

CHAPTER 4 Applications and Uses of Computer

Overview

The computer technology is vital for every functional area of an organization and IT systems are integral to every functional area. In finance and accounting, for example, managers use such systems to forecast revenues and business activity, determine the best sources and uses of funds, manage cash and other financial resources, analyze investments, and perform audits to ensure that the organization is fundamentally sound and that all financial reports and documents are accurate. At home, computers can help us to shop, determine our bank balance and pay bills. At work place, computer skills are needed for success in almost every occupational area. For businesses, with today's increased competition and global markets, it is almost impossible for an organization to stay competitive without the widespread use of computer technology. Another advantage of computer technology on working practices is the move towards the paperless office in which all data is held in computer files and there is no hard copy at all. The typical traditional office with filing cabinets full of files, trays of documents and correspondence awaiting or having received attention, desktops strewn with sea of paper would be a thing of the past. An empty desk with telephone and computer terminal would be all that was required. The writer does not believe that many, if any, organizations have actually achieved this but it's supposed to be the coming thing. In the field of education, teaching and learning are being profoundly influenced by the possibilities introduced by computer technology.

Significant changes have also taken place through the impact of interactive technology web-cams, video conferencing and so on. Not so long ago if it was necessary to talk with a group of clients the only way to do it was either to arrange a meeting that all of them could attend (always a tough thing to do) at a reasonably central venue to which every body had to travel too far, travel there (perhaps involving an overnight stay) and confer, or to hold series of telephone conversations with each one individually and keep on getting back to them until the matter was settled to everybody's satisfaction. Now, through the Internet and web cams a video conference can be set up in which everybody can take part without leaving their own office. This doesn't even take into account the overall impact of the Internet on the information levels available to businesses. The following are some of the major applications.

4.1 Uses of Computers in different Fields

Our daily encounters with and dependence upon technology is almost invisible as it takes the shape of electronic climate control systems, wireless communication systems such as phones and pagers, automatic tellers to dispense money, magnetically striped cards to facilitate consumer transactions, cable and satellite television, and automobiles and mass transit. Free trade agreements have led to globalization of commerce and increased competitiveness in labor markets. We listen to political and scientific debate about global warming and the effect of our modern use of fossil fuels, nuclear weapons, chemical warfare, and contamination of food and water supplies. In the past several decades we have gone from space exploration to space colonization, intelligent machines, and virtual reality that will lead us into the next millennium. The jobs of the future may not even exist today. Let us see the use of computer technology in our daily life.

4.1.1 Business

The Businesses must understand and adapt in the new source of competitive advantage by connecting to the core competencies and customer interaction on global scale, global market place. In the global business world, global interaction is very important. In every organization there are major business processes that provide the critical tasks such that customer bills, analyzing sales of various products in different locations etc. In business, computers are used as given below.

- **Marketing:** Marketing applications provide information about the organization's products, its distribution system, its advertising and personal selling activities, and its pricing strategies. Marketing applications help managers to develop strategies that combine the four major elements of marketing: Product, Promotion, Place, and Price.
- **Stock Exchanges:** Stock markets around the world are in transition. On some trading floors, paper is disappearing. In fact, the trading floor itself is disappearing in some places because many stock markets lunched the computerized system that makes it possible for stockbrokers to do all their trading electronically. Brokers interconnected through a data communications network submit and receive bids using their computer workstations or interconnected computer display screens, where brokers match buyers with sellers, so that neither trading floor nor slips of paper are necessary.



Figure 4.1: (Use of computer in stock exchange market)

- **Banks:** Computerized banking have provided several benefits such as save the time and convenience for customer. International banking and the abilities to handle trading in multiple currencies are critical for international trade. The cheques are read by MICR (Magnetic Ink Character Reader, a device used to allow the data on cheques to be read by machines) see in fig 4.2. Bank use mainframe computer to maintain their customer accounts by dealing with the transaction generated as a result of withdrawals and deposits. Some banks are used to operate a network of ATMs (Automated Teller Machine) see in figure 4.3. Although some international retail purchasing can be done by giving a credit card number.



