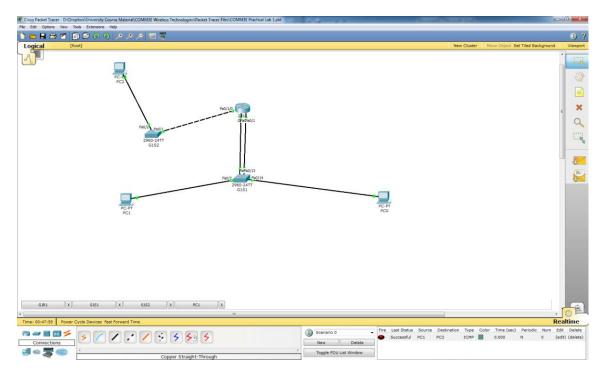
# Using Packet Tracer to Build a Network

We will be using Packet Tracer today to create the following network.

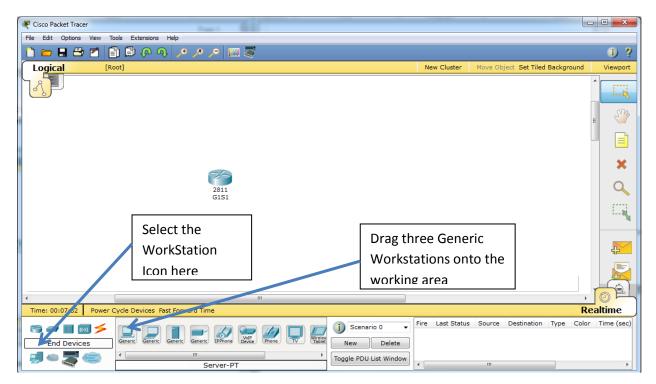


This topology requires one 2811 router two 2960 switches and three workstations.

🐺 Cisco Packet Tracer 1 - - - - - 1 0 0 0 1) ? Logical **X** Left Click on the device name 9 to edit it. Change the name to **G1R1** ф<sup>×</sup> 2811 G1S1 R Drag this icon onto the white area of the screen Scenario 0 🛲 🔳 💷 🗲 . 101 2010 20110 2011 Conert New Delete Toggle PDU List Window Router-PT-Empty

Launch Packet Tracer then drag a 2811 router icon onto the white area of the screen.

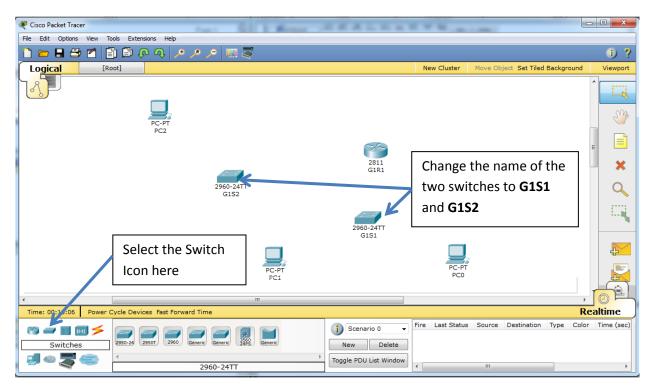
Now select the icon shown below and drag three Generic Workstations on to the screen.



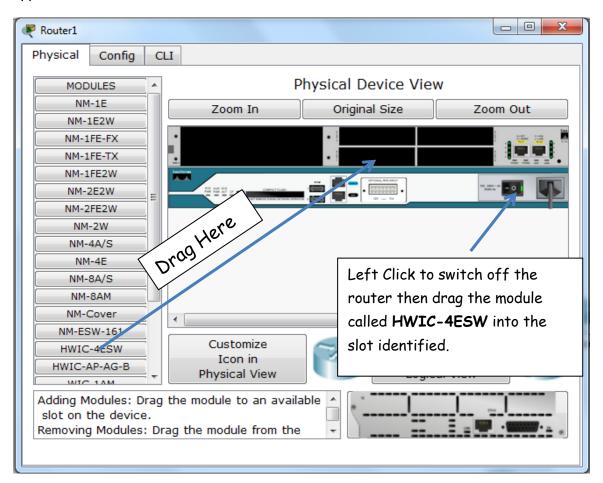
Packet Tracer should now look like this

🥐 Cisco Packet Tracer								- O X
File Edit Options View Tools E	ktensions Help							
🗋 🗁 🖶 🗁 🖆 🗐 🛱	P A / P	,으 📖 🥃						i) ?
Logical [Root]					New Cluster	Move Object S	et Tiled Background	Viewport
	PC-PT PC2							Sr3
	PC2			75				
				2811 G151				<b>×</b>
								Q
								- E.
								<b>F</b>
			C-PT PC1		PC-PT PC0			
•		III						
Time: 00:12:08 Power Cycle D	evices Fast Forward Ti	me						Realtime
End Devices	Generic Generic Generic	c IPPhone VolP Phone	e TV Wireles TV Tablet	i Scenario 0 - New Delete	Fire Last Status	Source Desti	nation Type Col	or Time (sec)
	 Wired	EndDevice-PT	4	Toggle PDU List Window	•	III		•

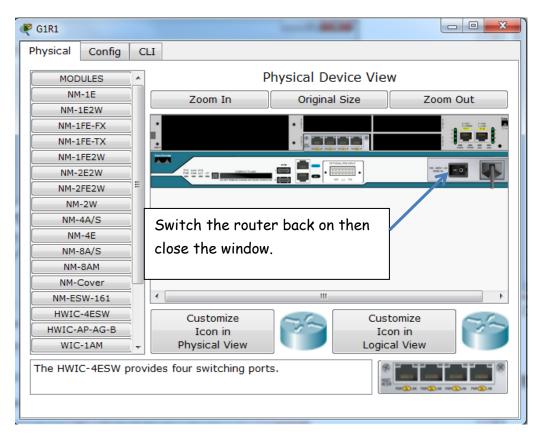
We now need to add two **2960 switches** to the topology so select the switch icon shown below then drag the two switch onto Packet Tracer. Arrange the icons so that the network looks like the image below



