Enterprise Networks Test

Instructions

Work in groups of four. Create a document entitled Enterprise Networks. The document must commence with the University ID, surname, forename, of all group members.

	Registration Number	Surname	Forename	% Contribution
Student 1	001174434	Turker	Selin	25%
Student 2	001141387	Hasan	Zahid	25%
Student 3	001141646	Iz	Ekrem	25%
Student 4	001131628	Chavush	Chisel	25%

All group members must individually upload the document. Populate the document with the completed tasks showing sufficient annotated and commented evidence. All References must adhere to Harvard https://www.gre.ac.uk/articles/ils/referencing

Test

You have one supervised laboratory session to start work on the practical. Outstanding sections of the laboratory must be completed in your own time before next week's laboratory session, when you will have to undertake a 70-minute practical test.

You are strongly advised to practice the test beforehand. You may prepare the cables required in the test beforehand.

Technical Support

For technical support contact CMS Technical Support

cms-support@gre.ac.uk

Marking Scheme

Test	%	Mark
Network Design	30%	
Network Implementation	50%	
Fault Detection	20%	
Total	100%	

Introduction

Enterprise Networks permit communication and resource-sharing among a company's business functions and workers, and may even include its suppliers, contractors, and distributors. Here, you will be introduced to the design and construction of enterprise networks, and program Cisco's network equipment. Cisco is the current market leader.

Cisco Packet Tracer

Create a free Cisco Academy account, using your University email, by visiting the following web page.

https://www.netacad.com/courses/packet-tracer/introduction-packet-tracer

Complete the cisco training course.

There is a link in the course to download Cisco Packet Tracer for use on your home machine.

Cables

It is important to understand the different types of cables that are used to wire up the network equipment.

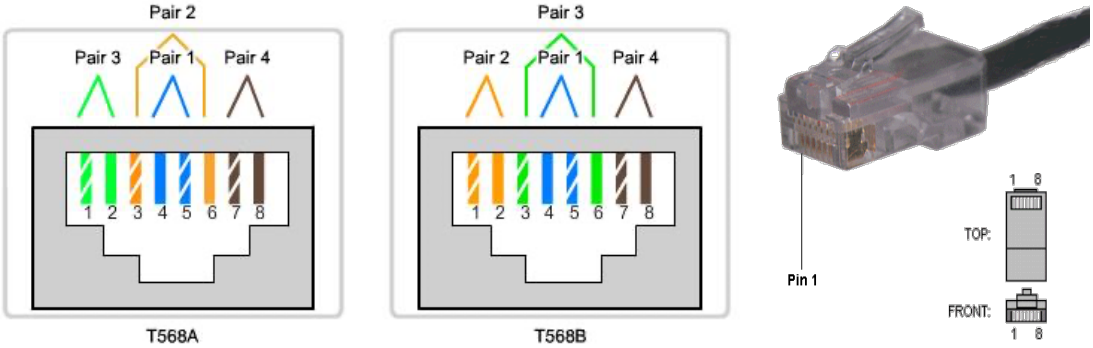
Telecommunications Industries Association / Electronic Industries Association (TIA/EIA) 568-B is a telecommunications standard that addresses commercial building cabling for telecommunications products and services.

T568A and T568B are the two-colour codes used for wiring eight-position Registered Jack 45 (RJ45) modular plugs.

The T568A wiring pattern is recognised as the preferred wiring pattern for this standard because it provides backwards compatibility. The standard specifies that horizontal cables should be terminated using the T568A pin/pair assignments.

Cable Construction

The perspective of the diagram below is looking from the cable into the plug.



Ethernet straight cable - Both ends T568A or both ends T568B.
Ethernet cross over cable - T568A to T568B.

Cable Symbols

Straight Cable _____

Crossover Cable _

TASK 1 - Build a network cable

Cut the cable to the required length - Remove 11 mm of the outer sheath from the cable to expose the twisted pairs. Take care to make sure the twisted pair conductors are not damaged.

Separate out the four pairs and untwist them - Arrange the wires to T568A or T568B, depending on type of cable - Insert ordered wires into RJ45 plug, ensuring that the outer insulation will be under the ridge of the cable grip of the RJ45 connector. If the wires are too long then carefully trim them.

Check that the wires all reach the end of their individual channels in the connector (if they don't, you won't get a good connection) - When the connector fits perfectly on the wires, and the outer sheath enters the connector to the correct distance, and you are sure that you have the wires in the correct positions. Use the crimping tool to make the connection permanent. If you are in doubt as to how to use the crimping tool, ask a member of staff.

Test the competed cable with the 'Velleman LAN Test Network Modular Tester' and the 'Fluke 620 LAN Cable Meter'.

See Appendix C for instructions on how to use the testers.

Private IP addresses

The Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of the IP4 address space for private internets.

