

**INTERMEDIATE  
Vocational Course  
Second Year**

**Computer Lab**

For the Course of Construction Technology

**p**

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# INTRODUCTION TO COMPUTERS

## 1.1 History of Computers-Computer Generations- Classification of Computers

### 1. History of Computers:

Computer is an Electronic device capable of high-speed calculations and processing data with more accuracy. It is having large storage capacity.

Computer history begins right from the ancient times, when man calculated with fingers. The earliest device called “ABACUS” (a wooden frame with bales or beads strung in parallel wires) was used to make simple calculations. Later in 17<sup>th</sup> century, John Napier, a Scottish Mathematician invented logarithms in 1614 and invented a manual calculating device called as Napier Bone or Cardboard multiplication calculator. Blassik Pascal invented the first mechanical adding machine in 1642.

In nineteenth century, Charles Babbage professor at Cambridge University is considered to be the father of computers. He designed a machine called difference engine. Later George Bool, an English Mathematician developed an Algebraic system, which is called Boolean algebra. This is used for manipulation of logical expressions. In 19<sup>th</sup> century, Dr. Herman Hollerith, developed techniques and machines that had significant impact on the future design of computers. He devised a “Consus Machine” which would handle 50 to 80 punched cards per minute. He set up his own company “Computing, Tabulating, Recording Company” which was merged with others and become International Business Machines (IBM). Today IBM is largest manufacturer of computers in the world.

### 2. Computer Generations:

Computers became commercially available during the early 1950's and have experienced very significant technological developments since that time. The changes and improvements

that have been made since 1950 are described as generations of computers.

### **A) First Generation Computers (1942-1955)**

In this vacuum tubes were used to control and amplify electronic signals. These computers could perform computations in milliseconds. These are very large in size and produce large amount of heat. It requires high maintenance (Air conditioning, frequent failure of tubes). These are mostly used for scientific computing rather than administrative applications.

Ex: ENIAC, EDVAC, EDSAC, UNIAC

### **B) Second Generation Computers (1955-1964)**

These computers use transistors in place of vacuum tubes. These are smaller in size, more reliable. It generates less heat. The computational speed and storage capacity were increased. Along with punched cards, magnetic tapes were used for I/O operations.

Ex: IBM 7000 series, ATLAS, LEO, UNIAC III

### **C) Third Generation Computers (1964-1975)**

In this integrated circuits (ICs) were used in place of transistors. These were smaller in size as compared to previous generation computers. These are more reliable and internal storage capacity was further increased (16K to 128K). These computers were able to reduce computational times from microseconds to nanoseconds. Maintenance cost is low because hardware failures are rare. These were widely used for various commercial applications all over the world.

Ex: IBM 960, KL 1900, CDC 6000 and PDP II

### **D) Fourth Generation Computers (1975 onwards)**

Computers with Very Large Scale Integration (VLSI) were termed as fourth generation computers. The size of the computers was reduced and internal capacity increased (128k to 512k and

above). These are much faster in computation than previous generations. Hardware failure is negligible and hence minimal maintenance is required.

Ex: IBM 30330, APPLE II, FACT FINDER, HP 3000 and IDM

### E) Fifth Generation Computers

Computers of future will be based on ULSI (Ultra Large Scale Integration) based on Artificial Intelligence. In structure it will be parallel (the present ones are serial) and will be able to do multiple tasks simultaneously.

In nature, it will not do just data processing but knowledge processing. And in architecture, it will have KIPS (Knowledge Information Processing System) rather than the present DIPS/LIPS (Data/Logic Information Processing System). Japan has already started work in this direction few years back. It has chosen the PROLOG (Programming in Logic) language as its operating software and plans to have the final machine talk with human beings, see and deliver pictures and hear the normal, natural language.

### 3. Classification of Computers

Computers are classified into 3 categories depending on

1. The types of Computer
2. The purpose of Computer
3. The capacity of the Computer

**1.The types of Computers:** Electronic computers are classified as Analog and Digital according to the manner they represent data.

**a) Analog Computers:** These computers operate on data in the form of continuously variable. Measurable physical quantities such as Temperature, Pressure, Revocations, Speed and Voltage. Ex: Automobile speedometer, Slide rule

**b) Digital Computers:** These computers operate on representation of real numbers and other Chargers coded numerically. These have a memory and solve problems by counting

4 **Introduction to Computers**  
precisely. Suited for data processing. More accurate than analog computers.