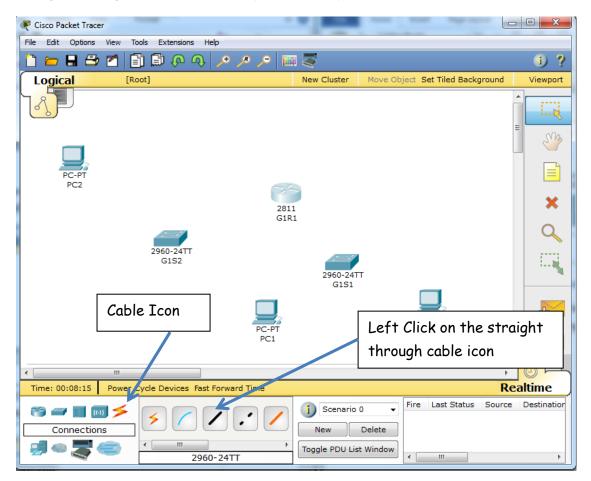
Our Router now needs an upgrade. Left click on the router **G1R1**. The following window should now appear



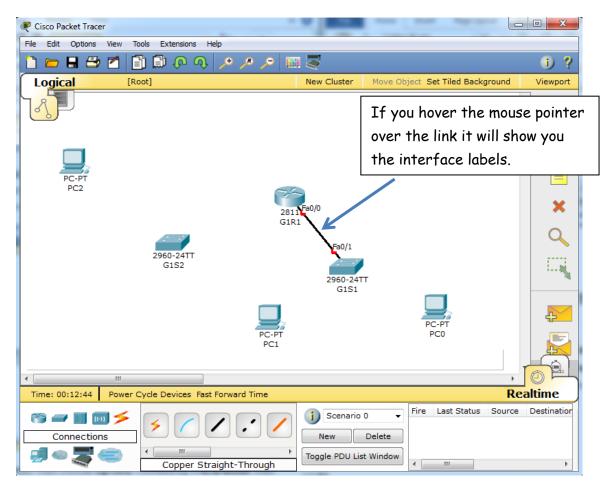
Your window should now look like this



We can now add cables to our topology. Left click on the **cable icon** shown below then select a straight through cable (which is represented by a solid black line)

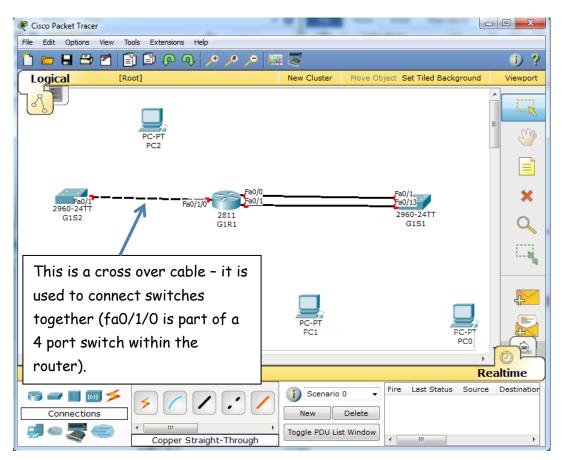


Now left click on router **G1R1**. A list of interfaces should appear. Left click on **FaO/O**. Now Left click on switch **G1S1**. Another list of interfaces should appear. Select **FaO/1**. Once this is done, a solid black line should appear on the screen as shown below. This line represents a straight through patch cable.



If you want the interface labels to appear on the screen all the time then choose **Options** followed by **Preferences** then select the check box next to **Always show port labels**.

Add additional cables until the network looks like this

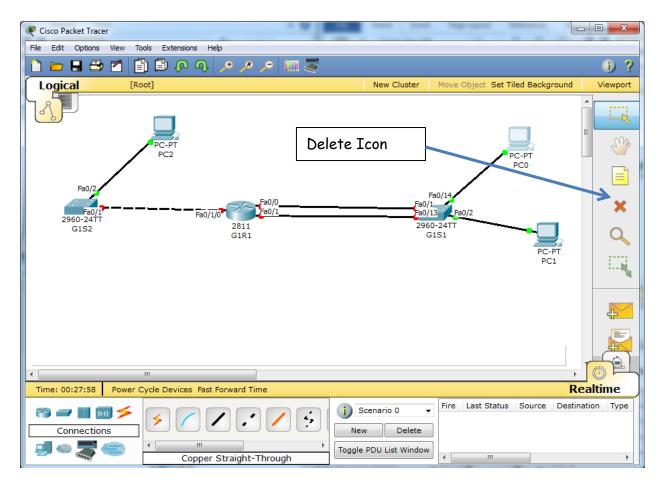


The table below shows the cables connections you must use to complete the wiring for this network

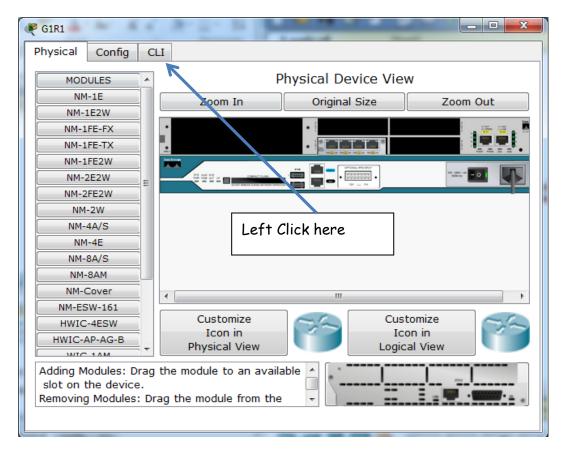
Local Device	Cable Type	Port	Remote Device	Port
Router G1R1	Straight Through	Fa0/0	Switch G1S1	Fa0/1
Router G1R1	Straight Through	Fa0/1	Switch G1S1	Fa0/13
Router G1R1	Cross Over	Fa0/1/0	Switch G1S2	Fa0/1
Switch G1S1	Straight Through	Fa0/2	PC1	FastEthernet
Switch G1S1	Straight Through	Fa0/14	PCO	FastEthernet
Switch G1S2	Straight Through	Fa0/2	PC2	FastEthernet

The screenshot on the following pages shows the finished wiring plan. Check over your work to make sure that everything is correct before proceeding.

