

# Computing Studies

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## Multimedia Applications

[INTERMEDIATE 1]

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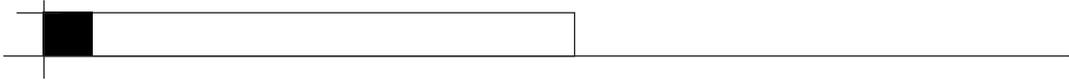
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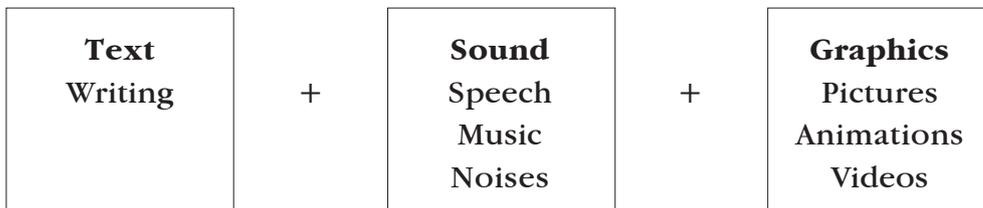
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**SECTION 1****What is multimedia?**

In everyday life, multimedia is everything you hear or see, e.g. text in books, sound in music, and graphics in pictures.

In computing multimedia is the presentation of information by a computer system using text, sound and graphics.

**Who uses multimedia?**

Multimedia can be used in a variety of ways, and a multimedia presentation can be put together in a variety of different formats.

**Education**

In education, multimedia can be used as a source of information. Students can search encyclopaedias such as *Encarta*, which provide facts on a variety of different topics using multimedia presentations.

Teachers can use multimedia presentations to make lessons more interesting by using animations to highlight or demonstrate key points. A multimedia presentation can also make it easier for pupils to read text rather than trying to read a teacher's writing on the board.

Programs which show pictures and text whilst children are reading a story can help them learn to read; these too are a form of multimedia presentation.

### **Business**

Multimedia is used for advertising and selling products on the Internet.

Some businesses use multimedia for training where CD-ROMs or on-line tutorials allow staff to learn at their own speed, and at a suitable time to the staff and the company. Another benefit is that this form of training saves the company money, as they do not have to pay the additional expenses of an employee attending a course away from the workplace.

### **Leisure**

People use the Internet for a wide range of reasons, including shopping and finding out about their hobbies. The Internet has many multimedia elements embedded in web pages and web browsers support a variety of multimedia formats. Many computer games use sound tracks, 3D graphics and video clips.



### Test yourself: Exercise 1

1. What is multimedia on a computer system?

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2. In the table below tick whether each of the following is text, sound or graphics.

Description	Text	Sound	Graphics
A picture of yourself			
A song on a CD			
A word-processed poem			
Video of Live Aid song			
Bart Simpson picture			
A dog barking			
School dinner menu			

3. Using the Internet, find three examples for each main area (education, business and leisure) where multimedia is used.

Area	Website address	Purpose of website
Education		
Business		
Leisure		

## A multimedia presentation

A basic multimedia system includes input devices, output devices, memory, backing storage, and a variety of software.

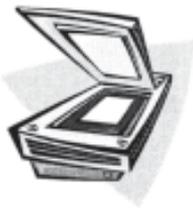
## Input devices and software

### Keyboard and mouse

For text entry, a standard QWERTY keyboard and mouse are needed.



### Scanner



A scanner allows the input of drawings, photographs or text directly into the computer's memory. A scanner is similar to a photocopier as it shines a light onto the item to be scanned and then reads the light that is reflected.

### *Optical Character Recognition Software (OCR)*

Optical Character Recognition Software is usually known as OCR software. When you use OCR software with a scanner you can scan text directly into the computer's memory as a word-processed document. Once scanned into the computer's word processor text can be edited and saved just like any text you may have typed into the word processor.

