COMPUTER BASED INSTRUCTIONS FOR TEACHER EDUCATORS AT SECONDARY LEVEL

PROJECT TEAM

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PREFACE

The revolution of Information and Communication Technology (ICT) influenced all the fields of human activities. It also influenced the teaching learning also. The advanced technological approaches based on ICT reduces the gap between teacher and learner. With the use of ICT in teaching, the learning become more interactive and user friendly. To inculcate the applications of ICT, there is a need to train the teacher educators at secondary level with a purpose that in turn they train the teachers.

DSERT, Bangalore requested the institute to undertake a comprehensive training programme on computer based instructions for teacher educators at secondary level. As a part of the programme the institute organised a training programme for the faculty of IASEs and CTEs of Karnataka was conducted from 8th to 13th March 2001.

I express my gratitude to Prof. J.S. Rajput, Director, NCERT; Prof. M.S. Khaparde, Joint Director, NCERT; Prof. G. Ravindra, Principal, RIE, Mysore; Prof. K. Dorasami, Dean of Instruction, RIE, Mysore and Dr. N.N. Prahallada, Head, DEE, RIE, Mysore, for giving me the opportunity to plan and execute the programme.

I express my thanks to Prof. P. Nagabushanam, Professor and Head, Department of Studies in Computer Science, University, Mysore and Dr. Rajaram S. Sharma, Reader and Head, Graphics and Multimedia Division, CIET, NCERT, New Delhi; and my colleagues, Dr. U. Lakshminarayana and Mr. A.C. Josy, for their support in the organisation of training programme.

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COMPUTER BASED INSTRUCTIONS FOR TEACHER EDUCATORS OF KARNATAKA

TIME TABLE

	9.00 to 9.15	10.15 to 11.30	11.45 to 1.00	1.45 to 3.00	3.00 to 4.15	4.15 to 5.30
8-3-2001 Thursday	Registration	Inauguration	Information and Communication Technology in Teacher Education **SNP**	Fundamentals of Computers **PN**	Operating Systems and Application Software and Windows 98 **PN**	Hands on Experiences
9-3-2001 Friday	Creating a word document **GV**		Special features of MS Word	Hands on Experiences on MS Word		
10-3-2001 Saturday	Data Management through MS Excel **ACJ**			Preparation and Presentation of Slides through MS Power Point **RSS**		
11-3-2001 Sunday	Creating student News letter through MS Publisher **GV**			Searching and Locating Resources from the Internet **SNP & RSS**		
12-3-2001 Monday	Utilisation of available software in teaching learning **GV & RSS**			Working on Individual Projects		
13-3-2001 Tuesday	Identification and Evaluation of Software **RSS & GV**		Presentations by Participants			Valedictory

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1. Information and Communication Technology in Teacher Education

Introduction

We are in the midst of a great *Information Revolution* - perhaps the most significant happening in human history since the *Industrial Revolution* that transformed the face of the Earth about a hundred and fifty years ago. A similar transformation is under way, but at a much faster pace and is certain to touch every facet of life on the planet.

India was nowhere in the picture during the Industrial Revolution that started and spread out from England and Europe. We simply cannot afford to be left behind by the present information revolution. While we appear to have missed out on the early part of this revolution, recent policy pronouncements of the central government hold out hope for the future. Andhra Pradesh has shown what can be achieved through a dynamic and determined leadership. It is a happy thought that the Karnataka government is set to follow suit, complimenting the achievements of the private sector in the state.

The Education sector has always lagged behind other sectors of the Indian economy in benefiting from the fruits of technological developments, including those in Information Technology. Within the Education sector, institutions catering to teacher education have generally been the slowest and most lukewarm in adapting to anything that is new and off the beaten track. This has severely affected the quality of teacher education in the country, with major repercussions on the quality of education imparted in schools and colleges.

With the proliferation of teacher education institutions in Karnataka, quality concerns have taken a back seat in the state. Information Technology is not likely to make any impact on teacher education unless special efforts are made. Much hope rests on such efforts being triggered by the intervention of the National Council for Teacher Education (NCTE) which has been given the mandate to bring about significant qualitative improvements in the field of Teacher Education in the country. NCTE does envisage widespread use of Information Technology in teacher education programmes, both at pre-service and in-service stages. The two-year B Ed course for pre-service teacher education being strongly promoted by the NCTE and already started by the Regional Institute of Education, Mysore, places considerable emphasis on the use of modern instructional technologies, with Information Technology playing a pivotal role. An introduction to Information Technology in relation to Education is being offered as a one-semester course. It is hoped that this will set a pattern for other teacher education institutions to follow.

The ICT Revolution

The present revolution in Information and Communication Technology(ICT) has been fuelled by two major technological developments in the last 30-40 years. One of them is the revolution in Communications Technology ushered in by communication satellites, supported by equally significant developments in ground based communication systems. The other is the advent of the Personal Computer in the late seventies followed by the rapid convergence of communication and computer technologies. The union of these two technologies, coupled with supporting developments such as lasers, information storage devices, display and printing devices, etc., has given rise to Information Technology.

The pace of developments in IT in recent years has been incredibly fast and beyond the wildest expectations of the most optimistic futurologist. We have seen the modest IBM PC of the early eighties grow into a multipurpose, multimedia computing and communication device of exceptional sophistication, versatility, speed and easy affordability. It can now be part of a truly global network of hundreds of millions of computers, the *Internet* that has created an *information superhighway*. Marshall McLuhan's vision of the *global village* has become a distinct reality. The barriers that separated peoples and nations earlier are fast vanishing.

Let us survey the impact of some of the major tools and techniques of ICT on our daily lives, with particular reference to Education.

Television

TV has certainly lived up to its expectations as a medium of entertainment but has fallen far short of its potential as a medium for educational transformation. The reason lies mainly in the failure to create dedicated educational TV broadcast channels and produce the quality software needed to keep them going. It is only now that the need for dedicated channels is being recognised. UGC has been promoting the design and production of ETV software by Educational Media centres in many universities. The impact of these and other efforts is yet to be felt. The *Discovery* and *National Geographic* channels in the private sector are providing high quality educational content regularly in their programmes. However, educational institutions do not appear to be benefiting from them in any significant way.

Computers

Not so long ago computers were the privileged possessions of large institutions and business houses because of their cost and complexity. With the invention of the microprocessors and other advances in microelectronics the scene has changed dramatically in the last 10-15 years. The *microcomputer* or PC is rapidly gaining popularity and affordability today. It combines high speed computing capabilities rivalling those of the mainframe computer of a decade ago with versatile communication and multimedia capabilities. It also has multi-tasking and multi-user capabilities that were earlier exclusive to mainframe computers. It gives the user entry to the information superhighway, one of the most significant developments in information technology.

Computer Education is being widely promoted by various agencies and institutions in both the public and private sectors. However, considering that learning to use computers has become as important in today's world as learning the three R's, these efforts fall far short of the need. Moreover, most efforts are concentrated on promoting learning *about* computers, with undue emphasis on programming with languages that have little currency today. The enormous scope for learning *with* computers is not being exploited. We shall examine this point in some detail later.

Multimedia Software

A computer with a high resolution colour monitor, a graphic accelerator card, an audio card, stereo speakers, a storage device of large capacity such as the CD-ROM and large amounts of processing memory supports *multimedia* applications - a blend of text, graphics, video and audio as in a motion picture. However, unlike the motion picture, multimedia software is *interactive*, one of the most powerful features of a computer in

any type of application. The huge amounts of information involved in multimedia software require the CD-ROM or DVD that can hold virtually mini libraries of information. Almost all encyclopaedias, including the venerable *Encyclopaedia Britannica*, are now published in electronic (CD-ROM) versions at a small fraction of their hard-copy price. It would soon be possible to carry a portable library in the form of a box of DVDs along with portable laptop computers. One can readily speculate on the immense implications of this to the field of Education.

Internet

The Internet combines the best of both communications technology and computer technology. Internet usage has made inroads in India only in the last few years, most of it in the commercial sector. It is yet to make its presence felt in the Education sector despite the huge promise it holds out here. Many reasons can be adduced for this and the cost factor is certainly a major one.

The Internet has the potential to bring about a veritable revolution in the teaching-learning process and as such has immense implications for teacher education in any society. It opens up a world wide web of educational resources at the click of a mouse. We shall revert to this a little later.

Teleconferencing

Teleconferencing or *Videoconferencing* has emerged as a very powerful and effective means of simultaneous audio, video and data communication involving people placed in widely different geographical locations. This has reduced the need for people to meet each other face to face at a single place with all its attendant problems and difficul-

ties. No wonder that Mr Chandrababu Naidu finds it an indispensable means of effective governance in Andhra Pradesh.

Teleconferencing is an effective but still expensive means of bringing learners and teachers together who might otherwise never meet each other. It has already been tried out on an experimental basis as a means of imparting training to primary school teachers in the country on a massive scale. What has been tried out however is not true videoconferencing since the video part of it has been only one-way because of technical and logistic problems. These are expected to overcome in the future.

With further improvements anticipated in Internet connectivity, especially the availability of much higher bandwidths, it would be possible to achieve videoconferencing *through the Internet*. It would then be possible to bring the best of learning experiences through the most effective and experienced communicators directly to each classroom and indeed to each student, irrespective of where he or she is located.

ICT for Teacher Education

We shall now address ourselves to the question of improving the quality of teacher education through the use of Information and Communication Technology.

a) In-service Programmes

We need to begin with *teacher educators* in service who need to understand how and in what ways information technology can be used to bring about qualitative improvements in teacher education. This can be attempted through short duration *awareness* programmes conducted at well-equipped institutions. The Regional Institute of Education at Mysore has been offering such programmes, generally at the request of the states

in the region. These programmes expose the participants to the following topics, giving as much hands on experience as possible:

(i) major developments in IT in a chronological order,

(ii) concepts of hardware and software,

(iii) principal hardware components of a multimedia and Internet ready system,

(iv) distinction between system software and application software,

(v) basics of DOS and WINDOWS operating environments,

(vi) word processing, document preparation and printing

(vii) spreadsheet applications, including graphical and statistical analysis of data,

(viii) fundamentals of database design, creation and management,

(ix) creation of audio-visual presentations and slide shows,

(x) demonstration and use of multimedia educational software on CD-ROMs,

(xi) networking concepts, including the Internet, and

(xii) Surfing the Internet for educational information.

It is necessary to replicate such programmes and infrastructure in other teacher training institutions, especially at the SCERTs and IASEs. Such awareness programmes should cover all teacher educators as early as possible. It is also necessary to offer such programmes to educational administrators and policy planners.

a) Infrastructure

Teacher education institutions have to build up the essential infrastructure needed to promote the use of IT in their academic programmes. In the present day context, the following facilities are recommended:

(i) A class-cum-projection room with good air circulation and ventilation, seating for 20-25 people, with furniture and power points for 3-4 computer systems and accessories.

(ii) One server-class computer system with a Pentium III 500 MHz processor, 15" colour monitor, 64 MB RAM, ~8 GB Hard Disk Drive, 3.5" Floppy Disk Drive, 8 MB graphics accelerator card, sound card with stereo speakers, 48x CD/DVD drive, Mouse, Keyboard, telephone line and a 33.6 kbps (or higher) MODEM.

(iii) Two or more client-class computer systems with Celeron 400 MHz processor, 14" colour monitor, 32 MB RAM, 4.3 GB HDD, FDD, Mouse and Keyboard.

(in a network configuration)

(iv) WINDOWS 98 Operating System software.

(v) MS Office 97/2000 Professional Application Software package.

(vi) Multi-media Projector and Screen.

(vii) Colour Inkjet or Laser printer.

(viii) Colour Scanner

(ix) One 500 VA UPS

(x) A selection of Multimedia Educational Software on CDs/DVDs, including common encyclopaedias and dictionaries.

It is assumed that Internet subscription is available from an Internet Service Provider (ISP) through telephone dial-up networking with the telephone calls being charged at local call rates. At present this may not be the case in most small towns.

The infrastructure facilities suggested here can be developed as part of the Educational Technology section of the teacher training institution, with the staff of such a unit trained to manage the facilities and run the training programmes.

a) Pre-service Programmes

While promoting the use of the tools and techniques of Information Technology as an integral part of the teaching-learning process, IT should also find a place in the curriculum of pre-service teacher education. This is also suggested by the NCTE in its 'Curriculum Framework for Quality Teacher Education', particularly in the context of its recommendation to increase the duration of the present programmes to 2 years. Accordingly, RIE Mysore has included a one-semester course on *Information Technology Literacy*. It is being offered now as an elective, but it is expected that practically all students will opt for it considering its perceived popularity. The course contains all the topics mentioned earlier under inservice programmes. However, each of them will be dealt with in greater detail and individual hands-on experience will find major emphasis.

b) Distance Education Programmes

The very nature of distance education is such that Information Technology is essential to the success of such programmes, more so than in the case of contact programmes. The UK Open University initiatives and practices are worthy of emulation in the country. NCTE has formulated strict guidelines for the conduct of teacher training programmes through the distance education mode in the country. These programmes are required to be of 2-year duration and the tools and techniques of IT are expected to employ in a big way. IGNOU has set the trend for other institutions to follow.

The Internet offers a very effective means of providing distance education in the *interactive* mode. Open universities and other institutions offering distance education programmes need to develop their websites on a massive scale and offer interactive educational content in these sites to cover as much of the course requirements as possible.

Dedicated TV channels need to be utilised effectively and imaginatively as and when they become available. Also, video programmes and interactive multimedia learning software on CD-ROMs need to be developed and made available to the learners, especially at the study centres. Here is a unique opportunity to promote the use of IT for quality teacher education *through the very technology itself.* It is heartening to note that the Karnataka State Open University is taking some positive steps in this direction. It is time to move away from the practice of mailing out poorly designed and printed 'correspondence lessons' to the learners, the principal legacy of 'Correspondence Courses'.

Quality Education through ICT

In promoting the use of Information and Communication Technology, the primary emphasis should be on the improvement of the *quality* of education. Needless to say, the technology by itself doesn't ensure quality. It is the human element that matters most. Since IT infrastructure is fairly expensive to build up, unless the teacher educator is very well trained and is sufficiently motivated to put the facilities to good use the whole effort may be unproductive. Educating the teacher educator is therefore the primary need, especially since the technology itself is unfamiliar to most people in the profession. First, we must get our priorities right.

Learning *with* Computers

When it comes to computers most efforts in the education sector today are concentrated on teaching and learning *about* computers (i.e., with a focus on Computer Science and Technology) rather than learning *with* computers (i.e., using computers and other devices of IT as *aids* to education). Teacher educators should be mainly concerned with computer aided instruction/learning (CAI/CAL). Of course there is a certain mini-

mum amount of learning *about* computers and their common applications that is essential. This however does not including learning programming languages, especially those that have little currency today. This is best left to the professional software developers. One can be a good automobile driver without necessarily knowing the details of how an automobile works. It is however desirable to know some of the more important programming *concepts* that are common to most modern programming languages.

Generic Software

Application software packages designed for tasks like word processing, spreadsheet analysis, database management, generating displays and graphics, etc., called generic software, have such widespread applications that everybody needs to learn how to use them. Teacher educators need to learn how to prepare, format and print a variety of documents, including project/research reports. This can best be done with a word processing package like MS WORD. The entry, validation, cleaning, processing and analysis of any kind of data can be done with a spreadsheet package like MS EXCEL. Design and preparation of visuals such as overhead transparencies can be done with any graphics package such as MS POWERPOINT. Along with WINDOWS operating system software, a study of such generic packages should be included in any introductory training programme. Inputs for these applications can come from contents drawn from school subjects. For example, the periodic table of elements in a Chemistry curriculum can be an excellent input for a database management application.

CAL Software

The concept of computer aided instruction/learning dates back to the time when inexpensive microcomputers became available. The BBC microcomputer made a signifi-

cant breakthrough in UK and later in India through the CLASS project. A large number of CAL packages pertaining to school subjects were developed for the BBC system and used widely in schools. Many of them were of outstanding quality despite the limitations of the hardware. The IBM PC initially did not attract as much interest in the educational field as its capabilities deserved. However, when multimedia enhancements and the CD-ROM became available, the 'WinTel' (Windows-based Intel Pentium) system was ready for full-fledged Multimedia educational software. In the last few years a large number of such packages, many of high quality, have been published commercially. The large storage capacity of the CD-ROM has made possible the development of entire courseware in interactive multimedia format in many school/junior college subjects. These are conducive to learning the central concepts in a subject effectively through a personalised, self-learning, interactive mode.

There is a strong need for designing and developing high quality multimedia CAL software in all subjects for the Indian school education system.

Learning through the Internet

In the last few years the Internet has emerged as a gold mine of information about almost anything under the Sun, accessible at the click of a mouse. A large number of websites managed and maintained by reputed institutions and individuals offer a wide range and variety of educational content, some of it in interactive multimedia format. Their numbers are growing exponentially. Most of these are freely accessible and can be selectively downloaded and stored in ones computer for individual use later. Some periodicals are available on subscription, costing much lower than their hard-copy versions.

One of the most powerful features of the Internet is the availability of browsers that enable the required information to be searched and the corresponding websites accessed without much effort. The educational content available in these sites is wide ranging and includes research reports, articles, abstracts, lesson plans, unit plans, curriculum materials, simulated interactive experiments, encyclopaedias, dictionaries, photographs, charts, maps, tables, etc. The user can even become an active member of an international team of researchers/investigators working on special projects requiring such international effort and co-operation. This author is presently part of such a team involved in a global project on the 'Search for Extraterrestrial Intelligence at Home' [SETI@Home]. More than a million people are involved worldwide in this exciting endeavour.

