

SECTION 7.2



Section 7.2 - The ways in which IT is used

Communication applications

Internet

Everyone has heard of the Internet and most of us have used it at one time or another. When using it, we may think to ourselves how wonderful it is to have so much information available, but rarely do we think about the software that is needed to give us access to all of that information. This is an example of communications software that we do not need to understand – we simply have it on our computers.

Web browser

A web browser is a software application which enables a user to display and interact with text, images, videos, music and other information typically located on a Web page at a website on the World Wide Web or a local area network. Text and images on a Web page can contain hyperlinks to other Web pages at the same or different website. Web browsers allow a user to quickly and easily access information provided on many Web pages at many websites by traversing these links. Web browsers format HTML information for display, so the appearance of a Web page may differ between browsers.



Some of the Web browsers currently available for personal computers include Mozilla Firefox, Safari, and Internet Explorer. Web browsers are the most commonly used type of HTTP user agent.



In terms of businesses using the internet, there are some good and bad points when comparing a company having a website compared with other methods of publicising its business.

Advantages:

- Companies can reach a wider (worldwide audience) across many countries
- It can improve their public image
- They can take orders on-line or accept job applications
- Save money on company budgets for fliers or leaflets
- Information can be updated at any time - no need to reprint fliers or leaflets
- Companies can target specific customers

Disadvantages:

- They can lose personal touch with their customers
- They have to pay a specialist to create the website or have to learn web creation skills
- Harder to judge customer requirements if not in stock
- It is expensive to set up a website
- Advertisements used for publicity are restricted to Internet users only

Web search engine

A Web search engine is a search engine designed to search for information on the World Wide Web. Information may consist of web pages, images and other types of files. A search engine operates, in the following order:

- Web crawling
- Indexing
- Searching



Applications for corporate publicity

Desktop publishing

Desktop publishing (also known as DTP) combines a personal computer and WYSIWYG (what you see is what you get) software to create publication documents on a computer for either large scale publishing. There are two categories generally known as DTP software: programs that support creation of text-intensive documents (such as books) where there is little change in format from page to page, and text and/or graphics programs that compose individual page layouts.

The former products have more features like soft references, which automatically update when the reference text is moved, automated indexing and cross-referencing features, and limited support for placement of graphics. The latter products give the page composer more control and flexibility over graphic design elements and positioning, text and image manipulation, and pre-press support features.

With both types, users can create complex page layouts that can incorporate body text, numbered footnotes, graphics, photos and other visual elements. The skills and software are often used to create graphics for point of sale displays, promotional items, trade show exhibits, retail package designs, and outdoor signs.

Comparisons with word processing

While desktop publishing software still provides extensive features necessary for print publishing, modern word processors now have publishing capabilities beyond those of many older DTP applications, blurring the line between word processing and desktop publishing. As computers and operating systems have become more powerful, vendors have sought to provide users with a single application platform that can meet all needs. Software such as Open Office.org Writer and Microsoft Word offers advanced layouts and linking between documents, and DTP applications have added in common word processor features.

Business cards



Business cards are cards bearing business information about a company or individual. They are shared during formal introductions as a convenience and a memory aid. A business card typically includes the giver's name, company affiliation (usually with a logo) and contact information such as street addresses, telephone number(s), e-mail addresses and website. Traditionally many cards were simple black text on white stock; today a professional business card will sometimes include one or more aspects of striking visual design.

Business cards are frequently used during sales calls (visits) to provide potential customers with a means to contact the business or representative of the business.

Letterheads

A letterhead is the heading at the top of a sheet of letter paper. It usually consists of a name and an address, and a logo or corporate design, and sometimes a background. Letterhead may also refer to a piece of letter paper imprinted with such a heading. There are various legal constraints on the items included in a letterhead, for example in England and Wales it may include the names of all directors or none, but not a selection.



Robotics in manufacture



Robots can be placed into roughly two classifications based on the type of job they do. The first category includes tasks which a robot can do better than a human. Here, robots can increase productivity, accuracy, and endurance. The second category consists of dirty, dangerous or dull jobs where it is desirable to replace human labor with robotics.

Jobs which require speed, accuracy, reliability or endurance can be performed far better by a robot than a human. Hence many jobs in factories which were traditionally performed by people are now robotized.

