# Information Systems

## Using Information

[Intermediate 2]

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## INTRODUCTION

This unit is designed to develop knowledge and understanding of the principles, features and purposes of information and the systems used to create, store, process, retrieve and present information. It also develops knowledge and understanding of the wide-ranging implications of the growing use of information systems within society. It provides an opportunity to develop practical skills in the use of contemporary information handling. Candidates may then apply this knowledge and these skills to solve practical problems.

### Target Audience

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following qualifications (or equivalent experience):

- Standard Grade in Computing Studies at General level
- Standard Grade English at General Level

The unit has two outcomes:

Demonstrate knowledge and understanding of the principles, features and purposes of information, organisational information systems, information management software, and the social, legal, ethical and economic implications of information systems

Demonstrate practical skills in the use of contemporary hardware and software in the context of creating, storing, processing, retrieving and presenting information.

Outcome 1 is assessed by a multiple-choice test. Outcome 2 is assessed by a checklist. Both of these are included in the NAB.

### Learning and teaching approaches

These materials constitute the Intermediate 2 section of the support notes and include content for every Intermediate 2 point in the arrangements. Suitable questions and activities have been included at the end of each section and there has also been an attempt to include activities for Intermediate 2.

It is recommended that the assessment of the practical element and delivery of this unit be combined in order to maximise the amount of time the students are working on the unit. These study materials should be made freely available to the students during the outcome 2 assessment, as should any tutorials, documentation or other materials relevant to the hardware or software required to complete the assessment.

A mixture of student-centred, resource based learning and teacher / lecturer class teaching is recommended. Students will require access to appropriate computer hardware and software and Internet access throughout this unit.

A range of suitable questions and activities is provided at various points throughout the notes and the teacher / lecturer should direct the students to these activities as they see fit. The questions should also provide a means of diagnostic assessment as part of the learning and teaching of the unit.

## Hardware and software requirements

This unit requires that the student has regular access to a computer system which can be used throughout the production of the multimedia product. At the time of going to print, such a system would have:

- a 600 MHz G4-based Apple Power Mac or a Pentium III 800 MHz Processor-based PC
- sufficient RAM, e.g. 128 Mb RAM for Macs and PCs
- sufficient backing store, e.g. 10 to 30 GB hard disk
- Internet Access and Word Processing, Spreadsheet and Presentation software including PIM software such as Microsoft 97 (Office 95 on a Mac) although Office 2000 with Outlook is recommended.
- Desk Top Publishing and Web Authoring Software. Project Management Software is optional and may be demonstrated by the teacher / lecture (although Project is expensive an evaluation package can be downloaded and used for 30 days free of charge, either SmartDraw or Microsoft Project can be used.

## How to tackle this unit

A standard learning pattern is suggested for your use throughout this unit:
- a clear outline of the main learning points
- questions to check understanding of these points
- practical tasks to illustrate the learning.

Wherever possible, tutors should provide opportunities for candidates to do practical work related to the learning in each section.

A PowerPoint Presentation solely for Intermediate 2 is available to download and can be used as an introduction. Pupils and students may well find a copy of the PowerPoint is a good basis for revision and should provide enough information to allow the questions to be answered. The questions could be copied separately and used to set homework.

## What is in the pack?

**Section 1: Data and Information**

The difference between Data and Information. Questions and tasks

**Section 2: Organisational Information Systems**

Explanation, definition, description and exemplification of organisational information systems. Questions and tasks

**Section 3: Information Management Software**

Explanation, definition, description and exemplification of different classes of software. Questions and tasks

**Section 4: The Social, Legal, Ethical and Economic Implications of Information Systems**

Explanation, definition, description and exemplification of social, legal, ethical and economic implications of information systems. Questions and tasks

**Section 5: Useful Resources**

Bibliography and Useful Web Links summarised.

**Section 6: Additional Resources**

Software evaluation Pro-forma and suggested answers and marking scheme for embedded questions.

# Using Information

## Introduction

We are said to live in an age where information and knowledge are so important that society can be divided up into two groups. These are “information rich” and “information poor”. If you are information rich you have access to many TV and radio channels, books, newspapers and journals, and of course computers and the World Wide Web. Those who are information poor tend to not have access to the Web and probably find it difficult to access relevant books and journals. Even in general conversations a discussion about a TV programme shown on satellite TV will be lost on people who only have 4 or 5 terrestrial channels. If you are following this course you will probably be information rich.

We are going to examine the nature and uses of information by looking at the differences between Data and Information, Organisational Information Systems, Information Management Software and the Implications of Information and Communications Technology.

## Data & Information

**Data** is raw unprocessed facts and figures that have no context or purposeful meaning and **Information** is processed data that has meaning and a context.

For example a computer operator may enter 36.41, which is data because we do not know in what context it is being used. However if this then appears on a bill to show that you owe a company £36.41 for goods received then this is information as it has a context and meaning.

The figures 36.41 will be held as binary data on some media such as a hard disk. It is the software, which accesses this data and displays in its context. It may also have some structure, if it is held in a program like a database for example, and a database will also give it structure. It is the software, which turns it from data into information and gives it meaning.

The binary patterns on backing storage device such as a disk, CD or DVD, or memory stick are all classed as data. For example the binary patterns, which describe an icon on your desktop, are data. They become information after the operating system software has processed them and then they become meaningful to you as the icons representative of your hard disk or Internet explorer.

### Exercise 1

**Questions on Data and Information.**

1 Copy the following table and decide which of the following are data or information 10

| | | |
|---|---|---|
| 1 | The registration number of a car. | |
| 2 | 234.73 | |
| 3 | SA04KRT | |
| 4 | An icon on a computer's desktop. | |
| 5 | 00101001 | |
| 6 | A binary stream held on a hard disk. | |
| 7 | Unprocessed raw facts. | |
| 8 | The contents of a field in a database. | |
| 9 | A paragraph of text in a word-processed document. | |
| 10 | 04081953 | |

2 Give two examples of data that are generated in a school's administration and assessment system. 2

3 Give two examples of information that are generated in a school's administration and assessment system 2

Total Marks 14

## Concepts in Relation to Organisational Management System

### Speed

Computers at the heart of information systems are capable of processing data very quickly. Although the computer is able to access data from backing storage at very high speeds this is one of the slowest aspects of data processing. The processor is able to carry out millions of calculations per second and some processors are optimised for speed of calculations.

### Accuracy

For most practical purposes computers store and process numbers to a great degree of accuracy but the accuracy also depends on the software written and of course human accuracy. Much financial software is accurate to 3 decimal places rounded to 2. Once the accuracy of a calculation has been verified the software and hardware combined will perform the calculation correctly every time.

### Volume

The number of transactions handled by an Information Systems in a period of time is referred to as the volume or number of transactions. A commercial data system often has to handle millions of transactions every week. Take a bank for example with 5 million customers. If each customer makes an average of 2 transactions (cash withdrawals and deposits, cheques written, direct debits and standing orders) then the system has dealt with 10 million transactions. The average for a bank of that size is probably far higher so as you can see the volume of data is huge. This has big implications for the size of backing storage, processing power and output capabilities of the system.

### Efficiency

The efficiency of an Information System is really a combination of the speed, accuracy and volume of the data processed. It could be measured as the number of accurate transactions carried out per minute. In relation to human processing, it is substantially more efficient to carry out processing on an information system. Information systems are capable of running without interruption 24 hours a day and 7 days a week.

## The Functions Of An Organisational Information System

There are four basic functions of an OIS (similar in nature to the Commercial Data Processing Cycle) relating to gathering data and storing, processing and outputting information. Note that we start by gathering **data** and from storing it onwards it becomes **information.**

### Gathering Data

In the past there have been a wide variety of methods of capturing data before bar codes have become almost universal on goods for sale. Many large companies employed large teams of data processing staff often entering data from **turnaround documents** (like utility bills filled in and returned with a cheque).

Another area of business that used data processing staff was the original mail order companies. Customers chose goods from a catalogue and sent the order forms in. Operators typed in the order and when the goods were despatched documents including a bill were produced. The customer received the goods and in time paid the bill, filling in a document to enclose with the cheque (or to pay in at the bank). The company eventually received the documents and the payment could be recorded against the customer account.

In shops there were several different ways of recording sales and stock control. Some large shops used **Kimball Tags**, which were strips of cards with holes punched in them. These cards were fed into a reader at the end of the day and the reader interpreted the sequences of holes as stock numbers and stored the data on a type of disk. The disk was sent to head office for processing and at the end of a week sales figures and stock levels could be calculated. A similar system was employed with **metallic stripes** on the cards, which were similarly read and used.

