

Data and information

1	Data	140799	210999
	Information	John's birthday is 14 July 1999	Jodie's birthday is 21 September 1999
	Knowledge	John is older than Jodie	

2 fit for purpose, accurate, unbiased, up-to-date

3 Garbage In, Garbage Out

4 a) Data + **Context** + **Meaning** = Information

b) Knowledge = **Information** + **Rules**

5	Data	141211
	Information	The sell-by date is 14 December 2011
	Knowledge	This food is out of date

Data validation

1 Data could be (four from)

- collected and recorded wrongly
- entered into the computer incorrectly
- processed incorrectly
- deliberately or accidentally changed by unauthorised people (hacking)
- become corrupted when being transmitted from one computer to another.

2	Data entered	Correct data	Type of validation check
	GLL93 5ZZ	GL93 5ZZ	Format
	23.2	2.32	Range
	9 781906 71106 0	9 781906 71106 1	Check digit

3 a) form, from **b)** Verification

4 a) Colour is missing. **b)** Presence check

5 $0 \geq \text{mark} \leq 75$

Services

1 Four from

betting, dating, voting, shopping, gaming

2	Device	Input	Output
	A computer monitor		✓
	Speaker		✓
	Mouse	✓	
	Joystick	✓	

- 3** You pay a subscription and then you pay an agreed amount for each film or live sporting event you watch.
- 4** Advantages (two from)
- Games can be educational.
 - Games can also be simulations in which real-life situations can be practised.
 - Many games are collaborative and involve team work.
 - Quick thinking and good hand–eye coordination could be developed.
 - Games that normally need more than one player (such as chess) can be played alone.
- Disadvantages (one from)
- Some research suggests that computer games are a form of addiction.
 - Playing games alone might limit the development of social skills.
 - Children may not get enough exercise.
- 5** Advantages (two from)
- The user is being active rather than passive.
 - A number of different activities can be carried out on one system.
 - The pictures are of better quality.
 - There is often a choice of languages.
 - There are possibilities for interactive learning.
- Disadvantages (one from)
- There can be arguments over which vote to give or which camera angle to look at.
 - It could lead to becoming a ‘couch potato’.
 - It could be expensive.

Image capture

- 1** The camera does not use a film in digital photography.
- 2** A pixel is a picture element consisting of a dot.
- 3** a) Image A is 1 megapixel; image B is 0.8 megapixels
b) Image A has the higher resolution.
- 4** Digital images can be (three from)
- published on websites
 - displayed in electronic picture frames or albums
 - placed on websites for relatives or friends to be able to access from anywhere in the world
 - manipulated using special software
 - printed out using a colour printer
 - saved onto DVD
 - sent to someone using a mobile phone.
- 5** screen, speakers

ICT and leisure services

- 1** Advantages (three from)
- Monitor the security of your home.
 - Check on the welfare of a baby.
 - Send pictures of yourself to friends in real time.
 - Monitor remote places without needing a human presence.

Disadvantages (two from)

- You might not be aware that a webcam is taking pictures.
- You could be tempted to do something foolish that you would later regret.
- Our privacy could be compromised.

2

Input and output devices		
Service	Input device	Output device
Social networking	Webcam	Monitor
	Keypad or keyboard	Speakers
	Mobile phone	Mobile phone
Mobile phones	Remote control unit	Screen
	Keypad or keyboard	Speakers
Music and sound	Remote control unit	TV screen
	Keypad or keyboard	Speakers
	Microphone	Monitor

- 3**
- When you apply for a job your new boss may check your social network pages.
 - A person who wishes to do you harm could find out where you live.

How computers connect to the internet

- 1** (Four from) dial-up, broadband, cable, wireless, satellite.
- 2** Copper uses electrical signals; needs a repeater every 100 m or so; limited in bandwidth; prone to electrical interference (such as lightning).
Fibre-optic uses light; the signal does not weaken much over distance; it is not prone to electrical disturbance; harder to hack; high bandwidth.
- 3** (Two from) archaeology, town planning, land surveying, agriculture.
- 4** No need for wires; many devices can connect automatically; signal only travels a short distance; may be hacked by others nearby.
- 5** With fibre-optic the video would arrive smoothly owing to the high bandwidth available whereas with dial-up the data would arrive so slowly that there would be long pauses while enough data was buffered to show the next screen.