An example of factory robots is:

Car production

This is now the primary example of factory automation. Over the last three decades automobile factories have become dominated by robots. A typical factory contains hundreds of industrial robots working on fully automated production lines - one robot for every ten human workers. On an automated production line a vehicle chassis is taken along a conveyor to be welded, glued, painted and finally assembled by a sequence of robot stations.

Production line control

In addition to product design, computers play an ever-increasing role in manufacturing. In some factories, computers control virtually everything. For example, consider a power plant that generates steam for electricity. In this kind of factory, a computer monitors pressures and temperatures at hundreds of critical points throughout the plant. If the pressure or temperature in a pipe or tank exceeds a specified level, the computer can regulate the process by instructing valves to turn and burners to adjust.

Factories also use computerised robotic arms to do physical work that is hazardous or highly repetitive. For example, automobile plants use robots to perform tasks such as painting, welding, cutting and bending metal sheets for body parts.



Manufacturing with computers and robotics is called computer-aided manufacturing (CAM). More recently, computer-integrated manufacturing (CIM) has given computers an additional role in designing the product. They can now order parts and plan production. This means that computers can coordinate the entire production process from design to manufacturing.

Also, a robot can be programmed to perform a designed task. A human must first work out what sequence of operations need to be performed and then write a computer program that will instruct the robot to perform these actions. Most industrial robots are reprogrammable, i.e. their original task designated can be changed when the need arises.

Online processing

A computer terminal is a device used to communicate with a central computer (or server). It is a means of sending data and receiving it. The central computer does all the processing work. It should be noted that applications which use on-line processing do not require the same immediate (fast) response.

Graphically we can represent online processing like this (below), where the input is made by the user which in turn is sent to the processor to be output.



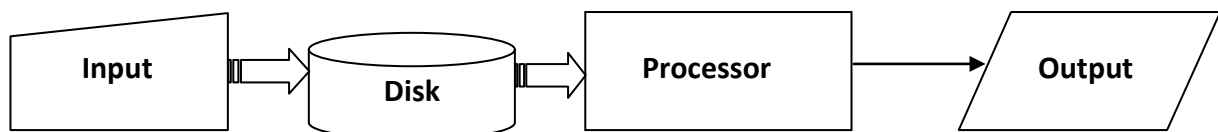
Example applications using on-line systems

- Booking a cinema seat using a computerised booking system.
- On behalf of its customers, a travel agent can book seats accordingly so no one else takes the seats instead.

Note: Real time applications are said to be online applications because a connection with a computer is needed.

Offline processing

Offline means that it is not under the control of a computer's central processing unit. With offline processing, input is made by the user which is then sent to a storage device and only sent to the processor after all the input is done.



Just think if the travel agent system example above was offline; it could not make the booking because it would mean it was not linked to the central computer.

Note: Batch processing applications are said to be offline applications.

Cinemas

A movie theater, movie theatre, picture theatre or cinema is a venue, usually a building, for viewing motion pictures ("movies" or "films"). Most movie theaters are commercial operations catering to the general public, who attend by purchasing a ticket. The movie is projected with a movie projector onto a large projection screen at the front of the auditorium. Some movie theaters are now equipped for digital cinema projection, removing the need to create and transport a physical film print.

Pricing and admission

In order to obtain admission to a movie theater, the prospective theater-goer must usually purchase a ticket, which may be for an arbitrary seat ("open" or "free" seating, first-come, first-served) or for a specific one (allocated seating). Movie theaters in Europe can have free seating or numbered seating.

Some theatres in Mexico offer numbered seating, in particular. In the case of numbered seating systems the attendee can often pick seats from a screen; sometimes the attendee cannot see the screen and has to make a choice based on still available seats. In the case of free seats, already seated customers may be forced by staff to move one or more places for the benefit of an arriving couple or group wanting to sit together.

Theatre



Theatre (or theater, see spelling differences) is the branch of the performing arts defined by Bernard Beckerman as what "occurs when one or more persons, isolated in time and/or space, present themselves to another or others."

By this broad definition, theatre has existed since the dawn of man, as a result of human tendency for storytelling. Since its inception, theatre has come to take on many forms, often utilizing elements such as speech, gesture, music, dance, and spectacle, combining the other performing arts, often as well as the visual arts, into a single artistic form.

Theatre and Cinema Booking System

You have read that real-time systems need to be online in order to process a transaction. As soon as the transaction is received by the computer, it is processed and any data files are updated.