To access information through the Internet one needs to subscribe to the service through a service provider. Till recently the VSNL had a monopoly over this and used to charge exorbitantly. However, the facility has now been opened up to the private sector and the subscription rates have come down substantially. Considering that one has to pay for the use of the telephone line also, the service is unaffordable to most individuals in India. Institutional subscription however is a viable proposition.

The quality of the dial-up Internet service is still very poor, due both to the quality of the communication channels and the bandwidth of these channels. Leased lines that provide round the clock service at much higher bandwidths provide high quality Internet connectivity. But this is out of reach of most institutions because of inhibitive costs imposed by continued monopolistic policies and practices.

Unless high bandwidth Internet service becomes available, as easily and affordably, as TV channels are now available through cable operators, Internet will not be the boon it is in other countries. The education sector is thus missing out on one of the most useful ingredients of the IT revolution today. This is a deplorable situation, requiring policy interventions at the highest levels.

Concluding Remarks

Now is the right time for the educational system in the country in general and the fraternity of teacher educators in particular to make a firm commitment to exploit the potential of Information Technology to bring about a qualitative revolution in the teaching-learning process. Not doing so would mean 'missing the boat' once again.

2. INTRODUCTION TO FUNDAMENTALS OF COMPUTER

Computers have been employed in almost all spheres of human activity. They have taken over the repetitive work in storage of data, processing and retrieval of information from different fields. They have been identified as follows:

In industry, computers have taken over the tasks of designing and manufacture. This is referred to as computer aided design (CAD) and computer aided manufacture (CAM). Numerically controlled machines and computer-managed systems have brought in a virtual revolution in automation.

In Banks and Post Offices, computers are employed to process cheques, count notes, handle bills and maintain records of all withdrawals, deposits, transfers, etc.

In Railways and Airways, computers are used to make seat reservations in trains and flights as also cancellations, alterations, etc. Up-to-date status of reservations is instantly displayed.

In Schools and Colleges, computers keep student records of attendance, performance in tests, fees, scholarship, etc. Computers are being used for instruction.

In Warehouses and Stores, computers maintain constant record of all supplies and consumptions, indicate shortfalls and monitor procurement, etc.

In Medicine and Healthcare, computers maintain records of patients and medicines as also help diagnose. For example, computerised blood test can result in all the desired information within minutes.

In Science and Technology, computers are used to analyse problems as also to design systems with any degree of complexity. Most systems are designed and simulation

studies are conducted either on computers or in laboratories before their large-scale fabrication.

In Art and Culture, computers play a role of creating colour graphics, patterns and pictures are also create a range of music to stimulate musical instruments.

In Architecture, newer designs of buildings and other structures are prepared and different views are examined before selecting a design.

Working with Computers

Computer literacy is higher order of knowledge than computer awareness. Whereas awareness refers to one's state of mind, i.e. knowing about something by seeing, visiting, etc., computer literacy refers to some ability to use a computer. A computer literate should be able to operate a computer, write simple programme, feed data, carry out word processing and arrange output in the desired format.

Keyboard Symbol

Computer keyboard has 101 keys for alphabets, numbers and other commands. Some special keys and their functions are stated in Table 1.

Table 1: Function of Keys

Key	Function of the Key
SPACE BAR	To leave a blank space.
SHIFT	For upper case letters and symbols.
RETURN (ENTER)	To return the ontrol to the computer after entering the response and to go to the next line.
DELETE	To delete the last character(s).
CURSOR ARROW KEYS	To move the cursor on the screen to locate any point.
CTRL	To change the character generated.
SCROLL LOCK	To stop the screen from scrolling.
COPY	To copy from the screen.
ESCAPE	To get out of the programme.
INSERT	To insert a character.

Monitor

The monitor may be adjusted to face the operator. Power-on indicator illuminates when the power is turned on. Brightness and contrast of the screen and colour can be changed with the help of knobs usually provided behind the monitor. The display area may be shifted horizontally or vertically by turning the controls.

Using the Diskette

The magnetised plastic diskette, also called disk or floppy, usually 5¼" diameter. is sealed in a black square-shaped protecting plastic cover and then placed in a jacket for storage which allows it to move freely within it as shown in Fig. 1. The surface of the diskette is coated with a magnetic material on which information is recorded or erased at will. One should, therefore, not touch the surface of the diskette; instead hold it by the cover. Care should be taken to keep the diskette away from direct sun and heat. Diskettes are stored vertically in a box. Vertical storage prevents the diskette from any pressure coming on its flat surfaces. All diskettes are identified by code numbers and names of files stored in it. A felt-tip pen (not pencil!) is used to write on the cover.

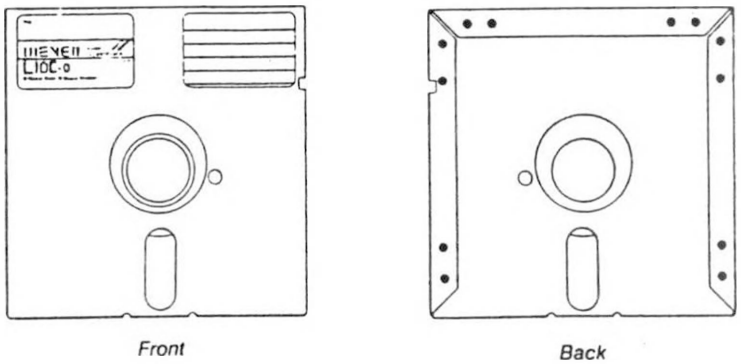


Fig. 1: Computer Diskette

In order to insert the diskette into the drive, take it out from the cover, hold it from the end with labels, etc., turn the knob up, slip it gently into the slot and turn the knob down. Do the reverse to take the diskette out of the drive.

Instructional Applications of Computers

Computers are being increasingly employed for classroom instruction as also for individualised and distance education. Computer-Based Instruction (CBI) is variously known as Computer Aided Learning (CAL) in the UK and Computer Assisted Instruction (CAI) in the USA. Either of these refers to on-line direct interactive learning experience through the computer. It can be done in one of the many different modes of instruction, some of which are:

- Tutorial Mode
- Drill and Practice Mode
- Simulation Mode
- Discovery Mode
- Gaming Mode

In the **Tutorial Mode**, information is presented in small units followed by a question. The student's response is analysed by the computer and an appropriate feedback is provided. This is similar to programmed instruction. As in programmed instruction, the information may be given in a linear fashion (Fig. 2) or in branched pathways (Fig. 3). Greater is the number of alternative paths, more adaptive the tutorial can be to individuals.

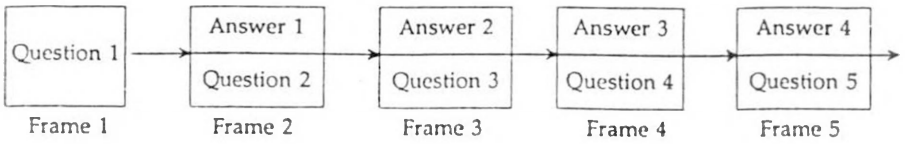


Fig. 2

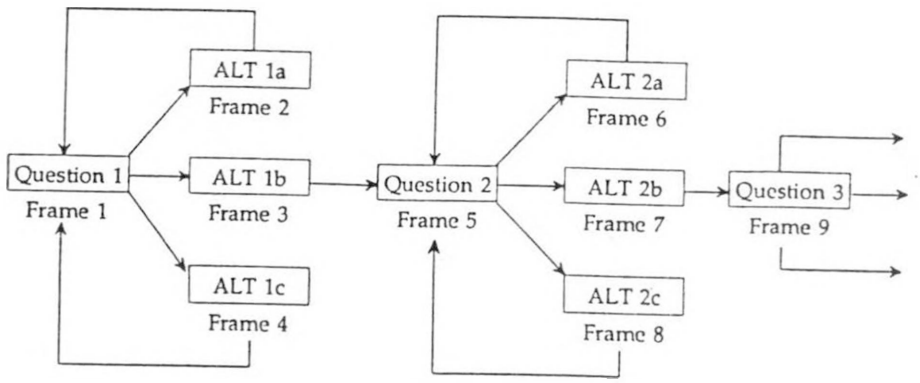


Fig. 3

In the **Drill and Practice Mode**, the learner is provided with a number of graded examples on the concepts and principles learnt earlier. The idea is to develop proficiency and fluency through doing. All the correct responses are reinforced and the incorrect responses are diagnosed and corrected. The computer continues the drill until mastery is achieved by the learner.

In the **Simulation Mode**, the learner is presented with scaled-down simulated situations bearing correspondence with the real situations. Simulations are made to avoid

risk, save money and conserve time. Simulation of an aeroplane in flight, an experiment on titration, a nuclear reaction, collision of two bodies, etc. are good examples of the simulation mode.

In the **Discovery Mode**, the inductive approach to teaching and learning is followed. The learner is encouraged to proceed through trial and error approach, i.e., by solving a given problem, realising, where and how he/she went wrong, trying again and finally solving the complex problem.

In the **Gaming Mode**, the learner is engaged in playing opposite the computer or opposite another learner. The extent of learning depends upon the type of the game. Games on spellings, names of places and general knowledge are some examples of the gaming mode.

There is another method of instruction with computers, called **Computer Managed Instruction** (CMI). In the CMI mode, the computer acts as the manager. It directs a learner to learn from different sources once the objectives have been formulated. The computer asks the learner to identify the objectives. Then, it organises itself to do the management as follows:

It advises the student to study from page n to page m from a book.

On completion, it gives test questions to the students and evaluates the learning.

Then it advises the student to go to a laboratory and conduct an experiment. On completion of the experiment, it provides further instruction, etc.

Computer-Aided Evaluation (CAE) is another recent innovation whereby computers are employed to evaluate the learning of student in a comprehensive manner.

Evaluation of learning is a multistage process. It commences with the formulation of instructional objectives and it proceeds beyond the announcement of results. The chronological stages of the process are as follows:

1. Identification of domains of learning and taxonomic levels of instructional objectives for all topics in a subject.
2. Preparation of test items and questions of different types on all topics vis-à-vis objectives.
3. Classifications and storing of test items and questions by type, topic, domain, level, optimum time, marks, etc.
4. Preparation of a table of specifications for the relative weightages assigned to different topics, domains, levels, etc.
5. Selection of test items and questions in accordance with the table of specifications in order to comprise a question paper, and
6. Implementation of the test to get student responses.
7. Scoring the student's response sheets and tabulating the raw scores.
8. Obtaining the statistical parameters such as mean, mode, median and standard deviation and fixing the cut-off point, etc.
9. Analysing the performance of individuals, group achievements, strengths and weaknesses of the course.
10. Conducting test analysis and item analysis including facility value, discrimination index and other parameters.
11. Drawing inferences and taking decisions vis-à-vis evaluation.

Computers are ideally suitable to take over the difficult, time consuming and mechanical tasks such as 3, 5, 6, 7, 8, 9 and 10. Teachers would then be able to concentrate more on the basic educational aspects of evaluation, namely 1, 2, 4 and 11. Development of expert systems is another alternative.

There are thus three levels of needs for computers in evaluation:

A. Question Banking and Retrieval

It refers to storing of classified questions, selection of items and printing out of question papers according to the table of specifications. Any number of question papers may be printed with the same table of specifications.

B. Scoring and Analysis of Scores

It includes facilitation of students' responses, scoring and analysing the responses as also analysing the performance of individuals, test analysis and item analysis.

C. Creating Knowledge Base

It endeavours to operate with computers through artificial intelligence, large data base and diagnostic retrieval system.

Small-Group Learning through Computers

The idea of using computers for small-group learning, i.e., pairs of students or 3-4 students instead of individualised learning is being experimented. In individualised instruction, the learner is all by himself/herself. Apart from the computer interactivity, there is no one to talk to, to ask or to discuss something. Absence of personal contact has led some to believe that small-group learning should be tried. More so because that would be more cost-effective requiring less than 50% computers and computer time.

Small-group learning by computers appears to have the combined advantages of individual learning and of group dynamics. A comparative study of the individualised CAI, called I-CAI and cooperative CAI, called C-CAI has shown that C-CAI alleviated the anxiety of low-ability learners and enabled all students to perform better than the I-CAI method of 'machine-child' learning. It is perhaps the support and encouragement from their pair mates which make them feel better and learn better.

In another study at the US Army Institute, it has been shown that the group training is more resistant to forgetting than individual training. It establishes the relative instructional advantage of small group of CBT for procedural learning tasks.

Assignment on Preparing Software

Consider a topic of instruction. Identify the objectives and the target audience. Decide on the mode of computer aided instruction. Write some typical frames in a consecutive order on any segment of your topic.

Advantages of CAI/CAL

The basic tenets of computer aided instruction offer the following advantages over other systems of instruction.

- Each student receives instruction at his own pace.
- Each student responds continuously as he receives instruction.
- Each student receives rapid feedback for his response.
- All units of learning are broken down into subunits and small elements of learning in accordance with Skinner's approach of teaching in small steps.
- Reinforcement of learning is achieved by personal messages, i.e., 'Yes, Ashish, that is right', etc.

- Learning sessions are kept manageable by designing the duration between half an hour to one hour.
- Lessons from the theories of learning are taken into account at the stage of instructional design. For example, Skinner's operant conditioning is implemented.
- Students can access the computers at any place, e.g., in their hostel rooms, in the tutorial rooms or at another place in the country.
- Students can learn in their own styles and ways, i.e., through examples, through case studies or through problems.
- Students can test their own learning at any time of progress. End-of-unit learning may also be timed at one's convenience.
- Teacher-time is saved from the routine information-giving activity and employed in innovative instruction-design and student guidance, etc.
- Advantages of different modes of learning are accrued by employing them appropriately, wherever desirable, i.e., lesson presentation, tutorial, exercise, simulation, etc.

3. OPERATING SYSTEM AND APPLICATION SOFTWARE

1. Introduction: An Operating System

The early computers were handled by specialised people who knew how the computer and its peripherals worked. That was no easy job. Inspite of their expertise, however, the early computer users could not really make the most of the computer resources available; a good deal of these resources was wasted under the management of programmers and operators.

What was required for a computer user was a suite of programs that would enable the computer to manage its own resources. This suite of programs was introduced in the 1960s and was called an operating system.

Think of the basic computer architecture - the I/O units that help input and output of data, and of the CPU with its different subunits. There must be some manager who would coordinate the functioning of so many hardware components. Then, the input to the computer is commonly made in high level languages, whereas the computer reads only machine code instructions. There has to be a translator that would interpret the high level language into machine language. All this is done by an operating system.

An operating system (i) provides an environment in which users' programs are run, (ii) helps make the best use of computer resources, and (iii) makes the computer user-friendly, making minimum intervention of the user necessary when a program is run.

The programs that constitute an operating system can be broadly categorised as either control programs or processing programs. Whenever we switch on the computer,

we activate the operating system. From then on, the operating system runs all the time, managing the functions of the application programs and the user.

2. Functions of an Operating System

An operating system is a system program. A general classification of its various functions follows.

2.1 Process Management

Scheduling of a job, deciding which jobs are to be done and in what sequence.

2.2 Storage Management

Dividing the internal memory resources of the computer for various programs.

2.3 Input/Output Management

Keeping track of different I/O peripherals connected to the CPU.

2.4 File Management

Controlling files and their management on auxiliary storage and supporting I/O operations on those files.

2.5 Security

The operating system is also responsible for system security. It checks whether unauthorised users are accessing the system. If there is an attempt like this, the operating system can lock the user out.

2.6 Interrupt

Whenever an unusual situation arises due to external or internal reasons, or there is a need for a service, the operating system interrupts and signals that some kind of service is required.

3. Components of an Operating System

The programs that make up the operating system can be grouped as follows.

3.1 Control Programs

These programs control and manage all the hardware and memory resources of the computer. For example, regulating and timing the activities of the CPU, allocating the primary storage and scheduling reception and transmission of data through I/O devices are all managed by control programs.

3.2 Supervisory Programs

The most significant of all programs of an operating system is the operating system supervisor. This resides in the primary storage section of the CPU. It calls up other programs of the operating system as and when needed by application programs.

3.3 Service Programs

The service programs provide system services to the user. They belong to either of the two broad categories: (a) Utility or Job control programs and (b) System aids.

(a) **Utility Programs**: These provide services that are required while running a program. They are a link between the different jobs of the application programs. These programs help handle jobs in the designed sequence, determine the task to be handled, the peripherals to be used, the assembler or compiler needed in a particular situation, etc. This is why they are also called job control programs. Formatting a disk before it is used to store information requires a utility program. When a disk is formatted, each track on the disk is magnetically divided into a number of sectors and each sector is numbered (more on formatting later).

(b) **System Aids**: There are many system aids that the operating system provides. An error in a program, for example, is identified by the operating system and an error message is displayed accordingly. (The logic error, however, must be located by the programmer).

There is another set of system aids that all operating systems have. This includes translating programs - assemblers, compilers and interpreters.

We generally communicate with the computer through a high level language creating instructions necessary to perform the task we have in mind. However, the high level language, which is not understood by any computer, is translated with the help of a translating program for the computer to 'understand'.

Assemblers were the first translators ever used. They translate assembly language into machine code. Mnemonic assembly code, which is the lowest level language to instruct the computer in, is translated into machine code by an assembler.

A compiler also translates a program written in a high level language into machine code. The program in high level language is called a source code. The compiled machine coded version obtained from it is the object code. The computer executes the object code.

An interpreter translates the program written in a high level language, one line at a time, as the program is being executed. The machine code program is not stored here as object code.

4. Operating System Storage

Most computers have the operating system stored in a secondary storage or backing store, being loaded into the immediate access store when the computer is switched on. When the computer is running, some parts of the operating system will be in

the immediate access stores all the time; other programs are loaded as and when necessary.

5. Types of Operating System

Like there are many types of computers, there are many types of operating systems suitable for the machines and the purposes for which they are used.