E-commerce

- 1** E-commerce is buying or selling goods or services over the internet.
- 2** To carry out online booking you would
 - browse websites to find one that provides what you want (e.g. 'Cheap holidays in Spain 2011')
 - search the website for your specific requirements (e.g. self catering, near beach)
 - choose the date, number of people, number of rooms and so on
 - proceed to a 'checkout'
 - choose a method of payment
 - enter the details of credit or debit card
 - enter information about the address where the tickets are to be delivered (or often you print off your tickets and travel plans yourself or they are sent to you by email).
- 3** Three from
 - The range of goods available is very large.
 - Saves the time and expense of travelling to the shops.
 - Goods are delivered directly to your home saving you having to carry large, heavy items.
 - Price comparison websites and online reviews help you to make a good choice.
 - Benefit those who live far from shops, who have difficulty in travelling or who work at home or have very young children.
- 4** Verification involves the data being entered twice and the computer checking the two entries match. This ensures that the data has been entered correctly.

Using ICT in schools

- 1**
 - a) MIS – Management Information System
 - b) OMR – Optical Mark Reader
 - c) DTP – Desktop Publisher
 - d) ICT – Information and Communication Technology
 - e) e-registration – Electronic registration
- 2**
 - The teacher records the attendance on a pre-printed form.
 - The forms are collected at the end of the day.
 - The marks on the form are read by an OMR.
- 3** Many uses could be allowed including
 - storing pupil data
 - searching for an individual pupil's emergency contact
 - producing class lists
 - searching for poor performers
 - listing exam results.
- 4** The timetable will be produced more quickly than by humans with less mistakes. Lists and individual timetables can be easily produced from the data.

Data logging and control

1	Situation	Sensor measuring
	Measuring a cooling liquid every 10 seconds	Temperature
	Seeing how often animals use a woodland path	Movement
	The amount of noise aircraft make	Sound
	Automatically open curtains when the sun rises	Light

2 keyboard, mouse, microphone (there may be other correct answers)

3 Three from Data collection can be automatic so no human presence is necessary.

- Readings can be continually taken over long periods.
- There is no chance of somebody forgetting to take a reading.
- Readings will be more accurate if a computer takes them because there is no chance of human error.
- Sensors can be placed in situations where it is dangerous for humans to go.
- Readings can be taken very quickly (several readings every second from a number of different sensors) – humans could not achieve this.

4 (Four from) weather stations all round the world; satellites; weather balloons; aircraft; radar stations; weather ships; weather buoys permanently anchored out at sea.

5 Methods of accessing the weather forecast might include: iPod; mobile phone; websites; TV; radio.

Advantages

- Farmers can know when to plant or harvest their crops.
- People can choose where and when to take their holidays to take advantage of good weather.
- Surfers know when large waves are expected.
- People can be evacuated if hurricanes or floods are expected.
- Aircraft and shipping rely heavily on accurate weather forecasting.

Disadvantages

- Weather is extremely difficult to forecast correctly.
- It is expensive to monitor so many variables from so many sources.
- Very expensive computers are used to perform the millions of calculations necessary.
- The weather forecasters get blamed if they get the weather forecast wrong.

Learning with ICT

1 a) VLE – Virtual Learning Environment

b) IWB – Interactive White Board

c) CAL – Computer-assisted Learning

2 ● The internet can help with research.

- A discussion group on the internet (often called a bulletin board or a forum) can be helpful in getting ideas.
- Email can provide contact with pupils in other schools.
- Desktop Publishing (DTP) programs can help with the presentation of coursework or other tasks.
- Spreadsheets can be used to create charts and organise numerical data.
- Databases can be used to store, sort, search data and produce reports.

