

# **STANDARD GRADE**

## **COMPUTING STUDIES**

**REVISION NOTES**

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**1 Hardware and Software**

*Hardware* is the physical parts of a computer such as a keyboard, floppy disc, processor chip etc.

*Software* is the programs that the computer can run such as word processing graphics, database, operating system etc.

**2 General Purpose Packages**

*General Purpose Packages* are programs that can be used for lots of different tasks and not for one specific task.

Word processing, Databases, Spreadsheets and Graphics are examples of general purpose packages.

Files are often saved in a *standard file format* so that the data they contain will be recognised by other computer programs. Standard file formats exist for most types of data.

Text: ASCII, RTF

Audio: MP3, WAV

Graphics: JPEG, GIF

Video: Real, MP4

- ◆ They allow files to be shared between different computer systems.
- ◆ They allow files to be used by other computer programs
- ◆ They allow files to be sent across the Internet and still be recognised at their destination.

**3 Human Computer Interface (HCI)**

The *Human Computer Interface* is the way in which the user communicates with the computer program. Most programs use a Graphical User Interface (GUI) also called a WIMP interface.

*WIMP (Windows, Icons, Mouse, Pull-down menus)*

The mouse is used to select from a list of choices on pull-down menus and small pictures called icons.

It is easy to use and suitable for beginners.  
However an expert user would find it slow

*Toolbars* group together icons that perform related tasks such as *drawing* or *editing*

*Keyboard shortcuts* allow an option to be selected by pressing a special combination of keys.

*Customizing the Interface* – Altering the interface to suit the individual user.

Changes can be made to the *content of menus*, the *colour scheme*, the *font size* used in menus and dialogue boxes and the *tool bars* that are shown.



Edit Toolbar

**4 On-Line Help, On-Line Tutorials, Wizards and Templates**

*On-Line Help* is help available within the program on how to do specific task.

*On-Line Tutorial* is a step by step lesson demonstrating the program features.

*Wizards* are small utility programs that guide a user, step-by-step through an unfamiliar task. An example is the mail merge wizard.

*Templates* are documents that contain some structure and content upon which other documents can be based. A template is customised by the user. *Example* Memo template.

## 5 **E-Mail & FAX**

*E-Mail* is the sending of electronic messages from one computer to another.

### *Advantages*

Messages are sent instantly.

You can send the same message to a group of people at the same time.

### *Disadvantages*

You can only send E-mails to people who have an E-mail account.

E-mails can be used to send a computer virus.

*FAX* machines scan documents and convert the picture into numbers.

The numbers are then transmitted over the telephone line to another FAX machine which converts the numbers back to a picture and prints it out.

## 6 **Networks**

A *Computer Network* is a group of computers connected together by cables.

A *Stand-Alone* computer is one which is not connected to any other computer.

A *LAN (Local Area Network)* connects computers over a small area such as a building.

A *WAN (Wide Area Network)* connects computers over large distances such as different towns or countries.

The computers in a WAN are usually joined using the telephone system.

### *Advantages*

Users can share hardware devices such as printers.

Many users can access the same files.

E-mail can be sent between computers.

### *Disadvantages*

If the network gets infected with a virus then all the computers can be infected.

If the central computer (file server) goes down then the network is not operational.

In a WAN a *modem* is required to convert the signals from the computer to a form that can be transmitted across the telephone line.

## 7 **Security and Privacy**

Security of data means that data stored on a computer is private and safe.

Access to confidential files can be restricted using passwords.

Physical security can involve keeping computers in locked rooms, putting locks on keyboards, etc.

## 8 **Accuracy**

Accuracy of data means that the data stored on a computer is correct and free from errors.

It is essential that data used in commercial data processing is correct otherwise customers could get the wrong goods, be overcharged, etc.

Errors can be made when data is entered into a computer using a keyboard.

*Accurate* data is data that is free from errors.

## 9 Integrated Package

*Integrated Packages* have two or more general purpose packages combined together in one program.

*Advantages* of an Integrated package

- ◆ Easy to transfer data from one general purpose package to another.
- ◆ They share a common HCI.  
(The general purpose packages are all operated in a similar way)
- ◆ Cheaper than buying several individual general purpose packages.
- ◆ Can set up dynamic links between the different general purpose packages. (eg. Mail Merge)

*Disadvantages* of an Integrated package

- ◆ The general purpose packages will not have as many features as a dedicated individual general purpose package.