These IP address should not be used on the Internet

- 10.0.0.0 - 10.255.255.255
- 172.16.0.0 - 172.31.255.255
- 192.168.0.0 - 192.168.255.255

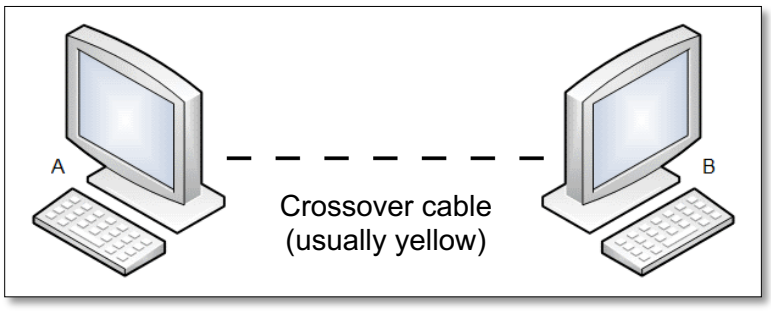
These addresses are common in home and office local area networks (LANs), as globally routable addresses are scarce, expensive to obtain, or their use is not necessary. These addresses are private because they are not globally delegated, meaning they are not allocated to a specific organisation.

Anyone can use these addresses without approval from a regional Internet Registry (RIR). Consequently, they are not routable within the public Internet. If such a private network needs to connect to the Internet, it must use either a Network Address Translator (NAT) gateway, or a proxy server.

TASK 2 - Packet Tracer

- Connect two computers via a crossover cable.

Launch Cisco Packet Tracer and construct the network below.



Drag two computers into the workspace on Packet Tracer from the menu choices at the bottom of the tool (as shown in the diagram). Connect these together using a cross-over cable by selecting the “lightening” icon to see all the cable choices. Roll your mouse over the different cable icons to see the options. Select the Cross-over cable and drag it into the workspace and onto the first computer icon. You should see a number of different connections that are possible – select Fast Ethernet. Then drag it to the other computer to complete the connection.

For the two computers to communicate you need to configure the IP addresses. To configure the IP addresses, choose a PC and click on it. Select the IP Configuration box and configure the Fast Ethernet interface. Choose a Class A private IP Network Address.

It is normal practice for the first network address to be given to the gateway. e.g., for a class C network address 192.168.20.0, the gateway address is 192.168.20.1 and the first host address 192.168.20.2.

On each machine, set the IP address, Subnet Mask and Default Gateway for IPv4 only.

Complete the following table.

Table 1

Network Address	100.0.0.0
Bit Mask (Dotted Decimal)	255.0.0.0
Bit Mask (Binary)	11111111.00000000.00000000.00000000
Gateway Address	100.0.0.1
First Host Address	100.0.0.2
Last Host Address	100.255.255.254
Broadcast Address	100.255.255.255
Host A Address	100.0.0.2
Host B Address	100.0.0.3

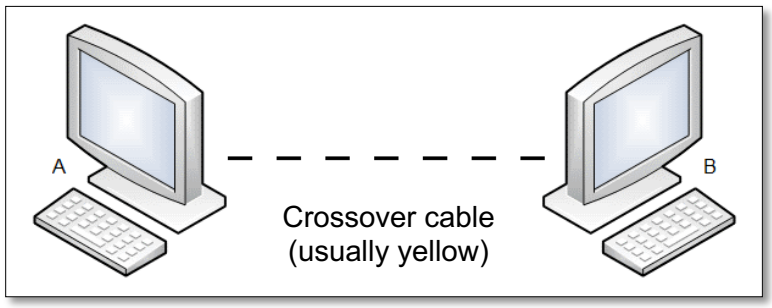
Test connectivity by pinging Computer PC0 from PC1 and vice versa.

To ping in Packet Tracer – Click on the Simulation button in the bottom right to bring up the Simulation Panel. Then click one of the computers and select the Command Prompt icon. Type in the Ping command and the IP address of the other computer. Click on the Play Controls just below the Simulation Panel to see the pings working. To stop – Reset the simulation.

TASK 3 - Connect two computers via a crossover cable.

Identify the 'COMMS network' RJ45 socket on the laboratory bench. The COMMS network socket is the RJ45 socket on the left of the socket pair and is labelled with odd numbering and is connected to the female RJ45 socket on the desktop via a red Ethernet cable - the right-hand socket is the CMS network and is labelled with even numbering and is connected to the rear of the laboratory machine with a grey Ethernet cable.

Log two computers on to the 'COMMS network' and then for each machine disconnect the red cable from the female RJ45 socket on the desktop. Connect the two machines together via the female RJ45 sockets with the yellow crossover cable.