OCR software has a limited number of characters it recognises, and therefore mistakes in scanned text are common.

## Microphone

A microphone can be used to allow sound to be entered into a computer's memory. Most computers have in-built microphones, or have an interface which allows a microphone to be plugged into the computer. The quality of sound generated by a microphone is generally poor so it would not be used for recording music.



### *Voice Recognition Software*

Voice Recognition Software allows the user to enter text by speaking rather than typing. The user speaks into the microphone and the words spoken are converted into text in a word-processing package. Voice recognition has drawbacks:

- The user must speak slowly and clearly to allow the software to recognise all the words.
- The software has difficulty with strong accents and the user may have to repeat words and phrases before they are recognised.

## Graphics tablet

A graphics tablet has a pen or pointer connected to a flat board, which is sensitive to pressure. When pressure is applied to the board using the pen or pointer, the position of the pen or pointer is sent to the computer. A graphics tablet allows the user to draw or trace shapes which will go directly into the computer.

A graphics tablet can allow the user to write text directly into the computer with the correct software.

### *Handwriting Recognition Software*

Handwriting Recognition Software allows the user to write in his or her normal handwriting. The software reads the shape of the writing and converts it into text that goes into the computer's word-processing program. One drawback of handwriting software is that if you are a poor writer the software may not read the handwriting correctly and errors will occur.

### Digital camera

Photographs taken using a digital camera can be easily saved to a computer's memory. The camera is connected to the computer using a cable, which then allows pictures stored in the camera to be uploaded into the computer's memory.



The amount of memory that a digital camera has will restrict the number of images that can be stored. A camera with 4mb of memory will be able to store between 30 to 100 JPEG images depending on the level of resolution used for the images. **Resolution is the amount of detail in an image.** If high-quality images are required they will need to be saved as a high-resolution image. The higher the resolution the more memory is required. Therefore, if you take pictures with a high resolution you will not be able to store as many pictures in your camera.

### *Digital Camera Software*

Most digital cameras come with photo-enhancing software, which will allow you to alter the content as well as the brightness, contrast and colours of the photographs.

### Video camera



A digital video camera is used for taking movies and works in a similar way to a still video camera but the pictures are stored on a tape.

A digital video camera can be connected to a computer system using a cable normally supplied with the camera. If the computer has the correct software, videos can be transferred onto the computer. Once the video is in the computer's memory the videos can be edited. Movies require a great deal of memory, so to store videos would require a large backing storage.

**Test yourself: Exercise 2**

1. Name four input devices.

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2. What does OCR stand for?

O \_ \_ \_ \_ \_ C \_ \_ \_ \_ \_ R \_ \_ \_ \_ \_

3. What does Voice Recognition Software allow you to do?

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4. What does the term Resolution mean?

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## Output devices

### Monitors

Monitors are also known as Visual Display Units. The VDU is the screen used to display the output from the computer. The image displayed on the VDU is made up of small blocks called pixels. The more pixels that are on an image the greater the resolution. Remember that the greater the resolution the more detailed your image will be. So a high-resolution monitor will give a high-quality picture, as it will have more pixels than a low-resolution monitor.



The 2 main types of monitor are:

***Cathode Ray Tube:*** This is the most common type of monitor. Images on this type of monitor are created by beams hitting phosphorus inside the screen making the phosphorus glow. The glowing particles of phosphorus are the pixels.

***Liquid Crystal Display:*** A LCD monitor is flat and lightweight and also needs very little power to operate. LCD screens are normally found on laptop computers

### Speakers

Loudspeakers are required to output the sound for a multimedia presentation. Most computers have in-built loudspeakers, as well as an interface which allows additional loudspeakers to be connected to the computer.



### ***Sound cards***

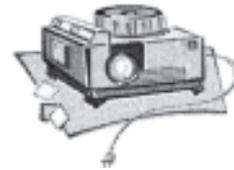
Sound cards are additional pieces of hardware that are inside a computer. A good quality sound card improves the sound quality and additional software allows sound to be composed, edited and recorded on the computer.

