

Databases



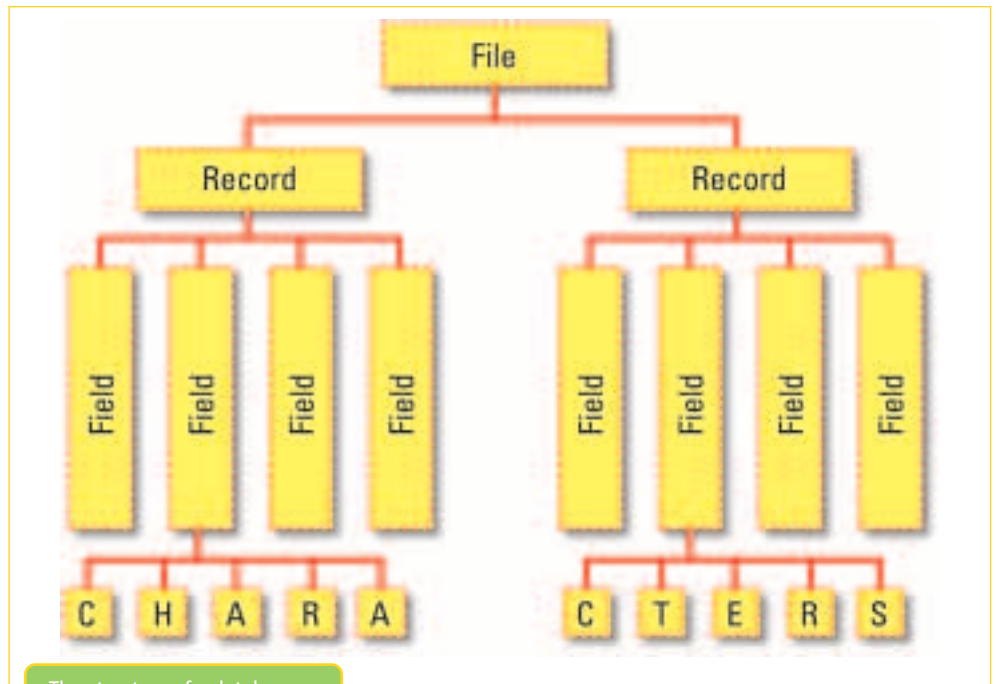
Did you know!

Databases existed in the time of Roman gladiators. One of the tasks of the Vestal Virgins was to record the births of Roman citizens. Eventually they would have run out of storage space as this practice continued for hundreds of years. However, very few records have survived.

Databases can be used to organise large amounts of data. A simple database that we all use is a telephone book. It collects people's names, addresses and telephone numbers in an organised manner. To use a telephone book, we look for people's names, since it is sorted alphabetically using this data. However, it is harder to search through for someone at a specific address if you have forgotten their name.

Features of a database

Computerised databases organise data in the same manner as manual ones. The data is stored in a **table**. Each person in the table is called a **record**. A record is an entry of data about an individual item. Each category of data that is collected is called a **field**. Fields in a telephone database would include name, address and number. The data in each field is usually made up of **characters**, but some databases allow items such as photos to be stored as well.



The structure of a database.



Did you know!

The first computerised database was devised by an American, Herman Hollerith, as a way to speed up the counting of the census. Previously, it had taken several years to calculate the population statistics in the USA, by which time was the census out of date.

Computerised databases have one big advantage over manual ones – they allow the data to be reorganised easily. You can **sort** the data on different fields in either ascending or descending order. For instance, you could easily reorganise a database of your friends so they were sorted according to the date of their birthday. **Searching** is way of locating data that meets certain conditions. For instance, you could search to find all the people who were born in 1990, or who live in your suburb.

Databases allow us to display and process the data in many different ways.

- **Table** view displays the data in columns and rows. You can see many fields and records at once, but you may need to scroll to see all of the data. Table view can be used for adding, changing and deleting data, as well as for displaying.

- **Form** view is an excellent way to enter data. It shows all the fields for one record at a time. It is usually set up with headings and boxes for the data to be entered into, just like a form you might have to fill out. You can scroll through pages of data, one record at a time.
- **Report** view is only used for displaying the data. It organises the data before it is printed out. You can choose to include all or some of the database, and sort the data on different fields.

A tool for planning a database is a **data dictionary**. This is a table that describes the type of data that will be stored in the database. The table below shows an example of a data dictionary for a database about people in your class. The first column shows the field names that will be used in setting up the database. Notice they are kept fairly short and without spaces or punctuation.