If a customer books a seat at a performance then the details are added to the bookings file immediately and that seat is noted as 'Reserved'. Another customer who asks a few seconds later for a seat at the same performance will not be able to book the same seat.

A Theatre and Cinema booking system is an on-line system because there is not an urgent need for processing like a jet fighter pilot needs with a real-time system.

Automatic Teller Machines



ATMs for cash withdrawals and bill paying

An **automated teller machine** (ATM) (also known as a Cash Machine) is a computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the need for a human clerk or bank teller.

On most modern ATMs, the customer is identified by inserting a plastic ATM card with a magnetic stripe or a plastic smartcard with a chip that contains a unique card number and some security information, such as an expiration date.

Security is provided by the customer entering a personal identification number (PIN). Using an ATM, customers can access their bank accounts in order to make cash withdrawals (or credit card cash advances) and check their account balances as well as purchasing mobile cell phone prepaid credit.

ATMs are placed not only near or inside the premises of banks, but also in locations such as shopping centers/malls, airports, grocery stores, petrol/gas stations, restaurants, or any place large numbers of people may gather.

Advantages of ATM's

- They are easy to use.
- They are available 24 hours a day.
- Customers don't have to go to the bank.
- There are fewer queues for customers to stand in.
- Less paperwork for the employees.

Disadvantages of ATM's

- Limited amount of money can be withdrawn.
- Can't cash cheques
- Cannot arrange loans.
- Cannot open or close an account.
- The machine is expensive.

Credit cards

There are many types of cards in use, credit, debit and cash cards. Debit cards are used as an alternative to cheques. When goods are bought using a debit card, the money is immediately transferred from the shopper's account to the store's account; the user must have the exact money in their account to pay for the goods.

Cash cards are used to obtain cash from a card dispenser.



Credit cards, as the name suggests, enable people to obtain credit either against goods bought or for cash from a cash dispenser. The difference to debit cards is that the credit card allows the consumer to spend money on credit to the issuing bank, but they must keep within the agreed limit. The cardholder receives a statement at the end of each month which details all transactions for that month.

Credit card checks

When credit or debit cards are used, checks would be made as a part of authorization, these checks include;

1. That the account number is valid
2. That the credit limit has not exceeded (for credit card)
3. That there is enough money in the account (for debit card)
4. That the card expiry date has not past
5. Checking that the card has no unusual spending patterns
6. That the PIN is correct
7. That the card has not been reported as stolen.

Note: that the items written on the back of the cards magnetic stripe does not include; Credit limit, customer name, address and Personal Identification Number (PIN).

Applications in Medicine

All hospitals make use of information technology and, because of the diverse nature of the work that hospitals do; the computer has many different uses.

Doctors' information systems

Patients Records



Computers can be used to provide a complete, accurate, up to date and readily available source of information about patients' health. Records of patients are usually kept for the duration of their lives so, in the past, a large amount of space was taken up by paperwork. There were also problems in locating a particular patient's file – especially if, say, the patient moved about the country a great deal.

Most hospitals now store patients' records on magnetic tapes or disks. The information can be found immediately by the computer. There are terminals at certain places in the hospital

where doctors or nurses can find details of a particular patient very quickly.

In-patients' records are probably best kept on magnetic disc. This method allows quicker access because it is a 'random access' storage medium. These records will be needed much more often than the out-patients' records. Out-patients' records contain a large quantity of information that may only be used, say, a couple of times in a patient's lifetime. So these records can be stored on magnetic tape which has a slower (serial) access time. New data can be added to the patient's records by keying this into the computer via a terminal. Thus the patient's record can be kept up-to-date with the latest information about his or her condition or circumstances.

Features of the patient database:

- Can sort patient records
- Can produce graphs of health results
- Can save the file in different formats
- Can print file/records/data/reports
- Can produce input forms
- It is easy to edit records
- Easy to add/delete records
- Can encrypt or password the data

Personal Health Records (PHR)

A personal health record is medical information that is in the possession of an individual patient (or patient's non-professional caregiver). The format may be either paper (or similar types of) documents, electronic media, or a combination of both. Any of the types of data listed above may be included. It may also include information that a doctor may not have, such as exercise routines, dietary habits, herbal or nonprescription medications, or results of home testing (such as home blood pressure or blood sugar readings).