## 10 Legal Acts Concerning Computing

The *Computer Misuse Act (1990)* makes the following activities illegal.

- ◆ Sending viruses
- ◆ Hacking into computer systems

The *Data Protection Act (1984)* is concerned with the rights of individuals in society.

A company holding data on people must obey the following rules.

- ◆ Data must be made secure by restricting access with passwords.
- ◆ Data must be up to date and accurate.
- ◆ Individuals have the right to demand a printout of their data. (Except for the Police.)
- ◆ Data must not be held if it is no longer required.
- ◆ A company wishing to hold data must register with a central government agency.

The *Copyright, Designs and Patents Act* is concerned with the rights of those who have created written, musical or artistic works. The following rules apply

- ◆ The creators have the right to control the ways in which their material may be used
- ◆ Copying, editing and publishing another persons work must be done with their permission
- ◆ It is illegal to copy/use computer programs without permission or licence
- ◆ Copying text or images from a web page could mean a breach of copyright.

**1 Word Processing**

*Word Processing* allows you to enter, delete, edit, save, retrieve and print text.

*Enter...*text is added.

*Delete...*text is removed.

*Edit...*text is altered.

*Save...*text is saved on a backing store. (eg. hard disc)

*Retrieve...*text is loaded back into memory from a backing store.

*Print...*a hard copy is obtained (a printout)

**2 Text Formatting**

*Fonts* are different shapes of text. eg. Times New Roman, Geneva, Arial, etc.

*Font Size* is the height of text measured in point size. eg. 12 point text is suitable for a letter.

(72 point text is 1 inch high)

*Styles* are enhancements of text. eg. **Bold**, *Italic*, Underline, ~~Strike Through~~, Subscript, Superscript etc.

*Colours* are different colours of text. eg. Black, Red, Yellow, etc.

**3 Text Alignment/Justification**

*Text Alignment* sometimes known as *Justification* is the way the text is lined up with the left and right margins of the page.

*Left Aligned*

Hello there,  
just a short note to let you  
know that the ship is  
sinking and the crew are  
sitting around and  
watching it go down.

Text is lined up with the  
**left** hand margin.

*Centre Aligned*

Hello there,  
just a short note to let you  
know that the ship is  
sinking and the crew are  
sitting around and  
watching it go down.

Text is lined up  
symmetrically about the  
**centre** of the page

*Right Aligned*

Hello there,  
just a short note to let you  
know that the ship is  
sinking and the crew are  
sitting around and  
watching it go down.

Text is lined up with  
the **right** hand margin.

*Fully Justified*

Hello there,  
just a short note to let you  
know that the ship is  
sinking and the crew are  
sitting around and  
watching it go down.

Text is lined up with  
**both** the left and right  
hand margin.

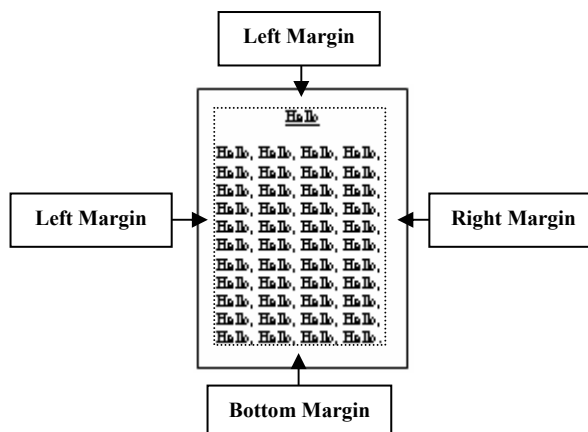
**4 Tables**

A *table* is made up of rows and columns of cells that can be filled with data. Tables are often used to organize and present information.