The disadvantage of these methods is the time delay between the goods being ordered, dispatched (remember "please allow 28 days for delivery") and the company banking the money and also shops were either overstocking or forever running out of stock.

The current methods that are employed to capture data for an information system will be investigated.

## Bar Codes

Bar codes are small labels printed on food, books, newspapers and magazines and nearly all product packages. They are made of lines, which represent numbers. A bar code stores four pieces of information.

- Country of Origin
- Manufacturers Code
- Item Code
- Check Digit

The bar code is scanned (the numbers can be entered manually as well if they won't scan). The bar code data is then used by the Point Of Sale terminal to search a database of products for the name and prices. It then prints an itemised bill and uses the data to update stock levels and a sales file which can be used there and then to calculate all sorts of statistics (daily sales by department, hourly sales etc.).

## Ordering Goods

What of the other methods of gathering data in common use. Mail order has all but disappeared and has been replaced by telephone and Internet ordering. Companies now rely on customers telephoning an order and paying over the phone with a credit or debit card. The goods are ordered instantly, the stock position can be given to the customer instantly, the money is transferred to the companies account almost instantly and the goods are usually despatched within a few hours and received usually within 48 hours by the customer.

When goods are ordered over the Internet a similar situation occurs except that much more of the process is automated. The customer orders the goods from the Internet

site, pays by credit or debit card and the goods often arrive either at a prearranged delivery time (supermarkets), or within a day or two.

The advantages of these methods to the company are that they are paid instantly in advance for goods ordered and hopefully increase their business. To the customer, goods are received very quickly and often at the customer's convenience and of course the customer does not need to leave their home (especially advantageous when young children are around and / or the weather is very bad). The customer also has protection from their credit card company if something goes wrong.

### Magnetic Strips and Chip and PIN

Credit and debit cards contain either magnetic strips or microchips that contain the holder's account details. When the card is passed through the reader either the strip or the chip is read and the account details transferred to the Point of Sale Terminal (POS).

With a magnetic strip card a bill is printed out, signed and retained by the retailer and a receipt is printed out for the customer.

With chip and pin the customer types a pin number into a device attached to the till. The PIN number verifies the sale and the receipt is printed out for the customer. It is generally quicker to use chip and PIN and much less open to fraud as there is no piece of paper for a thief to copy the number from.

### Magnetic Ink Character Recognition (MICR)

There are numbers printed at the foot of every cheque and on the slips in a pay-in book. These are printed not in ordinary ink, but magnetic ink and are the code numbers for the bank, branch, account and cheque. When the cheque is paid into the bank, a machine is used to read the details, firstly on the pay-in slip that gives the numbers for the account the money is to go to and then the cheques that give the numbers of the accounts the money is taken from. The bank clerk only needs to type in the amount of each cheque and the reader sends all the details to the branch computer that stores the data.

### Optical Character Recognition (OCR)

This is when the printed text is scanned into a computer. Pages of text can be scanned in very quickly and then searched for words or sentences. They can also be reprinted or edited. It is very useful in an office that receives or uses a lot of printed text. E.g. Lawyers or Accountants.

### Mark Sense Reader

This is a device, which brushes electrical contacts across the Mark Sense Document. If the contacts touch a pen or pencil mark then a current can flow between them. This is used most commonly in the National Lottery, where a player's numbers are read from the board they have filled in and a ticket produced. This method is also used for marking multiple choice question papers.

## Storing Information

Information can be stored on a variety of media such as magnetic tape, hard disk, CD-ROM and DVD, These fall into two categories, those where data can be written to, re-written and amended, and those where data can only be written once and read many times. Generally speaking all of the data input from any of the above methods of data input will be stored on hard disks. These have very fast access allowing records on the disk to be accessed very quickly. The access is also random or direct meaning the disk heads can go to any part of the disk without starting at the beginning and working through towards the end, such as with magnetic tape.

Generally tape is only used for backing up large hard disks and usually only file-servers on a network. It is totally unsuitable for most modern data processing applications. When fitted to a computer CD-ROM and DVD drives that can be written to, are usually used for backing up data from the hard disk of a personal computer.

Another popular device for transporting data from one computer to another (home to school or work and vice versa) is the **Memory Stick**. This small, large capacity device plugs into the USB port on the computer and almost immediately is recognised by the computer as an external disk drive and data can be saved to it just like a disk, except that it can have a larger capacity and is a lot faster than a disk drive.

## Processing Data

There are several types of processing that can be applied to data to turn it into information. These are four types, as follows:

- Searching/Selection
- Sorting/Rearranging
- Aggregating
- Performing Calculations

Searching involves selecting a sub-section of the data that meets a specified criterion. You may be familiar with this technique from work you may have done on databases in school or college when results of searches or queries happened instantaneously, but on a commercial basis searching can take a very long time. One example would be the Lottery where the winning numbers are entered in as search criteria. On average it takes half an hour to find the match for any winning combination. Even if they find a match on the first record they must continue to the end, as the last of around 14 million records could also be a match. Every time a bar code is scanned the database in the supermarket is searched for a match and the details returned. Even with 20 or so tills working and some 20,000 items in store the match is fairly instant.

Sorting involves arranging the data into some form of order. The choices are usually alphabetical or numeric and then ascending or descending. Large commercial organisations usually have their data sorted or indexed in some way. It is common to have the customer file permanently sorted in customer number order and when transactions are made over the course of a day (orders and payments usually), the transaction file is also sorted by customer number. The files are then merged and a new file created with the transactions attached to the correct customers. A bank will sort their customers firstly into branches and then by account number within the branch.

Aggregating involves summarising data by taking numerous data values and reducing them to either one value or a substantially reduced number of data values. Financial data is often aggregated, as actual totals of money earned or owed are wanted more often than the detail. For example when you buy goods in a shop or supermarket and pay for them you only pay the aggregated total and if you pay by credit or debit card then the card company or bank is only interested in the aggregated total to debit your account. When you receive the statement for the credit card all the transactions you have made are listed on the statement but you are only really interested in the aggregated total at the bottom – the amount you have to pay.

Performing calculations involves applying a formula to data to compute a new value. Obviously when using examples looked at in this section, calculations have taken place. The items have been totalled or added up and the total found for the till receipt, the bank and credit card statements have been similarly totalled. When a utility bill is calculated then several calculations take place: -

Cost of units = units used * unit cost
Net bill = Cost of Units + standing charge
Total Bill = Net bill + (Net bill * 0.175)

So the total bill is calculated in three stages with the VAT finally being added. The same principles apply for electricity, gas and phone bills although the phone bill has many more sub-sections and calculations which are performed.

## Outputting Information

*Paper*
The most popular output method is printing information onto paper. The list of examples of paper output is almost endless, but tying them in to our examples we include till receipts, bills of many kinds to customers, in a business we call these invoices and statements. Internal reports and business communications tend to be internal printed output in a business, while many businesses exist to produce printed output to send to customers and potential customers.

*Screen*
Often in a large data processing operation the operator is only allowed to see their input screen and maybe some customer details. Managers and directors are more likely to see reports and progress checks on screen. However with rise of web based and web aware software management reports can be viewed on screen in an interesting and visually stimulating manner, for example intranet pages (an intranet is like an internal internet for an organisation).

*File*
Once a database file has been updated with new information it will be saved to backing storage for future reference. In some situations reports or filtered data will be selected from the file and saved as a separate file. This allows the data to pass to another part of an Information system that deals with the subset of data. Files can be e-mailed to managers and viewed on-screen to save paper.

## Organisational Information System Management Strategies

When an organisation decides to install a computerised information system several important decisions need to be made and lots of planning undertaken. There are five areas where an organisation needs to have clear strategies when planning and using information systems. These are as follows Networks, Security, Backup and Recovery, Upgrading and Software.

### Network Strategy

An organisation needs a network strategy initially to plan how to set up the network in general to manage effectively its distribution of data and information to assist its decision-making and general operation. The network strategy should be based on sound fundamentals so that no matter the advances in technology the network will be able to adapt and still deliver the services the organisation requires.

The strategy needs to address the following areas:

- Data Transfer (Traffic)
- Distribution/coverage
- Access & Security
- Facilities
- Storage capacity

### Security Strategy

An organisation needs a security strategy to ensure that staff or competitors do not steal important operational data. This will also deal with what areas of the network staff can access (you cannot have data entry clerks accessing reports meant for senior management). Nowadays it must also deal with keeping unauthorised people from remotely accessing their network and of course virus attacks.

### Backup & Recovery Strategy

An organisation needs a backup and recovery strategy to ensure that operational data is not accidentally destroyed or damaged. As organisations rely more and more on information systems to store and process their data, it is vital that processes and procedures are introduced to ensure data is kept safe from harm.