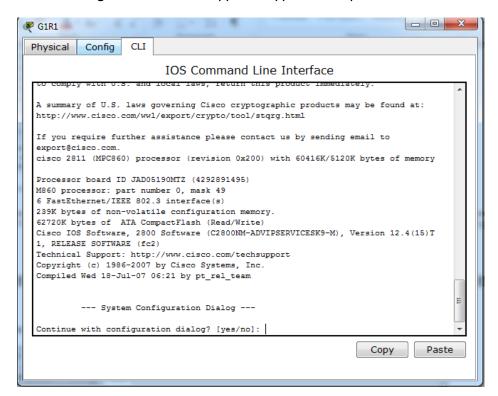
If you make a mistake and choose the wrong cable type or you connect the cables to the wrong interfaces then use the **Delete** icon shown below to delete your mistakes



You are now ready to start configuring your Router. Left click on Router **G1R1** then select the **CLI** tab shown below:



The following window should appear. Type **n** then press **Enter** to continue.



Press Enter again and the screen should now look like this

🥐 GIRI 🔤 🖂 🖂
Physical Config CLI
IOS Command Line Interface
CIECO 2011 (MECSOO) PROCESSOR (REVISION OX200) WICH SURIEK/SIZOK Dyces of memory
Processor board ID JAD05190MTZ (4292891495) M860 processor: part number 0, mask 49 6 FastEthernet/IEEE 802.3 interface(s)
239K bytes of non-volatile configuration memory. 62720K bytes of ATA CompactFlash (Read/Write) Cisco IOS Software, 2800 Software (C2800NM-ADVIPSERVICESK9-M), Version 12.4(15)T 1, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2007 by Cisco Systems, Inc. Compiled Wed 18-Jul-07 06:21 by pt_rel_team
System Configuration Dialog
Continue with configuration dialog? [yes/no]: n
Press RETURN to get started!
Router>
Copy Paste

Enter **enable** to move to **Privileged mode** then type **configure terminal** to enter **Global Configuration mode**. You will know you are in Global Configuration Mode because the prompt will have changed to **Router(config)#**  It is from **Global Configuration mode** that we enter commands that affect the whole router. It is also from here that we enter specialist modes used to configure particular aspects of the router.

Type the command **hostname G1R1** then press **Enter**. You have now changed the name of the device. This should be evident from the prompt which should now be **G1R1(Config)#** The screenshot below contains the commands described above.

(	🛛 🖂 🗮 🗶	J
	Physical Config CLI	
	IOS Command Line Interface	
	<pre>239K bytes of non-volatile configuration memory. 62720K bytes of ATA CompactFlash (Read/Write) Cisco IOS Software, 2800 Software (C2800NM-ADVIPSERVICESK9-M), Version 12.4(15)T 1, RELEASE SOFTWARE (fc2) Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2007 by Cisco Systems, Inc. Comprised Nation 10, Tele Content and the set of the set</pre>	
	Compiled Wed 18-Jul-07 06:21 by pt_rel_team System Configuration Dialog Continue with configuration dialog? [yes/no]: n	
	Press RETURN to get started!	
	Router>enable Router‡configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config) #hostname G1R1 G1R1(config) #	
	Copy Paste	

We must now configure the interfaces labelled fa0/0 and fa0/1 on our router. Each interface must be given an IP address and must be activated.

Issue the command interface fa0/0 then press Enter. The prompt should now have changed to G1R1(config-if)# which indicates that the router is now in interface configuration mode. Any command issued now will apply to the interface fa0/0.

The table below identifies the interface labels, IP addresses and subnet masks for router G1R1

Interface label	IP Address	Subnet Mask
Fa0/0	10.0.6.1	255.255.255.0
Fa0/1	10.0.7.1	255.255.255.0
Vlan 2	10.0.2.1	255.255.255.0
Vlan 3	10.0.3.1	255.255.255.0
Vlan 4	10.0.4.1	255.255.255.0
Vlan 5	10.0.5.1	255.255.255.0

Assign interface fa0/0 its IP address and subnet mask by issuing the command

ip address 10.0.6.1 255.255.255.0

Now activate the interface by issuing the command

## no shutdown

You should receive a message indicating that the interface is now active as shown in the screen shot below

	GIRI
	Physical Config CLI
	IOS Command Line Interface
	System Configuration Dialog
	Continue with configuration dialog? [yes/no]: n
8	Press RETURN to get started!
	Router>enable
	Router#configure terminal
	Enter configuration commands, one per line. End with CNTL/Z.
	Router(config) #hostname G1R1 G1R1(config) #interface fa0/0
	GIR1(config-if)#ip address 10.0.6.1 255.255.255.0
	G1R1(config-if) #no shutdown
	%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
	%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t
	o up
1	G1R1(config-if)#
	Copy Paste

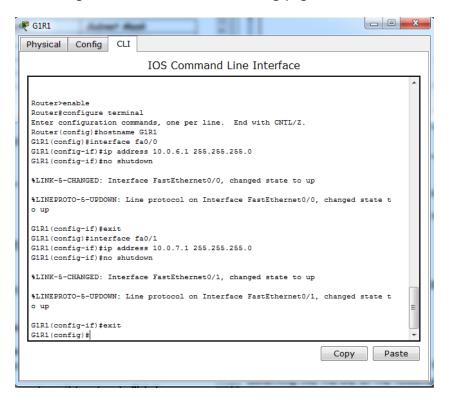
Type **exit** then press **Enter** to return to **Global Configuration mode**. Now configure interface **fa0/1** by issuing the following commands:

Interface fa0/1

Ip address 10.0.7.1 255.255.255.0

No shutdown

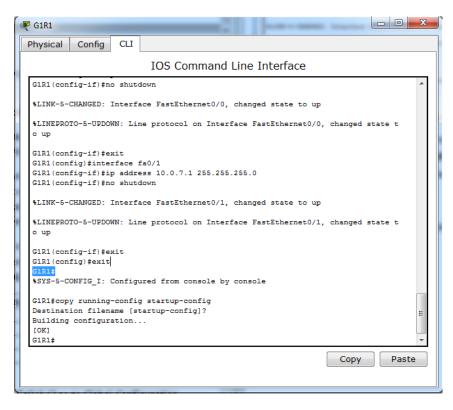
Return to **Global Configuration mode** by issuing the **exit** command again. Your screen should look something like the one on the following page



It would be a good idea at this stage to save our configuration. This must be done from **Privileged mode**. We are currently in **Global Configuration Mode**. Type exit then press **enter** to return to Privileged mode. The Prompt should change to **G1R1#** Now issue the command

## Copy running-config startup-config

Press Enter to confirm. Your screen should now look like this



We will now turn our attention to switch G1S1. Left click on its icon. The following screen should appear. If you cannot see the prompt, press the **enter** key until it appears.

🥐 G1S1	1		23
Physical Config CLI			
	IOS Command Line Interface		
SLINK-5-CHANGED: Inter	face FastEthernet0/2, changed state to up		*
	ine protocol on Interface FastEthernet0/2, changed	state t	
%LINK-5-CHANGED: Inter	face FastEthernet0/14, changed state to up		
%LINEPROTO-5-UPDOWN: L to up	ine protocol on Interface FastEthernet0/14, changed	state	
%LINK-5-CHANGED: Inter	face FastEthernet0/1, changed state to up		
<pre>%LINEPROTO-5-UPDOWN: L o up</pre>	ine protocol on Interface FastEthernet0/1, changed :	state t	
<pre>%LINK-5-CHANGED: Inter</pre>	face FastEthernet0/13, changed state to up		
<pre>%LINEPROTO-5-UPDOWN: L to up</pre>	ine protocol on Interface FastEthernet0/13, changed	state	ш
Switch>			Ŧ
	Сору	Past	e

Type **enable** then press **Enter** to move to **Privileged mode**. The prompt should have change to **Switch#** 

Now type configure terminal to move to **Global Configuration mode**. The prompt should have changed to **Switch(config)**#

Give the switch its name using the command below

# Hostname G1S1

The prompt should have changed to **G1S1(config)#** and the screen should look like the one shown below:

🤻 G1S1	
Physical Config CLI	
	IOS Command Line Interface
o nb ATUSEKOIO-2-DEPOMM' TIUE	protocor on interface rastRinerneto/2, changed state t
%LINK-5-CHANGED: Interfac	re FastEthernet0/14, changed state to up
%LINEPROTO-5-UPDOWN: Line to up	e protocol on Interface FastEthernet0/14, changed state
%LINK-5-CHANGED: Interfac	ce FastEthernet0/1, changed state to up
<pre>%LINEPROTO-5-UPDOWN: Line o up</pre>	e protocol on Interface FastEthernet0/1, changed state t
%LINK-5-CHANGED: Interfac	re FastEthernet0/13, changed state to up
%LINEPROTO-5-UPDOWN: Line to up	e protocol on Interface FastEthernet0/13, changed state
Switch>enable	
Switch‡configure terminal Enter configuration comma Switch(config)‡hostname G G1S1(config)‡	ands, one per line. End with CNTL/Z.
	Copy Paste

We are going to logically divide this switch into two. Ports **faO/1** to **faO/12** will be reserved for Light Weight Access Points (LWAPs). Ports **faO/13** to **faO/24** will be reserved for wired PCs. As Packet Tracer doesn't support LWAPs we will pretend that PC 1 is an access point.

A switch may be logically segmented by building VLANs (Virtual Local Area Networks) and by assigning ports to VLANs. If two ports are in different VLANs then direct communication between them is not allowed. Communication between VLANs must be controlled by a router.

We will create the following VLANs

VLAN Number	VLAN Name	Port Range
6	LWAP	Fa0/1 - fa0/12
7	Wired	Fa0/13 - fa0/24

From Global Configuration mode, issue the commands below:

# Vlan 6

The switch should now have created vlan 6 and the prompt should have changed to

# G1S1(config-vlan)#

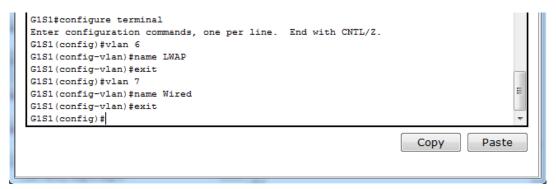
Which indicates that you have entered VLAN Configuration mode. The screen should look like this

G1S1# G1S1#configure terminal Enter configuration commands, one per line. End with CNTL/Z. G1S1(config)#vlan 6 G1S1(config-vlan)#	E
	Copy Paste

You must now give your vlan its name by issuing the command

## name LWAP

Issue the **exit** command to return to **Global Configuration mode** then create **vlan 7** and assign it the name **Wired**. The screenshot below holds the commands you must use.



Type **exit** and press **enter** to return to **Privileged mode** then issue the command **show vlan brief** to verify that our VLANs have been created and given the correct names. The screen should contain the following output:

	G1S1		-		-		
	Physic	al Config	CLI				
l				IOS Com	nand Lin	e Interface	
	G1S1( G1S1) G1S1( G1S1) G1S1( G1S1) G1S1 %SYS-	5-CONFIG_I:	) #name ] ) #exit n 7 ) #name ] ) #exit t Confign		ole by con	sole	
	G1S1#	show vlan b:	rief				
L	VLAN	Name			Status	Ports	
	1	default			active	Fa0/1, Fa0/2, 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 Gig1/1, Gig1/2	
	-	LWAP			active		
		Wired fddi-defaul:	-		active active		
		token-ring-	-		active		
	1004	fddinet-defa	ault		active	Ξ.	
	1005 G1S1#	trnet-defau	lt		active	-	
	L					Copy Paste	

At present all of our ports are in the default VLAN which is VLAN 1. We must now move 12 of them to join VLAN 6 and 12 to join VLAN 7.

