

Chapters 4 and 5 :

Describe how a router forwards data packets from one network to another.

The router reads the data packet destination address  
Looks up the paths to get to that address  
Compares to its routing table to get to the destination address  
Checks how busy the paths are  
Sends the packet on the least congested/quickest path

Describe what is meant by video-conferencing.

Video-conferencing is the use of telecommunication technologies  
It uses an internet connection  
It allows people in two or more locations to communicate  
Allows long distance communication  
Using simultaneous two-way communication  
Uses video and audio transmissions/streaming

Disadvantages of video-conferencing:

Video conferencing equipment can be expensive to buy  
The communication link could be expensive to set up and operate/satellite/internet link needed  
Lip sync/lagging can be an issue  
If the hardware breaks down the conference fails // poor connection conference fails  
Time zones as the games are in Australia and company is based in London  
Needs organising as to who's turn it is next // not talk at the same time  
Any sound in the conference can be picked up by microphones  
Open microphones can distort the sound

ways in which employment patterns have changed since the introduction of ICT

Part time working  
Job-sharing  
Compressed hours  
Flexible hours/flexi-time

### **Compressed hours**

Any **two** from:

- The worker completes the normal working hours per week...
- ...but works for fewer days
- For example, a 40-hour week compressed into 4 days not 5

### **Flexible hours**

Any **two** from:

- Workers complete the same number of hours over a working week...
- ...but can choose when to start and end in agreement with the manager
- Allows for workers to complete the school run or miss rush hour

Discuss the advantages and disadvantages of using Bluetooth or WiFi.

*Answers may make reference to, for example:*

Bluetooth is more useful when transferring data between two devices whereas WiFi is more suited to full scale networks

Bluetooth does not buffer

The devices connected via Bluetooth should be near to each other whereas WiFi has a larger range

Less data tends to be transferred with Bluetooth

Bluetooth uses a lower bandwidth

Eg sound data (phones) or file transfer (computers)

WiFi has better security than Bluetooth

Cost of Bluetooth is cheaper than WiFi

Bluetooth has a shorter password

Bluetooth devices are battery operated which needs to be replaced or recharged but

WiFi do not necessarily use batteries

To connect to the network need a Bluetooth adapter but WiFi needs a WiFi adapter, a wireless router and a wireless access point

Bluetooth range is approx. 20m whereas WiFi is approx. 100m

Bluetooth is simple to use and setup but WiFi is more complex

Bluetooth/Wifi are both wireless can't fall over the wires/move around the house

Saves money (on cables) as both do not require wires

Bluetooth is more energy efficient than wifi

in some cases 3% of the energy

Describe how security can be improved in a WiFi network.

Secure the wireless router/network with a strong password

Do not broadcast the wifi security key/SSID

Enable WPA encryption

Disable remote administration to the router

Enable user management

Change from the default SSID

Use MAC address filtering/change the router IP address

Use wireless security software

- (a) Two or more employees doing the same job but working at different times is called  
.....[1]
- (b) When a person is employed to work fewer hours than the normal working week, this is called  
.....[1]
- (c) When employees work the full normal hours in a week but work at times which suit them and the employer, this is called  
.....[1]
- (d) When an employee works the full normal hours in a week but works fewer days, this is called  
.....[1]

#### *Router*

The network software in the original computer determines that the destination computer is on a different network...

...using IP addresses

Data is sent to the switch/hub and then passed to router  
the router then passes it to the router of the other network  
that router passes it to the switch/hub...  
...to the destination computer

#### *Bridge*

The computer sends the data to the bridge via the hub/switch...

...using MAC addresses

if the protocol/MAC address is same, bridge passes data to the other network

Bridge passes it to the switch/hub...

...to destination computer with correct MAC address

Describe two similarities between physical faxing and electronic faxing.

Both involve you being assigned a fax (phone) number  
Both can involve use of a hard copy original  
Both require the use of a phone line

Describe three differences between physical faxing and electronic faxing.

Physical faxing requires purchase of a fax machine/electronic faxing requires use/purchase of a computer/scanner

Physical faxes can be picked up by anyone/electronic faxing goes straight to your email address

Physical faxes – phone-line could be busy/engaged – electronic faxes – phone line never registers as busy/engaged

Physical faxes – must have paper and can get paper jams

Electronic fax is quicker to arrive than physical

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They are going to set up an audio-conference. Describe the process of setting up this type of conference.

**Four** from:

Agree the date and time of the conference

**Either**

Contact an audio conferencing provider ...

...for organiser's PIN

...for participant's PIN

Give the PIN to each participant

at the start of the conference organiser types in his PIN

Each participant dials the number and enters the PIN

**or**

the organiser phones/contact the first participant

the organiser phones/contact subsequent participants

puts them on hold...

...until all participants have been contacted

joins the participants together/joins the conference

Explain why a firewall is needed.

It is needed for network security

It controls the incoming and outgoing network traffic.

A firewall establishes a barrier between a trusted, secure internal network and the Internet

It logs incoming and outgoing traffic

It stops malicious traffic

It prevents computers connecting to unwanted sites

It prevents untrusted/unrecognised computers accessing data on the system

Describe the function of a router.

Routers inspect/read the IP address of the data packets sent to it

Sends the data packet to a switch with that IP address

It may use the MAC address of the switch to do that by converting the IP to a MAC using ARP...

