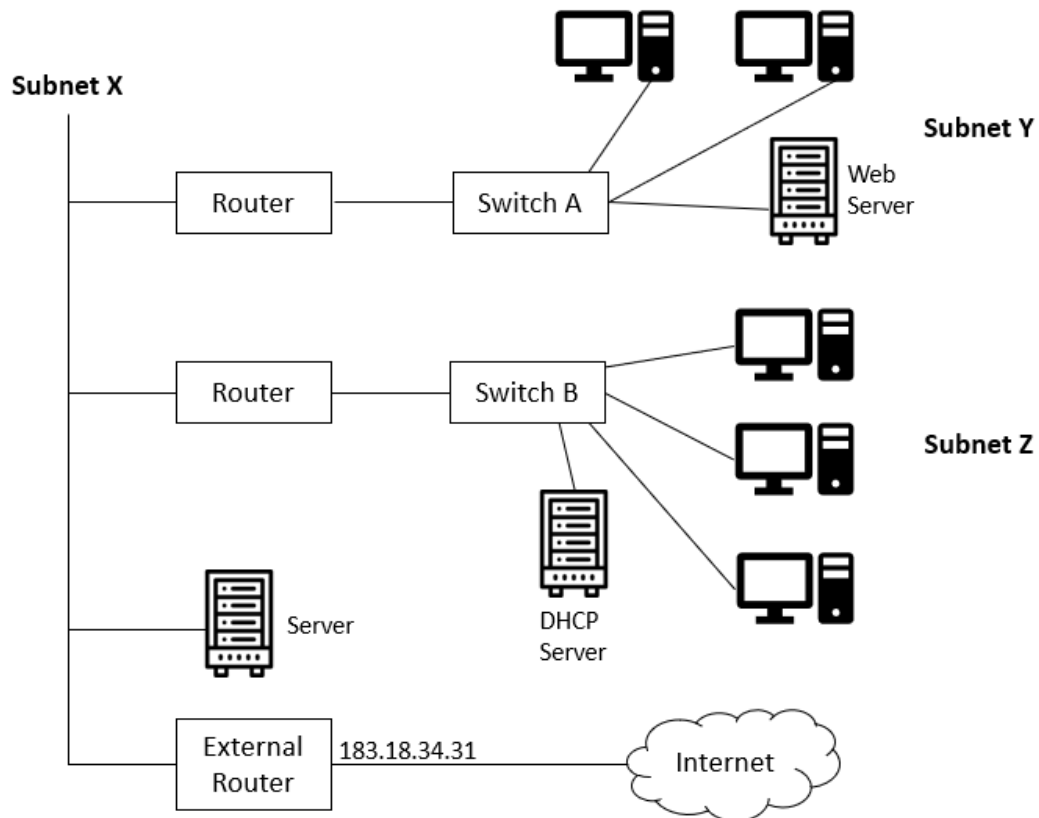


4.9.4.3 IP Addresses & Subnets

- 1) **Figure 1** shows the physical topology of a local area network (LAN) used by a company, and its connection to the internet. The LAN uses the IPv4 protocol.

Figure 1



Internally, the network has been divided into subnets: 27 bits have been allocated to the network/subnet identifier.

- a) In binary, write out the subnet mask that has been programmed into the device on the network.

[illegible]

[1 mark]

- b) Subnet Z** consists of all the devices that are directly connected to Switch B.

What is the maximum number of devices that could be connected to **Subnet Z** at the same time?