5.1 Single Program Operating System

A single program operating system permits only one program to be run at a time. Common examples are CP/M, MS-DOS (upto version 4).

5.2 A Multi-User Operating System

A multi-user operating system manages the computer resources in such a manner that a number of users can use those resources at the same time. In fact, the computer resources are time-shared among the users; each user uses the resources at one time. Often the time slice during which one user has exclusive access to the computer is so minute that it is imperceptible. This gives the impression that all users are using the resources at the same time. UNIX, UNIX WARE AND NOVELLNETWARE are well known multi-user operating system.

5.3 Multi-Processing Operating System

In a multi-processing environment, where two or more CPUs are linked together, it is the operating system that ensures that independent programs are processed at the same time by different CPUs. Alternatively, the CPUs may simultaneously execute different instructions from the same program. In either case, the operating system schedules the input, processing and output programs.

5.4 Virtual Storage Operating System

The virtual storage operating system is used for programs that are too large to be contained within primary storage. The operating system permits data to be moved between primary and secondary storage when the former is too small. To the user it appears that the computer has a large memory. Many professional word processors use this facility. Later versions of MS-DOS (e.g., ver. 6.2) belong to this category.

5.5 Virtual Machine Operating System

The virtual machine operating system gives the impression to each of a number of users that each has control over the computer while, in reality, they are only sharing the same resources. In such an environment, different users can even use different operating systems simultaneously. Consequently, the facility allows different application programs to use the operating system appropriate to them.

The overall control of such a system is under the supervision of a virtual machine operating system. CLIENT SERVER SYSTEMS, Gupta/SQL, etc. belong to this category of operating systems.

6. Widely Used Operating Systems

Optimum use of the latest developments in hardware and software technology depends upon the efficiency and versatility of operating systems. Some of the more popular ones are described below.

6.1 CP/M

Digital Research Corporation of USA introduced CP/M (Control Program for Microcomputers) operating system in the early 1970s. This was meant for 8-bit systems (e.g., Intel 8080) for file management and basic I/O operations. CP/M is a highly portable

operating system, i.e., it can be taken from one type of machine to another. Manufacturers built machines around CP/M and it became a standard for business and PC software.

6.2 MS/DOS

Microsoft Corporation developed a versatile operating system called PC-DOS for the IBM-PC (built on the Intel 8088, 16-bit). The operating system developed by the same firm for IBM compatible (but non-IBM) PCs, or clones, as they are popularly called, is widely known as MS-DOS (MS for Microsoft). It is a Disk-based Operating System, hence DOS. MS-DOS works essentially in the same way as CP/M.

DOS was designed for the Intel 8086/8088 chips that had relatively small memory. When the AT 80286 appeared in 1984, it had upto 16 MB memory and multi-processing capacity. DOS could not handle this with ease; it could handle 1 MB memory at a time out of 16 MB. The user had to shuttle parts of long programs in and out of the memory. This prolonged the program execution time. With AT 386, the problem became further acute because earlier PC chips were not designed for multi-processing. The more recent versions of DOS have overcome some of these limitations.

6.3 UNIX

UNIX is the most popular operating system for 16- and 32-bit micros. It supports multi-user, multi-terminal applications and simultaneous processing of different applications. UNIX also offers a large set of utility programs and is portable across different machine architectures. This explain its popularity.

4. CREATING TEACHER SUPPORT MATERIAL IN MS WORD

'Word Processing' refers to the use of computer in typing, editing, formatting and printing of a document. As the term indicates, the task of handling manipulation of words is called as Word Processing. The software that facilitates a computer to process words is called a World Processor. Word Processing is different from conventional typing in many aspects. With Word Processor, it is easy to edit, modify, re-edit the text any number of times in addition to the tasks of aligning the text between the margins, formatting the page layout etc. Word Star, Word Perfect, Microsoft Word etc are some of the popular word processors.

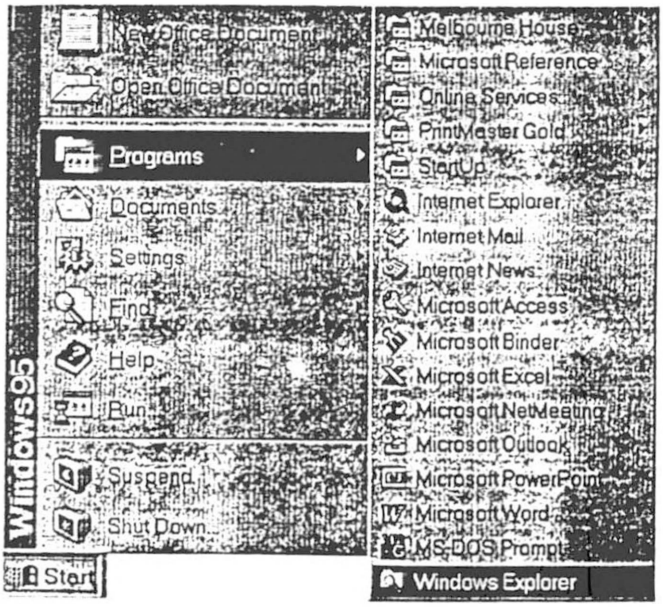
What is MS Word?

Microsoft Word is an extremely versatile and powerful word processing package developed by Microsoft Corporation. MS Word is an acronym for Microsoft Word. MS word is the most popular word processor, which runs on MS Windows.

Starting Word

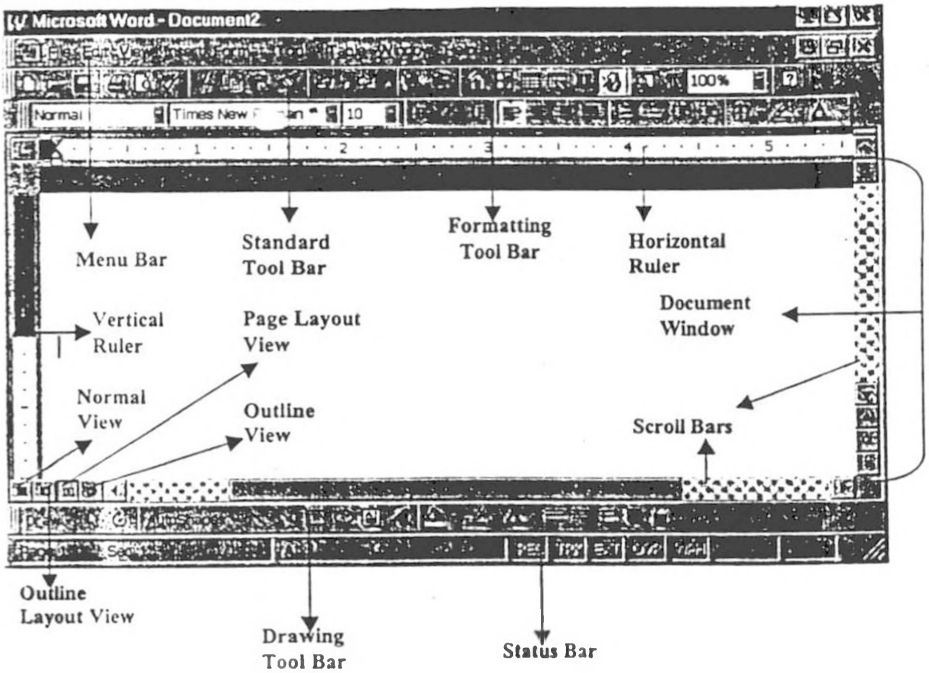
- Assume the MS word is installed in your computer in Windows 98 environment.
- Turn on your computer and monitor and wait until the window 98 desktop appears.
- Windows dialog box may appear, showing a useful tip or shortcut. Read the tip and then click (using mouse) on close clear it from the screen.
- Now click on the Start button at the lower-left corner of the task bar to see a menu of options.

- In the menu point to the Program option at the top of the list (you need not click here).
- A submenu will appear listing programs, groups of programs, and some windows 98 functions. There should be program MS Word or Microsoft Word.
- Click on ***Microsoft Word*** to start the program.
- You should now be looking at the word for windows screen as given below.



Word Screen

The Word screen displays several items to help you perform tasks efficiently. Below are the important displays of word screen.



- At the very top of the screen is the Main Title bar.
- On the left side of the title bar is the program control menu icon. The letter W indicates that this menu controls the entire Word program. For example, you can use case it to exit. Word or to change the size and position of the word..
- Next to control menu icon is the name of the program, followed by the name of the document. When you first start Word, it opens a new, blank Window called Document 1. When you write and save a document, the label called document 1 will be replaced by the document name you assign. If you start a new blank document, word will label it document 2 until you assign it a new title.
- On the right side of the title bar are three buttons  . From left to right, they are the Minimize button (reduce word to an icon on the Task bar), the Restore button (changes Word into a Window) and the Close button (closes Word).
- Below the title bar is the menu bar.
- On the left side of the menu bar is document control menu icon. This controls the document window.
- Next to document control menu icon, you find File, Edit, View, Insert, Format, Tools, Table, Window, Help buttons to perform most frequently used operations.
- On the right of the menu bar are another set of Minimize, Restore and Close buttons to control the document only. Minimize button shrinks your document to a small title bar, as shown here. Restore button returns the document windows to its previous size and position. Close button closes only the document.
- Below the Menu bar you find standard tool bar consisting of buttons to perform, the most frequently used file, editing table, column, drawing, charting and Help operations.

- Below the Standard Tools bar is the formatting tool bar consisting of buttons to change document style, font, font size, type, style, alignment, list format and indent levels.
- Below the formatting tool bar is the ruler to format lines and paragraphs.
- Under the ruler the area where your document appears as you type. It looks like a sheet of paper.
- In typing area you will see three objets – the insertion point (I), the end mark (-) and the mouse pointer (I).
- The blinking insertion point indicates where the next character typed will appear.
- The small horizontal line (end mark) indicates the end of your document, and it moves down as you insert text and up as you delete text.
- The mouse point (I) indicates the position of the mouse. The shape of the pointer depends on its location. When the pointer is in the typing area, it appears as a larger letter I. This is sometimes called the text select point or the I -beam.
- At the bottom of the screen are the horizontal scroll bar and the status bar.
- There is a vertical scroll bar along the right edge of the screen. Using scroll bars you can bring text into view that does not fit on the window.
- The status bar gives you information about your document, the location of the insertion point, and the status of the Word Program.
- There are various buttons on the standard tool bar as indicated in the following table.

BUTTON	*OPERATIONS/PURPOSE*
New	Open new document
Open	Open an existing document
Save	Save the current document
Print	Print the current document using the selected windows printer
Print preview	Display a screen image of the printed document
Spelling and grammar	Check document text for spelling and typographical errors
Cut	Deletes the specified (selected) text
Paste	Paste (place) contents of the deleted text by cut button
Format painter	Transfer format selection to designated passage
Undo typing	Undo a selected operation
Redo	Redo a selected operation
Auto format	Apply a stored format to the current selection or to the entire document
Insert auto text	Inserts stored passages at current cursor position
Insert table	Insert a new table, row or column based on current selection
Drawing	Displays drawing tool bar
Insert chart	Activates Microsoft Chart Operations
Show/Hide	Show/Hide special symbols
Zoom	Enlarge/reduce displayed page size
Help	Click and drag to an object about which you wish to display help information

The various buttons on the Formatting Toolbar are indicated below

BUTTON	*OPERATION*
Style	Apply a style in the current selection by typing or picking a style name
Font	Apply a type font to the current selection by typing or picking a font name
Font size	Apply a font point size on the current selection by typing or picking a size value
Bold	Make bold characters of the current selection
Italic	Make italic character of the current selection
Underline	Underline the current selection
Align left	Justify the current selected text in left
Center	Justify the current selected text in center
Right	Justify the current selected text in right
Justify	Justify the current selected text both left and right
Numbering	Apply or remove numbers to the current selection
Bullets	Apply or remove bullets to the current selection
Increase indent	Increase the indent level
Decrease indent	Decrease the indent level
Border	Display the border tool bar to apply borders, rules and / or grids to the current selection.

Each menu in Menu bar contains number of sub menus. These sub menus can be viewed by selecting the respective menus.

Entering text in Word (creating a file)

- The flashing line on Word screen, called the insertion point, indicates where the text you type will appear.
- Type the first line of the text.

- You may observe that as you type, the insertion point moves over.
- When you reach the end of a line, word automatically warps the text to the next line. You need to press ***Enter*** when you want to start a new line or paragraph.
- Type the remaining text.
- When you reach the bottom of the screen or end of the page just keep on typing Word will automatically scroll to or start a new page.
- Appearances of a dotted line indicate the end of the page.
- If you make a mistake as you type, press the ***Backspace*** key. You can also use delete key.
- You can insert the text anywhere by moving insertion point to that place and typing the text. To move the insertion point, point, place the mouse pointer where you want the insertion point to appear and click the left mouse.
- After completing the typing, the file (document) should be saved.

Saving a document

At the end of typing

- Click the Save button
- The Save as dialog box appears
- Type a name for the document
- Click Save button on the screen. Now work saves the document and displays the name at the top of the screen.
- To avoid losing your work, you should regularly save changes you make to the document.

Closing a document

- When you finish working with a document, you can close the document to remove it from your screen.

- To close the document click ***File*** from Menu.
- Click ***close.***

Opening a document

- You can open a saved document and display it on your screen. This allows you to review and make changes to your document.
- Click open button. You can also select the open option available in File Menu.
- The Open dialog box appears
- Click the name of the document you want to open (if you seen on the screen). Otherwise get the list of the files by selecting appropriate drive/directory.
- Click Open button on the right side of the screen.

Edit Text

1. To insert text

- Open the document
- Click where you want to insert the new text
- Type the text you want to insert. To insert a blank line, press the ENTER key.

2. To Delete Text

- Click to right of the first character you want to delete.
- Press the BACKSPACE key once for each character or space you want to delete. You can also use the Delete key to remove characters.
- To delete a blank line, click the beginning of the blank lines you want to delete or press the Backspace key at the end of line.
- You can combine two paragraphs by deleting the spaces in between them.

3. To Select Text

- Before performing many tasks in Word, you must select the text you want to work with. Selected text appears highlighted on your screen.
- Double-click anywhere over the Word you want to select.
- Holding down CTRL key, click anywhere over the sentence you want to select. Then release CTRL.
- Position the mouse cursor (I) anywhere over the paragraph you want to select and then quickly click three times.
- Position the mouse cursor, I over the first word of the text you want to select and drag to the last word.
- To delete text, click outside the selected area.

4. To Delete Selected Text

- Select the text you want to delete
- Press the Delete key to remove the text.

5. To Move Text

- Select the text you want to move
- Click anywhere over the selected text
- Drag the mouse to where you want to place the text
- Release the left mouse button and the text moves to the new location.
- You can also move the text by using CUT and PASTE buttons.

6. To Copy Text

- Select the text you want to move
- Click anywhere over the selected text.

- Press and hold down the CTRL key and drag the mouse to where you want to place the copy.
- Release the left mouse button and then release the CTRL key.

Copying Text using Toolbar Buttons:

- Select the text you want to copy.
- Click copy button
- Click where you want to place the copy
- Click Paste button

7. To undo Last change

- Click Undo button

8. To change Cast of Text

- You can change the case of text in your document without having to retype the text as indicated below
  - Select the text you want to change
  - Click Change Case. The change case dialog box appears
  - Click the case you want to use
  - Click OK.

9. To Find Text

- You can use the find feature to locate a Word or phrase in your document as indicated below
  - Click Edit
  - Click Find. The Find and Replace dialog box appears
  - Type the text you want to find
  - To start the search, click Find Next. Word highlights the first matching word if finds.

- To find the next matching word click Find Next. You can end the search at any time. To end the search, click Cancel.
- Repeat the previous step until a dialog box appears, telling you the search is completed.
- To close the dialog box, click OK.
- To close the Find and Replace dialog box, click Cancel

Word provides several advanced options to help you find the exact text you want

- Click Edit
- Click find. The find and replace dialog box appears
- Type the text you want to find
- Click More to display the advanced searching options
- Click the option(s) you want to use to find the text in your document (☐ changes to ☐).
- Click Find Next to search the document. Word highlights the first matching word it finds.
- Repeat the previous step until a dialog box appears, telling you the search is complete.
- Click OK to close the dialog box.
- Click Cancel to close the Find and Replace dialog box.

10. To Replace text

- The replace feature can locate and replace every occurrence of a word or phrase in your document as indicated below:
  - Click Edit
  - Click Replace. The Find and Replace dialog box appears.
  - Type the text you want to replace with new text
  - Press the TAB key to move to the REPLACE WITH box. Then type the new text.

- To start the search, click Find Next. Word highlights the first matching word it finds
- Click one of these options

  Find Next - Ignore the word

  Replace - Replace the word

  Replace All - Replace the word and other matching Words in the document
- Repeat previous step until a dialog box appears, telling you the search is complete.
- To close the dialog box click OK.

11. To Check Spelling and Grammar

- Word automatically checks your document for spelling and grammar errors as you type. You can easily correct these errors.
  - Word underlines misspelled words in red and grammar mistakes in green.
  - To correct an error, right clicks the error. A menu appears with suggestions to correct the error.
  - To select one ot the suggestions, click the suggestion. The suggestion you selected replaces the error in your document. The red or green underline disappears.
  - To ignore the error, right-click the error. A menu appears. Click Ignore All to Ignore sentence.

When you finish typing your document, you can find and correct all spelling and grammar errors at once.

- To correct the entire document, click spell check button. The spelling and grammar dialog box appears.
- On left side, the first misspelled word or grammar mistake and below this suggestions for correct the text appear.

- To select one of the suggestions, click the suggestion.
- Click change
- Next misspelled word or grammar mistake will be displayed.
- To skip the error and continue checking the document click Ignore. To skip the error and all occurrences of the errors, click Ignore All.
- Correct or Ignore misspelled words and grammar mistakes until a dialog indicating OK appears, telling you the spelling and grammar check is complete.
- To close dialog box click OK.
- You can turn off Word's automatic spelling and grammar check feature by clicking Tools/Options/Spelling & Grammar / OK.