- 3**
- You can learn from anywhere (no travelling to evening classes).
 - Learning can be done in your own time and at your own speed.
 - There are often online chat rooms or discussion forums where others who are learning the same subject can exchange ideas or discuss problems.
 - There is a wide range of learning courses available.

The desktop environment

- 1** a) file b) shortcut c) icon d) GUI
- 2** Windows, Icons, Menus, Pointer.
- 3** Screen resolution is the number of pixels on the screen. The more pixels the more detailed the images.

Software

- 1** a) word processor b) spreadsheet c) desktop publisher
d) presentation software e) database
- 2** For example
- the internet – latest results for a football match
 - DVD – the characteristics of a llama
 - online database – time of a flight from London to New York
- 3** Four from
- museums – describing exhibits
 - banks – explaining to a customer the services the bank can offer
 - doctors' surgeries – to allow a patient to register their attendance without needing to see the receptionist
 - restaurants or bars – where each item a customer buys is touched on a screen by a member of staff and the total bill is automatically calculated and displayed
 - factories – where dirt and grease could damage keyboards, and touch screens can be wiped clean easily
 - greenhouses or other places – where there are liquids present or a damp or dirty atmosphere
 - concept keyboards.
- 4** a) text-to-speech software
b) predictive text or speech-to-text software
c) concept keyboard or predictive text.

Databases 1

- 1** a) integer or number b) string or text c) string or text d) real number
- 2** Validation checks to see that data being entered is sensible.
- 3** a) range check b) list or lookup c) format or picture check

Databases 2

- 1** Four from
- Finding data is much faster than in a paper-based system.
 - Whenever data needs to be updated it can be easily found and edited.

- Data entered can be validated to make sure that no inappropriate data gets into the database. Sometimes called data integrity.
- Results of searches can be used to produce printed reports.
- Data in a database can be shared with other users on a network.
- Passwords may be set so that no unauthorised user can access the database.

2 Four from: physical security; passwords; biometric methods; backing up; access rights.

3 A wildcard is used in a query to stand for any character you do not know exactly.

Wildcard	Example	Result
*	surname LIKE "S*"	Finds all surnames beginning with 'S'.
?	surname LIKE "Ca?"	Finds all three letter surnames beginning with 'Ca'.
[]	form LIKE "10[YG]"	Finds records of forms '10Y' or '10G'.
[-]	LIKE "10[A-M]"	Finds forms '10A' to '10M', but not '10N' to '10Z'.
[!]	LIKE "10![YG]"	Finds forms '10A', '10B'... '10Z', but not '10Y' or '10G'.

Communicating electronically

1 subject; email address of recipient; message content; an attachment (possibly).

2 ● A computer virus might be attached to the message.

- Spam can quickly clutter up your system.
- Phishing emails might be used to get your personal or bank details.
- Offensive and hurtful emails can be sent.

3 Cc: (Carbon copy) – the email is sent to several recipients and each recipient can see who else the email was sent to.

Bcc: (Blind carbon copy) – the same as Cc: except that the recipients are hidden so that each recipient cannot see who else the email was sent as Bcc to.

4 Four from

- Emails can arrive within seconds.
- It is a cheap method of communication.
- The recipient does not need to be online when the email is sent.
- An email can be sent to a number of different recipients at the same time.
- Files may be attached to an email.
- Emails can be forwarded to others very easily.

Calculations and modelling

1 a) i) any from D1, E1, F1, G1, E11 **ii)** Any from D2 to D10 **iii)** G2:G10

b) =SUM(F2:F10)

Cell referencing and charts

1 relative, absolute

2 'What if?' calculations allow you to use the spreadsheet to see what would happen if you changed certain figures in the spreadsheet. They are used to predict outcomes.

3 a) bar **b)** pie **c)** line

Control

1 Four from: electronic toys; computer games; central heating systems; burglar alarms; smart meters; smoke alarms; fire alarms.