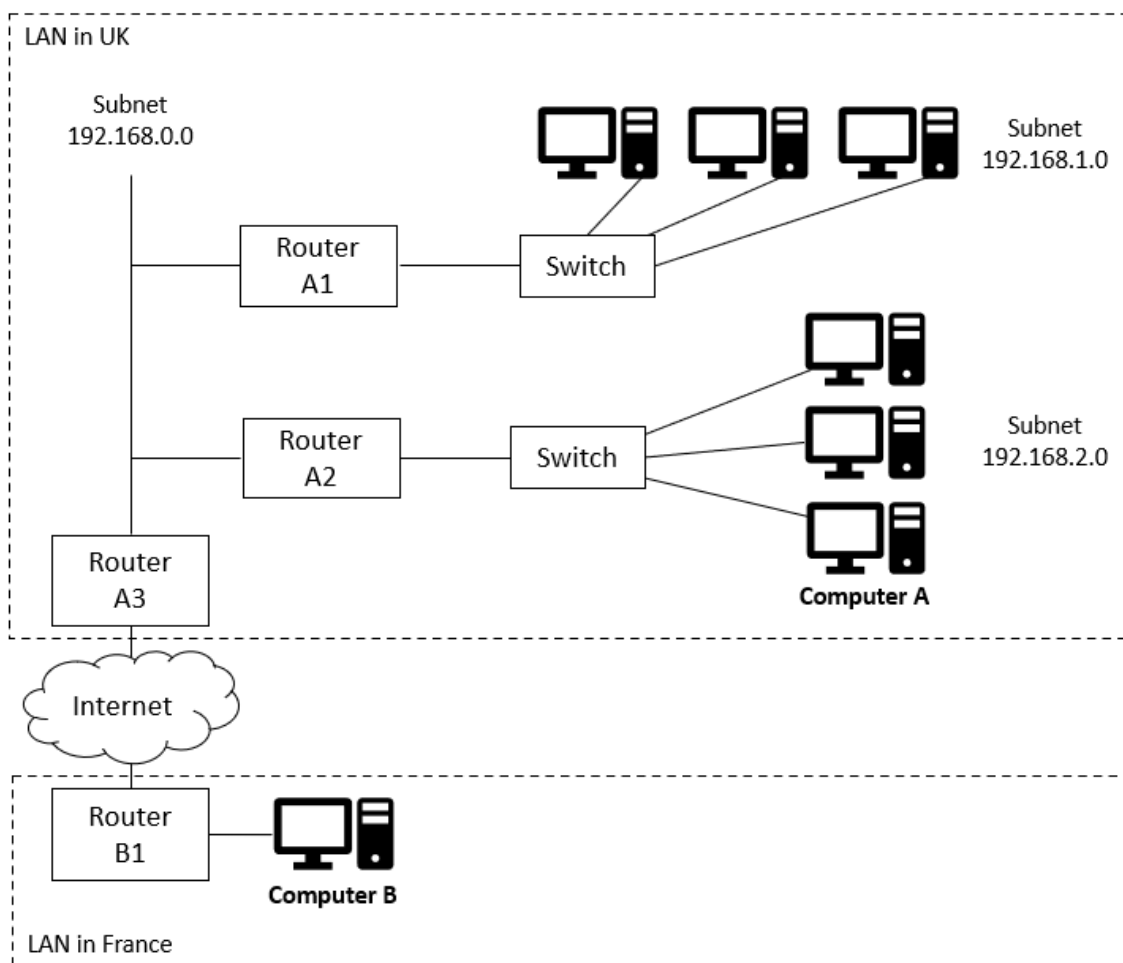
[1 mark]





2) Figure 2 shows a computer (**Computer A**) which is located on a LAN.

Figure 2



Computer A has the IP address 192.168.2.3

Many other computers connected to the Internet have the same IP address.

Explain how two or more computers connected to the Internet can have the same IP address and still communicate with each other.

[2 marks]





- 3) A packet of data is to be transmitted across the internet from a Computer A in the UK to a Computer B in Belgium.

Explain how Computer A will use a subnet mask to determine whether it can send the packet directly to Computer B across the LAN or if the packet must be sent via the Internet.