12. To replace a Word with one that is more suitable (in meaning)

- Click anywhere over the word you want to replace
- Click tools
- Click Language
- Click thesaurus. The thesaurus dialog box appear's
- Click the correct meaning of the word form the display
- To select the word you want to use, click the word.
- To replace the word in the document, click Replace.

If the thesaurus does not offer a suitable replacement for the word, click CANCEL to close the dialog box.

13. To make the corrections automatically

- Type the text you want to automatically place in your document.
- Select the text
- Click tools

- Click Auto Correct. The auto correct dialog box appears
- Type the text you want word to replace automatically with the text you selected earlier.
- Click OK.

14. To use Auto Text

To avoid typing the same text over and over again, you can store text you use frequently

- Type the text you want to be able to quickly insert.
- Select the text
- Click insert
- Click Auto Text
- Click New. The Create auto Text dialog box appears
- Name of the Auto Text entry appears on the screen. You can change this name if you want.
- Click OK for conformation of the name
- Click where you want to the Auto Text entry appear in your document·
- Click Insert
- Click Auto Text
- Click the Category that stores that text you want to use
- Click the Auto Text entry you want to insert.

15. To Insert Date and Time

You can have word insert the current date and time in your document. Word will automatically update the information each time you print the document.

- Click where you want the date and time to appear in your document

- Click Date and Time. The Date and Time dialog box appears. Also the available date and time format you want to use
- Click the format you want to use
- To have word automatically update the date and time each time you print the document.
- Click OK.

16. To count the Words in a document

- Click tools
- Click word cont. the count dialog box appears along with the information about the document
- Click close.

17. To add a Comment

You can add a comment to text in your document to make a note to yourself

- Select the text you want to add comment
- Click Insert
- Click comment
- Type the comment you want to add
- Position the mouse cursor. I over the yellow highlighted text containing the comment you want to view.
- A yellow box appears displaying your name and the comment you added.

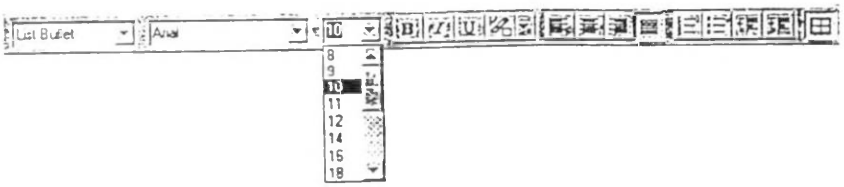
Formatting Text

1. To Bold Text

- Select the text you want to change
- Click Bold button

- The text you appear in the bold.

2. To show test in Italics
- Select the text you want to change
- Click Italic button



3. To Underline Text
- Select the text you want to change
- Click Underling U button.

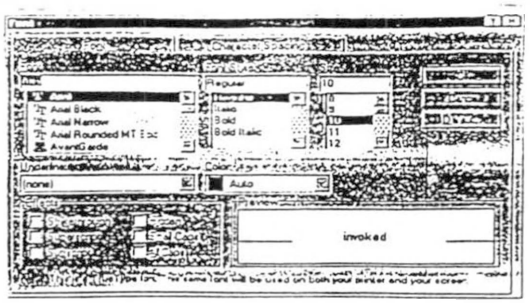
4. To change alignment to Text.
- Select the text you want to align differently
- Click one of the following options according to the requirement

Align Left ☐ Align Right ☐

Center ☐ Justify ☐

To deselect text click outside the selected text.

5 To Change Font of Text



- Select the text you want to change

- Click ☐ in the area Normal
- Click the font you want to use
- To change Size of Text

6. To Change Text Color
- Select the text you want to color
- Click ☐ at the color button
- Click the color you want to use

7. To change Size of Text
- Select the text you want to change
- Click ☐ at font size button
- Click the size you want to use

8. To change Appearance to Text
- Select the text you want to change
- Click Format
- Click Font. The font dialog box appears
- Click the font you want to use
- Click the style you want to use
- Click Underline U button
- Click the color you want to use
- Click the effect you want to use from the option
- Click OK.

9. To change Font for all new Documents
- Click Format
- Click Font. The font dialog box appears
- Click the font tab

- Click the font you want to use
- Click the style you want to use
- Click the size you want to use
- Click Default
- Click yes to confirm the changes

10. To Insert Symbol

- Click where you want a symbol to appear in the document
- Click Insert. The symbol dialog box appears displaying the current set of symbols
- Click ☐ at Symbol button
- Click the set of symbols you want to vies
- Click the symbol you want to place in the document. An enlarged version of the symbol appears.
- Click Insert
- Click close.

11. To change spacing between characters

- .Select the text you want to adjust the spacing for
- Click Format
- Click Font. The font dialog box appears
- Click the Character spacing tab.
- Change the spacing by clicking ☐ at Normal button
- Click the area to select the spacing option you want to use
- Click OK.

Formatting Paragraph

1. To Change line spacing

- Select the paragraph you want to change a new line spacing

- Click Format
- Click Paragraph. The paragraph dialog box appears
- Click the Indents and Spacing tab.
- Click at Line spacing
- Click the spacing option you want to use.
- Click OK.

2. To add Bullets

You can separate items a list by beginning each item with a bullet or number

- Select the text you want to display bullets
- Click Format
- Click Bullets and Numbering. The bullets and numbering dialog box appears
- Click the tab for the type of list you want to create
- Click the style you want to use
- Click OK.

3. To add numbers

- As in 2 follow the steps
- To remove bullets or number from the document perform the above steps with the selection of none instead of clicking for style.

4. To add a Border

- Select the text you want to display a border
- Click Tables and Borders tool bar or Format/Borders and Shading to select line style for the border, click the area at Tables and Borders.
- Click the line style you want to use

- Click the type of border you want to add.

5. To Add Shade

- Select the text you want to display shading
- Click Tables and Borders tool bar
- Click the color you want to use

6. To create a Drop Cap

You can create a large first letter at the beginning of a paragraph.

- Position the insertion point anywhere in the paragraph you want to display a drop cap.
- Click Format
- Click Drop Cap. The drop cap dialog box appears
- Click the way you want the drop cap to appear in the paragraph
- Click the font you want to use for the drop cap
- Click the font to use for the drop cap
- Click ☐ or ☐ at Lines to drop to change the number of lines
- click OK.

7. To Hyphenate Text

- Select the paragarph(s) you want word to hyphenate
- Click Tools
- Click Language
- Click Hyphenation
- Click the option automatically Hyphenate
- Click OK.

Formatting Pages

1. To Add Page Number

- click Insert
- click Page Numbers. The page number dialog box appears.
- To hide the page number on the first page of the document, click the option. Show number on first page ☐ changes to ☐)
- Click ☐ at Bottom of page number to select a position for the page number.
- Click the position where you want the page number to appear
- Click ☐ at right to select an alignment to the page numbers.
- Click the alignment you want to use
- Click Format to specify a format for the page numbers. The page number dialog box appears.
- Click ☐ at 1,2,3 area to select a format for the page numbers.
- Click the format you want to use
- Click Ok. You may see the display of sample of the page numbering.
- Click OK.
- If the page numbers do not appear at this stage, you must chant to the page layout view.

2. To Add Header and Footer

You can add a header and footer to each page of you document

- Display the document in page layout view
- Click view
- Click Header and Footer. Word displays Header and Footer tools bar.
- Type the header text to create a header
- Click ☐ button to create a footer. The Footer areas appears

- Type the footer text
- When you have finished creating the header and footer, click Close.
- Repeat the above steps if you want to edit a header or footer.

3. To add a Header and Footer Differently on different pages in the Document

- Display document in the Page Layout View
- Click View
- Click Header and Footer
- In the Header and Footer tool bar, click ☐ to set up different headers and footers for different pages in the document. The page setup dialog box appears.
- Click the option new page
- Click OK
- Type the Header and footer text
- Click ☐ or ☐ at Insert Auto Text to switch between the different header and footer
- Click Close.

4. To add Footnotes

- Display the document in the normal view
- Click Insert
- Click Footnote. The footnote and End note dialog box appears
- Click OK
- The number of the footnote appears in the document
- Type the text for the footnote.
- Click close

- Double click the numbering of the footnote to redisplay the footnote for editing
- Select the number of the footnote in the document and press the delete key to delete a footnote.

5. To Insert a Page Break

If you want to start a new page at a specific in your document, you can insert a page break as indicated below

- Click where you want to start a new page
- Click Insert
- Click Break. The break dialog box appears
- Click Ok.

6. To Remove a Page Break

- Display the document in the Normal view
- Click the Page Break line
- Press the Delete key

7. To Insert a Section Break

You can divide your document into sections so that you can format each section separately.

- Click where you want to start a new section
- Click Insert
- Click Break. The break dialog box appears
- Click one of the option at Type of Page (O changes to O). New page continues.
- Click OK.

8. To Center Text on a Page

- Click anywhere over the document or section you want to vertically center
- Click file
- Click page setup. The page setup dialog box appears
- Click ☐ at TOP
- Click Center
- Click OK.

9. To add a Border to a Page

- click Format
- Click Border and Shading. The borders and shading dialog box appears
- Click the page Border Tab
- Click the type of the line border you want to add
- Click the line style you want to use for the border
- Click OK
- You can also choose an Art Border after clicking the page border tab as indicated above

10. To change Margins

- Click button in standard toolbar to change the margins for the entire document
- Click the margin you want to move and the drag the margin to a new location
- Click close

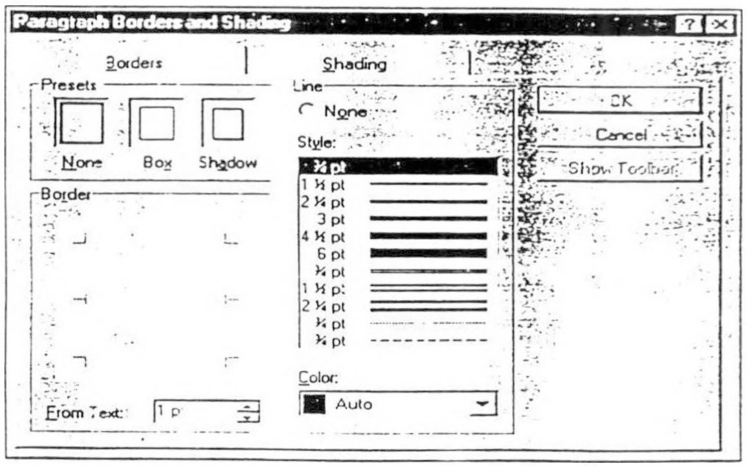
11. To change Paper Size

- Click anywhere over the document or section you want to print on a different paper size.

- Click file
- Click Page Setup. The page setup dialog box appears
- Click the paper size tab.
- Click the paper size you want to use
- Click OK.

12. To change page orientation

- Click anywhere over the document or screen you want to change to a different page orientation.
- Click File
- Click Page Setup. The page setup dialog box appears
- Click the Page Size tab.
- Click the page orientation you want to use
- Click OK.



Printing of a document

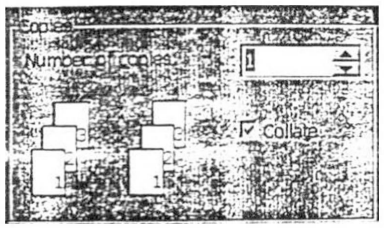
1. To Preview a Document

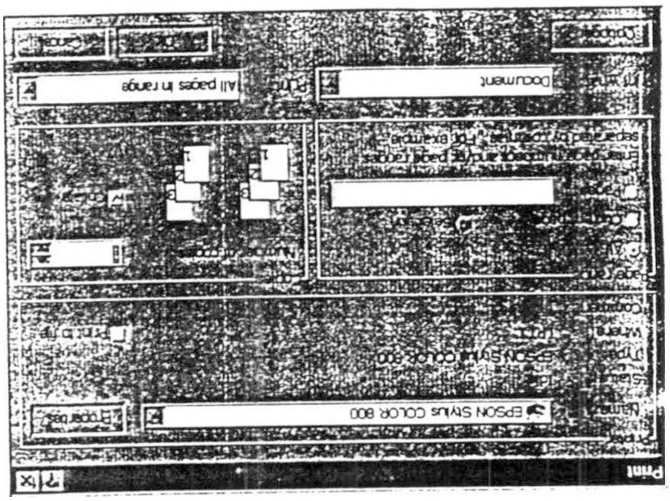
- Click ☐ to preview your document
- You magnify a page

- Using scroll bars you can browse through the document
- Click close

2. To print a Document

OPTIONS OF THE PRINT DIALOG BOX





- Click any where over the document or page you want to print
- Click File
- Click Print. The print dialog box appear

  All - Prints every page in the document

  Current Page- Prints the Page containing insertion point

  Pages - Prints the pages you specify

  Selection - Prints the text you selected

- If you have selected pages in the above step. the pages you want to print. For example 1,5,7, or 3-8.
- Click OK.
- You can quickly print the entire document by clicking the print button in standard toolbar.

Preparation of Tables

1. To create a Table

- Display the document in the Page Layout view.
- Click Table button
- Click Insert Table. Insert table dialog box appears. Specify the no of columns and rows in the respective box. Then click Autoformat tab. Select the format of your choice and click OK. The bland table appears on the screen

OR

- Click Draw Table. The tables and Borders toolbar appears
- Click where you want the top left corner of the table to appear.
- Drag the mouse until the outline of the table displays the size you want. Then release the mouse button.
- Move the mouse to where you want the line to begin (to add a line).
- Drag the mouse to where you want the line to end. Then release the mouse button.
- Repeat the above step to add the required number of lines.
- Click button at Tables and Borders.

2. To Change Row Height or Column Width

- Position to mouse over the button edge of the row you want to change and drag the row edge to a new position to change the row height.
- Position the mouse over the right edge of the column you want to change and drag the column edge to a new position to change the column width.

3. To Enter Text in Table

- Click the cell where you want to type text. Then type the text
- Repeat the above step until you have typed all the text.

4. To Add a Row or Column

- Click to the left of the row (to select a row). Word will insert a row above the row you select.
- Click
- To add a row at the bottom of a table click the bottom right cell in the table and then press the Tab key.
- Similarly by clicking the top of the column, you can add a column. Word will insert a column to the left of the column you select.

5. To Delete a Table or row or column

- Highlight and press Delete

6. To align Text in Cells

- Click the cell containing the text you want to align.
- Click one of the following options from Table and Borders.

  Align Top

  Center vertically

  Align bottom

7. To Change Table Bordėrs

- Click the Tables and Borders toolbar.
- Click ☐ at Tables and Borders to view a list of the available line systems.
- Click the line style you want to use
- Position the mouse over the border you want to change.

- Repeat the above steps for each border you want to change
- Click ☐ button at Table and Borders.

Working with Graphs

1. To add a Simple Shape

- Click Drawing Toolbar
- Click Auto Shapes
- Click the type of shape you want to add
- Click the shape you want to add
- Click where you want the top left corner of the shape to appear
- Drag the mouse until the shape is the size you want
- You can increase the size of the shape by using the handles appear by clicking inside the shape.

2. To Add Clip Art or a Picture

You can use professionally designed clip art and pictures that come with word to enhance your document as follows

- Click where you want to add a graphic
- Click Insert
- Click Picture
- Click Clip Art. A dialog box appears if additional graphic are available on the CD ROM disc identified in his area.
- Insert the CD ROM disc into your CD ROM disc drive to view the additional graphics.
- Click OK. The Microsoft Clip Gallery dialog box appears.
- Click the Clip Art or Picture tab
- Click the category of graphics you want to choose from
- Click the graphic you want to add
- Click insert to add the graphic to your document.

3. To Add a Text Box

You can add a text box to your document. Text boxes allow you to add comments or additional information to a picture or graphic in your document.

- Display Drawing Toolbar
- Click ☐ to add a text box
- Click where you want the top left corner of the text box to appear
- Drag the mouse until the text box is the size you want. The text box appears in your document
- Type the text you want to appear in the text box.
- You can change the size of the box using handles.

4. To add a Text Effect

- Display drawing toolbar
- Click ☐ to add a text effect. The Word Art Gallery dialog box appears.
- Click the type of text effect you want to add to your document
- Click OK. The edit Word Art Text dialog box appears.
- Type the text you want to display the effect you selected.
- Click OK to add the text effect to your document
- You can change the size of the text effect by using the handles around the text effect.

5. To Move or Resize a Graphic

You can easily change the location or size of a graphic in your document

- Display your document in the page Layout view.
- Position the mouse I over the graphic you want to move.

- Drag the graphic to a new location. The graphic appears in the new location.

6. To Change color of Graphic

- Display Drawing Tool bar
- Click the graphic you want to displays a different color.
- Click ☐ in this area and click the color you want to use.

7. To make a Graphic 3-D.

- Display Drawing toolbar
- Click the graphic you want to appear in 3D
- Click
- Click the 3D effect you want to use.

8. To Warp Text Around a Graphic

- Display your document in the page layout view
- Click the graphic you want to warp text around
- Click format
- Click Auto Shapes, Picture or Word Art. The format dialog box appears
- Click the warping tab
- Click the way you want text to warp around the graphic
- Click the side(s) of the graphic you want the text to warp around
- Click OK.