2 Advantages

- The paint sprayers do not require payment so will be cheaper than humans in the long term.
- They never need to take a holiday, report in sick or go on strike.
- They can operate in conditions that would be dirty, noisy and possibly dangerous to humans (such as breathing in the paint fumes).
- They can continuously work for long periods of time so the conveyor belt with the cars on can carry on working continuously.
- They produce exactly the same standard over and over whereas a human would probably miss bits out from time to time when they are tired or distracted.

Disadvantages

- They cannot think for themselves so they might spray an empty place if there was no car there.
- Buying and programming paint spraying robots can be expensive to set up.
- When they break down it could take longer to replace than a human because another human could take over the paint spraying but a robot would have to be dismantled. There might not be a spare one available.
- If robots are used for a long period of time, humans with the skills to spray paint cars may become rarer.

3 PEN DOWN

FORWARD 100

RIGHT 120

FORWARD 100

RIGHT 120

FORWARD 100

RIGHT 120

PEN UP

(The last two lines could be left out.)

Features

1 left, right, full, centre

2 The font type, size and colour, the formatting of the text, including line spacing, the position of a logo or banner.

- 3**
- A word might not be in the dictionary, such as a foreign word or the name of a small village.
 - A correct word may have been used in the wrong place such as 'witch' instead of 'which'.

Multimedia

1 Fly in from top, bottom or sides. Appear randomly.

2 Decide on the reading ages and abilities of your audience. Primary school pupils would need more images, sounds and simple text than for example scientists or other adults. Not all people can see or hear as well as others so give consideration to your use of sound, font style and font sizes and colours, so they do not discriminate against those short of sight or hard of hearing. If you use images, pop-up comments can appear when a mouse pointer is hovered over them.

3 Multimedia contains text, sounds, images, and video.

Data protection and copyright

- 1 a) Data Protection Act b) Copyright Designs and Patents Act
- 2 Four from
 - Each user should use a username and password when logging on to a system.
 - Passwords need to be changed regularly.
 - Obvious passwords like dates of birth or pet names should never be used.
 - Never tell your password to anyone.
 - All users should log off properly every time they have finished using a computer.
- 3 ● Do not to use a memory stick on a computer unless you are sure that the computer has anti-virus software installed.
 - Do not open an email from a sender who you do not know.
 - Never open an attachment from an unknown source.
 - Do not download software over the internet unless it is from a well-known and trusted source.
 - Run a virus check on a regular basis.
 - Keep the virus definitions of your anti-virus software up-to-date.

Staying safe and healthy

- 1 a) Three from your name, email address, phone number, home address, name of your school, details of bank or savings accounts you own.
 - b) Images can be faked. It is easy to use imaging software to make someone look slimmer or taller. People can lie about photos of themselves.
 - c) ● Emails or messages may contain viruses.
 - Text messages may cause you to run up a huge bill.
 - Pharming leads you to fake websites.
 - Phishing tries to steal your money or personal details.
 - Spam (junk email).
- 2 ● Back pain – use footrest, adjustable chairs, take a five-minute break every hour.
 - Eye strain – use good quality monitors, keep glare off screens, take a five-minute break every hour.
 - RSI – use ergonomic equipment, adjustable chairs, take a five-minute break every hour.
- 3 Four from
 - Trailing wires – keep all wires cleared away.
 - Fire from overheating equipment or plugs – keep equipment free from clutter and have plugs and sockets regularly inspected.
 - Electrocutation from bare or worn wires – have regular inspections of wiring.
 - Unsecured equipment may fall and injure someone – make sure shelves are firmly fixed and the equipment is secure on them.
 - Food and drink can cause sticking keys, disease or even electric shocks – never have food or drink near a computer.
 - Water spilled on electrical wiring can cause electrocutions and damage equipment – never have a source of water in a room with a computer.
- 4 Safety is generally short term and involves accidents, whereas health is more concerned with the long-term effect of using a computer.

Future developments

All discussions should include both advantages and disadvantages and reach a conclusion. Look to expand points you make rather than just listing advantages and disadvantages.