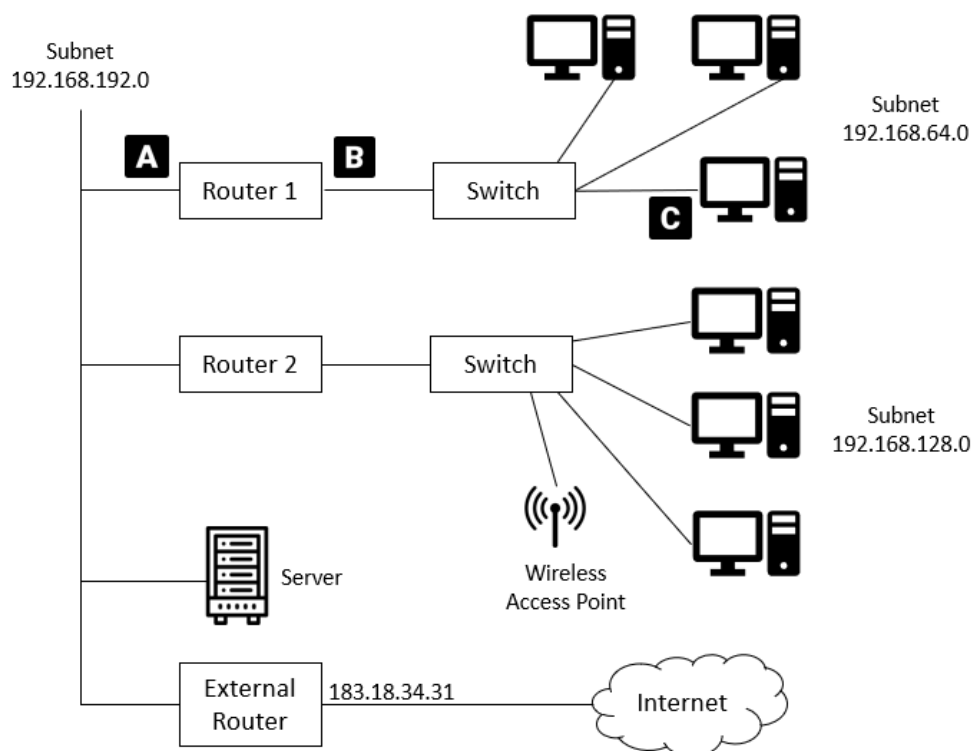
[3 marks]





- 4) **Figure 3** shows a computer network. The devices connected to the network are identified using IPv4 addresses. When assigning IP addresses, 20 bits have been allocated to the Network IDs and 12 bits have been allocated to the Host IDs.

Figure 3



- a) State suitable IP addresses for
- The Router 1 port labelled **A**
 - The Router 1 port labelled **B**
 - The computer labelled **C**

[3 marks]

- b) Which of the following four subnet masks (**A-D**) is the one that has been assigned to the devices connected to the network in **Figure 3**.

A	255.255.0.0
B	255.255.15.0
C	255.255.240.0
D	255.255.255.0

[1 mark]





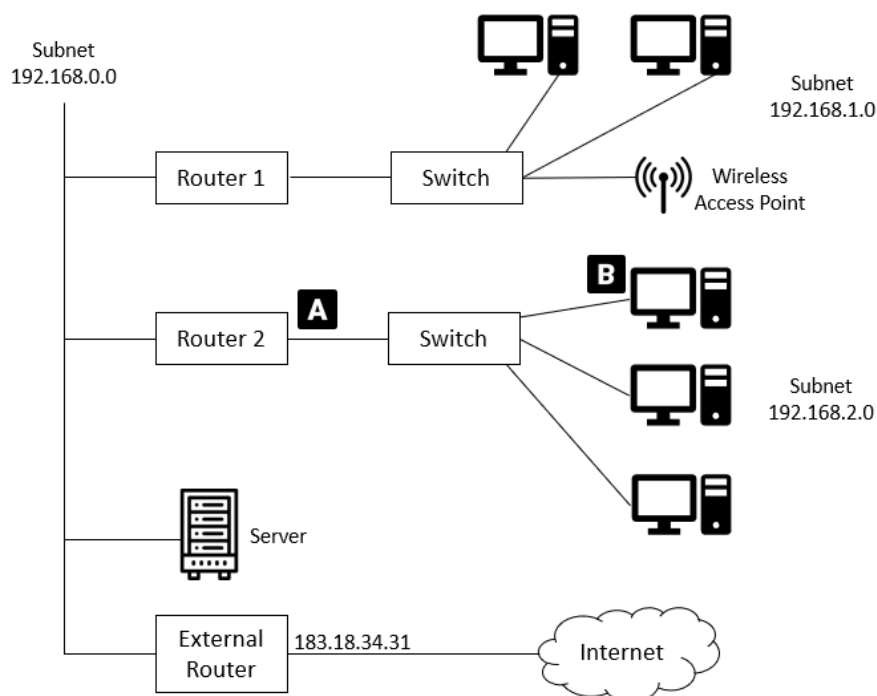
- c) The devices on the network in **Figure 3** use IPv4.

State **one** reason why IPv6 has been introduced to replace IPv4.

[1 mark]

- 5) **Figure 4** shows the physical topology of a local area network (LAN) and its connection to the Internet. The LAN uses the IPv4 protocol.

Figure 4



- a) State suitable IP addresses for:
- The Router 2 port labelled **A**
 - The computer network interface card labelled **B**

[2 marks]