Choose a Class A private IP Network Address and complete the following table. Note, it is normal practice for the first network address to be given to gateway. e.g., for a class C network address 192.168.20.0, the gateway address is 192.168.20.1 and the first host address 192.168.20.2

Table 2

Network Address	100.0.0.0
Bit Mask (Dotted Decimal)	255.0.0.0
Bit Mask (Binary)	11111111.00000000.00000000.00000000
Gateway Address	100.0.0.1
First Host Address	100.0.0.2
Last Host Address	100.255.255.254
Broadcast Address	100.255.255.255
Host A Address	100.0.0.2
Host B Address	100.0.0.3

Set the address information on computer A and computer B

- Click Start > Control Panel> Network and Internet Connections > Network Connections.
- Right-click on connection, and then click Properties
- Click Internet Protocol (TCP/IP), and then click Properties
- For each machine set the IP address, Subnet Mask and Default Gateway Address

Test for connectivity by pinging Machine B from A and vice versa.

Basic configuration of a router via its console interface

Cisco Internet Operating System (IOS) software provides access to several different command modes. Each command mode provides a different group of related commands. For security purposes, Cisco IOS software provides two levels of access to commands: **user and privileged.** The unprivileged user mode is called user EXEC mode.

The privileged mode is called privileged EXEC mode and requires a password. The commands available in user EXEC mode are a subset of the commands available in privileged EXEC mode.

Mode of Operation	Usage	How to Enter the Mode	Prompt
User EXEC	User EXEC commands allow you to connect to remote devices, change terminal settings on a temporary basis, perform basic tests, and list system information. The EXEC commands available at the user level are a subset of	Log in	Device-Name>

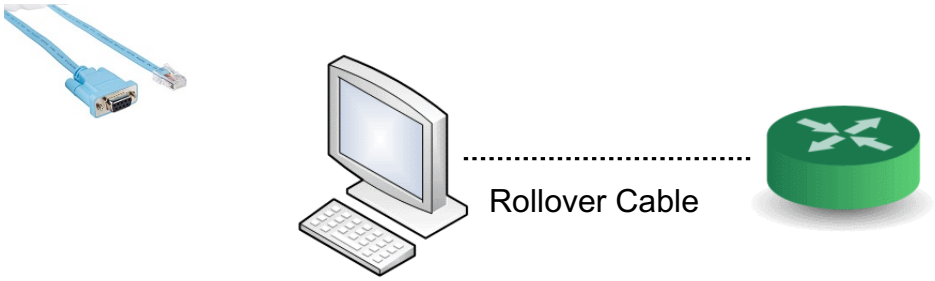
	those available at the privileged level.		
Privileged EXEC	Privileged EXEC commands set operating parameters. The privileged command set includes those commands contained in user EXEC mode, and also the configure command through which you can access the remaining command modes. Privileged EXEC mode also includes high-level testing commands, such as debug.	Enter the enable command from user EXEC mode.	Device-Name#
Global configuration	Global configuration commands apply to features that affect the whole system.	Enter the configure terminal command from the privileged EXEC mode.	Device-Name(config)#

Interface configuration	Interface configuration commands modify the operation of an interface such as an Ethernet or serial port. Many features are enabled on a per-interface basis. Interface configuration commands always follow an interface global configuration command, which defines the interface type.	Enter the interface type number command from global configuration mode. For example, enter the command interface gi0/0 to configure the gigabit Ethernet interface.	Device-Name(config-if)#

Physical Access to Cisco Router

To access the configuration mode of a physical router or switch a console cable must be used.

Console Connection - HyperTerminal is a terminal emulation program for serial communication that can be used to connect to the console port on Cisco IOS devices. For instructions to connect to a router or switch using a console cable see appendix A



TASK 4 - Using Packet Tracer to configure a router

Select the icon from the bottom list names “Network Devices” and select the first router on the list. Click on the router to see how many interfaces it has. Wait for the device to boot up. You will see a window at the bottom called Equivalent IOS Commands.

Select the **CLI tab** on the top menu to access the **IOS Command Line Interface. DO NOT** enter initial configuration dialog. Press Return and you will see Router **>**

Type enable to enter Privilege mode – **Router #**

The Cisco routers have modular interfaces. Different interface cards, such as Ethernet, Fast Ethernet, Gigabit Ethernet, Serial, Token-ring, Fibre Optic, and other media can be plugged into the router's different slots.

Display the router's configuration:

Router# show running-config

Identify the installed interfaces and their physical interface on the router,

Cisco router interface names follow the convention:
Media Type Slot# Port #

Complete the table below.