1 Some advantages

- Getting up later.
- Saving money and time on travelling to school.
- Learning in quieter and more pleasant surroundings.
- Working at own pace.

Some disadvantages

- You miss your friends.
- There may be many distractions at home such as crying babies or computer games.
- It might be harder to work without a teacher guiding you.
- It is harder to ask questions.

2 Some ideas

- 3D films.
- Moving seats to give virtual experiences.
- 'Smelly' vision.
- Movement of air inside the cinema.
- No one goes anymore because of home cinema improvements.
- CGI gives immensely 'realistic' sci-fi films.
- People injure themselves trying to be a superhero.
- Translating devices in the seats let you hear the film in different languages.
- Descriptions of the film action for the visually impaired.

3 Some ideas

- Walls that glow, replacing electric lights.
- Windows that darken as night falls.
- Doors with no keys that recognise those that live in the house.
- Surveillance that means we can watch our homes using a mobile phone or computer even when on holiday.
- Devices that feed the pets or control heating or lighting automatically.
- Televisions and computers becoming one single device and possibly forming one or more walls of your sitting room.
- 3D TV.
- Virtual-reality computer games that give 'whole body' experiences.

Advantages

- Homes become more efficient and cheaper to run.
- Homes become more comfortable to live in.
- Cleaning up is done automatically.

Disadvantages

- Humans depend on machines too much and forget how to think for themselves.
- Humans become lazy.
- Too much surveillance means we lose our privacy.

Ensuring data quality

- 1 a) odd b) even c) even
- 2 range, presence, format (picture), check digit, hash total, batch total
- 3 visual check, double entry

Using data logging and control

- 1 (Three from) central heating system, greenhouse, air condition system, traffic control, automatic doors, etc.
- 2 sensor, processor, actuator, close
- 3 Humans are not endangered. It is probably cheaper than keeping a human there. The sensors will always record the temperatures accurately and never forget to take a reading. The readings will be made more frequently than a human could make them.

4 a) Car parking system

- 1 Start
- 2 Car approaches barrier
- 3 Sensor detects car arriving
- 4 Control program checks if car park is full. If not sends signal to actuator. Adds one car to total in car park.
- 5 Actuator lifts barrier.
- 6 Sensor detects car leaving.
- 7 Control program checks driver has paid. Sends signal to actuator. Deducts one car from total in car park.
- 8 Actuator lifts barrier.
- 9 Back to start

b) Traffic control system

- 1 Start
- 2 Car approaches light
- 3 Sensors detect car
- 4 Control program checks other inputs from the system before sending signal to actuator
- 5 Actuator switches on green light
- 6 Sensors detect no car
- 7 Actuator switches on red light
- 8 Back to start

Data compression and file types

1	Activity	File type
	Recording a song to play on an iPod	.mp3
	Saving a video	.mp4
	Sending a photo to someone using your mobile	.jpeg
	Compressing a folder of files	.zip

- 2
 - Backing storage devices have limited capacity and large files will fill up the available storage space quickly.
 - Large files will also load more slowly than small ones
 - Large files take longer to find and access than smaller ones.
 - If data is transmitted across a network, smaller files are quicker to send than larger ones.
- 3 Advantages
 - Smaller file sizes. Files will take up less storage space when saved on hard disk or other storage media.
 - It will take less time to transmit when sent over a network or downloaded from the internet.
 Disadvantages
 - Precision can be lost.
 - It is not always possible to return to the uncompressed state.
 - Some packages cannot deal with some of the more uncommon file formats.

Going online

- 1 a) Universal Resource Locator b) hypertext transfer protocol c) file transfer protocol
- 2 Four from
 - Does it meet the original objective?
 - Is it appropriate for the target audience?
 - Does it contain accurate information?
 - Does it provide the correct information?
 - Is the information up-to-date?
 - Is the page unbiased?
- 3 Look for house style, audience, size, special techniques used.