Figure 4.2: ATM

Figure 4.3: Automated Teller Machines (ATM) and usage of machine

- **Departmental Store:** People at the store level, cashiers enter sales data into sale terminals by waving a bar code scanner across a package's bar-coded prices and stock numbers. Bar codes are read by bar -code readers, photoelectric scanners that translate the bar code symbols into digital forms (see in figure 4.4). The price of a particular item is set within the store's computer and appears on the sales-clerk's point of sale terminal

and on our receipt. Store and department manager who received report of store and department sales and inventory levels are indirect end users. Record of sales are input to the store's computer and used for accounting, restocking store inventory, and weeding out products that sell well. A Security VCR (video cassette recorder) is widely used in department stores and other locations where aesthetics are a priority. It is virtually impossible to tell where the camera is pointed, which makes it difficult for would-be camera avoiders to stay out of the camera's view range; that are equipped with a camera, and lens can be augmented with dummy cameras. VCRs use the tapes, hook up the same way, and have all of the standard features of today's consumer VCRs. Most importantly, they are just as easy to use. Security cameras are everywhere these days and the reason is quite clear: there is simply no better way to monitor home or business operations and ensure safety. Now computer hard disk has took place of VCR.



Figure 4.4: Use of bar code reader

- Office Automation:** Office Automation (OA) refers to the movement toward automating office tasks. An office where workers performs different tasks. The management and administrative tasks performed in an office five general categories of activities like decision-making, data manipulation, document handling, communication, and storage. Many offices have used advance computer technologies to perform various tasks in an office system such as for document management system, message-handling system, and office support systems.
 - Document Management Systems (DMS):** DMS include word processing, desktop publishing, reprographic, image processing, and archival storage applications. Word processing enable documents to be created and edited electronically as well as help to produce high quality memos, letters, proposals, reports, newsletters and brochures etc., which are used to send business community. Desktop publishing enables to make documents in attractive form by the use of photos, artwork, graphical illustrations etc. Spreadsheet is software package

used to create a table of columns and rows used by people responsible for tracking revenues, expenses, profits, loses, statistical, mathematical and logical processing etc. Reprographics is the process of reproducing multiple copies of a document. Image processing allow document to be scanned and stored in image oriented databases.

2. **Message-handling systems:** It enables to send messages or documents from one location to other location through facsimile (fax), electronic mail (e-mail), Voice Mail etc.
3. **Office Support Systems enable:** It to coordinate and manage the activities of work group. Groupware and desktop organizers are some examples of office support systems.

4.1.2 E-commerce

E-commerce (electronic commerce) describes the buying, selling, and exchanging of products, services, and information via computer network. The term e-commerce as describe transactions, conducted between business partners. There are many application of e-commerce, such as home banking, shopping in electronic malls, buying stocks, finding a job, conducting an auction, collaborating electronically with business partners around the globe, marketing & advertising and providing customer service. There are several types of e-commerce like collaborative commerce, Business to commerce, consumer to consumer, and Mobile commerce etc. Mobile satellite communications also promise to extend the global reach of voice, data and other services. The following services of e-commerce are used most frequently in e-business.

- **Electronic Mail (E-mail):** The e-mail is a service that transports text messages from a sender to one or more receivers via computer. Voice mail systems capture, store, and transmit spoken messages.
- **Video conferencing:** Video conferencing is a type of conferencing in which video cameras and microphones capture sight and sound transmission over networks. It is a advance form of teleconferencing. Videoconferencing should provide a complete simulation of a normal meeting environment, enabling both parties to see, hear and present material, just as if they were in the same room. It can speed up business process and procedures in the same way that the fax and the e-mail have revolutionized the way we share information. Tangible benefits are most easily related to actual cost savings. The most obvious quantifiable saving is the cost of travel and the cost of the time wasted during travel.