5. DATA MANAGEMENT THROUGH MS EXCEL

After going through this module, you will be able to

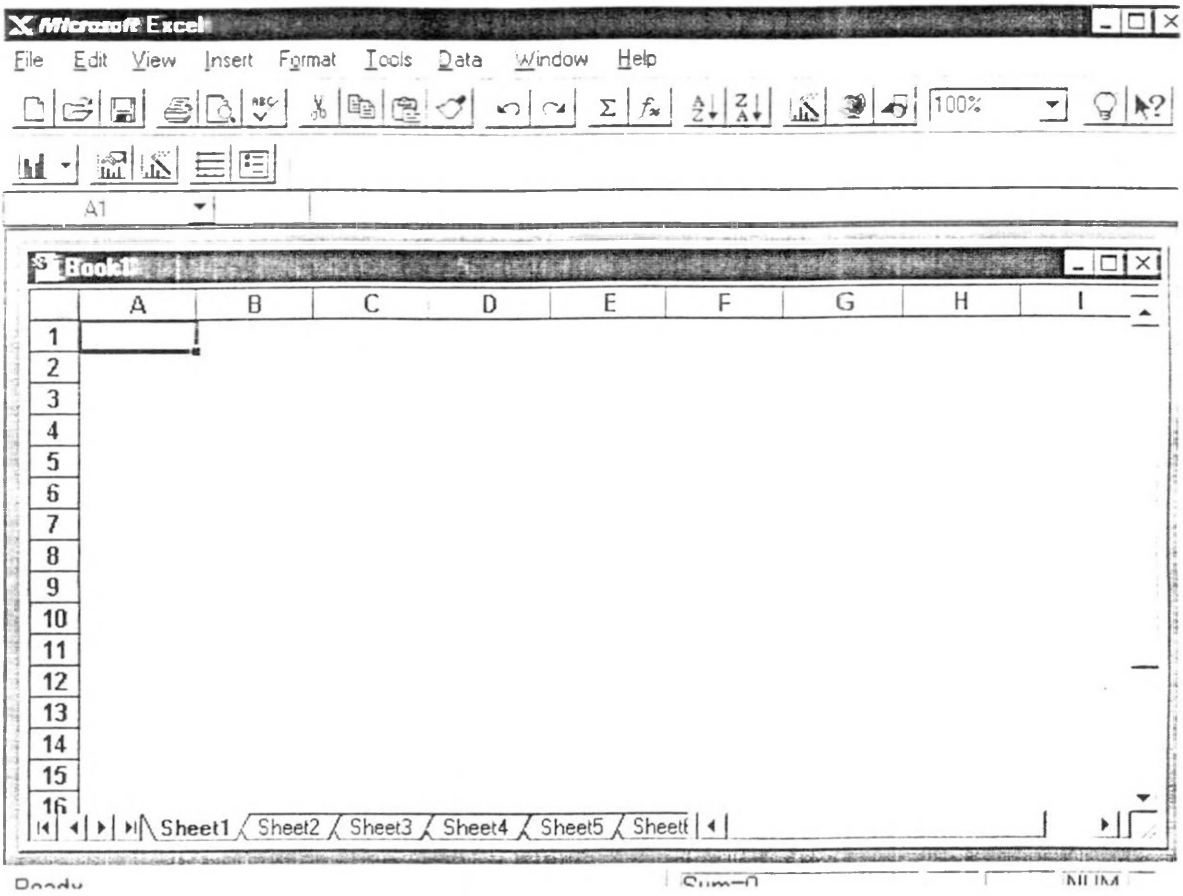
1. create the workbook and worksheets.
2. enter and edit data.
3. apply formulas to calculate values.
4. analyse the data.
5. create charts/graphs for the data.

Content

Microsoft Excel is a window based spread sheet software.

1. Open Microsoft Excel 2000

Open Excel from the programme menu, a new, empty workbook displayed. Workbook is the normal file in Excel. The workbook contains 16 worksheets, named sheet 1 through sheet 16. The sheet names appear on taps at the left bottom of the workbook window. Each worksheet has 16,384 rows and 256 columns. The columns are labelled with letters from A to IV and rows are labelled with numbers. Each cell is identified by its cell address which indicates with column alphabet and row number for example A1, B6, F20, etc. In each cell you can enter data in the form of text, number or formula. The picture below shows various components of the Excel window.



2. Moving Around in the Workbook

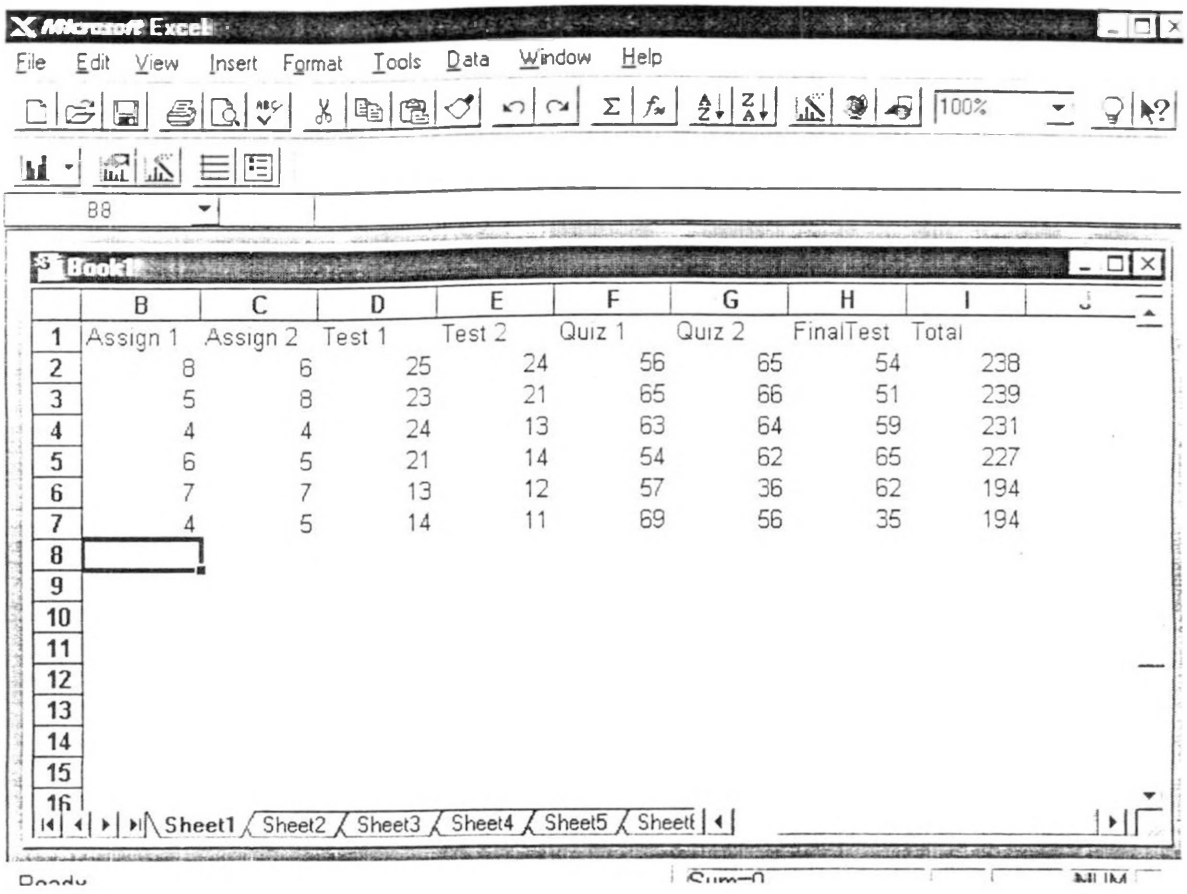
- To select any cell within a worksheet, move and place the cursor over the cell and click it.
- To move one cell to the right, press Tab, or to move one call to the left, press shift + Tab.
- To move one cell down, right, up or left, use the arrow keys.
- To move to the upper most left cell i.e. A1, press Ctrl + Home.
- To move to any cell by clicking Go To on the Edit menu, and then type the required cell number.
- To move down in the worksheet, press Page Down.

- To move up in the worksheet, press Page Up.
- To move to the first column of the worksheet, press Home.
- To move from worksheet to worksheet, click the worksheet tabs in the left bottom area on the worksheet.

3. Entering data

Select any cell and enter text or numeric data or a formula into the cell.

- Click A1 and type Student Name as the heading. The name of the student is longer and width of the cell will be increased by taking the cursor between columns A and B.
- Click B1 and type Assignment 1, click C1 and type Assignment 2, click D1 and type Test 1, click E1 and type Test 2, click F1 and type Quiz 1 and click G1 and type Quiz 2, click H1 and type Final Test, click I1 and type Total, click J1 and type Percentage.
- The headings appear longer can be wrap as follows:
  a. Select the cell to be wraped.
  b. Click format menu and click cells.
  c. Click Alignment tab.
  d. Make the text as 75°.
- Enter the data against various headings.
- The appearance of the data is as follows.



	B	C	D	E	F	G	H	I
1	Assign 1	Assign 2	Test 1	Test 2	Quiz 1	Quiz 2	FinalTest	Total
2	8	6	25	24	56	65	54	238
3	5	8	23	21	65	66	51	239
4	4	4	24	13	63	64	59	231
5	6	5	21	14	54	62	65	227
6	7	7	13	12	57	36	62	194
7	4	5	14	11	69	56	35	194
8								
9								
10								
11								
12								
13								
14								
15								
16								

Note: 1. Auto filling numbers
2. Auto sum

Activity 1

Prepare the worksheet with the following data and save with file name Mark Sheet.

4. Using a Formula

With a formula you can perform operations, such as addition, subtraction, multiplication and division on workbook values. Open file Marksheet.XLS and select I2 i.e. under Total.

- Type '=' in cell I2 and then type the formula B2+C2+D2+E2+F2+G2+H2 and then press Enter button.

- You will get the total of the values of second row in I2 cell.
- Select cell I2 and drag down upto I7.
- You will get the total of the marks.

There are many formulas that help to calculate everything from finances to statistical sampling plans. When you combine several mathematical steps in a formula, they are performed in a specific order. Excel 2000 starts calculating from the left to the right according to the following order of operations.

Order	Symbol	Description	Example
1	()	Parentheses	(A2+B2)
2	-	Negative number if used with one operand	-5
3	%	Percentage	3%
4	^	Exponentiation	3^2 (3*3) or 3^4 (3*3*3*3)
5	* and /	Multiplication and Division	5*4
6	+ and -	Addition and Subtraction	3+2 or 5-2
7	&	Connects two text values to produce one	8 & 9
8	=	Equal to	A1 = A2
9	<=	Less than or Equal to	A1<=A2
10	>=	Greater than or Equal to	A1>=A2
11	<	Less than	A1<A2
12	>	Greater than	A1>A2
13	<>	Not equal to	A1<>A2
14	:	Cell Range	B2:B25
15	,	Union Operator	Sum (A2:A15, B2:B15)

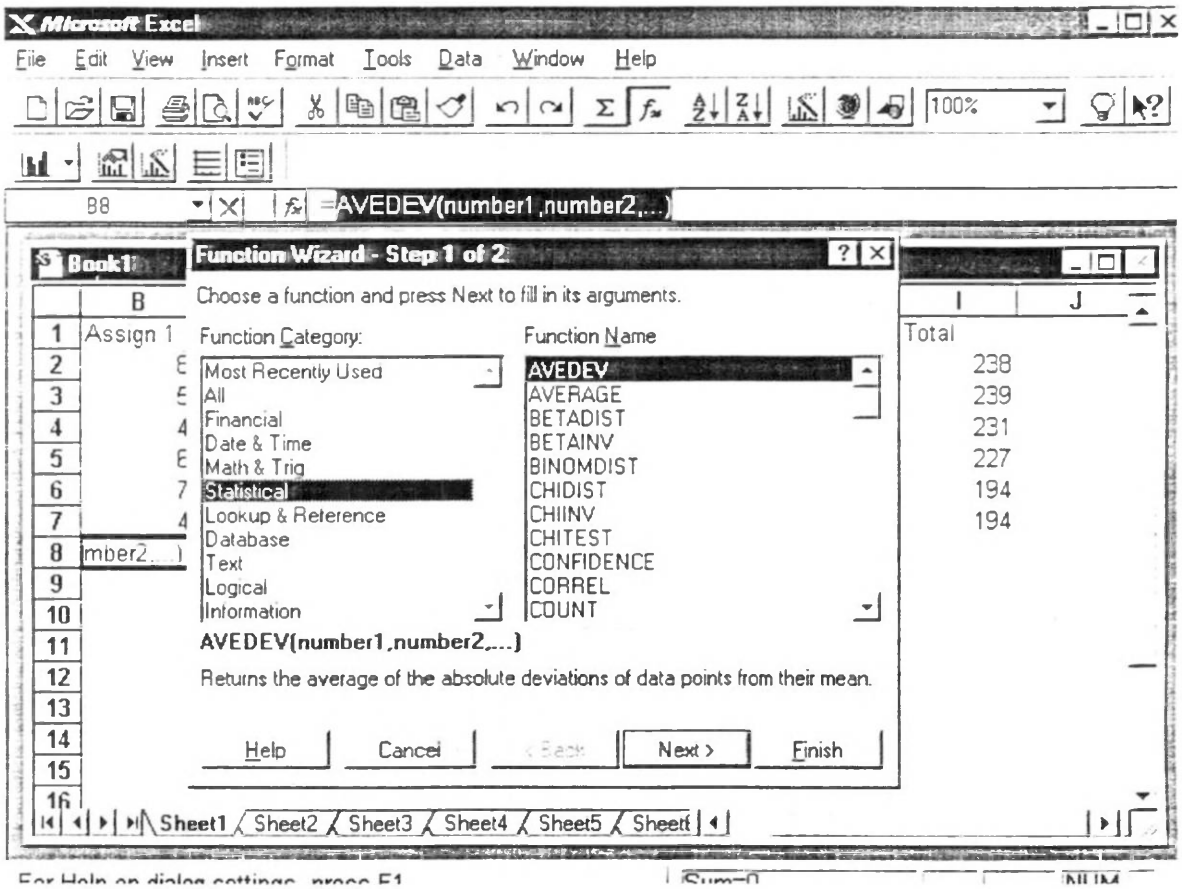
Activity 2

Compute percentage of marks for all the students by using formula.

5. Analyse Data

(a) Using Function Wizard

In the previous procedure, you used a formula to add three expanse categories on the worksheet. The formulae you created works fine for adding values in three cells, but it would grow unwidely if we had a large range of values to add. Also, if you added a new expanse category, you would have to remember to add the new cell reference to your formula. This problem can avoid by using function wizard.



1. Select cell to type the answer.
2. Click function wizard.
3. Choose the function option, i.e. Financial, Statistics, Mathematical, Logical, etc.

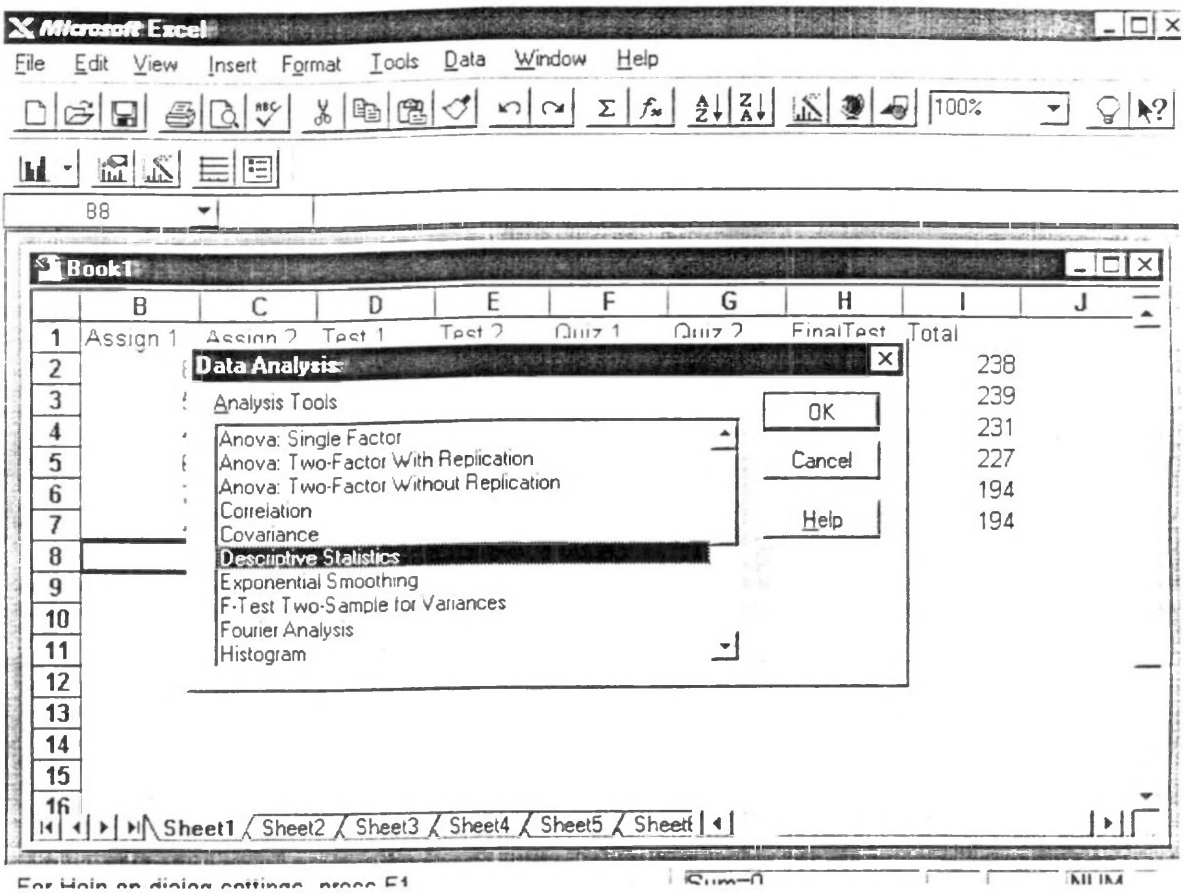
4. Scroll down the list of functions and select the function for example select statistical function.
5. Choose any one statistical function for example select mean of the data.
6. A window will appear and ask for range of the data.
7. Type the cell range for example A2:A25 or B2:B25 or C2:C35, etc.
8. Press the enter key or click OK button on the window you will get the answer in the cell selected in the first stage.