### Upgrade Strategy

An organisation needs an upgrade strategy to ensure its information systems can continue to support the core business as the organisation grows and changes over time. There are likely to be advances in the hardware technology such as faster cabling systems, faster and more secure communications hardware and computers. Advances are also likely to be found in the software used with faster and more secure operating systems and greater functionality in the application software. Organisations need to decide whether and when to upgrade, usually when it appears cost effective to do so.

## Software Strategy

Initially the organisation will decide whether they need bespoke software especially written for them. This is common for large organisations like banks, insurance companies, supermarkets, and companies like call centres and modern mail order companies. The organisation contacts a software house that will write the bespoke software. This is always expensive and many organisations will try and configure off the shelf application packages to suit their purposes. Often there is a mixture of bespoke and off the shelf packages in use with managers often manipulating and analysing in spreadsheets figures produced in bespoke systems.

## Centralised Database

At the heart of most organisational information systems will be found a very large and powerful database. The database program is often called the database engine and it saves and indexes files in tables and manages the relationships between the tables. The other functions such as data entry screens, querying and reporting are part of the database shell and are often seen as peripheral tools for handling the data.

The impact it can have on the business is that information held by the company can be found fairly easily by querying the centralised database. Usually a multi-user or network system is used which means that any user on the system can have access to the database. It can usually be configured to allow different operators different relevant views of the information (sales screens, account screens, stock screens etc.)

The advantages to the database being centralised are that it is much easier to organise, edit, update and back-up the data. Communications are easier if the data is held on one central computer rather than spread over several and there are no real disadvantages to having a centralised database.

## Concepts In Relation To Organisational Information Systems - Questions

| | | |
|---|---|---|
| 1 | How may the speed of a computer be calculated and expressed? | **1** |
| 2 | On what factors can the accuracy of a computer system be based? | **2** |
| 3 | What is meant by the volume of transactions in a computerised system | **1** |
| 4 | How could the efficiency of a computer system be measured? | **1** |
| 5 | a) Explain what is meant by a turnaround document. | **1** |
| | b) What has replaced Kimball Tags and magnetic stripes as the main method of collecting data from goods? | **1** |
| 6 | Explain how a bar code is used to produce an itemised till receipt? | **2** |
| 7 | What are the two modern methods of buying goods without visiting a shop? | **2** |
| 8 | a) Explain why a hard disk is the preferred storage medium for data processing applications. | **2** |
| | b) If a user wishes to carry quite large files from work to home, what backing storage device are they likely to use? | **1** |
| 9 | There are four main types of processing which can be applied to data. Name and describe each of them and give an example of each. | **4** |
| 10 | Name and describe the three most common methods of outputting data and give an example of each. | **3** |
| 11 | Explain why an organisation needs a network strategy and state the five areas it needs to address. | **2** |
| 12 | Why does an orgaisation need a security strategy in place? | **3** |
| 13 | Why is a backup strategy important to an organisation? | **1** |
| 14 | Referring to both hardware and software issues explain why an upgrade strategy is needed. | **2** |

| | | |
|---|---|---|
| 15 | Why will an organisation have a software strategy in place? | **1** |
| 16 | What effect can a centralised database have on an organisation and what advantages can it give. | **3** |
| | **Total Marks** | **33** |

## Information Management Software

Up until now we have really only considered the use of Database software in management information systems, but whilst this may be at the core of many organisations, most users of personal computers will use a range of software particularly at tactical and strategic levels. Firstly we will look at the different types of software that people are likely to use and the use they are likely to make of each type.

## Word Processing

Word processing is probably one of the most common pieces of application software available on a computer. It is likely to be used at all levels in an organisation with clerks and typists using word processing at an operational level, e.g. typing what they have been asked or told to. Its main use is for editing and manipulating text on a page. Originally it was simply a piece of software that allowed the user to use the computer like a typewriter. Over many years it has developed, with more complex features and facilities being added. Word processing application software would be used for writing reports, letters, memos and worksheets like this. Arguably the most well known word processing software is Microsoft Word.

## Spreadsheet

A spreadsheet package allows the user to arrange information on the screen as a table made up of boxes called cells. As well as laying information out in a table the spreadsheet also has the facility to carry out calculations using formulae. Spreadsheet application software would be used for laying out financial information like budgets, cash–flow forecasts, profit and loss tables. It can also be used to lay out statistical data in tables, or even simple budgets such as household or departmental expenditure. Spreadsheet software can also use the tables of data to create a range of graphs and charts. There are two pieces of spreadsheet software that are popular on computers. These are Lotus 1–2–3 and Microsoft's Excel.

## Database

A database package allows the user to organise and store information, which the computer will sort, search and navigate (browse) for the user. Databases contain files or tables, which may be related. The files or tables contain records and each record is made up of fields, which contain single items of data. We have already discussed several large applications of database software but on a personal or small business level, database application software would be used to store information about pupils in a school, customers for a video shop, criminals and crimes for the police or any other collection of data. There are many powerful pieces of database software available on the market to meet the needs of an organisation. The two common pieces for the desktop machines are Access from Microsoft and FileMaker Pro from FileMaker.

## Graphics Design

A graphics package allows the user to create and manipulate pictures. This type of software can include packages that allow you to draw pictures, create 2D and 3D graphic images, create animations or films, create and present slides of graphical information. Many professional organisations use Graphic Design software as a means to end and will spend a lot of time creating and editing images prior to using them in

Web Design, Publishing or even in creating animations, movies and computer games. If you are looking for a professional drawing package you might choose Adobe Illustrator, Paintshop Pro or Corel Draw. If you wanted to edit scanned photos you might select Adobe Photoshop or Corel Photo–Paint.

### Browsers

Browsers are programs, which allow users to retrieve information from the Internet. Strange you may think that we use the plural when the only browser you may ever have seen is Explorer, but there are others. A Browser's main use is to display and navigate the World Wide Web by displaying web pages as text, graphics, animations and hyperlinks, which have been written in code (actually HTML and XTML). Browsers support other functions such as allowing the user to bookmark favourite web pages for quick retrieval at a later time and maintain a history of web sites visited. There are also navigation functions such as forward and back buttons, a stop and refresh buttons.

Originally the dominant web browser was Netscape (where terms like bookmark as opposed to favourite originated), which eventually lost out to Microsoft Explorer. However when any product is dominant commercial competitors will develop what they think are better products. Both AOL and BT Broadband use their own browsers, which make functions like e-mails and bookmarking easier and they also plug security gaps which are not standard in Explorer, such as Pop-up blocker, anti-virus, anti-spam and parental controls. There is also an alternative culture that swears by browsers such as Opera and Mozilla, which again offer more and better functions.

### Email Client

This is a program, which allows a user to write, send, receive and read email messages.

There are in fact two different ways of using e-mail, on-line and off-line. In an off-line e-mail program like Outlook Express you can compose and read e-mails without connecting to the web, but in order to send and receive messages you need to log on. The messages are then sent and any new messages are downloaded into the mailbox where the user can read them after disconnecting from the web. The disadvantage of this method is that there is usually not much security and viruses can be downloaded along with the e-mails. The advantage is the low cost of connection time.

The other method is to connect to an on-line provider such as Hotmail, AOL and BT. All three of these providers make the user log on and stay online while they are reading and sending e-mails. The e-mail is never stored on your own computer and the security is much higher. The provider usually scans and traps viruses before letting the user read the mail, and spam can also be trapped. The disadvantage is that the user must be on-line all the time but with cost inclusive deals and broadband this is not a problem for many people.

### Chat Client

This is a program, which allows users who are connected to the Internet to send and receive messages interactively. There are several generations of Chat Client. The first allowed written conversations in which participants entered their comments using the keyboard and read the replies in a window on their screen. A development on this

generation was the introduction of Instant Messaging; allowing users to be informed immediately when a friend on their chat list logged on to the Internet. Another development of Chat Clients was the introduction of voice based messaging. This allowed users to communicate through the chat client in a similar way to using the telephone.

The most recent generation of Chat Clients allows video based messaging using web cams. Now users can see and hear the messages from their friends or colleagues.

Examples of these types of program are MSN Messenger, IRC (Internet Relay Chat) and Yahoo Messenger.

### Desk-Top Publishing (DTP)

This software is used to create documents that can be printed on paper. It allows you to layout text and graphics on a page for professional printing. It allows text and graphics to be positioned precisely on a page and allows a great deal of control over multi-page documents and different formats such as A3 foldable leaflets and A5 booklets. DTP also allows the user to prepare the pages for professional use by printers and publishers. There are various DTP packages in common use and you are more likely to come across Microsoft Publisher, Adobe PageMaker or In-Design or Quark Express than some of the other packages.