Figure 4.5: Video Conferencing actual cost saving meeting in different places

- **Electronic-shopping (E-shopping):** Many business now have website that allow Internet users to buy their goods or services. Shopping can take place using a computer at home, from work or at a mobile phone and e-shop can be anywhere in the world working 24 hours a day.
- **Electronic Banking:** An electronic banking is also known as cyber-banking or online includes various banking activities conducted from home, a business, or on the road instead of a physical bank location.

4.1.3 Industry

Computers are used to control manufacturing system and continuous running of the machinery. These are also help in monitoring temperature, pressure, and also check the quality and accuracy, measurement needed in the manufacturing process,

- **Robots:** A robot is an automatic programmable machine that moves and performs mechanical tasks (see Fig 4.6.). Robots are used in hundreds of applications from assembling and spray-painting cars, carrying out maintenance on overhead power cables, to testing blood samples, outer space experimental programs, in artificial satellites, and radioactive environments etc. Robots can work in environment that are hazardous to humans, it can perform repetitive and boring task continuously without a break at high level of accuracy than human.



Figure 4.6(a): Remak RX 32 three-axis servo robot, which fits machines up to 300 tons.



Figure 4.6(b): M-16iB/20T, from FANUC Robotics, which can carry 20 kilograms and is suited to injection machines up to about 800 tons.



Figure 4.6(c): W625H side-entry robot from Wittmann.

4.1.4 Computer Aided Design (CAD) & Computer-Aided Manufacture (CAM)

CAD are used for display designs and build production prototypes in software, test them as a computer object according to following given parameters.

- Compile parts and quantities lists.
- Outline production and assembly procedures
- Transmit the final design directly to machines.

CAD has many different applications some of them like designing new car or aircraft, bridge and building. Making changes to a design requires a large number of complex calculations. A CAD (see in fig.4.7.a) system needs

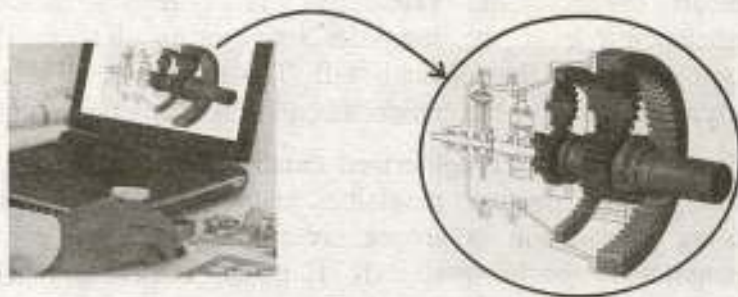


Figure 4.7(a): Using of Computer Aided Design software (CAD).

Figure 4.7(b): Computer Aided Design (CAD)

a high-resolution monitors, input devices (such as mouse, keyboard, graphic tables, and scanners etc.), and output devices (such as printers and plotters). CAD (see in fig 4.7.b) use often has the capability of displaying a three-dimensional object and speedily rotating it in any direction using controls on the keyboard.

Computer-Aided manufacture (CAM) is used to control all the part of a manufacturing process. CAM software uses digital design output, such as that from a CAD system, to directly control production machinery. CAM systems are manufactured following goods.

- Product can be made very accurately and consistently.
- Around the clock production is much cheaper.
- A product's design can be modified without the need of bringing production to a computer standstill.

4.1.5 Simulations

A computer simulation is a special type of computer model, which recreates a system that might exist outside the computer. Simulations are often

used to train peoples how to deal with situations that are too difficult, expensive or dangerous to recreate and practice for real. For example a flight simulation, which is used to train, pilots how to deal with situation that would be expensive and dangerous to practice using a real aircraft. A flight simulator consists of a working replica of the flight deck of an airplane.

4.1.6 Medical

The computers are commonly used in some area of medical fields such as laboratories, researches, scanning, monitoring, pharmacy etc., which are helping the doctor to diagnose an illness.