Creating websites

- 1 background colour, position of buttons, house style logos, font style and colours
- 2 a) Site navigation is exploring the pages of a website
b) Four from: hyperlinks, graphical hyperlinks (photos, clipart, etc.), hotspots, rollover buttons, bookmarks, polygon links
- 3 a) 00FF00 b) FF00FF

Tools and techniques for creating slide presentations

- 1 The variety of ways that information appears on the screen, such as
 - bulleted lists appear on a slide, one bullet at a time
 - bullets can fly in from the left or right
 - text can appear by the letter, word, or paragraph
 - text or objects can be dimmed or change colour.
- 2 Special effects that happen when one slide changes to another, such as fade, wipe, explode, fly-in, etc.
- 3 Advantages
 - Easy to standardise the slides using templates.
 - Presentations can be saved to disk or memory stick.
 - Easy to edit and to change the order of the slides.
 - Slides cannot be dropped and so become disordered.
 - Presentations can include lots of special effects, such as sound, video, animation.
 - Presentations can be set to run automatically.
 Disadvantages
 - Presentations rely on a computer.
 - Training needed to use the computer.
 - Computers can sometimes be unreliable and crash or not connect to the projector.
 - If there is no computer or projector already available at the venue where the presentation is to be held then expensive and heavy equipment needs to be carried around.

Multimedia components

- 1 Multimedia is when text, sound, still images, animation and video are combined together to give a production (such as a slide show presentation) or an interactive production (such as a computer game, quiz, search or questionnaire).
- 2 Mouse, gamepad, tracker ball, microphone, touch-sensitive screens or touch pads, graphics tablet
- 3 Screens (monitors), speakers.

Multimedia software

- 1 a) .mpg b) .mp3 c) .jpg

2 Advantages

- Less storage space is used so more data can be recorded on a given medium.
- Files are smaller so it takes less time to transmit them over the internet.
- Files are standardised to recognisable formats.

Disadvantages

- Quality and detail could be lost.
- It is not always possible to uncompress a compressed file to retrieve the original.

- 3 education, business, society, entertainment.

Graphics

- 1 $3000 \times 1000 / 1\ 000\ 000 = 3$ megapixels
- 2 $1\ \text{GB} = 1024$ megabytes
Each image is 2 megabytes.
Can store $1024 / 2$ images = 512 images
- 3 ● Vector drawings can be enlarged to any size without any loss in quality. Bitmaps become pixilated when enlarged.
● Image file sizes for vector graphics are smaller than for bitmap graphics, taking up less storage space and less time to load.

Tools and techniques for creating and manipulating still images

- 1 Zoom allows you to view the image on the screen larger or smaller than it first appeared.
- 2 colour effects, colour palettes, colour gradients
- 3 Rotation means turning the image round a centre of rotation a certain number of degrees. Reflection means flipping the image round an axis.

Use of movement

- 1 Persistence of vision is the process by which the eye is fooled into thinking that still pictures are moving.
- 2 Animations are created by using many images, each one having a tiny difference from the previous one. When the images are displayed rapidly one after another it appears as if they are moving.
- 3 Stop motion is where a series of pictures of a model are taken, each one showing a model in a slightly different state. When you play the pictures back rapidly it looks as if the model is moving.

Tools and techniques for creating animated images

- 1 Three from stop motion, onion skinning, rotoscoping, pixilation, claymation
- 2 ● The intended audience – whether it is adult, child, learned or uninformed.
 - The subject matter you are presenting.
 - The length of the sequence.
 - Any sounds you are using.

Sound hardware

- 1 Big heavy speakers are sometimes called woofers and are generally used for bass notes. Smaller speakers are called tweeters and are used for higher frequency sounds.
- 2 A sound card is needed to act as an interface between the input and output devices and the computer.
- 3 MIDI is a musical instrument digital interface.