Employee	Position	Wage
Ben Lopez	Manager	\$25,000
Monica Clinton	Director	\$6.9 Million
Jennifer Affleck	Clerk	\$36,500
Bill Lewinski	Secretary	\$19,900

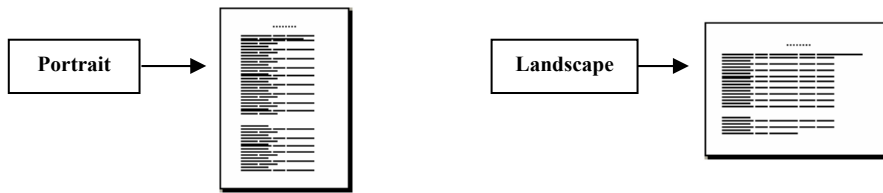
**5 Page Margins**

The Left, Right, Top and Bottom margins of a page can be altered.



## 6 Page Layout

*Page Layout* is the orientation of the page which can be either *Portrait* or *Landscape*.



## 7 Page Size

The default *Page Size* is A4. (10 ins x 8 ins) Different page sizes can be selected.  
eg. A5 which is half the size of A4, Envelope sizes, etc.

## 8 Search and Replace

*Search and Replace* allows you to look for a word or phrase in a document and replace it with another word or phrase.

eg. In a story you could change every occurrence of the name of a character from "Laura" to "Wendy"

## 9 Spell Check and Grammar Check

*Spell checks* look up each word in a dictionary and offer replacements for words that are not found. Peoples names and towns are often not in the dictionary and will be highlighted as a spelling error. The user can add new words to the dictionary.

*Grammar checks* look for errors in grammar such as no capital in a new sentence, the wrong tense, etc.

## 10 Standard Paragraphs

If the same paragraph is used over and over again in different documents then it can be saved onto disc and loaded into a document as required.

This saves a lot of time by removing the need to type in the paragraph each time it is used.

## 11 OCR (Optical Character Recognition)

A scanner can be used to input text documents into a computer. The OCR software recognizes the shapes of characters and converts the scanned image into editable text.

eg. OCR can be used to save retyping documents only available on paper.

## 12 Page Breaks

Inserting a *Page Break* before the end of a page starts a new page.

This removes the need to enter [RETURN] lots of times to get to the next page.

## 13 Headers and Footers

*Headers* and *footers* are used to enter data **once** which will then be shown at the top or bottom of **every** page in a long document.

The data may be a Title, Page Number, Date, Time etc...

## 14 Templates

A *Template* is a document in which certain parts and settings have already been created.

The template is used as a basis for a document to which other variable parts can then be added.

## 15 Printer Driver

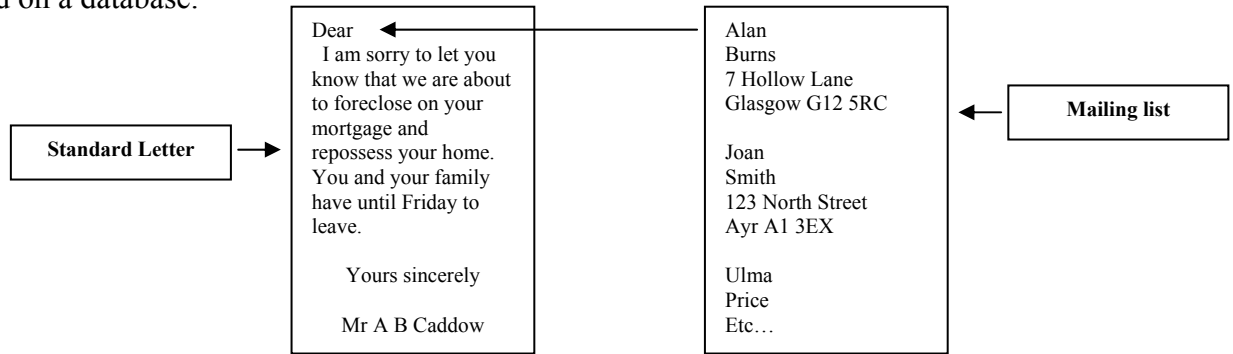
A *Printer Driver* is software which allows the computer to communicate with a printer.

The program translates formatting codes in a document into the correct code for the printer being used.

## 16 Standard Letters and Mail Merge

A *standard letter* is one which is sent to many people with only a few details (such as name and address) changed for each person.

*Mail merge* is the process of personalising a standard letter by inserting details contained in a mailing list held on a database.