### Presentation

This is software, which allows the user to create slide shows that can be shown on a large screen via a data projector. Current versions of the software can incorporate text, graphics (real photos, clip art etc.), sound clips and animations. Slides can be printed onto paper with 3 or 6 to a page so that the audience can have a copy of the presentation. The slides can also be printed A4 size onto acetate slide for use on an Over Head Projector. If you wanted to create a graphic slide presentation you might buy Microsoft PowerPoint or Apple's Keynote.

### Reference

Reference software is any program that can be used to help someone learn new facts, skills or information. In the early 90's many CD-ROMs were released covering almost every subject under the sun and many schools were given free CDs covering History, Geography and Science etc. The Internet has superceded the subject matter of many of these. Probably the most famous reference book, Encyclopedia Britannica has moved from being a paper-based collection of some 30 books costing up to thousands of pounds to a CD-ROM costing around £100. That has now become defunct and for around a £10 subscription you log onto Britannica online. Examples of this kind of software, which have survived on CD, is Encarta CD–ROM Encyclopedia and Dictionaries and other language based software like a Thesaurus.

### Financial

Financial software can be used to help manage and control money as well as carry out calculations relating to money. Budgeting at home or for a company is an example of a job a financial package may be designed to solve. They can also help control the transfer of money from one bank account to another and from one person to another.

Some examples of financial application software are Microsoft's Money 2003, Quicken's QuickBooks Pro and MYOB. Most businesses use a small business accounting package, which deals with customer and supplier accounts and produces invoices, statements and payment advices. They can also keep the actual records up to date and handle stock control, order processing and other functions. Some companies purchase financial software that has been either written from scratch especially for their use or modified for them whereas smaller businesses tend to purchase packages like Sage or Pegasus Accounting suites.

### Web Authoring

This type of program allows users to create web pages very easily without needing to know how to use the programming language HTML. It has developed to a level where whole web sites (involving hundreds of pages) can be managed and designed very quickly and simply. Web pages and sites can incorporate text, graphics, animations, audio files and full video. However one problem is that new file formats can be introduced and the Web Authoring software cannot recognise them. An example of this was when MP3 overtook Real Player format audio files and all the packages had to release new versions with support for MP3, which also tidied up lots of other loose ends. Examples of Web Authoring software are DreamWeaver from Macromedia, Adobe Go-Live and FrontPage from Microsoft.

## Personal and Organisational Uses of Information Management Software - Questions

| | | |
|---|---|---|
| 1 | What type of software would you use for editing and manipulating text on a page? | **1** |
| 2 | What type of software would allow the user to create and manipulate pictures? | **1** |
| 3 | What type of software would be used to lay out financial and statistical data in tables and apply formulas and calculations to the data? | **1** |
| 4 | What type of software would allow the user to create and store information? | **1** |
| 5 | a) What is e-mail client software used for?<br>b) Describe the two different methods of using e-mail.<br>c) Give an advantage and a disadvantage of using an on-line e-mail provider. | **1**<br>**2**<br>**2** |
| 6 | a) Describe what browser software is used for.<br>b) State the navigational functions supported by most browsers.<br>c) Describe what is meant by bookmarking. | **1**<br>**2**<br>**1** |
| 7 | Describe the three generations of chat client software, | **3** |
| 8 | Describe three ways DTP software can be used. | **3** |
| 9 | What type of software would be used to create a slide show, which may be used with a data projector? | **1** |
| 10 | What type of software is an Encyclopaedia supplied on a CD-ROM? | **1** |
| 11 | a) What may financial software used for in a home environment?<br>b) What may financial software used for in a business environment? | **1**<br>**2** |
| 12 | What does Web Authoring software allow the user to do? | **1** |
| 13 | If a company was making web sites commercially what types of software would they need and why? | **3** |
| 14 | If a teacher wished to make a slide show to help deliver a lesson, which type of software would the teacher use? | **1** |
| 15 | What type of software allows the user to create and maintain customer and supplier accounts? | **1** |
| | **Total Marks** | **30** |

## Tasks for Intermediate 2

You will have to complete a practical assessment using several different types of software in order to complete the unit. As a preparation for this it will be necessary for you to know how to operate your chosen packages to a reasonably high level. You have to use software to process and retrieve information and also to create and store information. Your teacher / lecturer will supply you with resources to teach you how to use your chosen packages: -

- Database
- Word Processor
- Desk Top Publisher
- Presentation software
- Web Authoring Software
- Spreadsheet

There is nothing to stop you learning how to use all the packages and then make your mind up which one to use.

Choose at least one task from **list A** and at least one from **List B.**

For the two tasks you submit for marking, hard copy evidence in the form of printouts should be included.

### List A

### Task 1

Make up one A4 sized page which is a newsletter about your favourite celebrity, sporting hero or team. Your page should have 3 columns, a suitable heading or title and at least 1 graphic. Use the Internet to help gather your information and graphics. After your graphic has been placed on the page ensure that it is resized (either larger or smaller). Plan out your page on paper before you start looking for information.

### Task 2

You have been given the task of setting up a database to track and analyse customer details for a large mail order store. Here is some sample data: -

| Customer Name | Address | Branch | Goods | Order Value |
|---|---|---|---|---|
| Mr G Davis | 12 North Road, Aberdeen | Aberdeen | Philips 28” TV | £799.00 |
| Mrs H Evans | 268 Long Street, Perth | Edinburgh | Bosch Washing machine | £525.00 |
| Miss H Smith | 10 Warren Road, Edinburgh | Edinburgh | Zanussi Freezer | £356,00 |
| Mrs D Carnegie | The Firs, Dunfermline | Edinburgh | NEFF Microwave | £799.00 |
| Mr I James | 12 Panmure Place, Glasgow | Glasgow | Philips PC Bundle | £398.00 |
| Mr H Wragg | 6 Garthdee Rd, Peterhead | Aberdeen | Sony Music Centre | £648.00 |
| My H Wyness | 2 New Perth Rd, Inverness | Aberdeen | Playstation + FIFA | £299.00 |
| Miss F West | 4 New Street, Stirling | Glasgow | Food processor | £99.00 |

- You have to enter the data into a database application.
- Sort the data by branch alphabetically ascending and value descending.
- Print a report or layout of your sorted data.
- Can you sort the data alphabetically by customer surname? If not what change would you have to make to your data? Make the change and when you have finished reorganising the data sort the data by customer surname.

The next tasks are probably quite difficult to perform using database software and you may wish to try the entire task in a spreadsheet and compare the functionality of the two packages.

- Calculate the total and average order value for each branch and overall.
- Show the total branch orders in a pie chart.

### Task 3

Make up a small Web Site of between 3 and 5 pages on a topic that interests you. Include as many graphics as you need and try and manipulate at least one graphic using graphics software (change the brightness and contrast or apply a filter or texture to the graphic).

Remember to include links to allow navigation between pages.

If you are going to submit this task for assessment please print out your finished pages.

## List 2

### Task 4

Using presentation software create a presentation of several slides using text and graphics and if possible sound. Some ideas are: -

- A sales presentation to sell a new product (computer, magazine etc.)
- A presentation about Information Systems to persuade students to enrol next year.
- The different sports a person can play in your school or college.
- Some holiday destinations either home or abroad.

### Task 5

Create a spreadsheet to track a small league of 8 teams over three weeks. You will also need to make a small table to show the results of the week's games.

Each week the league must be updated with the points and gaols scored and sorted in order of points and goal difference.

The headings you need are: - Team Name, Games played, Wins (3 points), Draws (1 point), Losses, Goals For, Goals Against, Goal Difference, Points.
Again if you wish to submit this task for evidence then include a printout of each week sorted as evidence you have completed the task.

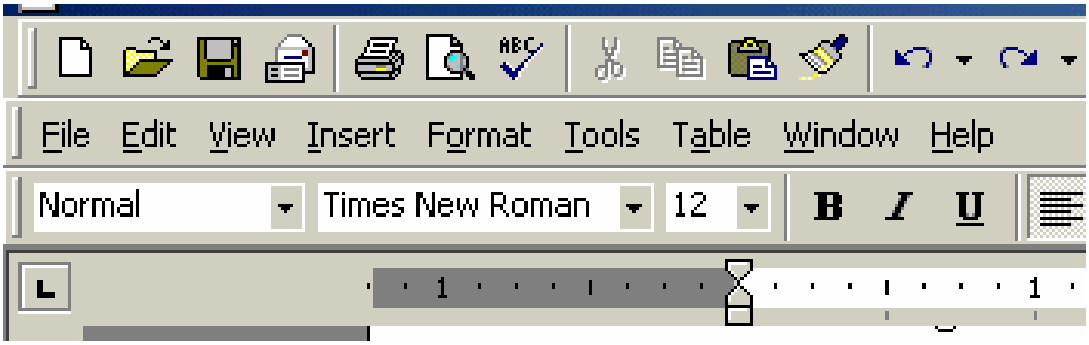
## Document Processing Software

We often define software in terms of the data objects it handles, the operations that can be performed on these objects and the formatting functions that can be applied to them.