Table 3

Interface Name	Interface Slot	Interface Port
FastEthernet	0	0
FastEthernet	0	1
Vlan	1	-

Router commands

From the privileged exec mode, enter global configuration mode:

```
Router# configure terminal
Router(config)#
```

Set the device hostname to router1

```
Router(config)# hostname router1
router1(config)#
```

Set the console access password to class. This controls console access to the router.

```
router1(config)# line console 0
router1(config-line)# password class
router1(config-line)# login
router1(config-line)# exit
```

Set the privileged exec password to cisco

```
router1(config)# enable secret cisco
router1(config)#
```

Configure the router's gi0/0 interface (Gigabit Ethernet 0/0) (or interface fa0/0, depending on router) to connect to the IPv4 class C network 192.168.0.0. It is normal practice to assign the first address of the network to a router's interface. So, for the network 192.168.0.0, the interface address should be 192.168.0.1. The bit mask must also be entered with the IP address. In this case, 255.255.255.0 (IPv4 class C).

```
router1(config)# interface gi0/0
router1(config-if)# description Connection to the class C network 192.168.0.0
router1(config-if)# ip address 192.168.0.1 255.255.255.0
```

```
router1(config-if)# no shutdown
router1(config-if)# end
router1#
```

For a configuration to be used the next time the router is powered on or reloaded, it must be saved in the router's Non-Volatile Random-Access Memory (NVRAM)

```
router1# copy running-config startup-config
Destination filename [startup-config]? <ENTER>
Building configuration...
[OK]
```

TASK 5 - Configure a router

Identify the male serial socket on the laboratory bench. Connect the console (rollover) cable to the console port on the router. Connect the other cable end to the male serial socket on the laboratory bench with a DB-9 adapter.

Open Hyper Terminal. At the Connection Description window, enter a session name in the Name field. Click OK.

- Enter the appropriate connection type, COM 1, in the Connect using field. Click OK.
- Change port settings to the following values:
    - Bits per second = 9600
    - Data Bits = 8
    - Parity = None
    - Stop bits = 1
    - Flow control = None
- Click OK

When the HyperTerminal session window comes up, press the Enter key. There should be a response from the router. This indicates that connection has been successfully completed.

To show which version of the IOS is installed. 15.1

```
Router> show version
```

To list the commands available in each mode, enter ? e.g.

```
Router> ?
```

From the user exec mode, enter privileged exec mode:

```
Router> enable
Router#
```

To go back to the previous level

```
Router# exit
Router>
```

Re-enter the privileged exec command mode and list the available commands

```
Router# ?
```

To display the router's configuration, enter the privileged exec command

```
Router# show running-config
```

The routers you are using will need to be set to the default configuration, i.e., there should be no configured passwords, IP addresses or routing configurations. If a configuration file was previously saved, it will have to be removed. To erase the current start-up configuration on the router

```
Router# erase start
Erasing the nvram file system will remove all configuration files! Continue?
[confirm] <ENTER>
[OK]
Erase of nvram: complete
```

```
Router# reload
Proceed with reload? [confirm] <ENTER>
```

Display the router's configuration:

```
Router# show running-config
```

Identify the installed interfaces and their physical interface on the router.

Complete the table below.

Table 4

Interface Name	Interface Slot	Interface Port
Embedded-Service-Engine	0	0
GigabitEthernet	0	0
GigabitEthernet	0	1
GigabitEthernet	0	2
Serial0	0	0
Serial0	0	1

From the privileged exec mode, enter global configuration mode:

```
Router# configure terminal
Router(config)#
```

Set the device hostname to router1

```
Router(config)# hostname router1
router1(config)#
```

Set the console access password to class. The console password controls console access to the router.

```
router1(config)# line console 0
router1(config-line)# password class
router1(config-line)# login
router1(config-line)# exit
```

Set the privileged exec password to cisco

```
router1(config)# enable secret cisco
router1(config)#
```

Configure the router's gi0/0 interface (Gigabit Ethernet 0/0) to connect to the IP4 class C network 192.168.0.0. It is normal practice to assign the first address of the network to a router's interface, so for the network 192.168.0.0 the interface address should be 192.168.0.1. The bit mask must also be entered with the IP address, so in this case as the network is an IP4 class C address the bit mask is 255.255.255.0

```
router1(config)# interface gi0/0
router1(config-if)# description Connection to the class C network 192.168.0.0
router1(config-if)# ip address 192.168.0.1 255.255.255.0
```

```
router1(config-if)# no shutdown
router1(config-if)# end
router1#
```

For a configuration to be used the next time the router is powered on or reloaded, it must be saved in the router's Non-Volatile Radom Access Memory (NVRAM).

```
router1# copy running-config startup-config
Destination filename [startup-config]? <ENTER>
Building configuration...
[OK]
```

Routing Protocols

A routing protocol specifies how routers determine routes between nodes on a network. At start up, each router only knows what networks are directly attached to it. A routing protocol shares this information first among immediate neighbours, and then throughout the network. This way, routers gain knowledge of the topology of the network. There are a wide range of routing protocols, which are used on various network types, such as Ad-Hoc, Cellular, Pico and IP networks.