Enter configure terminal to return to Global Configuration Mode. Now issue the command below

# Interface range fa0/1 - 12

The prompt should have changed to **G1S1(Config-range-if)#** The range option allows us to assign a number of commands to a group of interfaces. Now issue the commands below:

#### Switchport mode access

Switchport access vlan 6

#### exit

The first command tells the switch that each port in the range will belong to just one VLAN. The second command tells the switch that each port in the range will be assigned to VLAN 6. The third command returns you to **Global Configuration mode**.

Issue the commands below to assign ports 13 through to 24 to VLAN 7.

Interface range fa0/13 - 24

Switchport mode access

Switchport access vlan 7

Exit

The screen should look something like this:

G1S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
G1S1(config) #interface range fa0/1 - 24
G1S1(config-if-range)#switchport mode access
G1S1(config-if-range)#switchport access vlan 6
G1S1(config-if-range) #exit
G1S1(config) #interface range fa0/13 - 24
G1S1(config-if-range)#switchport mode access
G1S1(config-if-range)#switchport access vlan 7
G1S1(config-if-range) #exit
G1S1(config)#
Copy Paste

Type exit and press Enter to return to Privileged mode then issue the command

#### show vlan brief

to confirm that the interfaces have been moved to the correct VLANs. Your screen should now look like this:

IOS Command Line Interface         Enter configuration commands, one per line. End with CNTL/2.       CiS1(config)finterface range fa0/1 - 24         GIS1(config)finterface range)fswitchport mode access       GIS1(config-if-range)fswitchport access vlan 6         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range)fswitchport mode access         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range)finterface range fa0/13 - 24         GIS1(config)finterface range fa0/13 - 24       GIS1(config)finterface range)finterface range factor         GIS1(config)finterface range factor       GIS1(config)finterface range factor         GIS1(finterface range)finterface range factor       GIG1/1, Gig1/2         GIS1(finterface range)finterface range factor       Gig1/1, Gig1/2, Fa0/3, Fa0/4         Fa0/10, Fa0/6, Fa0/10, Fa0/10, Fa0/10       Fa0/21, Fa0/22,	Physical Config	) CLI		
G1S1 (config) #interface range fa0/1 - 24 G1S1 (config-if-range) #switchport mode access G1S1 (config-if-range) #switchport access vlan 6 G1S1 (config) #interface range fa0/13 - 24 G1S1 (config) #interface range fa0/13 - 24 G1S1 (config) #interface range fa0/13 - 24 G1S1 (config-if-range) #switchport access vlan 7 G1S1 (config-if-range) #switchport access vlan 7 G1S1 (config) #exit G1S1 (config) #exit G1S1 (config) #exit G1S1 # *SYS-5-CONFIG_I: Configured from console by console G1S1 #show vlan brief VLAN Name Status Ports 		IOS	Command Li	ne Interface
1       default       active       Gig1/1, Gig1/2         6       LWAP       active       Fa0/1, Fa0/2, Fa0/3, Fa0/4         7       Wired       Fa0/9, Fa0/10, Fa0/11, Fa0/12         7       Wired       active         1002       fddi-default       active         1003       token-ring-default       active         1004       fddinet-default       active         1005       trnet-default       active	G1S1(config) #im G1S1(config-if- G1S1(config-if- G1S1(config) #im G1S1(config) #im G1S1(config-if- G1S1(config-if- G1S1(config) #ex G1S1# &SYS-5-CONFIG_I	terface range fa range)#switchpor range)#switchpor range)#exit terface range fa range)#switchpor range)#switchpor range)#switchpor range)#switchpor range)#switchpor range)#switchpor	a0/1 - 24 ct mode access ct access vlan 6 a0/13 - 24 ct mode access ct access vlan 7	
6       LWAP       active       Fa0/1, Fa0/2, Fa0/3, Fa0/4         6       LWAP       active       Fa0/5, Fa0/6, Fa0/7, Fa0/8         7       Wired       active       Fa0/13, Fa0/10, Fa0/11, Fa0/12         7       Wired       active       Fa0/17, Fa0/18, Fa0/19, Fa0/10         1002       fddi-default       active       Fa0/21, Fa0/18, Fa0/19, Fa0/20         1003       token-ring-default       active       1004         1004       fddinet-default       active       E         1005       trnet-default       active       E	VLAN Name		Status	Ports
7 Wired active Fa0/13, Fa0/14, Fa0/15, Fa0/16 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				Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/6, Fa0/7, Fa0/8
1003 token-ring-default     active       1004 fddinet-default     active       1005 trnet-default     active	7 Wired		active	Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20
1004 fddinet-default active 1005 trnet-default active			active	
1005 trnet-default active	-			=
				-

It is now time to assign IP addresses to our Workstations PC1 and PCO so that they can participate in the network. Left click on the icon for PC1. The following window should appear

PC1	1.5			- 9.74		
Physical Config	Desktop	Software/Se	ervices			
MODULES Linksys-WMP300N PT-HOST-NM-1AM PT-HOST-NM-1CE		Zoom In	Physi	cal Device <sup>Original Size</sup>	View	Zoom Out
PT-HOST-NM-1CFE PT-HOST-NM-1CGE PT-HOST-NM-1FFE PT-HOST-NM-1FGE				5elect tl	he De:	skTop Tab
PT-HOST-NM-1W PT-HOST-NM-1W-A PT-HEADPHONE						
PT-MICROPHONE PT-CAMERA PT-USB-HARD-DRIV						-
	+ P	Customize Icon in hysical View	ļ		Customiz Icon in Logical Vi	
Adding Modules: D device. Removing Modules	-				e	•

Select the **DeskTop Tab**. The following window should now appear:

PC1 Physical Cor	nfig Desktop s	Software/Services		
106			run	http:
IP Configurat	ion Dial-up	Terminal	Command Prompt	Web Browser
(((o))) A		Choose this C	Pption	
PC Wirele	ss VPN	Traffic Generator	MIB Browser	Cisco IP Communicator
			]	communicator
E Mail	PPPoE Dia	ler Text Editor		
				100 mm

Left click on the **IP** Configuration button (see diagram above). You should now see the following window:

IP Configuration	x
<ul><li>DHCP</li><li>Static</li></ul>	Enter 10.0.6.2 here
IP Address	Enter 255.255.255.0 here
Subnet Mask Default Gateway	Enter 10.0.6.1 here
DNS Server	Leave this blank
	Leave This Diank

Enter the information shown above. Please note that PC1 is attached to switch port FaO/2. This port is in VLAN 6 and can communicate with any port in VLAN 6. Router G1R1 is also attached to the switch via VLAN 6 through its faO/0 interface. This means that PC1 will be able to communicate with the router via its FaO/0 interface.