Word Processing deals with the basic entering and editing of text and the **data objects** associated with a word processor are characters, words, paragraphs (between two return characters) and graphic objects embedded in the text.

## Operations

If we look at the menu options in Microsoft Word then we can see where we are going to find the operations that can be performed.




File Menu – contains operations that can be performed on whole files.
Edit Menu – has options like select all, cut, copy and paste on selected text
View Menu – the ways in which you can view the file, including headers and footers.
Insert Menu – Page break, date/time, picture etc.
Format Menu – contains options whereby you can format text (quite an extensive menu)
Tools Menu – Mail merge, spelling and grammar, options and customisation.
Table Menu – Insert table then table operations
Window and Help much as in other Windows applications.

Basic operations are usually to be found in the Edit menu. After selecting some text, you can choose to cut it, copy it, paste what was cut or copied or delete the text.

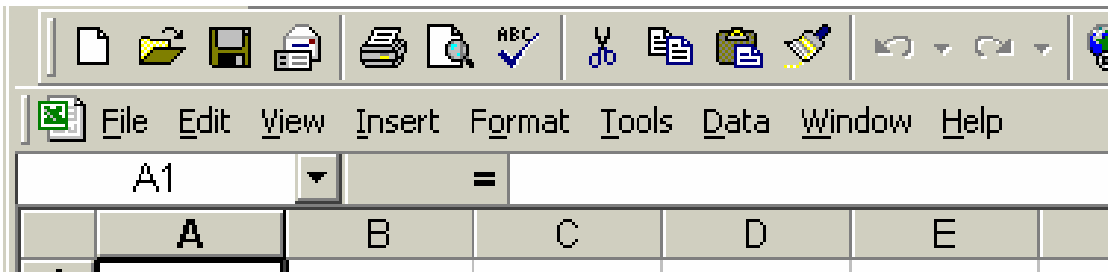
Formatting functions are found mostly in the format menu and also on the icons on the menu line with **B** ***I*** **U** on it. You can format the text by changing its font, size, colour and style. Paragraphs can be centred, left, right or fully justified and numbered and bullet lists can be created.

## Spreadsheets

Spreadsheets deal with the basic entering of numbers and text into cells or groups of cells. Formulae can be applied to cells or groups of cells and the **data objects** associated with a spreadsheet are cells, which can contain text, numbers or a formula.

## Operations

If we look at the menu options in Microsoft Excel then we can see where we are going to find the operations that can be performed.




File Menu – contains operations that can be performed on whole files.
Edit Menu – has options like select all, cut, copy and paste on selected cells, also options like Paste Special, which allows links to be established, Fill Down and Fill Across.
View Menu – the ways in which you can view the file, including headers and footers.
Insert Menu – Rows, columns, worksheet and most importantly functions..
Format Menu – contains options whereby you can format cells including numeric formatting like currency.
Tools Menu –Spelling, Protection Macros and of course options and customise..
Data Menu – Sort, filter and Pivot Tables.
Window and Help much as in other Windows applications.

Operations in a spreadsheet are what can be done to cells or groups of cells. The main power of a spreadsheet is the ability to replicate formulae by use of Fill Down and Fill Across. Formulae, which are found in the Insert menu, can be inserted in cells or typed in on the entry line (next to the = sign in the graphic). The chart menu is accessed via an icon on the menu bar and a wide range of charts can be drawn.

Formatting functions are found mostly in the format menu and also on the icons on the menu line with **B** ***I*** **U** on it. You can format the text by changing its font, size, colour and style. Cell contents can be aligned left, right or centred and one of the most powerful menu functions, the autosum, is one of the icons.. Numeric cells can be formatted in a wide variety of styles to do with numbers (percentages, currency, fractions etc).

## Evaluation of Software

Before an application package is bought it is common for individuals, businesses, schools and colleges and any other organisation to acquire a demonstration or evaluation copy of the software. This can usually be downloaded from the Internet or copied from an evaluation CD-ROM. Once installed the user usually has 30 days in which to make up their mind whether to purchase the software or not.

To aid them in their evaluation exercise it is common to refer to several criteria and try the evaluation over a range of packages using these criteria. Commonly these are, the range of data objects supported, the range of operations, formatting functions, the Human Computer Interface (HCI) and any on-line help and tutorials available. We shall examine these criteria in a bit more depth.

**Range of Data Objects** – Each type of software will deal with different objects as we have seen already above. Even with a word processor or database though one may be interested in the type of graphics files that can be used in documents or records. Graphics programs would need to support bit-mapped, JPEG, GIF and even animated graphics files. Web design software would have to support graphics and then audio and video with formats such as MP3 and QuickTime video needing to be considered.

**Range of Operations** – Again the operations available will depend on the genre of software but in general you would look carefully at what you want to achieve with the software before considering the operations. Database would need good search, sort and report facilities, whereas Web design software would look at the way in which text and graphics could be arranged on the page, how linking is achieved and how audio and video files are handled.

**Formatting Functions** – Again the text handling and graphics oriented packages will look at fonts, styles, paragraphs, alignment, text wrap and so on, whereas a spreadsheet will also have all the formatting of cells to consider (percentage, currency etc.).

**Human Computer Interface (HCI)** – Users of all packages will have to consider the menus, are they complete, can they be reconfigured etc., and toolbars and icons, can new icons be added to the toolbar and so on. Another area is that of keyboard commands, how easy are they to learn, can keys be programmed, are all functions available on the keyboard.

**On-line Help and Tutorials** – On-line Help and Tutorials are nowadays found in most packages. Paradoxically enough on-line here does not mean on the Internet, but does mean within the program and contained on the computer. The picture is clouded somewhat though which much on-line help now being displayed as web pages in your browser but locally on the computer and not on the Internet. Both help and the tutorial should be examined closely to see how good they are. Some manufacturers effectively provide the software manual as a help file, which is searchable. This can save you having to buy a manual.

If you can download the software you want to evaluate, perform a satisfactory evaluation, then you can buy a license over the Internet and you have saved the cost of the media, manual and postage and of course a delay in receiving it.

## Task on Evaluating Software

Using the criteria below, evaluate either Word Processor and DTP, Presentation and Web Design, Database and Spreadsheet, comparing the two chosen packages to find out which was better for the task chosen above.

**Criteria**

- Range of data objects
- Range of operations
- Formatting Functions
- HCI (including use of keyboard commands, menus and toolbars/icons
- Online help and online tutorials

Use the Software Evaluation sheet that your teacher / lecturer will give you to help you complete this task. You may be asked to write your evaluations by hand or the form may be made available to you electronically so you can fill it in on your computer.

## Implications of ICT

We are going to investigate some of the Social, Legal, Economic and Ethical implications of using IT and Information Systems.

## Social Implications

**Ease of Access and Availability** – For many of us we have very easy access to Information Systems both at school, college or work and home. These are not just computer systems connected to the Internet, but digital TV with its comprehensive news channels and the ready availability of books, magazines and newspapers, all made more available due to the use made of Information Systems.

We can have access to the Internet in our social lives as well with libraries having Internet access points and Internet cafes still being popular. Bars often have Internet access points and if you have stayed in a "big" hotel lately you will find that the rooms have Internet access points for your laptop to plug into.

Many people expect Internet access when they go on holiday and many hotels and apartment complexes advertise Internet access as a desirable feature, but many of us think that we go on holiday to get away from it all and are willing to let the e-mails pile up until we get home.

An interesting fact emerged in the late 1990's that "there are more telephones in the city of New York than in the entire continent of Africa". After a little research it was found that the as of now the gap has not narrowed but widened, presumably because of new building and mobile phones.

## Information rich/Information poor

There is a general concern that the widespread use of computers is dividing society into two kinds of people - the 'information rich' and 'information poor'.

The information rich will have easy access to computers and electronic communications. They will get information and news from the Internet and buy the latest products through on-line shopping. They will be able to follow computer-based learning and skills training courses at home, and look for jobs that are advertised solely on the Internet. They will find it easier to get well-paid jobs and will enjoy a more comfortable and secure life-style.

The information poor will not have easy access to computers and will not have the IT skills and confidence to take part in teleshopping, telebanking, Internet chat and news groups. As corporations like the BBC seek public opinion on current matters increasingly use the Internet, the voices of the information poor may not be heard. The jobs on offer to them will be less skilled, be paid less and be much more insecure. The information poor will have to work longer hours just to survive and will have less leisure time. Gradually the difference in access to information will create a real social divide between the materially rich and materially poor.