## 17 Static and Dynamic Links

When the same data is shared between two documents then the link can be either *static* or *dynamic*.

### Spreadsheet document

A	B	C	D
1	January		
2	3	7	5
3	4	5	3
4			
5			
6			
7			
8			
9			

### Word Processing Document

**Report**  
The sales figures for last month are shown in the table below.

**January**

3	7	5
4	5	3

I hope that you are pleased with the improvement.

Source data

Copied data

*Static Link*...If the source data is changed then the copied data **will not** automatically change.

*Dynamic Link*...If the source data is changed then the copied data **will** automatically change.

**1 Database Package**

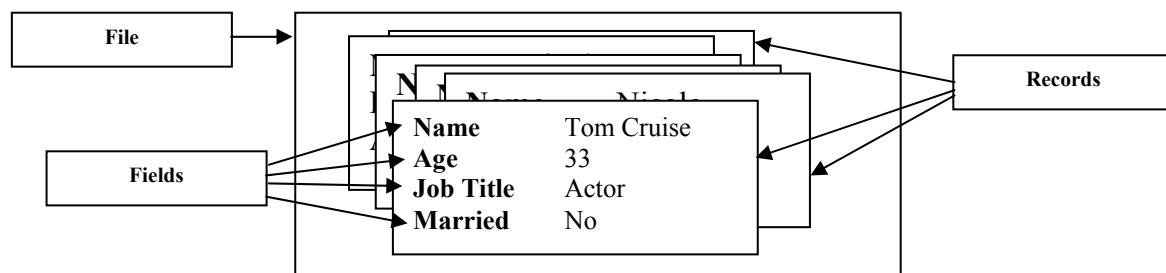
A *Database Package* is a program used to create and organise data.

*Advantages*

- ◆ Saves paper and space compared to a manual system on record cards.
- ◆ Amendments can be made easily to the data without rewriting a record card.
- ◆ The records in the database can be quickly sorted into any order.
- ◆ A search can be made quickly to find certain records.

**2 Database File**

A *database file* is a structured collection of similar data.



A *File*...is data on a particular topic contained in a collection of records.

A *Record*...is data on a single person or thing.

A *Field*...is an item of data on a record.

**3 Field Types**

A *Text field* contains characters. eg. Surname, Address.

A *Numeric field* contains numbers. eg. Exam Mark, Age.

A *Date field* contains a date. eg. Date of birth, Subscription Due Date.

A *Computed field (or Calculation field)* is calculated from data in other fields using a formula.

eg. A Calculation field called Pay could be calculated from the formula

=[Hours]\*[Pay per Hour]

A *Graphic field* contains graphics. eg. An icon, a smiley face.

A *Key field* is a field that contains a unique value in each record so that a particular record can be found by searching for the value in this field. eg. Reference number, Account number, etc.

**4 Inserting, Deleting and Amending Records**

*Insertion*...Adding a new record to the database.

*Deletion*...Removing a record from the database.

*Amending*...Updating a record to include any changes.

**5 Input and Output Format**

The layout of the screen for inputting data can be altered to make it easier to enter data. eg. Only show the fields into which data is being entered.

The layout of data to be output can be displayed in different ways.

eg. The records are printed out in columns, only certain fields are displayed, the records are sorted in a certain way, etc.

## 6 Expert System

An *Expert System* is a computer program which has a large number of rules stored in a *Knowledge Base* from which it is able to draw conclusions and make decisions.

Expert Systems are used in medical diagnosis, legal advice, car problems etc.

## 7 Sorting


*Sorting* a database means to arrange the records in a certain order.

The records can be sorted in ascending (increasing) or descending (decreasing) order.

The records can be sorted on one field or on more than one field.

*Simple Sort (Sorting on one field)*

The file below has been sorted in **Ascending** order on the **Age** field.



Name	Address	Age	Pet
Q. Lewinski	2 North Street	13	Parrot
F. Mercury	123 Gaga Drive	19	Dolphin
G. Sparkle	100 Treacle Crescent	22	Budgie
.....	.....	.....	.....
T. Forrests	13 Golf Drive	89	Dingo

*Complex sort (Sorting on two or more fields)*

The records are sorted according to the first field and only if the data in it is the same for two or more records is the second field used.