- **Patient Monitoring:** Computers are used in hospitals to monitoring critically ill patients in intensive care units. The patients have sensors attached to them, which detect changes in heart rate, pulse rate, blood pressure, breathing and brain activity. If any reading dislocates or reaches misbalancing level, the computer activates an alarming device to create sound and alerts the medical staff. The data is also logged and used to analyze the changes in a patient's condition over a period of time.
- **Patient Records:** Computerized databases are used to store information about patients, doctors, medicines and other chemicals and equipments. Storing information in proper order to provide the convenient way of arrangements for hospital staff. It makes easy to organize records than paper-based records that are not constantly following patients around the hospital. For example if a patient is admitted in one ward but being seen by a consultant and receiving treatment in other parts of the hospital; their details can be viewed and updated at any terminal in the hospital's LAN network.

The computerized databases are used to help match patients who are waiting for organ transplants such as a new kidney, liver or heart with suitable organs from donors.

- **Diagnosis:** It will come as no surprise that hospitals and clinics use computers to keep records and generate invoices. One common use of computer is to scan the body of the patient. A scanner sends electromagnetic rays through a patient's body and sensors detect that how much patient's body have affected to any type of cancer. Actually the body scanner helps the doctor to treat any type of tumors or cancers. For example, the CAT scanner passes rays over the patient; it displays an image that enables physicians to look beneath the patient's skin. As the scanner passes over the patient, it displays an image of bone and tissue structure on a computer screen (see figure 4.7).



Figure 4.7: Computed axial topography (CAT) still uses X-rays to see inside the body. But instead of using a single beam, a CAT scanner takes many X-rays around the body. The scanner's computer then builds up pictures of a 'slice' through the body and combines them to give a 3D image. Scientists used CAT to carry out the first detailed studies of the brain, before even more powerful techniques were developed.

4.1.7 Airline System

In airline system, computers are used to control passenger aircrafts and vehicles. Early aircraft were controlled by moving parts attached to the controls using cables. In modern, fly-by-wire system, electronic signals from the cockpit are sent to that adjusts the flight surfaces. Computer is embedded in the pilot's or driver's controls. It is linked up among different cities and gives full information about its flight and seat reservation.

4.1.8 Education

Computers are used in many colleges to provide the methods of teaching in different ways. The computer education is very familiar and rapidly increasing the graph of computer students. There are number of methods in which educational institutions can use computer to educate the students. Many computer-based educational programs software are available, which students can learn to read, to count, or to speak a foreign language. Software that combines the thrills of games with real information content is becoming more popular. Some organizations are using information technology in their employee training programs.

- **Computer Aided Learning (CAL):** Computer Aided Learning (CAL) could be described as the use of information technology to assist in the teaching and enhance learning process. Information Technology may be able to aid us in reducing the time spent on creation and maintenance of

teaching materials (one 'document' for lecture materials/reference notes/study aids). It is also reducing the administrative load associated with teaching and research.

- **Computer-Based Training (CBT):** CBT or Computer Based Training is a difficult term to adequately define because it encompasses various modes of instruction and has evolved from the simplest definition, *An interactive learning experience between the learner and computer in which the computer provides the majority of the stimulus, the learner must respond, and the computer analyzes the response and provides feedback to the learner.* Computer-Based Training is about using computers to help train people. It is not necessarily about training people to use computers. Computer based training works, compared with traditional techniques; it can bring many additional benefits to any organization, their training department and their students. For example:
 - (i) Students can readily acquire new skills at their own pace and at times that do not conflict with their work schedules.
 - (ii) Training times can usually be reduced.
 - (iii) Retention of course material is usually greater.
 - (iv) Interactive, visually stimulating, easily absorbed and easily available material encourages students to undertake training.
 - (v) Planning and timetabling problems can be reduced or eliminated.
 - (vi) Essential skills can be taught and refreshed whenever and wherever needed.
 - (vii) The quality and consistency of the training material is maintained throughout.
 - (viii) It is a highly cost-effective way to train large number of students, locally or at remote places.
 - (ix) Timely and high-quality training on demand leads to increased efficiency.