Activity 3

1. Compute mean, median and SD for the data by using function wizard.
2. Use the logical statement of If to select the students whose marks less than 5.

(b) Using Analysis Tool Pack

1. Click on the tool menu.
2. Select Data Analysis tool and click.
3. Different statistical analysis will appear on the window, select Descriptive Statistics and click.
4. Type the Input range of the data to compute Descriptive Statistics. By default it will take the groups by columns and can be changed to Rows also.
5. Type the output range if you want result in some worksheet otherwise you can ask for the result in new worksheet or new workbook.
6. Tick the summary statistics in the window. The confidence level for mean is 95% by default it can be modified.



7. Click OK, you will get the Descriptive Statistics, i.e. Mean, Standard Error of Mean, Median, Mode, Standard Deviation, Sample Variance, Kurtosis, Skewness, Range, Minimum value in the data, Maximum value in the data, Sum of the values and Count (number of values).

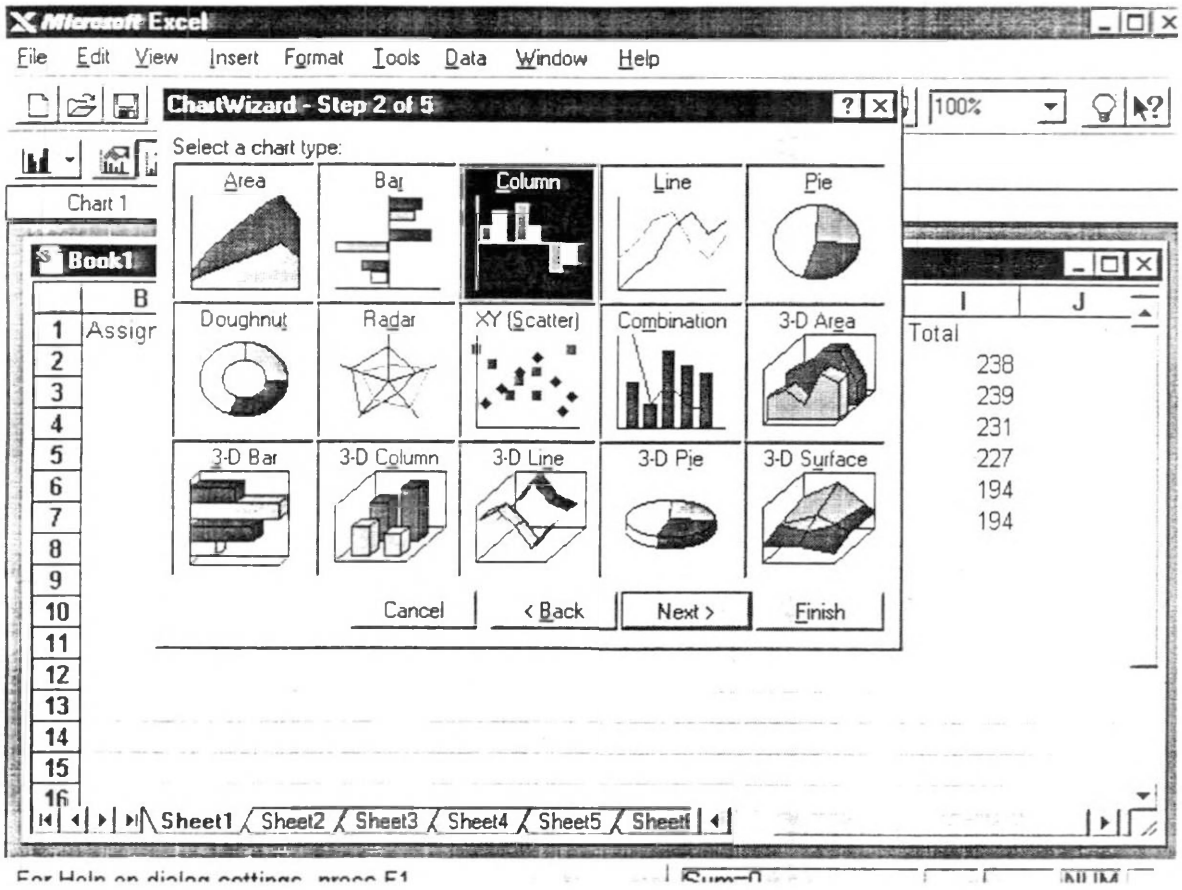
Activity 4

1. Compute Descriptive Statistics for the data in file 'Marksheet.XLS'.
2. Compute the coefficient of correlation by using Analysis Tool Pack.

(c) Creating Charts using the Chart Wizard

The earliest way to create a chart in Excel is to use the chart wizard that takes you through the various stages systematically offering you options at each stage.

You should have your data table in the Excel worksheet. The datatable should be continuous without any blank columns or rows. If there are any, then Excel create empty space in your chart. It is important that your data range is symmetrical.



The chart wizard takes you through four stages in the creation of a chart. First, you will have a dialog box with a list of various chart types.

In the second step, the chart wizard allows you to reselect or change the data for the chart using the data range textbook. A sample chart is also displayed for your preview. In case you are not satisfied with the emphasis in the chart, you can decide to change the data series from column to row or vice-versa. You can click the desired option button to change the data series.

After selecting the chart type and deciding on the data ranks, the chart need to be fine tuned. The chart wizard offers a wide range of choices in the third stage to do exactly that. This dialogue box has several tabs for the various aspects of the chart as show in figure.

Activity 5

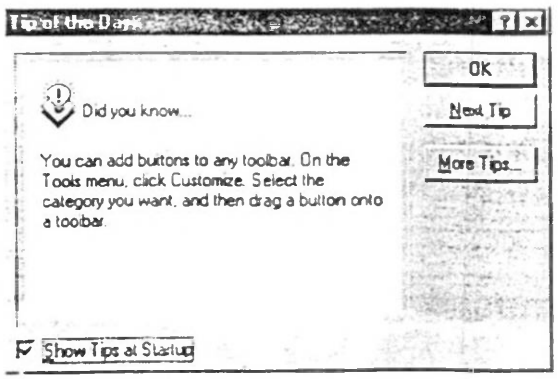
Create the suitable charts for the data file Marksheet.XLS.

6. PRESENTATION OF TEACHER SUPPORT MATERIAL THROUGH MS POWER POINT

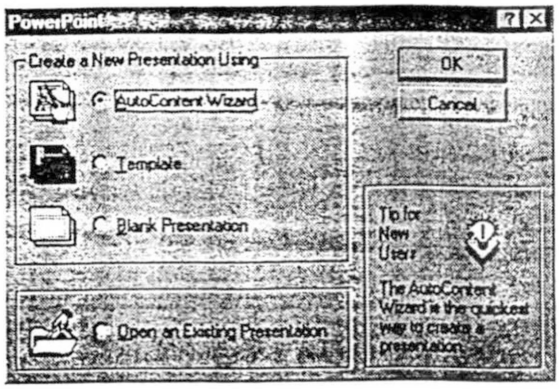
Power point is a window based application package and it helps in presentation. This package provides a library of pre-drawn images such as symbols, bar charts, and graphs that can be combined with other artwork or text to create slide with power point. Power point helps to design slides, hand outs, speakers notes etc to communicate once ideas, produces institution or instructional information in a precise and attractive way.

To start Power Point

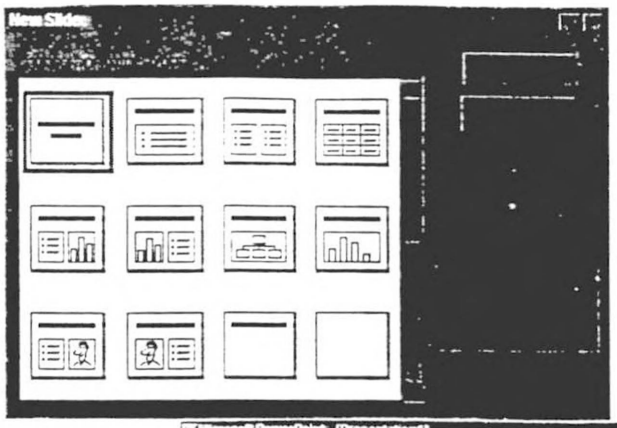
- Start windows
- Click on program option in the ***Start*** menu
- Select MS Power Point option from the list of the program
- Click on MS Power Point to ***Start*** the program
- Observe the tip of the day dialog box on the screen. Click on OK to close the dialog box.



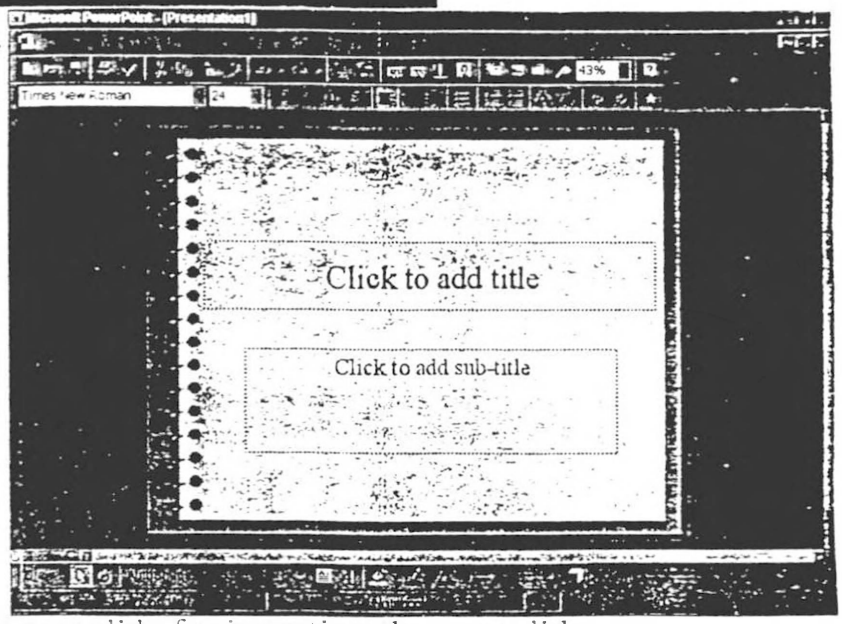
To create a presentation – A title slide



- Select new from file menu, to display the presentation dialog box.
- Click on blank presentation
- Select a layout from auto layout dialog box and click on OK.
- It will display the blank title slide to enter information.



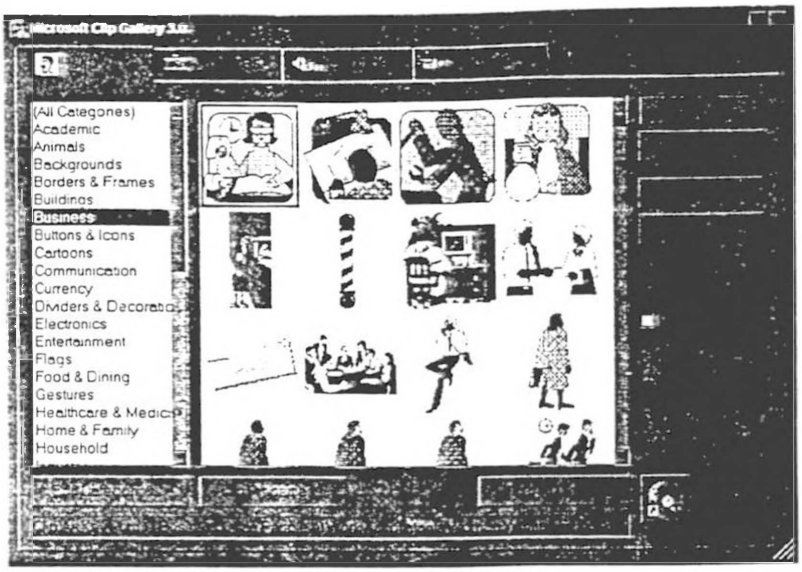
- Type the text in the box.



- Click on insert and click new slide for inserting the new slide.

Adding clip art to a slide

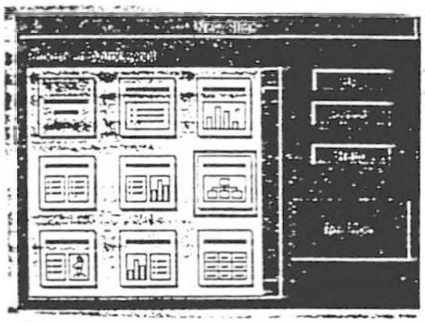
- Display the slide to which clip art is to be added
- Choose insert clip art
- Click on the clip art button from the standard tool bar to open the clip art gallery
- Select the desired category of clipart.

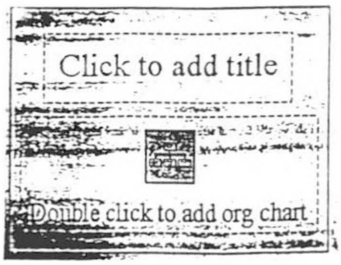


- Select the desired clip art image from the gallery and click on OK.

To create table

- Display the slide to which the table is to be added (by clicking new slide button on the status bar to display auto layout box) by selecting layout of the table from auto layout list.
- Click OK.
- It will display a bland organization chart display slide.





- Double click on org.chart to display organization chart window.
- Click on particular box to type title and name in the box.

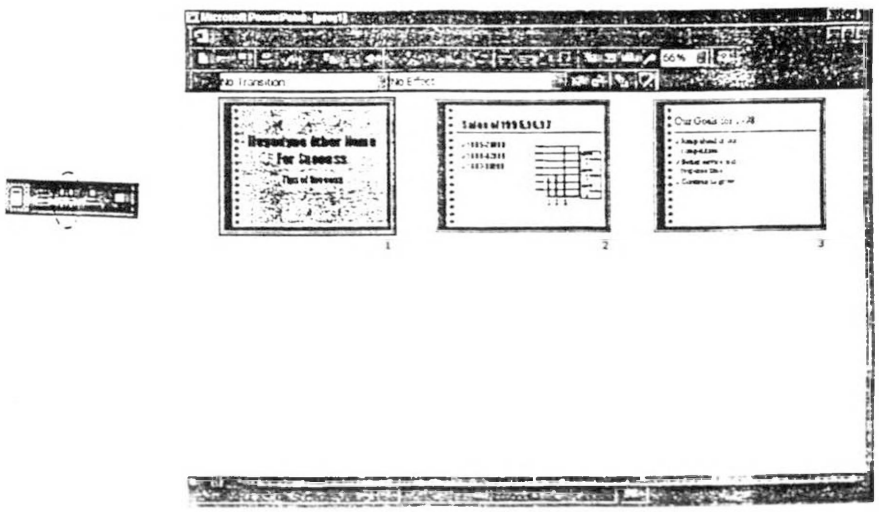
To apply design

- Click format and apply design
- Pick the design from the list of design templates
- Click apply

Power point also provides option for changes of the size of the text, changes of font of the text make text bold or italic. One can fill color to back ground of text, shadow the text etc.

Slide presentation

- Click on slide show
- Choose either all or from to depending on how many presentation of slide one wants
- Select custom animation
- Select timing and observe the objects selected, give effects and sound for each of them
- Click OK
- Click slide show and view show to have a presentation of slides. One can make a file or several slides, save it and take print out of it.



7. CREATING STUDENT PUBLICATIONS (MS PUBLISHER)

Step 1: Using Publisher's Newsletter Wizard

1. From the **Task Bar**, click the **Start** button.
2. Select **Programs** and choose **Publisher**. This will launch the application.
3. Click the **Publications by Wizard** tab.
4. In the **Wizards** pane, click **Newsletters**, and in the right pane, scroll to view a variety of newsletter styles. Click twice on a **Newsletter** of your choice to start the Wizard.
5. A **Personal Information** window may appear. Click **Cancel**.
6. To begin answering the Newsletter Wizard questions, click **Next**.
7. Select a **Color Scheme**. Click **Next**.
8. Select the desired **Number of Columns**. Click **Next**.
9. Under **Customer Address**, click **Next**. (**No** is the default.)
10. Under **One- or Two-Sided Printing**, click **Next**. (**Double-sided** is the default.)
11. Under **Personal Information**, select **Other Organization**. Then click **Finish**.
12. Click **Hide Wizard**.

Step 2: Customizing Your Newsletter

Publisher creates a layout for your newsletter using placeholder text and graphics. With a click of the mouse, you can replace titles, articles and ClipArt into the existing frames.

Working with Existing Text Frames

The Newsletter Wizard creates placeholder text frames. Typically, the text describes what you may want to include within that particular text frame. All you need to

do to change the suggested text is click once anywhere in the text frame and begin typing your own text. Your text will replace the default text.

To change the dimensions of the text frame, and thereby change the text margins, click once on the text area. Place the mouse pointer over any of the black squares or handles that are located on the perimeter of the text frame. When the pointer changes to a double-headed arrow with a caption **Resize**, click and drag a handle to enlarge or shrink the frame to the desired size.

1. From the **Standard toolbar** at the top of the screen, click the plus sign (+) to zoom to 66% so you have a larger image with which to work.
2. Click once on the placeholder text **"Lead Story Headline"**, and type a headline for your feature article.
3. Read suggestions in the **Lead Story**. Click in the text frame to add your own lead story.
4. If the text will not fit into the text frame, it will automatically flow into the next frame. A chain of connected text frames can span multiple pages and have numerous columns.
5. If text frames are connected, they will have to **Go to Next Frame** and **Go to Previous Frame** buttons on the lower-right or upper-left corner of the frames.
6. Disconnecting two connected frames is like breaking a link in a chain. To **disconnect and reconnect text frames**, click in the text frame to select the first frame.
7. From the **Text Frame Connecting** toolbar, click the **Disconnect Text Frames** button.