Sound must be converted from its original analogue state to digital to allow the output of sound from a computer. Good-quality sound cards enhance this conversion.

The speakers and microphone plug into the sound card.

### **Data projectors**

Data projectors simply project a presentation from the computer onto a large white screen usually mounted against a wall. Therefore instead of everyone crowding round a monitor the audience can sit and watch a presentation in comfort, as if watching a film in a cinema.



### ***Graphics card***

The quality of image displayed on a monitor depends on the quality of the graphics card installed inside the computer. The better the graphics card the better the quality of images that can be displayed.

Graphics cards usually have a large amount of their own memory which allows a variety of resolutions and screen displays.

The monitor and data projector plug into the graphics card.



**Test yourself: Exercise 3**

1. Another name for a monitor is a  
V \_\_\_\_\_ D \_\_\_\_\_ U \_\_\_\_\_
  
2. Name two types of monitor:  
  
C \_\_\_\_\_ R \_\_\_\_\_ T \_\_\_\_\_  
  
L \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_
  
3. Why would you add a better sound card to a computer that was to be used for multimedia presentations?  
  
\_\_\_\_\_  
  
\_\_\_\_\_  
  
\_\_\_\_\_  
  
\_\_\_\_\_
  
4. Complete the table below:

<b>Task</b>	<b>Output device required</b>
To show a multimedia presentation to your class on a screen.	
To watch a video clip on your computer.	
To listen to the radio from the internet on your computer.	

## Backing storage

In order to store multimedia presentations you need backing storage. There are a number of backing storage devices which are all parts of the hardware of a computer system. When discussing backing storage the term **access** is used. In this unit we will only look at backing storage which has **random** or **direct access**. Random/direct access is when the storage device can go to a piece of data straight away wherever it is stored.

### Hard disk

On a computer system the hard disk is the main backing storage device. Modern hard-disk drives have a large storage capacity usually between 20 and 30 gigabytes. This large storage capacity is ideal for multimedia presentations as these usually have large storage requirements, especially if they contain high-quality sound and video files.



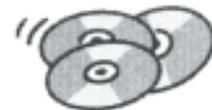
### Floppy disk



Floppy disks are ideal for storing and transferring small files, but due to their small storage capacity (1.44 megabytes) they are not usually suitable for multimedia files.

### Compact disks

CDs are known as **optical storage** which means that they use lasers to store and read data. CDs can be removed from a computer and used in other computers easily, making them **portable** unlike a hard disk. CDs have **direct access**.



#### *Compact Disk Read Only Memory (CD-ROM)*

CD-ROMs have a **large storage** capacity (700 megabytes), making them ideal storage for multimedia presentations. Indeed most computer games and programs come on CD-ROM. CD-ROMs cannot be updated as they are Read Only.

*Compact Disk Recordable (CD-R)*

Like CD-ROMs you can only save to CD-Rs once, which means you cannot edit the program or presentation once saved onto the disk. The CD-R works in exactly the same way as a CD-ROM and also has a large storage capacity.

*Compact Disk Re-Writable (CD-RW)*

Unlike CD-ROMs and CD-Rs a CD-RW can be **re-written** to many times. CD-RWs also have a large storage capacity, which makes them ideal backing storage for large multimedia presentations that may need to be updated.

*Digital Versatile Disk (DVD)*

The main difference between CDs and DVDs is that DVDs have a larger storage capacity, up to 17 gigabytes.

*Digital Versatile Disk – Recordable (DVD-R)*

DVD-Rs are disks that can be written to once.

*Digital Versatile Disk – Re-Writable (DVD-RW)*

DVD-RWs are disks that can be written to more than once, which also makes them ideal for storing large multimedia presentations that may need to be updated.