Specifically, for IP networks the protocols can be classed as Interior Gateway Routing or Exterior Gateway Routing.

Exterior Gateway Routing protocols are used on the backbone of the internet, the most dominant being the Border Gateway Protocol (BGP).
Interior Gateway Routing protocols are used in enterprise systems. Examples include Interior Gateway Routing Protocol (IGRP), Enhanced Interior Gateway Routing Protocol (EIGRP), Open Shortest Path First (OSPF), Routing Information Protocol (RIP) and Intermediate System to Intermediate System (IS-IS).

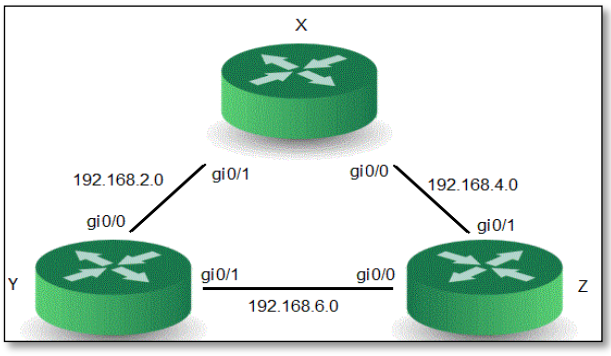
Here, we will focus on RIP, the most popular and the easiest to configure.

TASK 6 - Configuring Routing Protocols

Router Commands

Router Command	**Description**
Router(config)#router rip	Enable the RIP routing process
Router(config-router)#network address 1	Enter the network address of each directly connected network, using the network command
Router(config-router)#network address 2	Enter the network address of each directly connected network, using the network command
Router(config-router)#network address 3	Enter the network address of each directly connected network, using the network command
Router(config-router)#end	

Configure the following network, first using Packet Tracer and then on the real routers.



Router X configuration

```
router(config)# router rip
router(config-router)# network 192.168.2.0
router(config-router)# network 192.168.4.0
router(config-router)# end
```

Router Y configuration

```
router(config)# router rip
router(config-router)# network 192.168.2.0
router(config-router)# network 192.168.6.0
router(config-router)# end
```

Router Z configuration

```
router(config)# router rip
router(config-router)# network 192.168.4.0
router(config-router)# network 192.168.6.0
router(config-router)# end
```

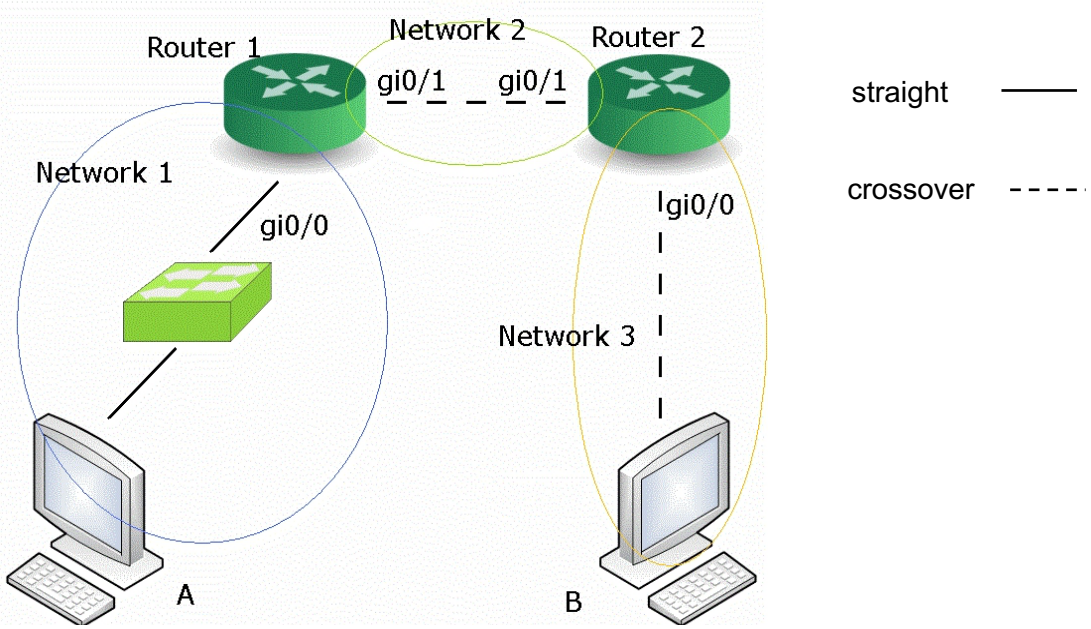
Show connectivity using Ping.

On each router use the command Router#show ip route to see the routing information.

