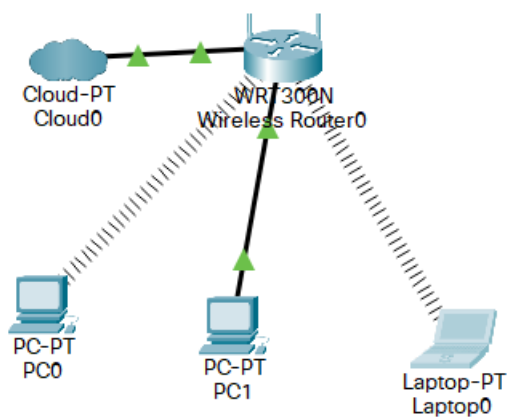Dhcp:

DNS:

IP:

ip   :

Pc1　　　www.baidu.com

第 14 题 WLAN 初步配置

【实验过程】（步骤、记录、数据、程序等）

网络拓扑

配置 IP 地址、子网掩码、网关

Setup	Setup	Wireless	Security	Access Restrictions	Applications & Gaming
	Basic Setup		DDNS		MAC Address Clone

Internet Setup

Internet Connection type

Static IP ▽

Internet IP Address:	19	.	89	.	6	.	1
Subnet Mask:	255	.	0	.	0	.	0
Default Gateway:	19	.	89	.	6	.	4
DNS 1:	0	.	0	.	0	.	0
DNS 2 (Optional):	0	.	0	.	0	.	0
DNS 3 (Optional):	0	.	0	.	0	.	0

Optional Settings (required by some internet service providers)

Host Name: _____

Domain Name: _____

MTU: ▽ Size: 1500

Network Setup

ssid

reless	Setup	Wireless	Security	Access Restrictions	Applications & Gaming	Adm
	Basic Wireless Settings		Wireless Security	Guest Network	Wireless MAC Filter	

c Wireless Settings

Network Mode:	Mixed ▽
Network Name (SSID):	tank_duke
Radio Band:	Auto ▽
Wide Channel:	Auto ▽
Standard Channel:	2 - 2.417GHz ▽
SSID Broadcast:	⦿ Enabled ◯ Disabled

Wireless-N Broadband Router

Administration	Setup	Wireless	Security	Access Restrictions	Applications & Gaming	Adminis
	Management		Log	Diagnostics	Factory Defaults	

Management

Router Access

Router Password: ●●●●●

Re-enter to confirm: ●●●●●

Web Access

Web Utility Access: ☑ HTTP ☐ HTTPS

Web Utility Access via Wireless: ◉ Enabled ○ Disabled

Remote Access

Remote Management: ○ Enabled ◉ Disabled

Web Utility Access: ◉ HTTP ○ HTTPS

Remote Upgrade: ○ Enabled ○ Disabled

Allowed Remote Ip Address:

He

Wireless-N Broadband R

ireless	Setup	Wireless	Security	Access Restrictions	Applications & Gaming	Administration
	Basic Wireless Settings		Wireless Security	Guest Network	Wireless MAC Filter	Advanc

eless Security

Security Mode: WEP ⌄

40/64-Bits (10 Hex digits) ⌄

Encryption:

Passphrase: [ ] Generate

Key1: [ ]

Key2: [ ]

Key3: [ ]

Key4: [ ]

TX Key: 1 ⌄

Help...

dhcp

Router IP	IP Address: `192` . `168` . `0` . `1` Subnet Mask: `255.255.255.0` ⌄
DHCP Server Settings	DHCP Server: ⦿ Enabled ◯ Disabled [DHCP Reservation] Start IP Address: 192.168.0. `100` Maximum number of Users: `50` IP Address Range: 192.168.0. 100 – 149 Client Lease Time: `0` minutes (0 means one day) Static DNS 1: `0` . `0` . `0` . `0` Static DNS 2: `0` . `0` . `0` . `0` Static DNS 3: `0` . `0` . `0` . `0` WINS: `0` . `0` . `0` . `0`