**USB – Flash drive**

A flash drive is a small compact memory chip that plugs into the USB port of a computer. Flash drives allow data to be stored, erased and re-written to many times. Flash drives are portable backing storage devices that have a storage capacity ranging from 64 megabytes up to 256 megabytes.



The table on the next page gives a summary of the cost, capacity, speed of access and portability of the backing storage devices discussed.

Remember that technology is improving every day so it is impossible to give exact storage capacity and cost.

### Summary of backing storage devices

Device	Cost	Capacity	Speed of access	Portability
Hard disk	Expensive	A lot – personal system usually 20–30 gigabytes	Very fast	No – usually inside machine
Floppy disk	Very cheap	1.4 megabytes	Slow	Yes, but easily damaged
CD-ROM	Very cheap	Around 700 megabytes	Fast	Yes, and not easily damaged
CD-R	Very cheap	Around 700 megabytes	Fast	Yes, and not easily damaged
CD-RW	Very cheap	Around 700 megabytes	Fast	Yes, and not easily damaged
DVD	Fairly cheap	Big up to 17 gigabytes	Fast	Yes, and not easily damaged
USB Flash Drive	Expensive for amount of storage	Increasing but up to 1 gigabyte	Fast	Yes – very small and robust



**Test yourself: Exercise 4**

1. What is backing storage used for?

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2. What does Direct/Random Access mean?

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3. What type of storage are Compact Disks?

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4. What are the disadvantages of a Floppy Disk?

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## File types

There are many different ways to store files but choosing the correct file type can dramatically reduce the amount of backing storage required. Some file types compress the data, which makes the storage requirements smaller and therefore faster to download.

### Text

Text files may have one of the following file extensions:

- .txt     **text**
- .doc     **document**
- .rtf     **rich text format**

Txt and Doc are versions of saving word-processed documents. However, they may only save data to a specific application, e.g. only open in Microsoft Word. If they will open in another application the original formatting of the text may be lost.

RTF files are saved with all the information about styles, fonts, sizes and page layout. RTF files are recognised by a range of applications allowing transfer of text to other applications without having to sort out how the text is formatted.

### Graphics

Graphics files may have one of the following file extensions:

- .bmp     **bitmap**
- .gif     **graphics interchange format**  
(a bit-mapped graphics file format)
- .jpeg    **Joint Photographic Experts Group**  
(used for photographs and graphics)

### Bitmapped graphics

A bitmapped graphic is a realistic picture made up of a grid of dots called **pixels**. A pixel can be stored in 1 bit of the computer's memory. A black pixel is stored as a 1 and a white pixel as a 0. The bitmap picture stores data about each pixel which means bitmap pictures have a large storage requirement. If we want to use coloured pixels, then the amount of memory increases as more memory is required to store the different coloured pixels.

### File compression

To reduce the storage requirements of graphic files we need to make the files smaller. One way of doing this is to compress the data.

#### Compressing using GIF

GIF files reduce storage requirements by using a code to store patterns of bits that are repeated throughout the file instead of storing each bit individually.

#### Compressing using JPEG

The Joint Photographic Experts Group (JPEG) invented the most common still image compression format. JPEG file compression reduces the file size by about eighty percent. This is done by cutting out parts of the graphic that won't be noticed by the human eye, e.g. slight shading of the same colour. There will be a little loss of picture quality, but the storage reduction makes it worth it.

Original file	(400K)
Compressed with JPEG	(44K)

### Moving images

Moving images come in two formats, video or animation images. Animations are created using animation software, whereas video images are captured from a video camera.

Video files may have one of the following file extensions:

**.mpeg** Moving Picture Experts Group

**.avi** Audio Video Interleave  
Microsoft's Video for Windows standard

Files saved as MPEG are compressed by cutting out any unchanged data from the various frames in the video. MPEG files are therefore easier to store. Note when MPEG files are played they are uncompressed so the viewer will not see any difference.

Files saved as .AVI store the audio and video data in a single file and this is not compressed. This limits the quality and size of the video to be stored.