Connectivity

- 1 bus, ring, star
- 2 ● A stand-alone computer is less liable to virus attack and hacking whereas a networked computer needs extra protection such as firewalls.
 - Data entered into a stand-alone computer is only available to the user of that computer but on a network all data can be shared.
 - A stand-alone computer needs its own printer, scanner and storage devices but computers on a network can share such hardware.
 - Each stand-alone computer needs its own software installed but software can be shared over a network.
 - Stand-alone computers are not as easily controlled as network computers where a network manager can allocate permissions to users, restrict their actions or limit the amount of storage space they can use.
 - If data files accessed by users on a network are stored on a file server, then it is easier to make scheduled backups than where the files are stored on several different computers.
- 3 Packet switching is the process by which network components check each packet, look at its address and direct it along the correct route. Each packet consists of binary digits and contains control data, an address of where it is going and the data it is delivering.

Point of sale and stock control systems

- 1 Inputs: a barcode reader/scanner; a keypad; electronic scales; magnetic stripe reader.
Outputs: a display screen; a printer to print the receipt and other tokens; a speaker to beep as goods go through.
- 2 ● To make sure no item of stock runs out.
 - To ensure that no items are over-ordered.
 - To ensure that not too many of an item are stocked.
 - To ensure that just sufficient numbers of perishable items are stocked so they can be sold before passing their sell-by date.
 - To keep track of the stock levels of all goods.
 - To order more goods from the suppliers if the stock level falls below the reorder level.
 - To analyse sales to see which items are selling well and which are not.

- To adjust the reorder level on the basis of the sales analysis.
- To allow for seasonal adjustment for some items.

- 3 a)** Stock is the name for all the goods a business has for sale.
- b)** Stock level is the quantity of a particular item in the shop or warehouse.
- c)** Stock control is the overall management of stock levels.

Using the computer

- 1** Three from single program, batch processing, multi-programming, multi-access, distributed system, process control system, parallel processing.
- 2** Advantages
- Low-level ICT skills are needed.
 - A GUI is an easy-to-use intuitive interface.
 - Pictures are more easily understood than words.
 - Help is available through office assistants.
 - Online tutorials are available if connected to the internet.
 - Desktops can be customised.
- Disadvantages
- It can use up a lot of a computer's resources.
 - It may run slowly.
- 3**
- Someone may not have a retina (no eyes).
 - The original data may have been input incorrectly and the computer thinks your retina belongs to someone else.

Banking and ICT

- 1 a)** Producing a payroll. **b)** Withdrawing money from an ATM.
- 2 a)** Automatic Teller Machine
- b)**
- Withdraw cash from your account.
 - Print a balance.
 - Print a small statement.
 - Order a new cheque book.
 - Change your Personal Identity Number (PIN).
- 3 a)** Magnetic Ink Character Recognition
- b)** Advantages
- A large number of cheques can be read very quickly.
 - Crumpled or dirty cheques can still be read. It will make no difference to the readability of a cheque if ink or coffee is spilled over it!
 - The characters are difficult to forge.
- Disadvantages
- The equipment is expensive. MICR systems need special readers and also printers that use the magnetic ink.
 - Only a very limited number of characters can be used.

Process control

Answers involving the description of a system should

- describe the system itself
- explain the inputs and outputs
- give the advantages of the system
- give the disadvantages of the system.

ICT and employment

- 1 Three from computer programmers, systems analysts, ICT technicians, network technicians, hardware designers, website designers, database managers.
- 2
 - It is not necessary for people to travel to the meeting.
 - People can attend the meeting from their home or their office.
 - Time is saved by not travelling to meetings.
 - There are no expenses such as buying tickets or hotel accommodation.
 - Meetings can be called at short notice as no one needs to travel.
 - It does not matter where in the world the participants are as long as they have access to a video conferencing computer.
- 3 Advantages
 - No travel expenses.
 - No time wasted in travelling to work.
 - Flexible hours. The teleworker has greater choice of when and how long to work.
 - Employers do not have to provide office space or facilities such as a canteen.
 Disadvantages
 - There is less social interaction and teleworkers may feel isolated.
 - There may be more distractions in the home environment (e.g. infants, domestic jobs, callers, etc.).
 - It may be more difficult for the management to check on whether work is being properly carried out.