If this is to happen, the PC must belong to the same subnet as the router's FaO/O interface. The FaO/O interface of G1R1 has IP address 10.0.6.1 and subnet mask 255.255.255.0 We have assigned PC1 an unused IP address from the same subnet (address 10.0.6.2). The PC must also have the same subnet mask as the router if they are to communicate. That is why the PC's mask was set to 255.255.255.0

The Default Gateway is the IP address of a router that the PC can reach. It must be part of the PC's own subnet - the only candidate is 10.0.6.1 which is the IP address of G1R1's fa0/0 interface.

Your screen should now look like this:

IP Configuration		X
DHCP		
Static		
		_
IP Address	10.0.6.2	
Subnet Mask	255.255.255.0	
Default Gateway	10.0.6.1	
DNS Server		

Close this window then select the PCO. Repeat the process outlines above to assign PCO the following IP address, subnet mask and default gateway.

R PC0	1	
Physical Config Des	sktop Software/Services	
IP Configuration		×
DHCP		http://
Static		Web Browser
IP Address	10.0.7.2	
Subnet Mask	255.255.255.0	
Default Gateway	10.0.7.1	
DNS Server		Cisco IP
		Communicator
E Mail PF	PPoE Dialer Text Editor	

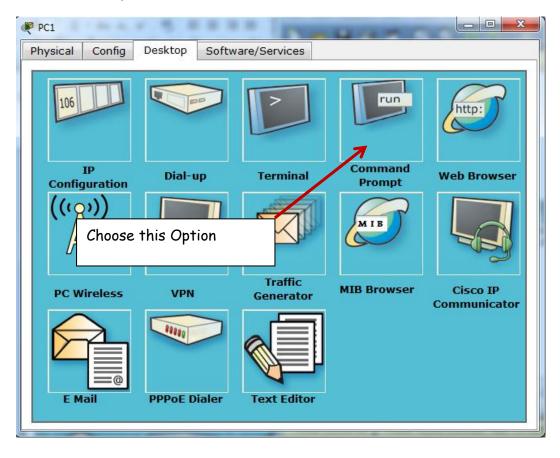
Please note the PCO is attached to the switch G1S1 via port fa0/13 which is in VLAN 7. It can therefore communicate directly with any device also plugged into VLAN 7. The router G1R1 is connected to VLAN 7 via its f0/1 interface. This interface has IP address 10.0.7.1. If PCO is to be able to communicate with the router it must be assigned an IP address that belongs to the same subnet as Fa0/1 on G1R1.

The IP address 10.0.7.2 is the first unused IP address from the subnet associated with FaO/1 of G1R1. The PC must also have the same subnet mask as the router if they are to communicate. That is why the PC's mask was set to 255.255.255.0

The Default Gateway is the IP address of a router that the PC can reach. It must be part of the PC's own subnet - the only candidate is 10.0.7.1 which is the IP address of G1R1's fa0/1 interface.

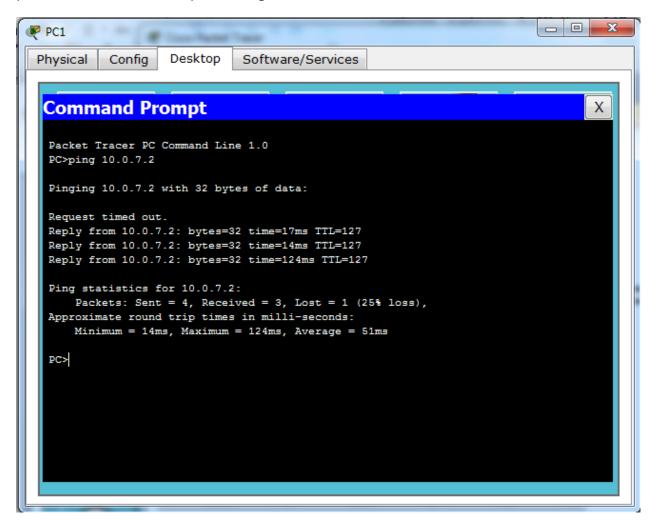
Our two PCs should be able to communicate with each other now through the router - they cannot communicate directly through the switch as they belong to two separate VLANs. Traffic from PCO will be sent to Fa0/1 of router G1R1. From there the router will route the traffic out of fa0/0 back to the switch. The switch will then forward the traffic to PC1.

We can test this using the **ping** command. Navigate to the following window for PC1 then select the **Command Prompt** button (see below).



Enter the command **ping 10.0.7.2** This command sends several short messages to the destination IP address (10.0.7.2) which is the IP address of PCO. If PCO replies then we know we have end to end connectivity.

The screenshot below shows you what you should be seeing. If you cannot see any replies then ask your lecturer to examine your configuration.



Please note that the first "ping" will often timeout (no reply) because it takes a finite amount of time for the initial connection to be established. This is normal.

Now configure Switch G1S2. You will have to:

- Give the Switch the name G1S2
- Create the VLANs listed in the following table
- Assign the switch ports of G1S2 to the VLANs identified in the table.