### **Animation software**

Animations are a series of still pictures that have a slight change in each picture. They are played very fast so they give the impression of a moving picture, like a flick book.

Text, graphs and buttons on web pages as well as pictures can all be animated.

### **Capturing and storing audio**

The vibration of air creates the sounds we hear. Your eardrum changes these vibrations of air into sound that we recognise.

Sound files may have the file extension:

**.wav** WAV sound file

**.mp3** MPEG-1 Audio Layer-3

Files saved as .WAV are compressed but still have a fairly high storage requirement. All computers running Windows and most Web Browsers will run a WAV sound file.

Files saved as .MP3 have a much higher degree of compression than .WAV files. They therefore have small storage requirements but still maintain a high sound quality.

### **Audio compression**

Compression of audio files is necessary due to the size of raw audio data.

Compressing the sound file means that, because the file is smaller, it will be quicker to download it.

### **Copyright**

Remember copyright when you wish to use a picture or song from your favourite book or CD in your multimedia presentation: otherwise you may be breaking the law. Copyright regulations mean that many songs and pictures cannot be used without the owner's permission. However, some graphics and audio files are copyright free – if in doubt ask your teacher.



### Test yourself: Exercise 5

In the table below, tick to indicate what kind of file the file extension on the left represents:

File extension	Graphic	Video	Text	Sound
.bmp				
.txt				
.wav				
.doc				
.gif				
.mpeg				
.mp3				
.avi				
.rtf				
.jpeg				

## **Multimedia software**

Once you have collected a mixture of text, graphic and audio files you will need to put them together in a format that can be viewed as a presentation.

There are a number of software packages which allow us to create our own multimedia presentation.

### **Presentation packages**

Presentation packages are application packages that allow you to create multimedia presentations. This is done by creating slides or pages, which can include text, sound and graphics. The most common presentation package is Microsoft PowerPoint.

### **Multimedia authoring packages**

Multimedia authoring packages are similar to presentation packages but have more sophisticated facilities for creating your multimedia presentation. To create stand-alone multimedia applications such as Microsoft Encarta, professionals use multimedia authoring packages such as Hyperstudio and Macromedia Director.

### **Desktop publishing packages**

DTP packages, such as Microsoft Publisher and Quark Express use material such as text and graphics that have already been created and saved to another file. The material already created is imported into the DTP package, which allows you to lay out your page in any format you choose. Most DTP packages come with a number of templates such as Newspaper Front Page, Birthday Cards and Calendars ready for you to import material to create your own design.

### **Templates**

Most packages will provide the user with templates, which can be adapted to suit the user's needs. Templates are ready-made blank documents with placeholders for the insertion of text and graphics. Examples of templates are: calendars, birthday cards, newspaper page, etc.

**SECTION 2****Creating a multimedia presentation (1)**

There are many operations that are the same in different software packages.

**Save files**

When you use the SAVE command, the computer will write all of the data in your file to the backing storage device you have chosen so that you can use it again at a later date.

**Printing**

When you use the PRINT command, the computer will send your file to the printer and a hard copy (printout) will be printed. Most software and printers will allow you to print out selected parts of your file.

**Colours**

Most applications will allow you to change the colour of text to make your presentation more interesting. You normally select the text you wish to change the colour of and then select the colour of your choice from a palette of colours on the toolbar.

**Text/graphic effects**

A number of applications allow you to alter the effect of text. You can choose how you wish your text to appear, and there is a range of options including fading in and out, dropping in from the top and flashing.

## Word-processing software

A word processor allows you to enter and manipulate text using the keyboard. Some of the advantages of using a word processor are:

- You can save your text, reload it and edit it without having to retype it again.
- You can alter the size of the text.