One effect of high levels of unemployment has been that families feel more secure with two wages coming into the family. This has meant that more and more mothers have careers. As a result, they may not have any children till they are 30 or older and even

then they may only have one child because they do not want, or are afraid to, interrupt their careers.

Although this change in family patterns may only be indirectly and partly caused by computerisation, are there any risks to the family and to society as a whole from this development?

More and more families enjoy television, computers and electronic games in their homes. Father may be watching television; mother may be teleshopping over the Internet while the children are in their bedrooms playing arcade games. Research has shown that families are spending less and less time together. In addition, with the growth of teleworking, fewer people are meeting with colleagues to discuss matters business matters during the day.

Is there a risk that computers are having an adverse effect on human relations within the family and in society in general?

Another less obvious effect of computers and IT on the family is the change that banks have made to our lives. Before banks were computerised, mainly relatively wealthy, middle-class professional people used them. Most workers were paid weekly and in cash, and they did not need a bank account. With the introduction of computerisation, banks started to persuade companies, government and local authorities to pay employees by cheque. To cash cheques it was much more convenient to have a bank account. Once a large part of the population had opened accounts, banks persuaded companies to pay their staff by transferring funds from the company account directly into their employees' accounts. As a result, very little cash is in circulation now compared with the 1950s and 60s. Once people had become comfortable with carrying less cash, it was a very small step to persuade them to work with 'plastic money' – the current widespread use of debit and credit cards.

## Educational Qualifications and ICT

There have been qualifications in Computing since the early 1960's, but these were solely in Universities and colleges. What is more is that it was well into the 1980's when there was enough content available to teach that computing degrees were able to concentrate on computing subjects and not need lots of Maths, Physics and totally unrelated courses like Philosophy and Law to fill out the degree. It was not until the mid 1980's that computing was available in schools and not until 1999 that the two strands of software and hardware divided into Computing and Information Systems. Now there are very many different courses offered at degree and NC level all related to ICT.

Look at how modern ICT allows citizens to communicate and participate in society. The use of text messaging to vote on TV shows, enter competitions and have your opinions broadcast on national TV and Radio. Use you digital TV to order goods, vote on TV shows like "I'm a computer teacher – get me out of here" and many other functions. The most unlikely people are using ICT because they either have to or want to. Teachers, lawyers, shop assistants, nurses and the list is endless of people who have to use computers. Grannies and Aunties downloading digital photos of the grand children and nephews and nieces, manipulating those photos with graphics software and saving them and producing lovely prints.

## Knowledge Workers

The term "knowledge worker" describes someone who adds value by processing existing information to create new information that could be used to define and solve problems. Examples of knowledge workers include lawyers, doctors, diplomats, law-makers, software developers, managers and bankers. We can probably say that knowledge workers use their intellect to convert their ideas into products, services, or processes.

A knowledge worker could be a problem solver rather than a production worker, or a person who uses intellectual rather than manual skills to earn a living and someone who uses knowledge and information to add to deeper knowledge and information.

There are thought to be two main types of knowledge worker, “core knowledge workers” and “everyone else”.

Core knowledge workers are those in specific ‘knowledge management’ roles. Examples include Chief Information/Knowledge Officers, Knowledge Managers, Librarians, Content Managers, Information Officers, Knowledge Analysts, etc.

‘Everyone else’ constitutes all the other knowledge workers. In health car for example, doctors, nurses, dentists, pharmacists, managers, technicians, administrators, etc. In short, everyone in the NHS engaged in some form of ‘knowledge work’.

Of course there is not always a clear dividing line between the two, but the distinction can be a useful one when starting out. It can be particularly useful in helping people to understand that everyone is a knowledge worker to some degree, and knowledge work is everyone’s responsibility, not just that of a few people with ‘information’ or ‘knowledge’ in their job title.

## Online Retail

For many of you reading this Internet shopping is the here and now. When 80 16-18 year olds were sampled recently 60 of then (that is 75%) admitted to buying something online. In the same survey 80 adults (aged 24 – 60) were sampled and only 17 admitted to buying something online. The young people went for music, DVD’s and the top buy was hair straighteners. The adults’ top buy was holiday related.

Regular and repeat orders were for grocery shopping and books among the adults whereas the young people tended to make one-off purchases (apart from some games and skateboard related merchandise).

Why the huge difference and what is happening to our traditional shops. Well it appears that many on-line shoppers buy goods they find difficult to source. It has been suggested that the shopping malls have fuelled the on-line frenzy. If the National chains, which make every shopping centre almost identical, do not carry what someone wants then people now turn to the Web as their first port of call.

There are recognised advantages and disadvantages to the consumer and the retailer.

**Consumer – Advantages**

- More choice of goods on-line.
- Cheaper prices
- Home delivery – Grocery shopping on-line very useful for young families

**Consumer – Disadvantages**

- Often long delivery times.
- Temptation to spend more than intended.
- Social isolation (supermarkets are the new social scene).

**On-line Retailer – Advantages**

- Can reach a far wider audience
- Don't need expensive showrooms.
- Don't need to employ trained sales staff.

**On-line Retailer – Disadvantages**

- Must spend money on a web site with secure payment system.
- Must accept a high rate of returns.
- Never meets customers.

## Legal Implications of Information Systems

### Data Protection Act

The original Data Protection Act was introduced in 1984 to set out key principals (rules) to regulate the collection, storage and use of personal data. This law was introduced to protect and give rights to individuals who might feel their personal data was either incorrect or being misused. The law was updated in 1998 to cover some of the inadequacies of the original act and to update it in the light of new technology and political circumstances relating to European legislation

A Data Commissioner was appointed and from an office on the outskirts of Manchester dealt with all complaints from all over the country. They investigated companies that individuals and businesses complained against and if their case was upheld then sanctions could be made against the company misusing the data.

Data subjects were defined as being people or organisations about which data was held in electronic form.

Data users (or controllers) were defined as the companies and organisations that held the data concerning the data subjects.

### The 1998 Data protection Act

The Act contains eight principals, which apply to all personal data processed by Data Controllers (the people who hold the data).

- Personal data shall be processed fairly and lawfully.
- Personal data shall be obtained only for lawful purposes, and shall not be further processed in any manner incompatible with those purposes.
- Personal data shall be adequate, relevant and not excessive in relation to the purposes for which it is processed.
- Personal data shall be accurate and, where necessary, kept up to date.
- Personal data processed for any purpose shall not be kept for longer than is necessary.
- Personal data shall be processed in accordance with the rights of data subjects.
- Appropriate measures shall be taken against unauthorised or unlawful processing of data and against accidental loss or destruction of, or damage to, personal data.
- Personal data shall not be transferred to a country outside Europe, unless that country ensures protection for the rights of data subjects in relation to the Act.

There are some unconditional exemptions and these are: -

- Data related to National Security
- Data which by law has to be made public (e.g. voters' roll)
- Data held by the Police and National Health Service

There are some types of data that were and still are exempt from Registration. These are known as conditional exemptions and are: -

- mailing lists (names and addresses) that allow the data subject to receive information

- data used for calculating and paying wages
- information used for club memberships
- data used by a data subject at home.

**Rights of Data Subjects** - As well as the principals, the Act gives rights to individuals (Data Subjects) in relation to personal data, which is held about them by Data Controllers. An individual has the right to see any personal data stored either electronically or manually about them. The Data controller may ask that a small fee be paid to cover their costs in providing the data. As well as the right to see their personal data, Data subjects have the right to have their data corrected if it is inaccurate. They also have the right to prevent their data being used by companies to send them junk mail.

**Responsibilities of Data Users** - Data Users have to register with the Data Protection Registrar if they wished to hold personal information about data subjects. They must be willing to let data subjects see data held about them, and are entitled to charge a small fee, but must amend any false data without charge. Data Users must also be willing to remove subjects' names and addresses from mailing lists if asked to.

## Computer Misuse Act

During the 1980's as the use of computers and telecommunications systems in society grew rapidly, so did incidents of computer related crime. The law as it stood was unable to deal with the new crimes being committed involving computers. The Government set up a Royal Commission to look at the whole area of computer misuse. This resulted in the government introducing the "Computer Misuse Act 1990".

The Act contains three sections covering various misuses.

- Unauthorised access to computer material.
- Unauthorised access with intent to commit or facilitate commission of further offences.
- Unauthorised modification of computer material.

The first section deals with "basic hacking", which is getting access to a computer system, data or a program without permission. If for example a pupil finds the teacher's password and uses it to access the school computer system, even though no damage to files or data has been done, it is still a crime. This section of the Act only covers unauthorised access of a computer system, so viewing or printing out another users word-processed file without permission is also a crime.