8. The text in the "broken-off" part of the chain is placed in the **Text in Overflow** area of the selected frame.
9. If you want to keep the text in the overflow area, click anywhere outside a Publisher object.
10. To have a story continue into another text frame, first click the frame that has overflow text.
11. From the **Text Frame Connecting** toolbar, click the **Connect Text Frames** button.
12. The mouse pointer changes to a pitcher of text.
13. Click anywhere inside an empty text frame to "pour" the text into the second frame.
14. If you import a text file and all of the text does not fit into the text frame, Publisher will ask you if you would like to use **Autoflow**. If you respond by clicking the **Yes** button, Publisher will flow the text throughout your publication, connecting the text frames for you.

Adding Text Frames

1. From the **Objects** toolbar click on the **A** (text tool).
2. Draw a text frame by beginning at the top left area where you want your text to begin and dragging to the bottom right area where you want your text to end.
3. Click once anywhere in the text frame to enter Edit mode.
4. Change the text style (font, size, style) if desired, using the **Formatting** toolbar, and begin typing your text.

Entering Your Information

1. Click once on the placeholder text **"Newsletter Date"** in the top right hand corner and type the date.

2. In the **Table of Contents** frame, highlight titles and replace with your own.
3. Click once on the text **"Secondary Story Headline"** and replace with your own headline.
4. From the **Status Bar** located at the bottom of the screen, click the page navigation icon to page 2.
5. Click once on the text **"Inside Story Headline"** on the top of page 2, and replace with your own headline.

Saving the Newsletter in Your Program Folder

1. Save your publication. From the **File** menu, select **Save**.
2. Locate your Program Folder. Open the student_samples folder. Open the student_publication folder.
3. Name your file. It will automatically be saved with the .pub file extension.
4. Click **Save**.
5. As you continue to enhance your newsletter, you'll want to frequently click **Save** so your new work is saved.

Step 3: Enhancing Your Newsletter

Changing Graphics

1. Go to **page 1** of the newsletter.
2. To change an image within your newsletter, double click on the image and Publisher will automatically open its location.
3. Click the **Pictures** tab in the **Insert ClipArt** window.
4. Click the **All Categories** button at the top left of the **Insert ClipArt** dialog box to go to the main category menu.

5. Select one of the categories in the **ClipArt Catalog** and maximize the screen to view all clips.
6. Select an image to insert into your newsletter.
7. Click the **Insert clip** button to insert it into the picture frame in your newsletter.
8. If the ClipArt catalog could not find the image you select, click **OK**. Then click **Cancel** and try another image.

Entering Captions for Graphics

Captions add information to a graphic by describing the image. To update or change the caption, follow the next set of directions.

1. Click the **Text Frame** below the graphic to highlight the text.
2. Zoom in by clicking the **+** sign on the **Standard Toolbar** to get a closer look at the caption.
3. Type a caption for the image.
4. Click outside the text frame.
5. **Zoom** out by clicking the **-** sign on the **Standard Toolbar**.

Deleting Extra Pages

If your newsletter contains more pages than you need, deleting them is easy. If you want to delete pages, follow the next set of directions.

1. Go to **page 3**, for example.
2. From the **Edit** menu, select **Delete Page**.
3. Select **Right page only** and click **OK**.
4. If the goal is a two-page publication, repeat steps 1 to 3 as necessary.

5. If you do not want to delete the page, from the **Edit** menu, select **Undo Delete Page**. to restore page 3.

Inserting Drop Caps

Sometimes a Drop Cap or fancy first letter in a paragraph catches the reader's attention or helps fill a page that only has a small amount of text.

1. Select a paragraph of text.
2. From the **Format** menu, select **Drop Cap**.
3. If necessary, click the **Drop Cap** tab, then select one of the available **Drop Caps**.

Note: You may change the Drop Cap options under the Custom Drop Cap tab.

4. Click **OK**.

Creating a Student Sample Brochure

Step 1: Using Publisher's Brochure Wlzard

1. From the **Task Bar**, click the **Start** button.
2. Select **Programs** and choose **Publisher**. This will launch the application.
3. Click he **Publications by Wizard** tab.
4. In the **Wizards** pane, click **Brochures**, and in the right pane, scroll to view a **Brochure** of your choice. Click twice on your selection to start the Wizard.
5. A **Personal Information** window may appear. Click **Cancel**.
6. To begin answering the Brochure Wizard questions, click **Next**.
7. Select a **Color Scheme**. Click **Next**.
8. Select the desired **Paper Size**. Click **Next**.
9. Under **Customer Address**, click **Next**. (**No** is the default.)

10. Under **Form**, click **Next**. (**None** is the default.)

11. Under **Personal Information**, select **Other Organisation**. Then click **Finish**.

12. Click **Hide Wizard**.

Step 3: Customizing Your Brochure

Publisher creates the layout for your brochure using placeholder text and graphics. With a click of the mouse, you can replace titles, text and ClipArt into the existing frames.

Working With Existing Text Frames

The Brochure Wizard creates placeholder text frames within your brochure with text already inside. Typically, the text describes what you may want to include within that particular text frame. All you need to do to change the suggested text is click once anywhere in the text frame and begin typing your own text. Your text will replace the default text.

To change the dimensions of the text frame, and thereby change the text margins, click once on the text area. Place the mouse pointer over any of the black squares or handles that are located on the perimeter of the text frame. When the pointer changes to a double-headed arrow with a caption **Resize**, click and drag a handle to enlarge to shrink the frame to the desired size.

Entering Your Titles

1. From the **Standard Toolbar** at the top of the screen, click the plus sign (+) to zoom to 66% so you have a larger image with which to work.
2. Click once on the placeholder text **"Product Service Information"**, and type a title for your brochure.

3. Read suggestions in the **Back Panel Heading**. Click **Zoom** to increase the text size, or print the page for reference. Click once on the placeholder text **"Back Panel Heading"** and type a headline for your back panel.
4. Click once in the **"Your organization tab line"** frame on the right side to replace the text with your own tag line. A tag line, or motto, is a brief, memorable statement that summarizes the purpose of an organization or emphasizes an important aspect of a product or service.
5. From the **Status Bar**, click the page navigation icon located at the bottom of your screen to go to page 2.

Entering Your Information

1. Click once on the text **"Main Inside Heading"** on the top of page 2. Type in a new heading.
2. Read suggestions in the **Main Inside Heading**. Click in the text frame to add your own text.
3. From the **Status Bar** located at the bottom of the screen, click the navigation icon to go to the next page of your publication.
4. If the text will not fit into the first text frame, it will automatically flow into the next frame. A chain of connected text frames can span multiple pages and have numerous columns.

Connecting and Disconnecting Text Frames

1. If text frames are connected, they will have the **Go to Next Frame** and **Go to Previous Frame** buttons on the lower-right or upper-left corner of the frames.

2. Disconnecting two connected frames is like breaking a link in a chain. To **disconnect and reconnect text frames**, click in the text frame to select the first frame.
3. From the **Text Frame Connecting** toolbar, click the **Disconnect Text Frames** button.
4. The text in the "broken-off" part of the chain is placed in the **Text in Overflow** area of the selected frame.
5. If you want to keep the text in the overflow area, click anywhere outside a Publisher object.
6. To have a story continue into another text frame, first click the frame that has overflow text.
7. From the **Text Frame Connecting** toolbar, click the **Connect Text Frames** button.
8. The mouse pointer changes to a pitcher of text.
9. Click anywhere inside an empty text frame to "pour" the text into the second frame.
10. If you import a text file and all of the text does not fit into the text frame, Publisher will ask you if you would like to use **Autoflow**. If you respond by clicking the **Yes** button, Publisher will flow the text throughout your publication, connecting the text frames for you.

Adding Text Frames

1. From the **Objects** toolbar on the left, click on the **A** (text tool).
2. Draw a text frame by beginning at the top left area where you want your text to begin and dragging to the bottom right area where you want your text to end.
3. Click once anywhere in the text frame to enter Edit mode.

4. Change the text style (font, size, style) if desired, using the **Formatting** toolbar, and begin typing your text.

Saving Your Brochure

1. From the **File** menu, select **Save**.
2. Locate your Program Folder. Open the student_samples folder. Open the student_publication folder.
3. Name your file. It will automatically be saved with the .pub file extension.
4. Click **Save**.

Step 3: Enhancing Your Brochure

Changing Graphics

1. Go to **page 1** of the brochure.
2. To change an image within your brochure, double click on the image and Publisher will automatically open its location.
3. Click the **Pictures** tab in the **Insert ClipArt** window.
4. Click the **All Categories** button at the top left of the **Insert ClipArt** dialog box to go to the main category menu.
5. Select one of the categories in the **ClipArt Catalog** and maximize the screen to view all clips.
6. Select an image to insert into your brochure.
7. Click the **Insert clip** button to insert it into the picture frame in your brochure.
8. If the ClipArt catalog could not find the image you selected, click **OK**. Then click **Cancel** and try another image.

Entering Captions for Graphics

Captions add information to a graphic by describing the image. To update or change the caption, follow the next set of directions.

1. Click the **Text Frame** below the graphic to highlight the text.
2. Zoom in to get a closer look at the caption.
3. Type a caption for the image.
4. Click outside the text frame.
5. From the **Standard** toolbar, click the **Zoom** indicator to zoom out.

Deleting Extra Pages

If your brochure contains more pages than you need, deleting them is easy. If you want to delete a page, follow the next set of directions.

1. Go to **page 2**, for example.
2. From the **Edit** menu, select **Delete Page**.
3. You will receive a message from the computer's **Office Assistant**. Click **OK**.
4. If you do not want to delete the page, from the **Edit** menu, select **Undo Delete Page** to restore page 2.

Inserting Drop Caps

Sometimes a Drop Cap or fancy first letter in a paragraph catches the reader's attention or helps fill a page that only has a small amount of text.

1. Select a paragraph of text.
2. From the **Format** menu, select **Drop Cap**.

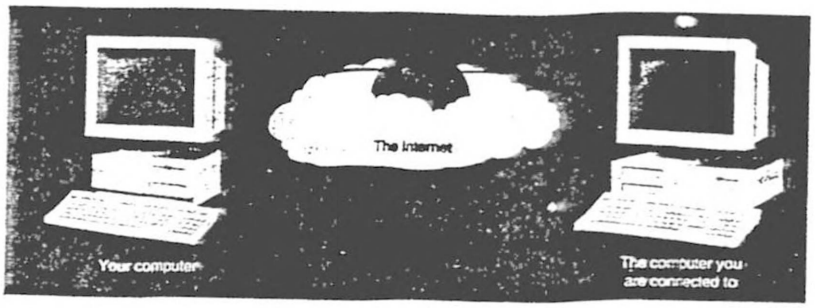
3. If necessary, click the **Drop Cap** tab, then select one of the available **Drop Caps**.

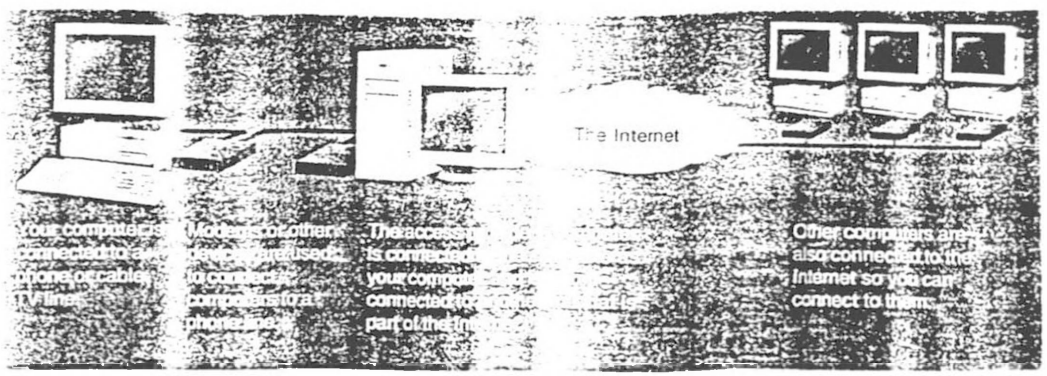
Note: You may change the Drop Cap options under the Custom Drop Cap tab.

4. click **OK**.

8. LOCATING RESOURCES FROM INTERNET

The Internet was designed in the 1960s as to enhance military communications in US. It gained further popularity when the National Science Foundation enhanced its capabilities to facilitate data sharing among scientists and academicians. Internet is network that connects other networks of computers around the globe into one seamless network and in network two or more computers connected to each other and share a common language, so that they can communicate with one another i.e. The internet links thousands of smaller networks together so that the information prosent on one network may be shared by other networks.





The Internet works through

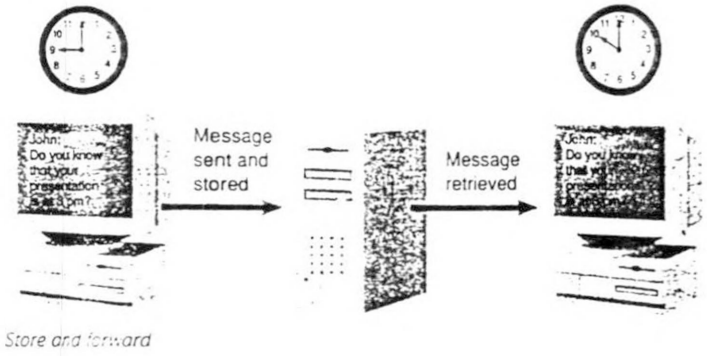
- Cabling: It is necessary to connect computers to the internet. Telephone lines acts as a connector
- Language: Languages are needed to interpret information on flowing from computer to computer over internet. The languages used by internet are Internet Protocol (IP) and Transmission Control Protocol (TCP) IP is used for detecting the messages and getting it retransmitted.
- Software applications: Through these components the user of internet directly interacts. Various available browsers' helps in sending requests to web servers and sending back requested documents, which is displayed by the browser.

The client server relationship

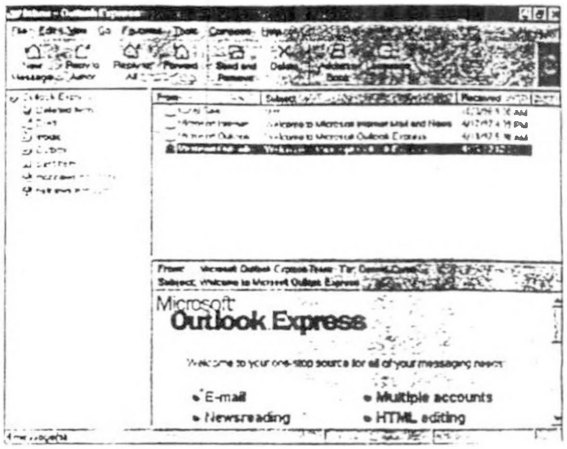
Use of Internet

1. E-mail (Electronic Mail): Over half of the world's nations have sites on Internet. The Internet enables us to exchange messages throughout the world with people-friends, colleagues, relatives. E-mail is an exciting feature of the internet as we can send and receive messages over long distances also. It is quite fast easy and inexpensive as well. To send e-mail to some one, his/her address is needed which has two parts, the users name and the name of the computer his/her mail would store called domain name. These two parts are separated by @. A typical e-mail might read riebpl@bom6.vsnl.net.in .

To sent or receive e-mail software is needed which allows one to write, read and file messages (e.g. MS Outlook Express, MS Eudora). Attachments can also be sent through e-mail.

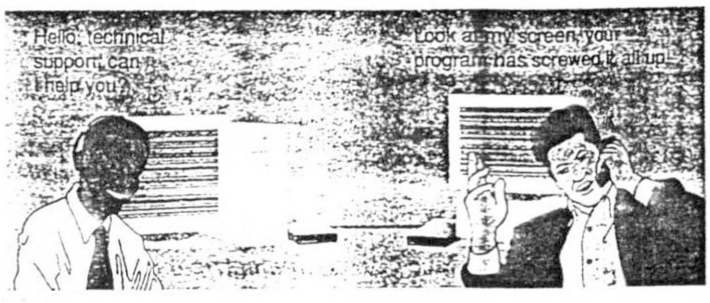


Store and forward



2. Access to information : Any information on any subject can be obtained easily on internet. We can have a good browse at newspapers, magazines, academic papers, government documents, famous speeches, works by literary figures etc. we can do all this while working with a compute sitting at out desktop
3. Progammes: The internet offers thousands of free programs. Some of these are word processors, spreadsheets and games.
4. Entertainment: The internet offers hundreds of simple games free of cost for enjoyment of children as well as elders. We can have a good browse at current movies or listen to over songs. We can have several conversations even with famous personalities.
5. Discussion: We can chat with people similar tastes and preferences. Questions can be asked, problems discussed and interesting stories read. The internet offers thousands of discussions groups on various subjects. The subjects may include

environment, food, humor, music, photography, politics, religion, sports and so on.

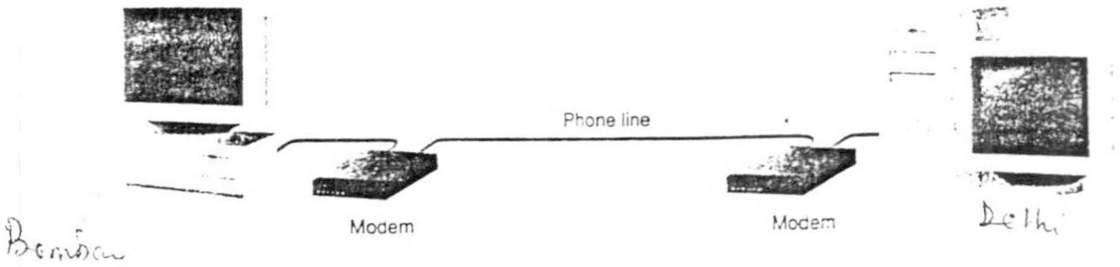


6. Business and on-line shopping: Internet is an effective media for business communication. Gopher and www are excellent ways to distribute information about the products or services. E-mail is a very good tool for communicating with business contacts and csutomers. Also we can order desired goods and service on the internet just sitting comfortable at home.