•

VLAN ID	VLAN Name	Ports
2	Management	2 - 6
3	Sales	7 - 12
4	Finance	13 - 18
5	Guest	19 - 24

Use the **show vlan brief** command to verify that switch **G1S2** has been successfully configured. The output should look like this:

🤻 G1S2	1	-		x
Physi	cal Config CLI			
		IOS Command	d Line Interface	
G152 G152	-			~
G1S2 G1S2	-			
G152				
G1S2	- ŧ			
G1S2	ŧ			
G1S2	‡show vlan brief			
VLAN	Name	Status	us Ports	
1	default		.ve Fa0/1, Gig1/1, Gig1/2	
2	Management	active	ve Fa0/2, Fa0/3, Fa0/4, Fa0/5 Fa0/6	
3	Sales	active	ve Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12	
4	Finance	active	ve Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18	
5	Guest	active	ve Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24	
1002	fddi-default	active		
1003	token-ring-default	active	ve	
	fddinet-default	active	ve	=
	trnet-default	active	ve	
G1S2	Ŧ			Ŧ
			Copy Paste	
- 111	connections			-

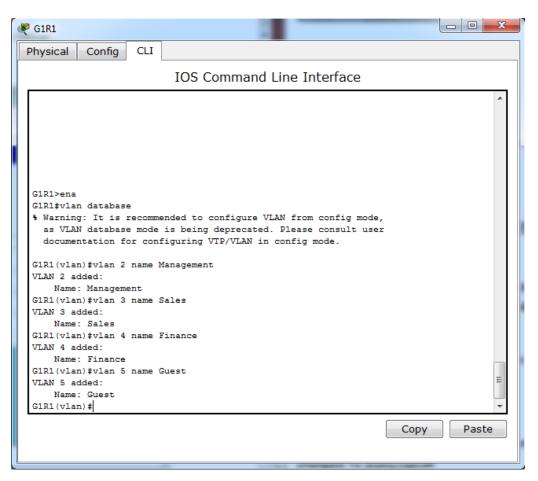
The Router G1R1 also contains a four port switch. This was the module that we added to the router at the beginning of the tutorial. This module must now be configured to operate with the router and the rest of the network.

Packet Tracer requires us to build the VLANs on the router. Navigate to **Privileged mode** on router G1R1 then issue the command

Vlan database

This command accesses the mode from where we build VLANs on a router. The prompt should have changed to G1R1(vlan)#

Issue the command vlan 2 name Management This will create VLAN 2 and assign its name. Repeat this command for VLANs 3, 4 and 5. Refer to the table on Page 21 for the VLAN names. Your screen should now look like this:



Type exit then press Enter to return to Privileged mode. We cannot assign IP addresses directly to the ports within the switch module as they don't support this function. We must instead create virtual interfaces for each VLAN that operate through the ports.

Move to **Global Configuration mode** then issue the commands below to create a virtual interface that works with VLAN 2.

Interface vlan 2

Ip address 10.0.2.1 255.255.255.0

No shutdown

Exit

Now repeat this process to create virtual interfaces for VLANs 3, 4 and 5. Use the information within the table below:

Virtual Interface	IP Address	Subnet Mask
Vlan 2	10.0.2.1	255.255.255.0
Vlan 3	10.0.3.1	255.255.255.0
Vlan 4	10.0.4.1	255.255.255.0
Vlan 5	10.0.5.1	255.255.255.0

Your screen should look like this:

🤻 G1R1 📃 🗖	x						
Physical Config CLI							
IOS Command Line Interface							
G1R1#configure terminal Enter configuration commands, one per line. End with CNTL/Z. G1R1(config)#interface vlan 2	*						
<pre>%LINK-5-CHANGED: Interface Vlan2, changed state to up G1R1(config-if)#ip address 10.0.2.1 255.255.255.0 G1R1(config-if)#no shutdown 2010(config-if)#no shutdown</pre>							
G1R1(config-if) #exit G1R1(config) #interface vlan 3 G1R1(config-if) # MINVE-CHNNED: Interface Vlan2, shanged state to vn							
<pre>%LINK-5-CHANGED: Interface Vlan3, changed state to up ip address 10.0.3.1 255.255.255.0 G1R1(config-if)#no shutdown G1R1(config-if)#exit</pre>							
G1R1(config)#interface vlan 4							
<pre>%LINK-5-CHANGED: Interface Vlan4, changed state to up G1R1(config-if)#ip address 10.0.4.1 255.255.255.0 G1R1(config-if)#no shutdown</pre>							
G1R1(config-if) #exit G1R1(config) #interface vlan 5							
<pre>%LINK-5-CHANGED: Interface Vlan5, changed state to up G1R1(config-if)#ip address 10.0.5.1 255.255.255.0 G1R1(config-if)#no shutdown</pre>	=						
G1R1(config-if) #exit G1R1(config) #	*						
Copy Paste							

We can verify that all of our interfaces (virtual and real) are configured correctly by returning to **Privileged mode** and issuing the command:

# Show ip interface brief

This command identifies the name, IP address and status of each interface as shown below:

🤻 G1R1						test, and a tree	-			
Physical	Config	CLI								
			IOS Com	nand	Line	Interface				
G1R1#sho Interfac FastEthe	-		brief IP-Address 10.0.6.1		Method			Protoc	col	These are the real interfaces we configured at the
FastEthe			10.0.7.1		manual	-		up	*	beginning of the tutorial
FastEthe	rnet0/1/0		unassigned	YES	unset	administratively	down	down	1	
FastEthe	rnet0/1/1		unassigned	YES	unset	administratively	down	down		These are the four switch
FastEthe	rnet0/1/2		unassigned	YES	unset	administratively	down	down	K	ports we added that cannot
FastEthe	rnet0/1/3		unassigned	YES	unset	administratively	down	down	1	be assigned IP address and
Vlan1			unassigned	YES	unset	administratively	down	down		are yet to be configured.
Vlan2			10.0.2.1	YES	manual	up		down	1	
Vlan3			10.0.3.1	YES	manual	up		down		These are the four virtual
Vlan4			10.0.4.1	YES	manual	up		down		interfaces we have just
Vlan5 G1R1#			10.0.5.1	YES	manual	up		down	, •	created. They are down
							Сору	/	Paste	because they must be paired with a real interface.