The second section applies to situations when a computer system is being used to help in committing another crime. If a computer is being used to steal money from a bank account or used to help disable an alarm system to aid a robbery then it is covered by this section of the act.

The third section of the Act covers "expert hacking", which is the modification of data on a computer system without permission. It is this section that covers the deliberate

planting of viruses on a computer system. It also covers the deletion or modification of another users file. It could also apply to a student who changes the system setup files on a computer, without permission.

## Copyright, Designs & Patents Act

Earlier in the notes the issue of software copyright was introduced. The Copyright laws also apply to published materials, which can come in the form of music, film, pictures, books etc. and are actually a very large and complex act. We only really need to concern ourselves with a part of the Copyright section of the Act.

There are three methods of licensing software and slightly different copyright laws apply to each kind.

1. Software can be legally bought and installed on as many computers as the license permits. Home and small business users usually buy a single user license, whereas schools, colleges, local authorities and large businesses generally buy multiple licencses
2. Shareware is generally downloaded from the Internet and can be legally installed for, usually, 30 days after which time a payment should be made to the author or the software taken off the computer.
3. Freeware is similar to shareware except that there is no need to pay and therefore no trial period. It can be downloaded and installed free of charge.

In short, commercial software must be licensed before it is installed on a computer and it is illegal to copy software.

As well as the applications themselves content created using a computer application is also protected by copyright. One area of great concern commercially is that of computer databases. They can store vast amounts of very useful information, which may be commercially very valuable and have cost the originators a lot of money to set up. The copyright laws cover the database, or an extract from it.

It is also illegal to copy any published material without either the permission of the copyright holder (creator) or the purchase of a licence, which allows copying. If you write a story on your word processor, you as creator own the copyright to that story. It is illegal for anyone else, without your permission, to copy and distribute that story, freely or for financial gain. It is also illegal for you to copy anybody else's work without permission. This applies directly to material found on the Internet or the World Wide Web.

It can count as plagiarism to copy material directly from Internet sites and try to pass it off as your own original work. If you must use the material it must be acknowledged in some way or another.

There is software available which allows the user to capture and save complete web sites. It must be borne in mind that to use that web content for any purpose at all may be illegal.

If you are creating published material such as a Web page or a poster, it is possible to use clip art in your work. You can use copyright–free clip art or alternatively buy a clip art disc with a licence to copy the graphics.

It is also possible to copy some parts of published material under the fair dealing provision of the Act. This permits copying for private study or research one section from a magazine, newspaper or journal. It also allows you to copy up to 5% of a book or one chapter. The material must however be for personal use.

One area of great concern is that of software piracy, where illegal copies of software are sold and also software is installed on machines when no licence has been purchased. So concerned are the software houses that an organisation called FAST – Federation Against Software Theft – has been set up to try and prevent the large scale of software theft which is thought to exist within organisations in the U.K.

## Health and Safety Regulations

Needless to say the regulations relating to Health and Safety are vast and cover every conceivable work situation, but we are only concerned here with issues such as seating, lighting, RSI and radiation as well as employers' responsibilities.

The Health and Safety at Work Act 1974 has been updated to include the Management of Health and Safety at Work Regulations 1999.

The main requirement on employers is to carry out a risk assessment. Employers with five or more employees need to record the significant findings of the risk assessment. Risk assessment should be straightforward in a simple workplace such as a typical office.

As a result of a risk assessment it might be pointed out to a health and safety officer that the seating arrangements are not only uncomfortable but causing employees pain and discomfort due to their position. Maybe the lighting is poor and employees are suffering eye strain. Over time either of these complaints cold lead to a much more serious condition and these complaints must be taken seriously by management
.
One injury that is a phenomenon of modern working practices particularly with computers is repetitive strain injury or RSI. The term repetitive strain injury (RSI) is used by some to refer to pain in the arm when working with computers, but is actually very serious and can lead to deformity and leave the sufferer in a great deal of long term pain. It is often caused by being forced to work with same few keys over and over again (such as number keys).

**Radiation** – Computer monitors emit radiation! This was a discovered back in the 1970's and the levels of radiation given off by some of the really big, old-fashioned monitors were very high. Employees, mostly female, who were affected by the radiation complained of headaches, feeling listless and in one or two cases actually miscarrying during pregnancy. Special lead lined aprons were made available to women who were worried about the effects radiation could have on them.

By the 1980's computer monitors were smaller and working with much lower power consumption and output. The trend has increased until nowadays, and there have been shields built into the monitors so radiation does not escape. A common point of escape was from the back of the monitor, the screen acted as a shield, and people who faced the back of a monitor for prolonged periods (all day, every working day) could suffer from problems. The routes of escape have now been sealed on modern monitors and there should be no danger of illness caused by radiation when using modern equipment.

## Economic Implications of ICT

### Jobs in ICT

Most jobs in ICT require that some further education and training is carried out after leaving school. The minimum qualification for professional jobs is probably at HND level although an IT related degree gives access to the best jobs. There are development personnel such as systems analysts and programmers and operational personnel such as operators and support staff who keep the systems running.

Starting development positions in organisations are usually: -
**Programmer / Analyst** – Responsible for program development and modification, program and data changes, testing and documentation.
**Web Administrator** – Responsible for developing, managing and co-ordinating the posting of company material from departments onto the company web site.
**Network Administrator** – Responsible for the day-to-day management and maintenance of the network.
**Salaries** – As these are very responsible starting positions, salaries will be in the region of £20,000 to £30,000 depending on the level of responsibility.

Advanced development positions are usually like: -
**Database Manager –** Responsible for identifying needs and developing software accordingly
**Project Leader and Senior Analyst** – Sometimes separate posts, sometimes a joint post the project leader will liase with directors and top managers and translate ideas into computer related documentation.
**IT Manager** – Generally in charge of the entire IT operation, staff and equipment.
Salaries – these senior posts can carry very high salaries with fringe benefits such as company cars.

### The Effect of New ICT on Business

When a business invests in new ICT there is bound to be some effect on the business and individuals within the business. For example if a small business invests in a computerised accounting system, dealing with sales and purchase invoices, they will have spent a lot of money.

Manual book-keepers will need to be retrained to use the computerised system effectively otherwise it will not be worth the company's while investing in it.

The company would expect increased productivity. This may mean that fewer staff members are required to do the same work, or the same staff can do far more work. In

an accounting system increased functionality would be expected, automated printing of statements and letters about overdue accounts for example, and this can help get money in more quickly (increased productivity).

A business would get an accountant to produce a profit and loss account every three or six months at great expense, but a computerised system can produce this sort of information at the drop of a hat, saving a lot of money and keeping the managers better informed.

Generally a cost accountant would work out just how more profitable an employee was from using ICT and as we have seen this can be a combination of earning more money (telesales as opposed to mail order), saving the company money (producing accounting information) and doing jobs that could not be done before (statements and letters). All these factors build up a picture of productivity and profitability of an individual.

## Ethical Implications of ICT

### Netiquette

This is a user's guide to the polite way you use the Web and e-mail, whether on the Internet or an Intranet. It should be relevant for both personal and business users, and the more public the forum (an e-group or office internal e-forum) the more the user should be aware of and use netiquette. It comes in the form of advice and some general points and then some particular points.

Some general points are: -

- Treat others the way you wish to be treated yourself.
- Make sure you do not contravene legislation regarding use of computers and Information Technology.
- Use accurate details when referring to other Internet resources or sites.
- Ensure that you are not wasteful of others resources when sending e-mails or in the design of your web page.
- Try and contribute to the network in your area of expertise.
- Adhere to Internet standards for production of e-mail correspondence and web pages.
- Always identify yourself when joining in newsgroups and try not to interject irrelevancies.