Equipments needed for internet

1. Computer
2. Telephone line
3. Programs we require special programs for the use of internet. These programs are given free of cost by most service providers.
4. Modem: A modem serves as a medium to exchange information between a computer and the Internet. It is a short for Modulator/Demodulator. Modems may be of internal or external. An internal modems slips into an expansion slot provided in the computer. An external modem is placed outside a computer. The internal model is less expensive. Fax modem helps in sending a fax from any computer to fax machine.

5. Service provider: It is a company, which gives us the facility to gain access to the Internet against a fee.



Getting connected to the Internet:

We can gain access to the internet with the help of a commercial on-line service after paying nominal charges. In India, Videsh Sanchar Nigam Limited (VSNL), Satyam computers are the well known commercial on line services.

Setting up an account:

It is to establish a commercial on line service, which provides satisfactory answers to the customers. The programs, which we shall need to use the on line service and to gain access to the internet are provided by commercial on line service.

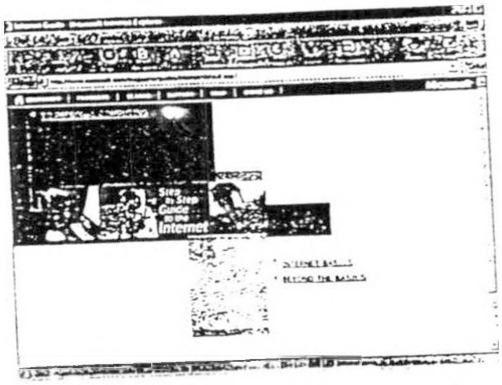
A modem helps us to be linked to the commercial on-line service through telephone lines. If we choose a service with a local telephone number we shall avoid long distance charges.

Getting information:

FTP (File Transfer Protocol) helps in transferring files from one computer to another. Million of fields are stored on Internet of FTP sites and some of them are accessible to the general public. Some of them are open to people who have got authorized access to the organization that holds the file.

World Wide Web (www)

The one part of Internet is called World Wide Web or just the web is the world's most exciting and fastest growing user-friendly facet of Internet. The World Wide Web comprises a large collection of documents called web pages. A university, a government agency, an organization or a company to be viewed by all may store web pages. Any of these departments are called a web site.



To open the Internet Explorer Web Tutorial

1. On the desktop, double-click **Internet Explorer**.
2. On the **Help** menu, click **Web Tutorial**.

The thousands of computers are connected. So one can use his/her own computer's mouse to point and click his/her way around the world. On the trip through web sites one can visit colleges, companies, government departments other individuals.

A web browser is a program. It allows us to view and to explore information on the world wide web. At present the most popular web browser is Netscape navigator and Internet Explorer. Through it one can go to some of the web sides. The search engines help in searching some of the information's and web sites.

Hypertext: The working of web depends mainly up on hypertext as its means of interacting with users. It is a system for viewing information (both text and picture) on a computer screen in a non-serial manner such that related items of information can easily be reached. The hypertext is same as regular text i.e. it can be stored, read, searched or edited. But unlike regular text. It has connections with in the text to other documents. Most www documents contain hypertext.

Hypermedia: It is a combination of hypertext and multimedia in an on line document. It not only contain links to other pices of text but also to other from of media such as sounds, images and movies.

HTML (Hyper Markup Language): It is a standard software language used by the web. It is used for creating and recognizing hypermedia documents to provide pages for the internets world wide web. Special links are used by it to join related information together regarding graphics. photographs, text sound video. These links can help people to be connected to other lines in the document or to a Web SITE world wide.

The list of some of the web sites :

A. Gateways to learning
   - www.familyeducation.com
   - www.scholastic.com

- www.bigchalk.com
- www.school.aol.com

B. Maths

- www.mathgoodies.com
- http://library.thinkquest.org/16661
- http://enchantedmind.com
- http://www.pbs.org/teachersouce/maths
- http://forum.swarthmore.edu/teacher

C Social Studies

- www.encarta.msn.com
- www.worldbookonline.com
- www.odci.gov/cia/publications/factbook/index.html
- www.nationalgeographic.com
- www.askasia.org
- www.stanford.edu/group
- www.castlesontheweb.com

D. Language Arts

- www.m-w.com
- www.wordcentral.com
- www.bookadventure.com
- www.carolhuist.com
- www.inkspot.com

E. Science

- http://photojournal.jpl.nasa.gov
- http://nvelabs.kcts.org/flash_ie_mac.html
- www.wideopen.igc.apc.org/ran/index.html

- www.zoomdinosaurs.com/subuects/dinosaurs
- www.brainim.com
- http://monarchwatch.org

F Other noteworthy webs

- www.nytimes.com/learning
- www.wcom.com/marcopolo
- http://www.funbrain.com
- http://www.weather.com
- www.artsednet.edu
- www.discoveryschools.com/puzzlemaker
- www.letsfindout.com

The list of some of the search engines

- www.infoseek.com
- www.altivista.com
- www.hotbot.com
- www.excite.com
- www.lycos.com
- www.yahoo.com

Indian Search directories

- www.123india.com
- www.khoj.com
- www.rediff.com
- www.indiainfo.com

Websites

- www.ithaas.com
- www.nic.in

- www.nationalgeographic.com
- www.learn.org
- http://www.teacher.zone.com
- www.googli.com
- www.schoolnet.com
- www.eduplace.com
- www.classroom.com
- www.education-world.com
- www.schoolnetindia.com
- www.timesofindia.com
- www.expressindia.com
- www.biography.com
- www.eb.com
- www.nobelprizes.com

9. COMPUTER BASED INSTRUCTIONAL STRATEGIES

It is an accepted fact that the development in information technology has brought revolution in the area of school education in many countries. But unfortunately in India majority of the teachers have yet to understand about the concept of information technology, lack the related skills to use it and therefore, it is taking lot of time to bring its components to the classrooms.

Information technology transfers knowledge through mechanical mode i.e. through its powerful and versatile tools such as interactive multimedia packages, internet, e-mail, etc. and make the students actively involved in the learning process. It facilitates the students to be exposed to a vast range of contents, provides opportunity to interact with teacher students across the world. Earlier the teachers were using various teaching aids such as charts, models, radio, tape recorder, slides, OHP transparencies and films, etc. to make their teaching more meaningful and to help the students to understand better. But in this endeavour mostly the students were passive listeners/ viewers. There was less scope for them to interact and learn at their own pace. With the introduction of interactive TV, computer graphics, animation, multimedia and internet, etc. the information technology has made teaching learning more interesting, motivating as well as it has increased the understanding of abstract concepts. Therefore, in the present context where information technology is accepted as part of education system, there is a need for the teachers to create information technology-rich environment and integrate it effectively to the teaching-learning process to improve the cognitive capacity of their students.

In the changing situation, the teachers have to encourage students to be independent learners, i.e. they should learn how to learn and construct knowledge themselves through interaction, exploration, problem solving, etc. by the intelligent and creative use of facilities of information technology.

As computer literacy is very much essential to open the gate of information technology, it is expected that slowly all the teachers and students should try to attain this minimum requirement.

The simple programme such as MS Word, MS Excel, Paint Brush, Power Point, etc. also could be useful for improving teaching-learning process. Therefore, once the teachers and students know how to operate and use these programmes, they can create lot of small workers by their own intelligence and creativity.

The user of information technology including computers in teaching-learning could be as follows:

MS Word

The teachers with the help of MS Word can prepare (1) Activity sheets/work sheets, (2) hand outs e.g. auto-biography of a honeybee an atom/history of Madhya Pradesh, etc.), (3) programme learning materials in science/mathematics/social studies, (4) question papers for quarterly examination, (5) questions for quizzes in the class, (6) check list for observation of handling of apparatus, observation of students behaviour, etc., (7) prepare time table, (8) write letters.

The students also can use MS Word to prepare tables, project reports, assignments reports of field visit, etc.

MS Excel

Teachers can use MS Excel to manage the student data related to students percentage of attendance, marks; the list of equipments and their status in school lab/ museum, etc.; the list of books; list of authors;students activities over the year; analysis of data according to requirement, and to prepare result sheets.

Students can use MS Excel for simple calculations, prepare tables for different kinds of readings related to experiments in various subjects/data of survey during field visit, draw graphs, use statistic for their data.

Paint Brush

Teachers can draw various diagrams (which may not be available or clear) for the use in their classroom.

Both teachers and students can use Paint Brush and MS Word according to their creative talent and bring out pictures which can be used as chart/hand out/pamphlet/ pictures for wall magazine/school magazine/pictures for the bulletin board of any class/ science lab/museum/science club, etc.

Power Point

Teachers can use Power Point for various purposes: (1) for presentation of topics effectively in the class e.g. reflection and its application in every day life, Shajahan and his contributions to Indian history, Solar eclipse, Life cycle of a butter fly, (2) to design a cover page of magazine/report/book, (3) to prepare hand-out with clip art, e.g. picture on communication, information technology.

Student also can use Power Point in the same way as teachers for preparing cover page of their field report/ project report/slides and for presentation which would help them in improving their communication skills.

Multimedia and Internet

Multimedia and Internet are the facilities which helps more in interactivity. Some of the subject related topics can be experienced through both. The teachers can use both multimedia and internet for the enrichment of their own knowledge. They can plan lessons integrating the experience grained from different CDs or by down loading some of the materials from internet. He/she can also make use of multi-media/internet in the class for students. Individualised instruction can be planned for different students. Some group work project/activities can be given to the students based on their experience (related to a topic/theme/problem) with multimedia CDs and or internet. Teachers also can plan assignments based on CDs available in school and by the use of internet.

The students can prepare reports, explore new and interesting topics, research on small problems, know more about literature, writers, artists drama (Shakespeare, O. Henry, Ravi Verma, Premchand, etc.), learn some of the subjects on-line, know more about various schools/institutes in India and around the world. Both teachers and students can chat with experienced teachers, scientists, historians, geographers, mathematicians, etc. to enrich their experiences, clear their doubts.

e-mail could be used by both i.e. teachers and students to get various informations from any corner of the world.

Teachers can exchange their teaching ideas/lesson plans through e-mail.

Scanning

Various photographs/pictures/maps/diagrams/painting/graphs, etc. can be scanned from books/atlases and teachers can use them in their classes.

Students also can scan photographs/pictures/maps and include them in their field report/project report/magazines.

Animation

Many of the abstracts concept can be made easy by the use of animation experience in the class - such as fertilisation in a flower, cell division, working of heart, movement of an object, changes occurring during a chemical reaction, etc.

The teachers can create simple animation experience for their students by using its simple technique to clarify various difficult concepts. Even students can also use animation technique to give shape to their creative ideas.

In addition to all the above, the information technology can be used in peer tutoring, cooperative learning, diagnosing difficulties and remedial teaching. It can also be used to learn through various simulation and educational games. For gifted students it works as excellent tool to satisfy their interest, thirst for knowledge and problem solving. Even children with special needs (as Braille facility is available for blinds and with the sound effect, animation, etc.) the learning becomes easy and meaningful. The repetition of experience makes learning effective for slow learners.

In conclusion it can be said that information technology which would be certainly a powerful tool for the teachers, if properly used can make the Indian kids richer in knowledge an Indian schools more effective. On the whole the information technology can be used in teaching-learning process in three ways i.e. one way is using the computer

as a tool to present and preserve information, the second way is using it as a tool to self-learning by using the self-learning material which are available in the form of CDs and the third way is using it as a tool to search the information or to locate the resource material which are available on the internet.

10. IDENTIFICATION AND EVALUATION OF EXISTING SOFTWARE

Identification of Software

Identification of software appropriate to the objectives and the content of a lesson is related to what is considered to be appropriate stimuli that the learner should receive in order to be receptive and responsive to it. Of course, the software should permit the learner to interact in learning process. The medium should be capable of transmitting all the desired information, stimulate the thinking of the students and arouse responses. If we expect a certain behaviour from a learner after instruction, we should give him/her opportunity to practise that behaviour during instruction.

A practical process of software selection consists of following three steps:

Step 1 : Make a preliminary selection on the basis of type and form of learning such as factual information, visual identification, principles, procedures, etc.

Step 2 : Check if there are any constraints, i.e., ensure the availability of hardware, software, making software, etc.

Step 3 : Check for instructional requirements such as visual, colour, sound, motion, participation, practice, etc.

These three steps are taken one by one by looking at the step-requirements and identifying the software.

Evaluation of Software

Evaluating educational software is no mean task, for evaluation involves value judgement of an individual. It is difficult for many teachers to say what represents quality,

when the medium is so little known to most. Therefore, instead of setting a rigid set of criteria for evaluation or a definitive standard, we adopt the spirit of exploration for one.

Characteristics of Software

A. Content

1. The content is accurate

Possible problems in content accuracy include …

- Outdated information or instructional approach
- Factual errors
- Invalid model used in a simulation
- Oversimplified model or examples
- Improper use of statistics
- Inaccurate use of statistics
- Inaccurate graphs or displays

2. The content has educational value

This is a subjective domain. Some considerations leading to a positive judgement might include …

- The content is addressed in the prescribed school curriculum.
- An instructional situation is possible where the package would be useful.
- The content of the package is central to the subject field.

3. The content is free of caste, creed, religion and other stereotypes

- Certain groups may be over-represented at the expense of limiting others.
- Some groups may be portrayed in terms that are indicative of untrue generalisations about the characteristics of that group.

B. Instructional Characteristics

1. The purpose of the courseware is well defined

Purpose, goals and objectives may be included in the program or be available as part of print materials. The overall purpose of the package should be concisely stated with specific objectives stated for specific components.

- Objectives are explicit, not inferred
- Objectives are stated in terms of expected student behaviour

Make sure that having used the package the student is likely to learn what the material sets out to teach, rather than merely being engaged in the process.

2. Presentation of content

This is about how the facts, concepts and principles are presented, not about the content itself. Presentation should be clear and logical.

- The information is well organised
- The structure of the presentation is evident to the user
- Definitions and explanations are available when necessary
- Illustrations are appropriate
- Links are relevant
- Follows educationally sound principles of instruction
- Uses the computer's capabilities advantageously
- Simulations replicate vital aspect of original situation, process, etc.
- Simulations provide user involvement to make experience meaningful.

3. The level of difficulty is appropriate for the intended target

The readability of the on-screen text is consistent with the expected ability of the user. Examples and graphic illustrations are suitable for the user. There are multiple layers of information (hyper-linked) for users with all kinds of abilities.

4. Text

The text is expected to be original.

- The text position is consistent and predictable
- The text narrative is clear and unambiguous
- The text, captions, labels, etc. are thoroughly edited and free of error in grammar, spelling and punctuation.
- The text does not scroll or scramble.
- Some words go together, e.g. 'to imagine', 'in case', 'of course', 'at all'. These word groups appear on the screen together.
- Hyphenation is avoided.

5. Graphics, video, colour and sound

Graphics, video clips, colour and sound are used for appropriate instructional reasons. They do not detract from instructional purposes.

- Visual and auditory effects are relevant to the content and they stimulate student interest.
- They focus attention on important content areas.
- Colours are selected in good contrast; the use of colours is consistent throughout the program.

- Graphics are not complicated or full of too much information.
- Graphics are not repetitive and slow.

6. User participation

The program provides for a variety of student responses. That is what makes it motivational.

- The program is used in a 'hands-on' way rather than as a presentation.
- It provides for a variety of student responses.
- The student has control over input variables.
- The student has control over the time allowed for solving problem, if any.
- The student has control over presentation of display materials.
- The program provides for 'Help', 'Hint' or any other additional support to the user.

C. Technical Characteristics

1. Technical needs

- Make sure the product is compatible with the operating system of your machine.
- You have adequate RAM, hard disk drive, multimedia capabilities (sound, video and CD-ROM speed) (modem speed, in case you are dealing with a product on the Web).

2. The program design and the navigational path

The overall design of the lesson should promote the learning activities envisaged by the author. A brilliant design comes to naught if the user stumbles over minor difficulties.

- At any point in the lesson, the user knows where he is and where he can go.
- What is he supposed to be doing there; how to get help if he needs it.

- Moving from one screen to another is user-controlled.
- Text and images that are hyperlinked are clearly indicated.
- The minimum amount of information is displayed to achieve a particular instructional purpose.
- At any point, the user can stop, go back to the main menu or get out of the program.

3. User support materials

Educational software often comes with some printed materials for teachers and students. Or, the additional material may come as part of digitised information.

Materials for students may include:

- A guide to the use of the package
- Follow-up activities or reinforce the instruction
- Worksheets.

For teachers, we can expect:

- Suggested mode of instructional activities.
- Pre-requisite skills necessary for best utilisation.
- Teacher directed pre- and post-instructional activities.

4. Ease of operation

The intended user can easily and independently operate the program.

- The loading and running instructions are simple.
- The program has enough internal documentation to permit ease of use.
- Help pages and functions are provided and accessible at points of need.
- The program does not hang or appear to be doing nothing without cues.

- The user can exit the program at will and return to menus.
- There are effective error-tapping devices.
- The program can be used with a minimum of computer competencies.
- Voices are intelligible.
- Sound constitutes essential or integral part of the program.
- Hyperlinks are open, i.e. there is no pre-determined sequence.
- Allows the user to offload some tasks.
- Unambiguous options.

Based on the above characteristics, we can evaluate the software.