**Question -**

**Topology overview**

* **1 router to connect both departments.**
* **2 switches. 1 for each department. Switches will connect to the router.**
* **2 PCs connected to each switch.**
* **1 Printer for each department**
* **Set up a CLI username and password for router. Username – admin, password- P@$$w0rd**

**Solution and Explanation.**

Before connecting the wires we must place the appropriate end devices, switches and routers.

A diagram of a network

Description automatically generated

So each department has a switch connecting 1PC, 1 laptop and a printer.

1. **Connecting using wires**

A screen shot of a computer

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Figure 1.1

If we choose the above-marked option in Figure 1.1, we can select the “Automatically choose connection type” option. It means it will choose the right wire for the connections on its own.  
But Since we have to connect each device together, we need to understand if we use straight-through cable or crossover cable.   
***If we are connecting a router to a switch, we use straight-through cables, since they transfer data using different pins. But if we want to connect a router to a router we use cross-over cable.***

***A screenshot of a computer

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1. **Subnetting**

We have 2 departments hence we need 2 subnets. We can borrow one bit from the 4th octet since the formula to calculate subnet is 2^n.

So 2^1. N equals 1. Hence the fourth octet looks like 1000000.

We are given the 192.168.40.0 range.

**Accounts department**

**Our subnet mask will be** – 255.255.255.128

**Our network address is** - 192.168.40.0

**First network address is** - 192.168.40.1

**Last usable address** is - 192.168.40.126

**Broadcast address is** – 192.168.40.127

Address range – 192.168.40.1-192.168.40.126 (inclusive)

**Delivery Department**

**Our subnet mask will be** – 255.255.255.128

**Next network address is** – 192.168.40.128

**First network address is** - 192.168.40.129

**Last usable address is** - 192.168.40.254

**Broadcast address is** – 192.168.40.255

Address range - 192.168.40.129-192.168.40.254 (inclusive

1. **Configurations** –

On Router –

1. To keep a password for CLI I used the following commands.

Enable

Configure terminal

Line console 0

password P@$$w0rd

login

2 – If we use the ***do show ip int brief*** command, we see 2 interface gigabitehernet0/0/01 and 0/0/1. Both are administratively down. To enable them we use the “no shutdown” command, by going to he respective interfaces or using the range command.  
A screenshot of a computer screen

Description automatically generated

Results of no shutdown command. The status column changed to up.

A screenshot of a computer

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The status changed to up.

3 – We will be assigning ip address of 192.168.40.1 to g0/0/0. The switch of the accounts department is connected to this interface. 192.168.40.129 to g0/0/1 for the delivery department.

A computer screen with green text

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**Setting up end devices (PC, laptop and Printer)**

We will assign 192.168.40.2, 192.168.40.3, 192.168.40.4 to PC1, laptop1, and printer in the accounts department. Default gateway is router g0/0/0 ip address, i.e. 192.168.40.1

We will assign 192.168.40.130, 192.168.40.131, 192.168.40.132 to PC1, laptop1, and printer in the accounts department. Default gateway is router g0/0/1 ip address, i.e. 192.168.40.129.

We can do this by cimply clicking on the respective end devices, and going to configure tab.

A screenshot of a computer

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**Commands on Switch.**

This wasn’t mentioned in the task, but we will shut down switch interfaces which aren’t in use. This is a good security practice.

Use the command ***show ip int br***

A screenshot of a computer

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We see interfaces 5-24 is down

So we use the below command to turn it off

A screen shot of a computer

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**Final Test of Ping**

Ping from PC1 to, PC2, Printer 2, and Laptop 2.

To ping we go on the respective end device, and click the Desktop option.

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A screenshot of a computer program

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Iur ping successfully works this means our topology is working.