**2. The purpose of computers:** Depending on the flexibility in operations they are either general purpose or special purpose.

**a) Special purpose computers:** These computers solve a restricted class of problems. It is designed to do only one job. These computers are used to control automated manufacturing process, to track aeroplanes or missiles.

**b) General-purpose computers:** These computers were designed to solve a wide variety of problems. Ex: Payroll, Inventory

**3. The capacity of computers:** The capacity is expressed in terms of volume of words that a computer can handle. The three broad categories are Mainframes, Minis, and Microcomputers.

**a) Mainframe computers:** These are large characterized by a separate processor for computing and handling large volume of data. They can support smaller computers in a Network and Time-sharing systems.

**b) Mini computers:** These are having smaller capacity with more compact.

**c) Microcomputers:** These are built on microprocessors. These are much faster, compact in size, storage from 4k to 128k.

## **1.2 Basic Computer Architecture-Input and Output devices- Identify different peripherals of computer**

### **1. Basic Computer Architecture:**

All computers perform the following five basic operations:  
1.Inputting 2. Storing 3.Processing 4. Outputting 5. Controlling  
The basic internal organization of all computers is one and same.  
Any computer system consists of three distinct units. These units are

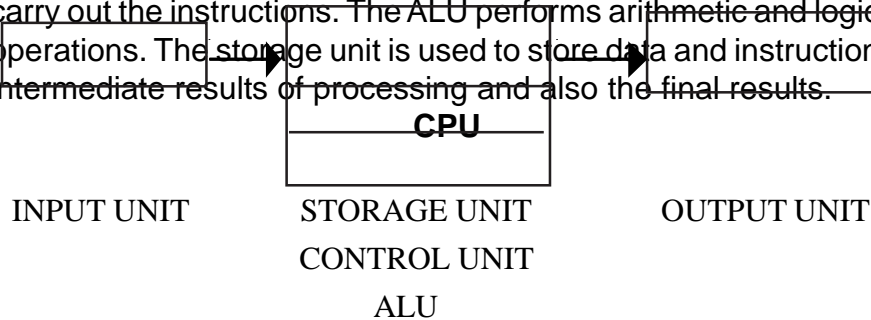
1. Input unit      2. Central Processing unit      3. Output unit

These units are interconnected by electrical cables to permit communication between them. This allows the computer to function as a system.

**1. Input unit:** A computer must receive both data and program statements to function properly and be able to solve problems. The method of inputting data and programs to a computer is accomplished by an input device called input unit. Computer input devices read data from a source, such as magnetic disks and translate that data into electronic impulses for transfer into the CPU. Some typical input devices are keyboard, mouse, and scanner.

**2. Output unit:** The results of the processed data are sent from the CPU to an Output device to show to the outside world. Some typical output devices are floppy disk, hard disk, video display, printer, etc.

**3. Central Processing Unit:** It is called as the brain of computer system. It takes data or information from input unit and process the data and the results are sent to output unit. It consists of a Control Unit, Arithmetic logic Unit (ALU) and Storage Unit .The control unit maintain order of operations and sends the appropriate electronic impulses to ALU and storage sections so that they can carry out the instructions. The ALU performs arithmetic and logical operations. The storage unit is used to store data and instructions, intermediate results of processing and also the final results.



**Fig.1.2.1**

## 2. Input and Output devices:

**1. Input device:** This is used to supply data and programs to the computer system. These read data from a source such as magnetic disks and translate that data into electronic impulses for transfer into the CPU. Ex: Keyboard, MICR, OMR, OCR

**Keyboard:** This is used for typing, speed cannot exceed 200 characters per minute. It generally consists of alphanumeric keys, Cursor control keys, and Function keys.

**MICR:** In this the characters are printed on documents with magnetizable ink. This enables a magnetic ink reader to recognize the characters for input to the computer. These are generally used on Bank Cheques and Postal Orders.

**OMR:** Optical Mark Recognition has been in widespread use since 1960 for a wide variety of applications. Small black marks are printed on documents and is a flexible system because the value or meaning of a mark is unique to the particular type of document.