The second and third columns are important as they will affect the final size of the database. Number fields can only contain numbers. Text fields can contain text, numbers or punctuation. The size of the field should be kept as small as possible, without being too small. The last column is used for a longer description of the field name, or the type of data input style you would prefer.

Field name	Data type	Size	Description
FName	Text	15	First name
SName	Text	15	Surname
PCode	Number	4	Postcode
MobPh	Text	12	Mobile phone number (xxxx) xxxxxx
DoB	Date	Short	Date of birth
Photo	OLE		Photo of person

questions

- 1 Answer true or false to the following statements, and then explain your choice.
 - a Manual databases are easier to search through than computerised ones.
 - b A field is the data collected about a person or item.
 - c An ascending sort reorganises the data from lowest to highest.
 - d A descending sort reorganises things into alphabetical order.
- 2 Match up each of these terms to one of the statements below.
 data dictionary form report search table
 - a A table that shows a listing of the fields to be used in a database.
 - b An excellent way for entering data that displays one full record at a time.
 - c A layout of rows and columns that displays multiple records and fields.
 - d Looking for data that meets certain conditions.
 - e A tool used for displaying all or part of the data from a database.

Input tools



Did you know!

Psst!

The layout of the keyboard that most computers use is 'QWERTY'. It was first laid out in the 1800s as a way to slow typists down.



Did you know!

Psst!

ASCII is a universal code for keyboard characters. Each different character is represented by a different code, for example A is 1000001.

The keyboard and the mouse are the most commonly used input devices, but they are only useful with some data types. The **keyboard** allows the user to enter text into a computer system. Characters are sent through the computer's cabling as a coded sequence of binary numbers. The keyboard also allows the user to have some control over the cursor, for example the ←, ↑, →, and ↓ keys. The **mouse** is mostly used to control the movement of the cursor, but the buttons allow the user to make selections (point and click). There are various types of keyboards and mice, including wireless versions, but they all perform much the same function.

A **scanner** is a way of entering both graphics and text. A powerful light beam is reflected off the page being scanned, and the computer analyses the pattern of reflections. This is turned into a pattern of pixels that can be saved as a bitmap image. A pixel (picture element) is the smallest part of an image. The smaller the dot size ('higher resolution'), the better quality the scanned image, but this results in a larger file size.

With extra OCR software installed, the computer analyses the scanned images for recognisable shapes – characters. It converts these into ASCII and stores the data as text, rather than as a graphic. OCR is an acronym for Optical Character Recognition.



A flatbed scanner.

Digital cameras quickly change the scene being photographed into a bitmap. Most digital cameras have functions that allow you to review and delete images to free up memory. Extra memory can be added to some cameras, enabling more photographs to be stored. Cables are used to connect the camera to the computer so that photographs can be transferred.

Cameras may allow the user to store short video sequences, but these require more memory. The more megapixels a camera has (higher resolution), the better the final quality of the photographs. As with scanners, this means larger files, and fewer images are able to be stored.

Digital video cameras save video data in a form that can be easily used by computers. They incorporate **microphones** to record sound.



A digital video camera.

Specialised input tools are part of many design industries. Graphic tablets allow the user to draw on a flat surface to control the mouse. Joysticks are used in the creation of video and animation sequences. MIDIs allow for music to be played and stored directly onto a computer without the need for microphones.

questions

- 1 Copy this table into your notebook. Place a tick if the input tool can be used for text, graphics, audio, animation or video.

Input tool	Text	Graphics	Audio	Animation	Video
Keyboard					
Mouse					
Scanner					
Digital camera					
Digital video camera					
Microphone					

- 2 Explain what resolution is, and how it affects the quality of the image and file size.

Information technology quiz

The following questions will help you revise your knowledge of materials, tools and techniques. All the answers can be found in the text, so if you get stuck, go back and have another read.

questions

- 1 Match the terms in List A with the definitions in List B.

List A	List B
Animation	address of a web page
ART	data type involving cartoons
Audio	data type involving characters
Data	data type involving movies
Graphics	data type involving pictures
Hyperlink	data type involving sounds
Information	output that has been given meaning
Text	part of a design that takes you to another place
URL	the raw facts that go into a computer
Video	three things to check before collecting data

- 2 Choose the best response. Input is:
- a what goes into a system
 - b what comes out of a system
 - c how data is kept in a system
 - d a type of plug on a computer.
- 3 Choose the best response. Output is:
- a what goes into a system
 - b what comes out of a system
 - c how data is kept in a system
 - d a type of plug on a computer.
- 4 Choose the best response. The storage device which holds the most data is:
- a CD
 - b DVD
 - c floppy disk
 - d hard disk.

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