

Solutions

Each answer shows the steps, then the **result**.

2.1

- **client-server**
- any two: files are stored and backed up centrally; one user account works on any machine; software and security are managed once, on the server; the server can be a powerful machine

2.2

- any two: a thin client does little or no processing locally, a thick client does its own; a thin client stores almost nothing locally, a thick client stores its own files; a thin client depends on the network at all times, a thick client can work without it; a thin client is cheaper than a thick client

2.3

- the sending device passes the packet to the central switch
- the switch reads the destination address and forwards it **only** down the cable to that device

2.4

- a **bridge** joins two LAN segments into one network and passes traffic between them
- a **repeater** receives a weakened signal and retransmits it at full strength, extending the reach of a cable

2.5

- a switch sends data to a device **within** one LAN, using its MAC address
- a router sends data **between different networks**, using the IP address

3.1

(a) within one campus: a **LAN**; between the two campuses: a **WAN**

(b) a LAN covers a small area – one site or building – and the university owns its own switches and cabling

- the campuses are five kilometres apart, which is a large geographical area
- the link between them must be leased from a telecommunications company rather than owned, which is what makes it a WAN

3.2

(a) a **mesh** topology

(b) every device is linked directly to others, so there are several possible routes between any two

- a packet is passed from node to node along one of those routes

- if a link or device fails, the packet is rerouted along another path, so the network keeps working – which is what a hospital needs

(c) it needs a great deal of cabling, so it is expensive to install and to extend

3.3

(a) the **server** does the processing and stores the data

- the client only sends the user's input and displays the output it receives
- (b) benefit, any one: the client machines are cheap; everything is backed up, updated and secured in one place
- drawback, any one: nothing works if the network or the server fails; the server must be powerful enough for every client at once

3.4

(a) any three, one mark for the name and one for the function:

- **switch** – connects the devices in the LAN and forwards each frame only to the port for its destination
- **NIC** – lets a device send and receive on the network, and carries its unique MAC address
- **router** – connects the LAN to the internet and forwards packets between the two networks
- **cabling** – carries the signals between the devices and the switch
- **WAP** – lets wireless devices join the wired LAN
- **server** – provides a service to the other devices, such as files or printing

(b) it joins the LAN to a **different** network, here the internet

- it reads each packet's destination **IP address** and forwards it using its routing table
- any one further function: it hands out private IP addresses by DHCP; it performs network address translation so the LAN shares one public address; it acts as a firewall