The effects of using ICT

- 1
 - Computer programmers (sometimes called software engineers).
 - Systems analysts help companies to computerise their business or upgrade an existing system.
 - ICT technicians or network technicians are needed to manage the computer systems and troubleshoot any problems.
 - Hardware designer – all new hardware must be designed, prototyped and tested.
 - Website designer – every web page displayed on the World Wide Web needs to be designed and created and kept constantly up-to-date. For example, a web page that displays news stories needs to be updated every few minutes.
 - Database manager – if an organisation keeps a database of information, then it will need to be designed, created and kept up-to-date.
- 2 Any items from
 - ICT is making it easier to monitor what people are doing.
 - CCTV cameras are everywhere.
 - Communications from phone calls, emails and text messaging can be monitored.

- Satellites with cameras are capable of seeing what you are reading or identify a car number plate from above.
- Google® Earth lets anyone see anywhere on earth or even travel virtually the streets of unfamiliar towns.
- We can be tracked by mobile phone signals or by our use of debit and credit cards.
- We voluntarily leave our thoughts and pictures on FaceBook, YouTube, Twitter and blogs.
- Most governments are creating databases of DNA.
- Many governments have introduced identity cards and biometric passports.
- New laws are being passed to protect the individual from threats to their privacy caused by ICT and to fight against cyber crime.
- ICT is helping to form political opinion using survey groups such as YouGov.
- The internet allows the public to share experiences all over the world. This has meant that different groups can air their views to the world, and radio and TV broadcasts (especially news) can be seen and heard from anywhere in the world.
- Much can now be carried out online, such as filling in tax forms or census forms, researching births, marriages and deaths and so on.

3 Arguments using both advantages and disadvantages and a reasoned conclusion.

Advantages

- It is not necessary for people to travel to the meeting.
- People can attend the meeting from their home or their office.
- Time is saved by not travelling to meetings.
- There is no need for some expenses, such as buying tickets or hotel accommodation.
- Meetings can be called at short notice as no one needs to travel.
- It does not matter where in the world the participants are, as long as they have access to a video conferencing computer.

Disadvantages

- People prefer to meet face-to-face with others when important decisions need to be made.
- Meetings held on computers lack the personal touch.
- The video conferencing equipment needs to be bought. Microphones, speakers and video cameras are required on each of the computers and the necessary software installed. This can be expensive.
- The sound and pictures may not be completely synchronised and may appear a little 'jerky'.

Responsibilities

The Data Protection Act (1998)

Obligations

The obligations of the organisation storing the data are

- to register with the Information Commissioner and state the purpose for which they need the information
- to store and process the data only for a lawful stated purpose
- to collect and process the data fairly and lawfully
- to keep only adequate, relevant data not excessive for the stated purpose
- to meet the rights of the data subject
- to keep the data accurate and up-to-date
- not to keep the data longer than necessary
- to keep data secure
- not to send the data abroad, other than to EU countries.

Rights

- 1 The rights of the data subject are
 - to have access in order to view the personal data stored about them
 - to have the data corrected if incorrect data is stored about them
 - to be entitled to compensation if unlawful processing of the data leads to damage or distress.
- 2
 - To secure the health, safety and welfare of people at work.
 - To protect others against risks to health or safety in connection with the activities of people at work.
 - To control the keeping and use of dangerous substances.
 - To control certain emissions into the atmosphere.
- 3 Sensitive personal data includes
 - racial or ethnic origin
 - religious beliefs
 - political opinions
 - trade union membership
 - physical or mental health
 - offences and convictions.

Safety of data and units used in computing

- 1 hackers, viruses, hardware breakdown, human error
- 2 A transaction log is a history of the actions that have occurred over a period of time. It is used to monitor who has logged in, when they logged in, and what they did while logged in.

Decimal	Binary	Hexadecimal
1	1	1
5	101	5
10	1010	A
17	10001	12
32	100000	20
255	11111111	FF