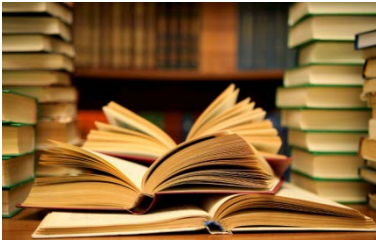
PHRs can contain a diverse range of data but usually include information about:

- Allergies and adverse drug reactions,
- Medications (including dose and how often taken)
- Illnesses and hospitalisations,
- Surgeries and other procedures,
- Vaccinations,
- Laboratory test results,
- Family history.

In addition to storing an individual's personal health information, some PHRs provide added-value services such as drug-drug interaction checking or electronic messaging between patients and providers.

Applications in Libraries

Records of books and borrowers and the issue of books



When a member joins a library, a membership card is issued which has a bar-code printed on it. Every book in the library has a bar-code printed inside it. When a member takes a book out on loan, the bar-code of the book is read by a bar-code reader – also the bar-code of the member’s card. Together with the date, this constitutes a transaction. The librarian would need to enter a username / password / membership number / security code to access the system.

This type of ‘record keeping system’ makes it easier to find details of books and their authors. It is easier to keep records of stock by being able to add, insert, and delete records. It also saves space, books can be automatically ordered, it’s quicker to process sales and easier to see selling/spending trends.

INPUT

- The bar-code from the book – read by barcode reader/scanner.
- The bar-code or magnetic stripe from the member’s card – read by barcode reader or magnetic stripe reader.
- The date, librarian’s name, etc.



This ‘transaction’ is then stored in the library’s database.

Note: Barcodes contain a check digit which is used for automatic validation by the barcode reader.

DATABASE

The library’s database would have files (tables) containing details about:

- The books, magazines, etc, in the library.
- The members they have.
- The day to day transactions taken place.



INFORMATION RETRIEVAL

The librarian will need to be able to find out whether a book is currently in stock in the library or whether it is out on loan – searches would have to be performed on the database. There may also be a link to other libraries.

PROCESS

The computer system will need to be able to calculate which books are overdue and whether any fines are due.

OUTPUT

- Summary reports.
- Result of searches.

Note: Email’s or mail merged documents can be sent out as reminders to members who have overdue books.

The library is an ‘**online system**’ as data is updated immediately a book is loaned out.

It can also be a ‘**batch-processing system**’ when all the overdue reminder letters are sent out to members.

Point Of Sale



Point of sale or point of service (POS or PoS) can mean a retail shop, a checkout counter in a shop, or the location where a transaction occurs. More specifically, the point of sale often refers to the hardware and software used for checkouts -- the equivalent of an electronic cash register.

Point of sale systems are used in supermarkets, restaurants, hotels, stadiums, and casinos, as well as almost any type of retail establishment.

Automatic re-ordering



All ordering is performed by computer to help with 'Stock control'. There are fast electronic communication lines between the shops, the distribution centres and the head office. There are also direct lines to the major suppliers, which mean that orders can go straight through to production lines.

One advantage is this is that stock arrives just in time before sale so it is always fresh. Another advantage of this system is that money does not need to be tied up in stock and can be used for more productive purposes.

All goods in a supermarket have barcodes printed on them. When a customer pays for the goods, each item's barcode is passed over a laser scanner built into the Point-of-Sale (POS) terminal. This reads the barcode and sends it to the main computer.

- The computer stores a database containing information about all the products the supermarket sells.
- The computer sends the price and the description of the item back to the POS terminal.
- The price is added to the customer's bill. The price and the description are displayed on a small monitor. They also get printed onto the customer's receipt.
- The computer will also note that one of this item has been sold and will reduce the stock level on file. The computer always knows exactly how many of each item is in the supermarket. This is called 'automatic stock-taking'.
- At the end of each day, the computer sends out requests for more of those items which are running low.

The customer can pay the bill using Electronic Fund Transfer at Point of Sale (EFTPOS). A credit card (or debit card) is swiped through a card reader to read the customer's bank account details. These details and the amount of the bill are sent through the telephone system to the bank's computer system.

The correct amount of money is transferred by the computer system from the customer's account to the supermarket's account. Some supermarkets offer a loyalty scheme. Each customer has a loyalty card which has a magnetic swipe strip. The card is swiped each time the customer buys goods and points are awarded. The customer can use these points for discounts or vouchers.