Compared to traditional classroom training methods, students using Computer-based training absorb similar material faster and retain more of the information they are taught.

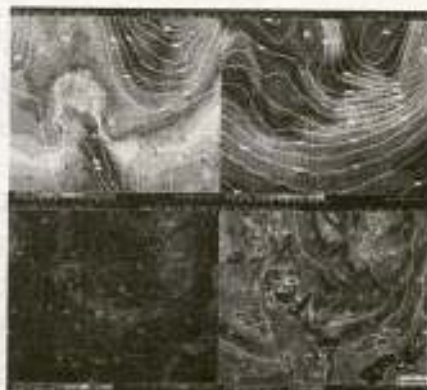
4.1.9 Weather Forecasting

Computer based weather forecasting depends on accurate collection of data from weather stations, airports, satellites, different sensitive devices (which are situated on huge towers and buildings etc.) all around the world. Computer depends on building a model of hot, cold air, dry and humid air interaction, and how these interactions are affected by land and sea

temperature, season and so on. Once this is done, the data is collected on atmospheric phenomena over a region. The computer model then generates a forecast of how the air will change. The necessary parameters can never be measured with total accuracy and it is impossible to make a perfect representation of all the factors that affect weather. Some businesses, however, are so dependent on the weather that they need constantly updated information. SPARCO Weather forecasting department offer analysis of live weather data, and provide help to make business decisions based on weather forecasting.



Figure 4.9:
Weather over casting provides weather forecasting and decision making support to farmers and flight scheduling etc.



4.1.10 Home

Nowadays many people have computers at home and it has become a necessity electrical home appliance used in home. Children play games, keep track of the stamp collections, draw pictures, play music, view movies and do some sort of reading and writing according to their needs. A typical domestic system consists of a PC with a relatively small hard disk; printer, modem and CD-ROM drive etc. People can utilize computers for keeping records, making home budgets, using electronic mail and Internet services to learn and increase their knowledge. The uses of microprocessor technology in manufacturing of electronic home appliances like microwave, air-conditioning, washing machine, sewing machine etc., have completely changed our way of life.

4.2 Computer Assistance simplifying our work practices

Mostly people think that computer have a brain and can think and decide what to do, this is not true they are primarily machines, whereas the real thinking is done by human beings who feed the computers with information and program them to perform different operations. There are many reasons for using computers and some

of these are listed below.

- (i) Computers can work much faster than human's work.
- (ii) Computers never get tired or need a rest.
- (iii) Computers can do jobs that it would be dangerous for a human to do.
- (iv) Computers can store large amount of information.
- (v) Computers can retrieve information very quickly.
- (vi) Computers never lose or misplace information.

Computers linked through communications systems offer major personal and business benefit to users like speed, consistency, precision, and reliability etc.

- **Speed:** Computer can perform calculations or process at a very high speed in a fraction of a second like nano second or even pico second. Computer can perform complex calculations, recall stored information, transmit information from one location to another and move objects around a computer screen almost instantaneously.
- **Consistency:** People often have difficulty repeating their actions exactly. Indeed, doing something once is not nearly as difficult as doing it the same way, and with the same result repeatedly.

Computer excels at repeating actions consistently. Whether using a spell checker built into a word processor or playing multimedia animation for training purposes, a computer will carry out the activity the same way every time.

- **Precision:** In addition to being fast and consistent, computers are extremely precise. They can detect minute differences that people cannot see. In manufacturing an automobile, for example, the precise placement of a part as directed by a computer, may make the difference between long use and early wear. Computers excel in managing the smallest differences in being precise.
- **Reliability:** With speed consistency, and precision come reliability. When we know that the same procedure will be followed rapidly, consistently, and precisely, we can expect reliability of result i.e. we can depend on getting the same result again and again with any error.

Exercise 4C

1. Fill in the blanks:

- (i) CAD stands for _____.
- (ii) Electronic banking allows individuals to obtain cash instantly from _____.
- (iii) CAT stands for _____.
- (iv) VCR stands for _____.