The file below has been sorted on **two** fields.

**Field1** Form Class field in **Ascending** order.

**Field2** Exam field in **Descending** order.

Form Class	Exam	Date of Birth	Hobbies
3B	87	120688	Sky Diving
3B	72	130988	Archery
3B	56	230488	Jogging
3B	31	091288	Chess
3C	93	290288	Computing
3C	67	301088	Athletics
3C	45	251288	Water Polo
3D	89	010189	Reading
.....	.....	.....	.....

## 8 Searching

*Searching* a database means to find records which meet certain conditions.

The records can be searched on one field or on more than one field.

*Simple Search (Searching on one field)*

eg. Search for records where the **Salary** field = £30,000.

*Complex Search (Searching on two or more fields)*

eg. Search for records where the **Winner** field = "Partick Thistle" AND **Year** field is less than 1970.

## 9 Search for Information on CDROM / WWW (Internet)

*Keyword:* A word which is used to search for an item on a database.

*Simple Search:* A simple search involves searching on **one field only**.

*Complex Search:* A complex search involves searching for information on **two or more fields**.

*CD-ROM* CD-ROM encyclopaedias have their own indexing software allowing the user to search for information by entering one or more keywords.

*Advantages:* You do not need to be connected to the internet.

*Disadvantages:* Information is fixed and cannot be updated without replacing the disk.  
Information may not be detailed enough.

### *Internet*

The internet contains many millions of pages of information.

A **search engine** is a special site on the web designed to help you find information.

Search engines search the internet for different words.

A **basic search** allows the user to enter **one or more keywords**.

An **advanced search** allows the user to **refine the search**, by eg. restricting the search to certain parts of the web or by choosing different options from a menu.

## 9 Validation

*Validation* of data means that the program will not accept data that is not possible or sensible.

eg. A range check will only accept a value in a certain range. eg. If a month is entered as a number then it must be in the range 1...12.

## 10 Verification

*Verification* of data means that **two** people enter the same data. The program then compares both versions and highlights any differences which are then corrected.

**1 Spreadsheet**

A *Spreadsheet* is a grid of cells which can contain numbers, text or formula.

	A	B	C	D	E	F
1	Champions League					
2						
3		P	W	D	L	Points
4	Partick Thistle	3	3	0	0	9
5	Juventuse	3	2	1	0	7
6	Barcelona	3	0	1	2	1
7	Manchester United	3	0	0	3	0

Column width and row height of cells can be altered to suit their contents.

**2 Formula**

*Formula* are used to perform calculations on the data in the spreadsheet. The arithmetic operations are Add (+), Subtract (-), Multiply (\*), and Divide (/).

eg.

	A	B	C	D
1	3	4	6	
2	9	7	2	
3	5	1	8	
4				

In the above spreadsheet  
 =A3+B2-C3 gives an answer of 4. (=5+7-8)  
 =A1\*B1/C1 gives an answer of 2. (=3x4/6)  
 =(A1+B2+C3)/3 gives an answer of 6. (=(3+7+8)/3)

**3 Functions**

*Functions* are built in formula to calculate highest values, lowest values, totals, averages, etc. The functions required for this course are MAX, MIN, SUM, AVERAGE and IF.

eg.

	A	B	C	D
1	3	4	6	
2	9	7	2	
3	5	1	8	
4				

In the above spreadsheet  
 =MAX(A1..A3) gives an answer of 9. (The highest value of 3, 9 and 5.)  
 =MIN(A2..C2) gives an answer of 2. (The lowest value of 9, 7 and 2.)  
 =SUM(B1..C3) gives an answer of 28. (The sum of 4, 6, 7, 2, 1 and 8.)  
 =AVERAGE(B1..B3) gives an answer of 4. (The average of 4, 7 and 1.)

The *IF function* (conditional function) returns one value if a condition is true and another value if a condition is false.

$$=IF(\text{Condition}, \text{True}, \text{False})$$

=IF(A1>10, C1\*2, C1\*3) gives an answer of 18 since the condition A1>10 is false and C1\*3 gives an answer of 18. (=6x3)

#### 4 Replication

*Replication* is when a formula is filled down or across.

A *Relative Cell Reference* is when the cell reference changes according to the row or column that it is copied into.