TASK 8 - Network Configuration

First using Packet Tracer and then on the real routers and switches.

Configure the small enterprise network shown to utilise the interior gateway dynamic routing protocol RIP.



Device Name	Router 1	Router 2
Console Access Password	class	class
Privileged exec password	cisco	cisco
Routing Protocol	RIP	RIP

When using the hardware. Clear both the Router and Switch of all settings, see Appendix B.

Complete the two tables,

Table 5

	Network 1 192.168.0.0	Network 2 172.16.0.0	Network 3 11.0.0.0
Network Address	192.168.0.0	172.16.0.0	11.0.0.0
Bit Mask (Doted Decimal)	255.255.255.0	255.255.0.0	255.0.0.0
Router1 Interface Address gi0/0	192.168.0.1	-	-
Router1 Interface Address gi0/1	-	172.16.0.1	-
Router2 Interface Address gi0/0	-	-	11.0.0.1
Router2 Interface Address gi0/1	-	172.16.0.2	-

First Host Address	192.168.0.2	172.16.0.3	11.0.0.2
Last Host Address	192.168.0.254	172.16.255.254	11.255.255.254
Broadcast Address	192.168.0.255	172.16.255.255	11.255.255.255

Table 6

From	To	IP Address	Ping Results
Host A	Router1 Interface Address gi0/0	192.168.0.1	Success
Host A	Router2 Interface Address gi0/1	172.16.0.2	Success
Host A	Host B	11.0.0.2	Success
Host B	Router2 Interface Address gi0/0	11.0.0.1	Success
Host B	Router1 Interface Address gi0/1	172.16.0.1	Success
Host B	Host A	192.168.0.2	Success

TEST

Work in groups of four. You have ninety minutes to complete the test.

Test - Network Design

A system requires the class C IP address 192.158.50.0 is subdivided into four subnets.

Select one of your group members' nine-digit University identification number.
Use this number to generate four numbers (a, b, c, and d) which will determine the number of hosts within four subnets.

Replace 0's from the nine-digit number with the number 2.

Counting from the right, the first two digits are A, the third digit is B**,** the fourth digit is C and the fifth digit is D.

For example, for the id number 000643086, a = 86, b = 2, c = 3 and d = 4.

Complete the table.

Subnet	1	2	3	4
Number of Hosts	46	6	1	4

Complete the following table. Router Interfaces will use the first IP address in the subnet address block.

Table 7

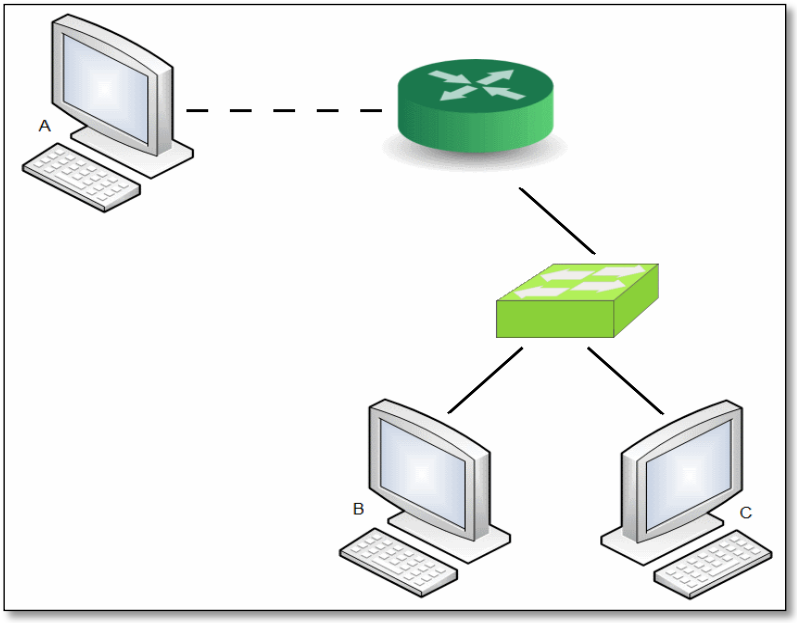
	Subnet 1	Subnet 2	Subnet 3	Subnet 4
Number of Hosts	62	62	62	62
Network Address	192.158.50.0	192.158.50.64	192.158.50.128	192.158.50.192
Router Interface Address	192.158.50.1	192.158.50.65	192.158.50.129	192.158.50.193
First Host Address	192.158.50.2	192.158.50.66	192.158.50.130	192.158.50.194
Last Host Address	192.158.50.62	192.158.50.126	192.158.50.190	192.158.50.254

Broadcast Address	192.158.50.63	192.158.50.127	192.158.50.191	192.158.50.255
Bit Mask (Binary)	11111111.11111111.11111111.11000000	11111111.11111111.11111111.11000000	11111111.11111111.11111111.11000000	11111111.11111111.11111111.11000000
Bit Mask (Doted Decimal)	255.255.255.192	255.255.255.192	255.255.255.192	255.255.255.192

Test - Network Implementation

Clear both the Router and the Switch of all settings – see appendix B.