- (v) A robot is an automatic programmable machine that moves and performs _____ tasks.
- (vi) An electronic banking is also known as _____.
- (vii) The cheques are read by _____ machine in computerized bank.
- (viii) The _____ is a type of conferencing in which video cameras and microphones capture sight and sound transmission over networks.
- (ix) Office Support Systems enable to coordinate and manage the activities of _____.
- (x) FAX stands for _____.

2. Choose the correct option.

- (i) CBT stands for:
 - (a) Computer Based Trade
 - (b) Computer Based Training
 - (c) Certificate Based Training
 - (d) None of the above.
- (ii) The benefit of CAD may be summed up as:
 - (a) Accuracy
 - (b) Repeatability.
 - (c) Speed and flexibility of production
 - (d) All of the above.
- (iii) Computer at home can be used:
 - (a) Keeping records
 - (b) Making budgets
 - (c) Watching Movies
 - (d) All of the above
- (iv) A word processor can be used to:
 - (a) Write Text
 - (b) Edit Text
 - (c) Print Text
 - (d) All of the above
- (v) CAL stands for:
 - (a) Computer Aided Learning
 - (b) Computer Assist Learning
 - (c) Computer Added Learning
 - (d) None of the above
- (vi) Typically, an ATM can be used to:
 - (a) Keeping records
 - (b) Making budgets
 - (c) Watching Movies
 - (d) None of the above
- (vii) Modern computer can perform calculations or process at _____ high speed.
 - (a) per second
 - (b) per minute
 - (c) nino second
 - (d) None of the above
- (viii) CAT stands for:
 - (a) Computerised Axial Topography
 - (b) Computer Axial Topography
 - (c) Computer Aided Topography
 - (d) None of the above.
- (ix) Computer based weather forecasting depends on accurate collection of data from:
 - (a) Television
 - (b) Weather stations
 - (c) Radar
 - (d) Antenna

- (x) MICR stands for:
 (a) Magic in Character Redo (b) Magnetic Ink Character Recorder
 (c) Magnetic Ink Character Reader (d) None of the above
3. Write T for true and F for false statement
- (i) CBT is more expensive than non-CBT training.
 (ii) Videoconferencing is an advanced form of teleconferencing.
 (iii) The e-shop has opened for limited time period on the web sites.
 (iv) CAL could be described as the use of information technology to assist in the teaching and learning processes.
 (v) Bar Code Reader can be read all types of ink characters.
 (vi) Fax machine can be inserted inside computers.
 (vii) A robot is an automatic programmable machine.
 (viii) A computer simulation is a special type of computer hardware.
 (ix) An electronic banking is also known as cyber-banking.
 (x) Modern computer can perform calculations at a second.
5. Explain the term Computer Aided Manufacturing process.
6. What is meant by computer simulation?
7. What is an ATM?
8. Explain how computer can be useful in business.
9. Explain how computer can be useful in medical field.
10. Define the role of E-Commerce in our daily life.
11. How computer can be useful in weather forecasting?
12. Define the CBT training.
13. Describe the online shopping and banking.
14. Define the Videoconferencing.

Answers

- | | | | | | |
|----|------------------------------|----------------|-------------------------------------|--------|-------|
| 1. | (i) Computer Aided Design | (ii) ATM | (iii) Computerized Axial Topography | | |
| | (iv) Video Cassette Recorder | (v) Mechanical | (vi) Cyber Banking (vii) MICR | | |
| | (viii) Video Conferencing | (ix) Workgroup | (x) Facsimile | | |
| 2. | (i) b | (ii) d | (iii) d | (iv) d | (v) a |
| | (vi) d | (vii) d | (viii) a | (ix) b | (x) c |
| 3. | (i) T | (ii) T | (iii) F | (iv) T | (v) F |
| | (vi) F | (vii) T | (viii) F | (ix) T | (x) F |