10 point 12 point 18 point **48 point**

- You can alter the style of the text: plain text, *italic text*, **bold text**, underline text.
- You can spell-check your document.
- You can align your text to the left, right, centre or fully justify it.
- You can search and replace text.
- You can alter the page layout by inserting headers and footers.
- You can change the orientation of the page between landscape and portrait.

Other methods of creating and capturing text include **OCR Software** and **Voice Recognition and Handwriting Recognition Software**. Refer to Section 1 of these notes (pages 8–9).



## Test yourself: Exercise 6

1. Using a word processor enter the text shown below.

### **Multimedia**

In education, multimedia can be used as a source of information. Students can search encyclopaedias such as *Encarta*, which provide facts on a variety of different topics using multimedia presentations.

Teachers can use multimedia presentations to make lessons more interesting by using animations to highlight or demonstrate key points. A multimedia presentation can also make it easier for pupils to read text rather than trying to read a teacher's writing on the board.

Programs, which show pictures and text whilst children are reading a story can help them learn to read; these too are a form of multimedia presentation.

Spell-check your document to ensure that you have no spelling mistakes.

2. Edit the text so that it matches the one shown below.  
It is not important what font or size of text is used.

### **Multimedia**

In education, *multimedia* can be used as a source of information. Students can search encyclopaedias such as Encarta, which provide facts on a variety of different topics using multimedia presentations.

Teachers can use multimedia presentations to make lessons more interesting by using animations to highlight or demonstrate key points. A multimedia presentation can also make it easier for pupils to read text rather than trying to read a teacher's writing on the board.

Programs, which show pictures and text whilst children are reading a story can help them learn to read; these too are a form of multimedia presentation.

## Still images

### Creating still images

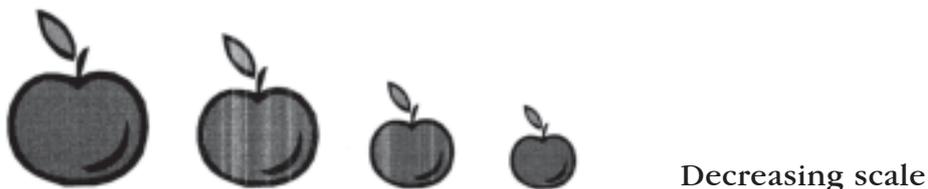
Still images are pictures that do not move. They are created on a computer either as **bitmapped graphics** (sometimes known as paint graphics) or **vector-drawn graphics** (sometimes known as draw graphics).

Creating new graphics is a slow and highly skilled job. You may be able to create a graphic, but creating a bitmapped graphic using a mouse is very difficult.

### Creating vector-drawn graphics

*Layering of objects:* Overlapping objects can be placed in front of, or behind, other objects.

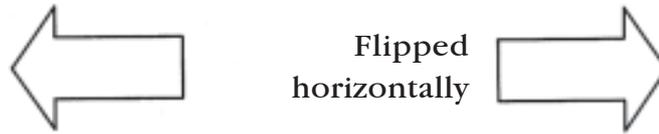
*Scaling without loss of quality:* When an object is scaled it is made bigger or smaller.



*Rotating:* When a vector-drawn graphic is rotated, it will be turned through a number of degrees.



*Flipping:* A vector-drawn graphic can be flipped horizontally or vertically.



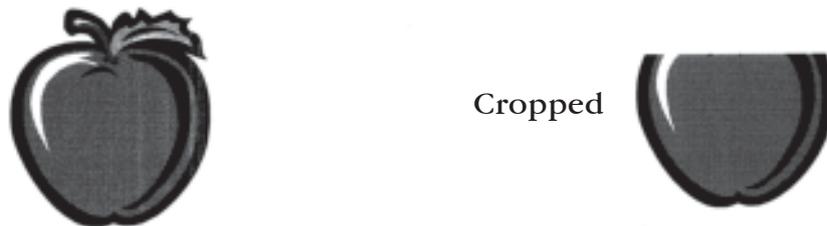
*Colouring:* An object can be coloured.