...until it finds the corresponding switch

Describe two advantages for each of the following methods

#### WiFi

Any **two** from:

- Can connect to the internet from any room in a house
- No cables
- Can be used on multiple devices

#### Satellite

Any **two** from:

- This is broadband
- Useful for general use of the internet
- (Connects via satellites so) better coverage
- Can be used almost anywhere in the world

#### 3G/4G

Any **two** from:

- Used in mobile devices laptops/tablets/smartphones
- Connects wireless through the 3G or 4G network
- Allows access on the move
- Allows access even if no WiFi available
- Not affected by rain or snow as satellite communication

Describe what an ISP is and, apart from security measures, describe what it offers its customers.

Internet Service Provider/provides Internet access – 1 mark

**Two** from:

- Often offers web space to create own website
- Provides email address
- Router to connect to the internet
- Domain name to have own website
- Storage space to save data in the cloud
- DNS service to convert URLs to IP addresses

Describe one other disadvantage of a WiFi network compared to a cabled network.

Can get interference from another radio signal/speed of data transmission can be slower

Explain what is meant by VOIP.

Voice over Internet Protocol

A set of rules that enable people to use the Internet to make telephone calls/talk each other

Sends voice data in packets using IP

[2]

Identify two different types of job where employment has decreased

Payroll workers

Typing pool workers

Car production workers

Checkout operators

Bank workers

Identify two different types of job where employment has increased.

Website designers

Computer programmers

Delivery drivers in retail stores

Computer maintenance staff

Robot maintenance staff

Describe the details of computer addresses that are stored by a router.

Stores IP addresses

IP address is a unique identifier set up by network manager/ISP

Can change but should match the network it's on

IP address consists of 4 numbers separated by full stops

Stores MAC addresses

6 pairs of hexadecimal digits

MAC address is usually hard coded by manufacturer, never changes

Describe three ways she could reduce the amount of excess information she gets without changing either her computer or ISP.

Used advanced searches

Use Boolean operands...

...use + and – to limit results to only key words

Use speech marks around key phrases

Use the specific web address

A school has a cabled LAN. The head teacher of the school wants to replace it with a WLAN. Explain the differences between a cabled LAN and a WLAN, giving two advantages and two disadvantages of having a WLAN.



LAN uses cables to transmit data whereas a WLAN uses wireless technology to transmit data (1 mark)

**Advantages (2 marks)**

Any **two** from:

cheaper as less cabling is required  
new workstations can be sited anywhere  
different devices can be connected easily

**Disadvantages (2 marks)**

Any **two** from:

- limited area of network
- strength of signal is weaker
- easier to hack into/less secure
- physical obstacles can interfere with signal/can cause disconnection
- slower data transmission rates

[5]

Multi-national companies often use video-conferencing. Discuss the advantages and disadvantages of holding video-conferences rather than face-to-face meetings.

**Examples of advantages:**

- workers can use own office so documents do not get lost in transit/bulky documents/equipment do not have to be carried around
- company can call meeting at short notice
- company does not have to pay travelling expenses
- company does not have to pay hotel expenses
- company does not have to pay for conference room facilities
- travelling time is saved
- might be dangerous to fly/travel
- disabled people may find it difficult to travel

**Examples of disadvantages:**

- takes time to train employees
- difficult to call international meetings because of time differences
- initial cost of hardware
- equipment can break down
- strength of signal/bandwidth/lipsync can be a problem/connection can be lost/power cuts
- loss of personal/social contact with other workers
- takes time for workers to learn new technology
- cannot sign legal documents

[8]

Give three reasons why it would not be sensible to use batch processing in an online theatre booking system.

It might lead to double booking

Customer would not be sure booking has been successful

Would take a long time to receive confirmation/ticket

Processing would take a long time which would cost company money

Describe four items which can be provided by an ISP.

Access to the internet  
Email address  
Router to connect to the internet  
Domain name to have own website  
Email security software  
Web space to create own website  
Storage space to save data in the cloud  
DNS service to convert URLs to IP addresses  
Firewall to block unauthorised traffic

Disadvantages of biometrics :

The necessary software/equipment is more expensive to purchase  
Takes longer to match data  
If individual gets ill/background noise can make voice unintelligible to system  
With certain illnesses retina scans stop working  
Injuries to fingers can cause biometric device to fail to recognise you.  
Could be wearing contact lenses which would stop retina scan working

LAN

**Two** from:

- LAN is a Local Area Network
- LAN covers a small area/one building
- A school network is a LAN

WAN

**Two** from:

- WAN is a wide area network
- WAN covers a large geographical area/worldwide
- The Internet is a WAN
- A WAN consists of connected LANs

WLAN

**Two** from:

- WLAN is a wireless local area network
- Uses wireless technology to transmit data
- Uses Wireless Access Points (WAPs) connected to a wired network



A hub

Broadcasts data to all computers/devices in a network

A bridge

Passes data to another network

A switch

Passes data to specific computers/devices in a network

A proxy server

Retrieves web pages and passes them to the computer that requested it/caches web pages

**What improved the internet ?**

Optical fibre broadband

Increased bandwidth

Fourth generation mobile telecommunications

Apart from security aspects, describe the role of a proxy server

- Can act as a web server

- Can act as a buffer between internet and LAN

- Server passes on requests to the internet

- Passes the requested web pages to individual computers

- Can cache/store the webpages

- Subsequent requests for that/those web page(s) are responded to more quickly

- Can be used to monitor internet usage

Uses of Internet :

- Using social networks

- Booking tickets

- Playing educational games

- Watching videos/music

- Send/receive emails

- Create a blog/description of blogging

- Researching current affairs/school work

- Looking at the news

- Reading ebooks/books online