For the network shown.



Identify what cable types are required and construct the four cables. Test the cables with the 'VTLAN3 Velleman LAN Test Network Modular Tester' and the 'Fluke 620 LAN Cable Meter'

Construct the topology

Using the subnetting scheme from Test - Network design.

Computers B and C are on subnet 1

Computer A is on subnet 2

Configure the router such that:

- Set the device name to test
- Set the console access password to class
- Set the privileged exec password to cisco
- Routing Protocol RIP

Complete the table.

Table 8

From	To	IP Address	Ping Results
Host A	Gateway	192.158.50.70-192.158.50.65	Success
Host A	Host B	192.158.50.70-192.158.50.10	Success
Host A	Host C	192.158.50.90-192.158.50.20	Success
Host B	Gateway	192.158.50.10-192.158.50.1	Success
Host B	Host A	192.158.50.10-192.158.50.70	Success
Host B	Host C	192.158.50.10-192.158.50.20	Success
Host C	Gateway	192.158.50.20-192.158.50.1	Success
Host C	Host A	192.158.50.20-192.158.50.70	Success
Host C	Host B	192.158.50.20-192.158.50.10	Success

Test - Fault Detection

Ask a lecturer to introduce two problems into your network while you look away. Problems can be either physical or logical. Then, try to solve these problems.

Table 9

Fault	Solution
Cable was not connected properly.	We connected the cable.
No shutdown and duplex auto	

Test Upload

Before you leave the laboratory, you must upload the test as PDF.

You cannot upload later. Failure to upload will result in a zero grade.

Appendix A

Connecting to a router or switch using a console cable

Identify the male serial socket on the laboratory bench. Connect the console (rollover) cable to the console port on the router. Connect the other cable end to the male serial socket on the laboratory bench with a DB-9 adapter.

Open Hyper Terminal. At the Connection Description window, enter a session name in the Name field. Click OK.
Enter the appropriate *connection type*, COM 1, in the *Connect using* field. Click Okay. Change port settings to the following values: -

- Bits per second = 9600
- Data Bits = 8
- Parity = None
- Stop bits = 1
- Flow control = None

Click Okay.

When the HyperTerminal session window comes up, press the Enter key. There should be a response from the router. This indicates that connection has been successfully completed.

Appendix B

Router# erase start

Erasing the nvram file system will remove all configuration files!

Continue?

[confirm] <ENTER>

[OK]

Erase of nvram: complete

Router# reload

Proceed with reload? [confirm] <ENTER>

Switch# delete vlan.dat

Switch# erase start-up config

Erasing the nvram file system will remove all configuration files!

Continue?

[confirm] <ENTER>

[OK]