### Techniques for creating bitmapped graphics

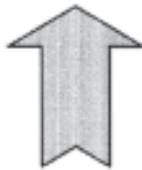
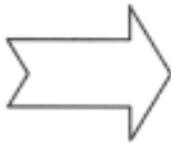
Bitmap graphics can use all of the techniques used for vector graphics but they can also be cropped.

*Cropping:* Cropping (sometimes known as clipping) cuts off part of the picture.



**Test yourself: Exercise 7**

Some editing changes have been made to the graphics below. Using the words, **scaled**, **rotated**, **flipped**, **cropped** and **coloured**, state the changes to each graphic. Some graphics may have undergone more than one change.

**Objects****Changes**

## **Capturing still graphic images**

You will not be able to create your own high-quality graphics, regardless of whether you use a bitmapped or vector-drawn package, unless you have a lot of free time and artistic talent. Therefore it is common to use existing graphics, which will save you time and effort.

Here are some popular ways of capturing existing still images:

### **Clip art**

Clip art is a collection of professionally created graphics, photos, audio clips, movies and fonts, which can be used in your multimedia presentations.

If you require a graphic for a presentation, then a clip-art collection should be your first choice of sources.

Clip art usually comes with applications or on clip-art CDs. However you can access additional clip-art elements by accessing the WWW. There are not usually any copyright restrictions if you are using clip art for your own work.

### **Scanning**

You can scan pictures into a bitmapped painting package, which would allow you to edit the pictures. If you decide to scan pictures from books, magazines, etc. be careful that they are not subject to copyright restrictions and require the copyright holder's permission before using.

### **Internet**

Graphics can be downloaded from sites on the Internet but be careful of copyright restrictions.

### **Digital camera**

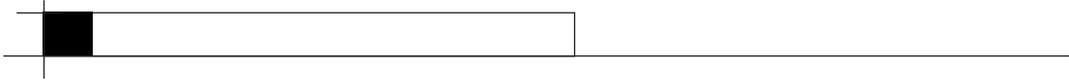
Pictures taken on your digital camera can be downloaded on to your machine, edited if desired, and then placed in your presentation.



### Test yourself: Exercise 8

You have to capture three graphics using three different methods.

1. Using clip art, find a picture of a printer and print out a copy of the picture.
2. Get the digital camera and photograph the printer you normally use. Upload the picture to the computer and print out the picture.
3. Using the print-out from 2 above, scan in the picture of the printer you printed and save it onto your disk.
4. Write a brief paragraph describing how easy it was to capture each of the graphics and the amount of storage required for each graphic.



**SECTION 3****Creating a multimedia presentation (2): Practical assignment**

There are five steps you will need to follow to enable you to complete this practical assignment in multimedia presentation properly.

- Choose topic
- Design presentation on paper
- Gather information
- Put presentation together
- Preview

**Topic**

The topic must include the four items that make up a presentation.

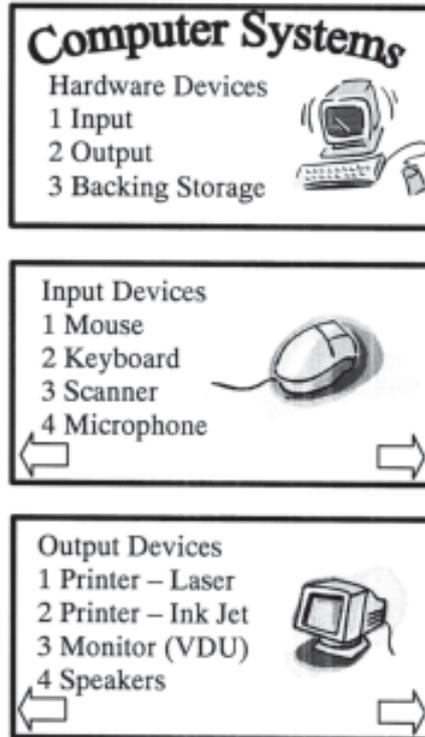
- Text
- Sound
- Graphics
- Video

You must choose your topic carefully.