In the example below the formula =A1+B1 has been replicated (A1 and B1 are both relative cell references)

	A	B	C
1			=A1+B1
2			=A2+B2
3			=A3+B3
4			=A4+B4
5			=A5+B5

An *Absolute Cell Reference* is when the cell reference does not change according to the row or column that it is copied into.

Dollar signs are used to make a cell an absolute cell reference. eg. \$A\$1

In the example below the formula =A1+B1 has been replicated (A1 is an absolute cell reference and B1 is a relative cell references)

	A	B	C
1			=\$A\$1+B1
2			=\$A\$1+B2
3			=\$A\$1+B3
4			=\$A\$1+B4
5			=\$A\$1+B5

#### 5 Cell Attributes

The *Cell Attributes* of a cell are the features or display options of a cell.

eg. The width of the cell, the type of justification, the number of decimal places, the background colour, etc.

#### 6 Cell Protection

*Cell protection* is when the contents of a cell are locked so that the contents can not be changed.

#### 7 Charting

*Charting* is when cells are selected and the selected data is used to produce a choice of graph.

The types of graph include a bar chart, a pie chart, a line graph etc.

**1 Graphics Package**

A *Graphics Package* is a program that is used to produce pictures. There are two types of graphic software, **Painting** and **Drawing**.

**2 Pixels**

Graphics are made up of tiny dots called *Pixels*. (The word **pixel** comes from **picture element**)

**3 Resolution**

*High Resolution Graphics* are made up from a large number of small pixels. This gives a good quality graphic with a lot of detail.

*Low Resolution Graphics* are made up from a small number of large pixels. This gives a poor quality graphic with little detail.

**4 Painting**

*Painting* graphics store the graphic as the colour of the pixels that make up the graphic.



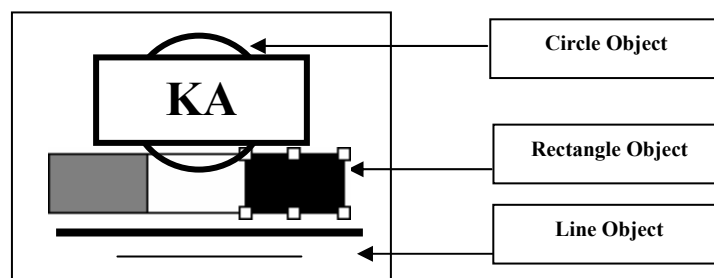
The tools that a painting package uses allows the individual pixels to be changed. eg. Pen, Rubber, Airbrush, etc.

**5 Scanner**

A *Scanner* can be used to input graphics into a computer which can then be edited. The quality of the scanned image is determined by the resolution and the number of colours. A 48 bit scanner has more colours than a 32 bit scanner. The resolution is measured in dpi. (dots per inch) eg. 3600 dpi, 4800 dpi, etc.

**6 Drawing**

*Drawing* graphics store the graphic as a list of objects (shapes) that make up the graphic. The objects are shapes such as Rectangles, Circles, Lines, etc.



The *attributes* of an object are features which can be altered. eg. The rectangle tool has attributes such as Line Thickness, Line Colour, Fill Colour, etc.

## 7 Editing Graphic

### Scale

To *Scale* a graphic is to change it's size by enlarging or reducing.  
eg.



### Rotate

To *Rotate* a graphic is to turn it through an angle.  
eg.



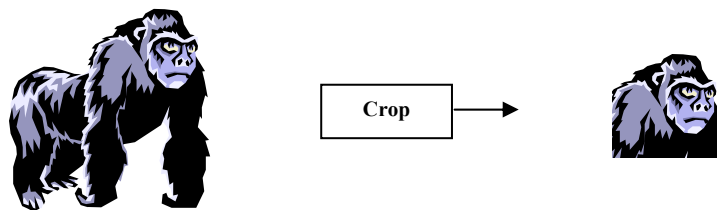
### Flip

To *Flip* a graphic is to reflect it in an axis of symmetry.  
eg.



### Crop

To *Crop* a graphic is to trim the horizontal or vertical edges of a graphic to show a particular area.  
eg.



## 8 Animation

*Animation* is moving graphics.

It is used in Games, Screen Savers, Virtual Reality, etc.