And some particular pieces of advice are:-

1. Do not type e-mails all in CAPITALS as it is regarded as equivalent to shouting.
2. Do not leave the Subject: field blank. Always fill in the Subject: field with a brief and concise description of the content of your e-mail. This is very important in helping those you communicate with organize and manage their e-mail.
3. Refrain from formatting your e-mail with coloured text and background colours or images in your day-to-day communications. Your colour and formatting choices

can make your e-mails impossible to read. In addition, formatting could make your e-mails difficult to reply to without having to go through a procedure to convert your e-mail to plain text first

4. On those rare occasions where it is necessary to send a group of people the very same e-mail, as a courtesy to those you are sending to, please list all of the recipients e-mail addresses in the BCC field. (Blind Carbon Copy - from the old days when typewriters used carbon paper to create identical copies of a document when it was being typed.). When an e-mail address is designated in the Blind Carbon Copy field, the recipient will get a copy of the e-mail while their e-mail address remains invisible to the other recipients of the e-mail - some of whom they may or may not know
5. Do not forward any stupid joke, "chain letter" or unimportant e-mails to your friends without their permission.
   Never give out phone numbers or personal information without confirming you are communicating with a reputable party. Never give out personal contact information of others without their specific permission to do so.
6. Make a reasonable effort to search a Web site for the information you are looking for before e: mailing a colleague for help.
7. Do not use Return Receipt Request (RR) for each and every personal e-mail you send because you like "knowing" when someone opens your e-mail. Not only is this annoying to the recipient, this feature is intrusive especially in an on-line discussion forum or e-group where hundreds of people can get that RR.
8. Do not send inflammatory, highly critical or just plain nasty e-mails especially to a group. This is called flaming and can cause great offence.
9. Keep in mind that all private e-mail is considered to be copyrighted by the original author. If you post private e-mail to a public list or board, or forward it to an outside party in whole or in part, you must include the author's permission to post the material publicly.
10. Always minimize, compress or "zip" large files before sending as your intended recipient may have a slow connection and not be prepared to watch the “Lord of the Rings “ trilogy again while waiting for a download they may not even want. Better still ascertain that they actually want the file before sending it.
11. Do not forward hoax virus warnings – enough said.

## Intellectual Property Rights

Intellectual property is a form of knowledge that societies have decided can be assigned specific property rights. They have some resemblance to ownership rights over physical property or land. With recent scientific and technical advances, particularly in information and communications technologies, knowledge has become to an even greater degree than before the principal source of competitive advantage for both companies and countries.

Much original work is regularly published on the Internet, such as newspaper articles, university papers, and reports from interest groups and information from companies. All original work so published will be classed as having information intellectual property rights.

Intellectual property rights in relation to information also relate to musicians and the sites where music can be downloaded. There is usually no problem with listening to music

over the Internet but if anyone tries to download copyright music without either paying or agreeing to the copyright conditions then they and the site they have found the music on could both be sued for breach of copyright. In truth it is much more likely to be the Web site and it is likely to be closed down like Napster was in 2003.

## Implications of ICT – Suggested Tasks

Your teacher / lecturer will tell you if and when they want you to do these tasks (maybe after the questions). The tasks are suitable for Intermediate 2 and higher candidates, but a greater depth of coverage of the topic is expected from higher candidates

### Task

Either on your own or in a small group make up a presentation or web site to cover one of the following topics.

Either work through one of these sections fully or give an overview of all of them. Aim for about 12 slides or 4 web pages

- The social implications of ICT
- The legal implications of ICT
- The economic implications of ICT
- The ethical implications of ICT

## Implications of ICT - Questions

| | | |
|---|---|---|
| 1 | Describe what is meant by ease of access and availability of ICT and give an example (preferably not from the notes) | **2** |
| 2 | Explain the difference between information rich and information poor. Illustrate your answer with an example | **2** |
| 3 | Why must citizens now be IT aware and have an educational qualification in IT? | **2** |
| 4 | Name three jobs that are filled by knowledge workers. | **1** |
| 5 | Give one advantage and one disadvantage to both the retailer and customer of on-line shopping. | **4** |
| 6 | Under the terms of the Data Protection Act 1998 explain what is meant by:-<br>a) Data protection principles<br>b) The rights of the data subject<br>c) The responsibilities of the data controller<br>d) The role of the Information Commissioner | **4** |
| 7 | What are the three misuses covered by the Computer Misuse Act (do not answer in terms of “hacking” etc.) | **3** |
| 8 | In terms of computer usage what offence is covered under the Copyright Designs and Patents Act 1998. | **1** |
| 9 | How do the health and safety regulations cover seating, lighting, RSI, eye strain and radiation with regard to computer usage? | **3** |
| 10 | Describe the type of work carried out by someone in a starting position and also of someone working in an advanced position within an IT organisation (1 job from each). | **2** |
| 11 | Explain how the effect of new ICT in a business can affect the productivity and profitability of individuals and the company. You may need to write a paragraph about this. | **4** |
| 12 | Netiquette is very important to both individuals and businesses. Explain why typing e-mails in capitals, flaming and sending very large files are contrary to good netiquette. | **3** |
| 13 | Explain why information intellectual property rights are important and give an example of where this is important**.** | **2** |
| | **Total Marks** | **33** |

## SECTION 5

### Web Links

| | |
|---|---|
| www.bsa.org | Business Software Alliance |
| Provides reports and information on international software piracy. | |
| http://cyberethics.cbi.msstate.edu | Cyberethics |
| Good selection of resources on computer ethics, including case studies. | |
| www.nd.edu/~rbarger/cases.html | Ethical case studies |
| A large selection of case studies regarding ethics, posing some excellent questions and discussion points. | |
| http://library.thinkquest.org/26658 | Computer Ethics |
| An interactive guide to computer ethics. | |
| http://library.hilton.kzn.school.za/Computers/compethics.htm | |
| The 10 commandments of computer ethics. | |
| www.legislation.hmso.gov.uk/acts/acts1998/19980029.htm | |
| The text of the Data Protection Act 1998. | |
| www.hmso.gov.uk/acts/acts1997/1997050.htm | The Police Act 1997 |
| Describes the role of the National Criminal Intelligence Service, which is entitled to authorise activities such as tapping telephone lines. | |
| http://www.hmso.gov.uk/acts/acts2000/20000007.htm | |
| Information on the Regulation of Investigatory Powers Act | |
| http://www.legislation.hmso.gov.uk/acts/acts1996/1996031.htm | |
| The Defamation Act 1996 | |
| http://www.hmso.gov.uk/acts/acts2000/20000007.htm | |
| The Electronic Communications Act 2000 | |
| http://www1.bcs.org.uk/ | The British Computer Society |
| Code of Conduct & Practice | |
| www.cio.com/forums/ec | CIO Magazine |
| E-commerce resource centre. | |
| www.ecommerce.ac.uk | E-commerce innovation centre |
| Cardiff University provides interesting case studies and basic explanations of concepts and terms. | |
| www.ft.com/ftit | Financial Times IT surveys. |
| An excellent monthly articles based on case studies. | |
| http://ecommerce.about.com | About.com |
| Portal for all aspects of e-commerce. | |
| http://www.faqs.org/faqs/ | Internet FAQ Archive |
| This archive contains Usenet Frequently Asked Questions (FAQ) postings in HTML format and in text format. | |
| | |
| | |

## Bibliography

### Recommended texts

Management Information Systems 9th Edition – T Lucey 2005 Continuum
1-84480-126-8

Information and Communication Technology for Advanced Level – Julian Mott & Anne Leeming 2003 Hodder & Stoughton
0-340-772441

Information and Communication Technology for AS Level – Julian Mott & Anne Leeming 2002 Hodder & Stoughton
0-340-80427-0

A Level ICT 3rd Edition – P M Heathcote 2003 Payne-Galloway Publishers
1-904467-13-X

Information Systems for You 2nd Edition – Stephen Doyle 1999 Stanley Thornes
0-7487-4459-2

**Suggested useful texts for background reading**

Small Pieces Loosely Joined {a unified theory of the web} – David Weinberger 2002 Perseus Publishing
0-7382-0543-5

Business Information Systems: Analysis, Design and Practice – Graham Curtis & David Cobham 2002 FT Prentice Hall
0-273-65130-7

Business Information Systems: Technology, Development and Management for the e-business – Edited by Dave Chaffey 2003 FT Prentice Hall
0-273-65540-X

Essentials of Management Information Systems: Managing the Digital Firm – Kenneth C Laudon & Jane P Laudon 2003 Prentice Hall US
0-13-049542-5

The Future Just Happened – Michael Lewis 2002 Coronet
0-340-770864

## 6 Additional Resources

The following resources are provided for the use of teachers and lecturers.

Software evaluation sheet.

Suggested answers to the embedded questions in the text along with a suggested allocation of marks, allowing the questions to be used as informal assessments and as useful help in preparing for the extended writing needed for the exam. .

- Data and Information
- Organisational Information Systems
- Information Management Software
- Implications of ICT

**Software Evaluation Form:** **Name _____**

**Class of Software; -**

**Names of the two packages: -**

**A short description of the task**.

| | |
|---|---|
| **Range of data objects** | |
| **Range of operations** | |
| **Formatting Functions** | |
| **HCI – Use of keyboard commands**<br><br>**HCI – Menus and toolbars/icons** | |
| **On-line help** | |
| **On-line tutorials** | |
| **Which package better suited the task you described?**<br><br>**Summarise the important reasons why you chose this. Package.** | |