Here are some examples:

- Family
- Pets
- Hobbies
- Sports – rugby, hockey, etc.
- Holidays
- Computer systems

Here is an example of a presentation. This presentation has three pages about computer systems although it is possible have more. There are also links to each of the pages.



## Design

It is essential that you plan your presentation properly before going anywhere near the computer.

In planning your presentation your tutor will give you planning sheets on which you should roughly indicate the layout of the presentation.

There should be a planning sheet for each page you are planning for the presentation.

Remember the final presentation **must** include text, sound, video, graphics and page linking (hyperlinks).

Please show your design to your tutor for approval before using the computer.

Presentation Planning Sheet 1

Presentation Planning Sheet 2

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Presentation Planning Sheet 3

## Gathering information

Now you are going to gather all the information that you will require to complete your presentation.

It is important that all the information is gathered, and then saved, so that the presentation can be put together in a single operation.

Choose a topic that really interests you – this will make your presentation more interesting to complete.

You have to tell your tutor where you obtained your information from and the filename that it is saved under. You will need to fill in the grid for this part.

Remember to save the files with meaningful file names.

It is possible to write the text yourself.

Music can come from your own collection.

You may decide to draw your own graphics.

Video clips could be shot using a digital video camera or digital camera.

Once you have gathered all the information (text, sound, video and graphics) show them to your tutor.

Information obtained from	File name for information
---------------------------	---------------------------

Text 1		
Text 2		
Text 3		

Graphic 1		
Graphic 2		
Graphic 3		

Sound 1		
Sound 2		
Sound 3		

Video 1		
Video 2		
Video 3		

### **Putting the information together**

Decide which multimedia package(s) you are going to use.

#### ***Remember***

Save your work on the computer on a regular basis – it will stop there being a disappointment if the computer crashes – it is good practice to do this. You can lose hours of work if you don't.

Show your final presentation to your tutor.

#### **Preview**

Thought – does the presentation do exactly as you had planned?

Does the sound play properly?

Are the hyperlinks correct?

Be self-critical of your own presentation.

Could the presentation be improved if you had more time available?  
If so, how?

Once you are completely satisfied with your presentation, you should obtain a hard copy for your files.

**SOLUTIONS****Exercise 1 (page 7)**

1. Presentation of Information using text, sound and graphics.
- 2.

Description	Text	Sound	Graphics
A picture of yourself			✓
A song on a CD		✓	
A word-processed poem	✓		
Video of Live Aid song		✓	
Bart Simpson picture			✓
A dog barking		✓	
School dinner menu	✓		

**Exercise 2 (page 11)**

1. Any 4 of the following:

Keyboard, mouse, scanner, microphone, graphics tablet, digital camera, video camera.

2. Optical Character Recognition
3. Allows user to enter text by speaking into a microphone rather than typing in text.
4. Resolution is the amount of detail in an image. The amount of detail is referred to as the number of pixels.

**Exercise 3 (page 14)**

1. Visual Display Unit
2. Cathode Ray Tube, Liquid Crystal Display
3. The better the sound card the better the quality of sound for your presentation.
4. Data Projector  
Monitor  
Speakers

**Exercise 4 (page 18)**

1. Backing storage is used to store or save files and/or multimedia presentations.
2. When a storage device can go straight to a piece of data wherever it is stored.
3. Optical Storage
4. Easily damaged, small storage capacity.

**Exercise 5 (page 23)**

File Extension	Graphic	Video	Text	Sound
.bmp	✓			
.txt			✓	
.wav				✓
.doc			✓	
.gif	✓			
.mpeg		✓		
.mp3				✓
.avi		✓		
.rtf			✓	
.jpeg	✓			

**Exercise 7 (page 31)**

scaled



rotated; coloured



cropped; coloured