Port FaO/1/O on router G1R1 is the only switch port currently in use. It must be configured to carry traffic for VLANs 2, 3, 4 and 5 so that our virtual interfaces will be able to work. A switch port will normally only carry traffic for one VLAN. Such a port is called an Access Port. We have already configured many Access Ports on our two switches (G1S1 and G1S2).

Sometimes, as in this instance, a switch port must carry traffic for more than one VLAN. Such a port is called a Trunk port. We must configure port Fa0/1/0 on **G1R1** as a Trunk. We must also configure port Fa0/1 on Switch **G1S2** as a trunk since it must also send and receive traffic from several VLANs.

Move to Global Configuration mode on router G1R1 the issue the following commands

Interface fa0/1/0

Switchport mode trunk

No shutdown

Exit

As soon as you entered the command no shutdown you should have seen the four virtual interfaces activate as in the screenshot below:

🤻 G1R1 - 🗆 📼 💌
Physical Config CLI
IOS Command Line Interface
G1R1>enable G1R1#configure terminal Enter configuration commands, one per line. End with CNTL/2. G1R1(config)#interface fa0/1/0 G1R1(config-if)#switchport mode trunk G1R1(config-if)#no shut
<pre>%LINK-5-CHANGED: Interface FastEthernet0/1/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1/0, changed state to up</pre>
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up</pre>
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan3, changed state to up</pre>
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan4, changed state to up                                      </pre>
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan5, changed state to up G1R1(config-if)#exit G1R1(config)#exit G1R1# %SYS-5-CONFIG_I: Configured from console by console</pre>
GIRI#
Copy Paste

Now Return to Privileged mode and issue the command

#### Show interface trunk

This should indicate that port **FaO/1/0** is a **trunk** port and is now carrying traffic for multiple VLANs. Your screen should look like this:

Port	Mode	Encapsulation		Native vlan		
Fa0/1/0	on	802.lq	trunking	1		
Port	Vlans all	owed on trunk				
Fa0/1/0	1-1005			Port Fa0/1/0 isconfigured to		
Port	Vlans all	owed and active in	managemen	carry traffic for all known		
Fa0/1/0	1,2,3,4,5	i		carry traffic for all known		
				VLANS. This includes VLANS		
Port	Vlans in	spanning tree forw	arding sta		=	
Fa0/1/0	1,2,3,4,5	<		1, 2, 3, 4, and 5		
G1R1#			L		-	
				Copy Pa	aste	

We must now complete configure the other end of the link between G1R1 and G1S2 as a trunk otherwise both devices will be confused and unable to communicate.

Go to Switch G1S2 and access Global Configuration mode. Now issue the commands below

# Interface fa0/1

### Switchport mode trunk

## Exit

Now access **Privileged mode** and issue the command below to verify that interface fa01 is now configured as trunk

#### Show interface trunk

Your screen should look like this:

G1S2 (config	g) #						
G1S2(config) #interface fa0/1							
G1S2(config-if) #switchport mode trunk							
G1S2(config-if) #exit							
G1S2 (config	g) ‡exit						
<pre>G1S2 (config-if) #exit G1S2 (config) #exit G1S2# %SYS-5-CONFIG_I: Configured from console by console G1S2#show interface trunk Port Mode Encapsulation Status Native vlan Fa0/1 on 802.1q trunking 1 Port Vlans allowed on trunk Fa0/1 1-1005 Port Vlans allowed and active in management domain Fa0/1 1,2,3,4,5 Port Vlans in spanning tree forwarding state and not pruned Fa0/1 1,2,3,4,5</pre>							
SYS-5-CON	FIG_I: Configu	ured from consol	e by console				
G1S2#show :	interface tru	nk					
Port	Mode	Encapsulation	Status	Native vlam	1		
Fa0/1	on	802.1q	trunking	1			
Port	Vlans allowed on trunk						
Fa0/1	1-1005						
Port	Vlans allowed and active in management domain						
Fa0/1	1,2,3,4,5						
Port	Vlans in spanning tree forwarding state and not pruned						
Fa0/1							
G1S2#						*	
					Сору	Paste	

The only thing left to do is to assign PC2 an IP address, subnet mask and default gateway so that it may properly join the network. PC2 is attached to switch G1S2 by port fa0/2 which is assigned to VLAN 2. Switch G1S2 is connected to the router G1R1 via a trunk port which will carry all VLANs including VLAN 2. The VLAN 2 virtual interface on router G1R1 has been assigned the IP address 10.0.2.1 so PC2 must be given a spare IP address from this subnet if it is to be able to connect to the network. We will assign it the IP address 10.0.2.2 with mask 255.255.255.0. The default gateway should be the router IP Address from this subnet which is 10.0.2.1

Configure PC2 accordingly then use the ping command to verify that it can communicate with PCO and PC1.

Save your configurations. Go to Privileged mode on G1R1, G1S1 and G1S2 and issue the command

## Copy running-config startup-config

Now **Save** your Packet Tracer configuration. The **Save** command is accessed from the File menu on the Packet Tracer main window.

You may view your complete configuration by accessing Privileged mode on a router or a switchand then issuing the command

# Show running-config

Here is a partial configuration taken from router **G1R1** using this command.

₹ GIR1							
Physical Config CLI							
IOS Command Line Interface							
GIR1#show running-config							
Building configuration							
Current configuration : 925 bytes							
version 12.4							
no service timestamps log datetime msec no service timestamps debug datetime msec							
no service password-encryption							
hostname G1R1							
1							
1							
1							
1							
1							
- 1							
1							
1							
1 1							
1							
<pre>interface FastEthernet0/0 ip address 10.0.6.1 255.255.0</pre>							
duplex auto speed auto							
1							
<pre>interface FastEthernet0/1 ip address 10.0.7.1 255.255.255.0</pre>							
uplex auto speed auto							
1							
<pre>interface FastEthernet0/1/0 switchport mode trunk</pre>							
1	_						
interface FastEthernet0/1/1 switchport mode access	E						
shutdown !							
interface FastEthernet0/1/2							
switchport mode access shutdown							
! interface FastEthernet0/1/3							
switchport mode access							
shutdown !							
interface Vlan1							
	Copy Paste						