Erase of nvram: complete

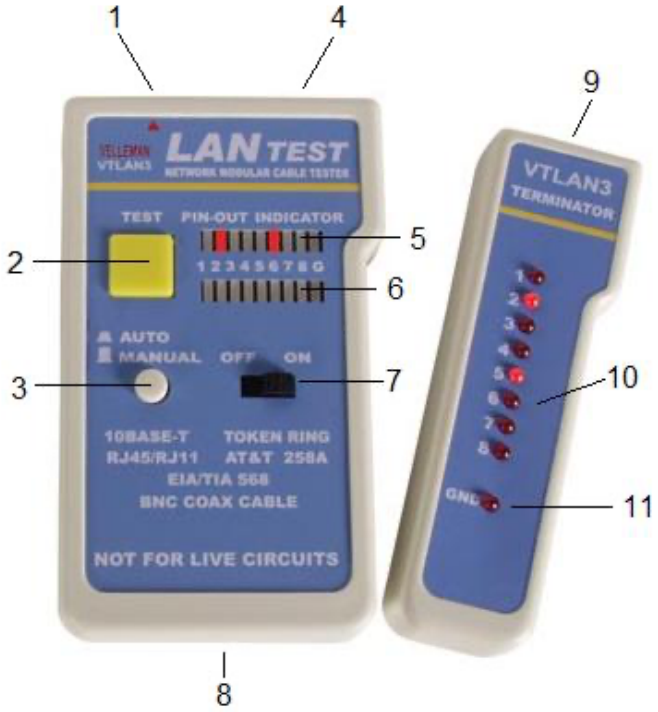
Switch# reload

Proceed with reload? [confirm] <ENTER>

Appendix C

VTLAN3 VellemanLAN Test Network Modular Tester

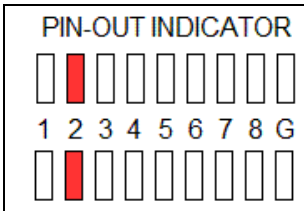
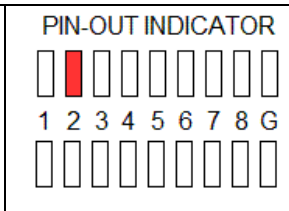
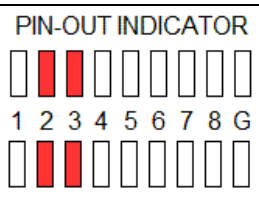
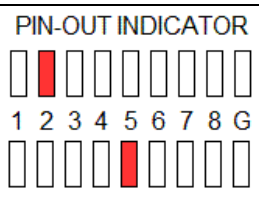
This device can be used for testing network and telephone cables (RJ-45, 10 Base-T, Token Ring, RJ11/12 USOC and coaxial BNC). It can test cables from a distance and in places that are not easily accessible. It automatically runs all tests and checks for continuity, open, shorted, and crossed wire pairs.



1. RJ45 socket (send)
2. Manual test button (advances step by step during manual test mode)
3. Auto / manual test switch
4. RJ45 socket (receive)
5. Send indicator graph
6. Receive indicator graph
7. Power switch
8. Battery box (backside of the unit)
9. RJ45 socket (receive)
10. Receive indicator LEDs
11. Shield earth indicator LED

Testing RJ45 and similar cables

- Insert one end in the SEND RJ45 socket (socket marked with small triangle) and the other in the RECEIVER RJ45 socket.
- Switch on the device.
- Select the manual or the automatic test mode.
- In automatic test mode, the tester will start testing and the LED graph will light from left to right. In manual mode, push the TEST button to advance a step at a time.
- The upper graph represents the input signal; the lower graph represents the output signal. If they match and are lit in sequence, the cable is OK. If not, refer to the examples below to pinpoint the error: -

			
Good connection	Open circuit: 2nd wire is broken	Short-circuit between 2nd and 3rd wire	Cross connection between 2nd and 5th wires

Remote Testing

- Insert one end in the SEND socket and the other end in the RECEIVER socket or a terminator.
- If the cable is fixed onto the wall or underground and only the jack is available, use an adapter wire or the RJ45 test wire.
- Read the output from the terminator.

Fluke 620 LAN Cable Meter

The Fluke 620 LAN Cable Meter is a battery operated, handheld instrument that identifies cable failures, measures length, and checks the wiring of cables used for Device Net, Control Net, and Ethernet Local Area Network (LAN) systems. The device tests for incorrect pairing, split pairs, mis wired, shorted and open wires on all twisted pair cables, as well as shorts on coaxial cables.

The cable type is normally printed on the cable. However, all the cable you will be using in the laboratory is Unshielded Twisted Pair (UTP), Telecommunications Industries Association / Electronic Industries Association (EIA/TIA) 4 pair, CAT 5, American Wire Gauge (AWG) 24, 100 Ω.

- Set Calibrate to Cable to No.
- Turn the rotary switch selector on the tester to the WIRE MAP position. The wire map function displays which pins on one end of the cable are connected to which pins on the other end.
- Press the SETUP button to enter the setup mode and observe the LCD screen on the tester.
- Press the UP or DOWN arrow buttons and ENTER to select an option.

CABLE	UTP
WIRING	EIA/TIA 4 Pair (4PR)
CATEGORY	Category 5
WIRE SIZE	AWG 24

CAL to CABLE?	Yes
BEEPING	On
LCD CONTRAST	8

When satisfied that the settings are correct, press the SETUP button to exit setup mode.

Making Tests and Measurements

Three modes can be selected via the rotary switch selector:-

Wire Map - Displays wiring connections, shorts, opens, and split pairs. Place the near end of the cable into the RJ45 jack labelled UTP/FTP on the tester. Place the RJ45 -RJ45 female coupler on the far end of the cable, and then insert the cable identifier into the other side of the coupler. The wiring of both the near and far end of the cable will be displayed. The top set of numbers displayed on the LCD seen refers to the near end, and the bottom set of numbers refers to the far end.

Length - Measures the length of coaxial cables and each pair of twisted pair cable in feet or meters and tests for anomalies. Place the near end of the cable into the RJ45 jack labelled UTP/FTP on the tester. Place the RJ45 -RJ45 female coupler on the far end of the cable, and then insert the cable identifier into the other side of the coupler.

Test - Tests the attached cable and indicates a “pass or fail” based on the parameters specified for the selected cable. Place the near

end of the cable into the RJ45 jack labelled UTP/FTP on the tester. Place the RJ45 -RJ45 female coupler on the far end of the cable, and then insert the cable identifier into the other side of the coupler.