**OCR:** These documents are clearly understandable to every one. Hand printing requires no special equipment or expertise other than reasonable care.

**2. Output device:** This is used to take results of processed data and shows to the outside world. These results are transferred from the output storage area onto an output medium such as floppy disk, hard drive, video display, printer, and so on.

**MONITOR:** It is visual display unit, which displays data with the help of "Cathode Ray Tube" (CRT). Monitors have 24 rows and 80 columns. There are 3 types of monitors: Monochrome, RGB, and Colour Monitor.

**PRINTER:** This is used to print data on hard copy like paper. There are various types of printers available like Dot matrix, Laser printer, Ink jet printer, etc.

### 3. Different peripherals of Computer System

The various input /output devices and auxiliary storage units of a computer system are called as peripherals. The following are the various peripherals generally used for a computer system:

**1.Keyboard:** This is used to supply data to the computer system by typing. Its speed cannot exceed 3 characters per second. This consists of alphanumeric keys, cursor keys and function keys.

**2.Mouse:** This is a hand-held input device which when run along the table causes the cursor to move correspondingly on the screen. A mouse is a convenient way of selecting parts of display without having to use the keyboard. A mouse may either be attached to the VDU by a lead or be unattached and operate by ultrasonic.

**3. Joystick:** It is a small vertical stick attached to the tracking ball for easier mechanical movements. It is used chiefly in games.

**4. Monitor:** It is used to display data on screen with the help of cathode ray tube. It acts both as input and output device.

**5. Printer and Plotter:** It is used to print the data on to a hard medium like paper. Plotters are used for graphic output and are used in applications like drawing technical diagrams.

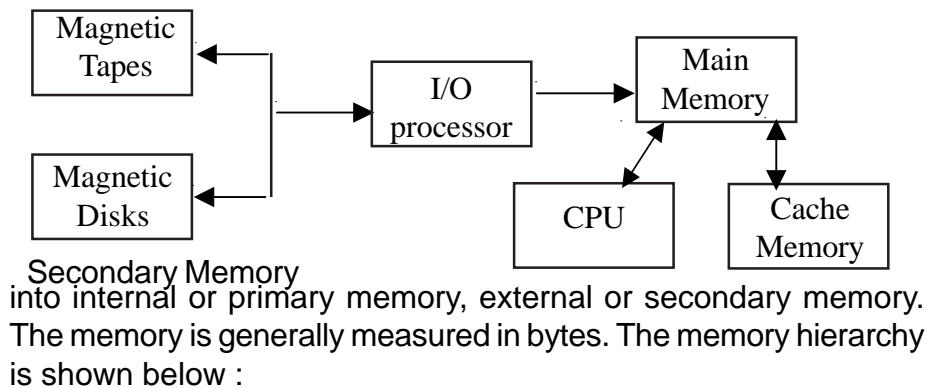
**6. Hard disk:** It is used to store programs (software), data in a computer system. This is fixed inside the CPU box. Its storage capacity is very large. Minimum hard disk storage capacity is 20 MB.

**7. Modem:** This is a modulator-demodulator used to convert digital signals to be communicated over an analog channel such as telephone line to sine waves at the sending end and back to digital signals at the receiving end. This is generally used for Internet connection.

**8. Motherboard:** It is a printed circuit board placed in CPU. It is connected to all other components like RAM, processor, hard disk

### 1.3 Memories-Storage media

Computer memory is a device or medium that can store programs, data and instructions. A memory is made up of a large number of cells with each cell capable of storing one bit. This can be divided



Secondary Memory into internal or primary memory, external or secondary memory. The memory is generally measured in bytes. The memory hierarchy is shown below :

**Fig. 1.3.1**

**1. Primary Memory:** It is made up of several small storage areas called locations or cells. The data and instructions must flow into and out of primary storage. The instructions retained in chips can initiate I/O operations and processing tasks. Two important chips are used in computers for their primary storage. They are the RAM, ROM chips.

Random Access Memory (RAM) provides access to read and write the data from their bit cells. This memory is volatile (caused when the power cuts off). Also known as temporary storage. It is available for the user to store the data and instructions at the time of the execution and can be permanently stored by using a backing storage media.

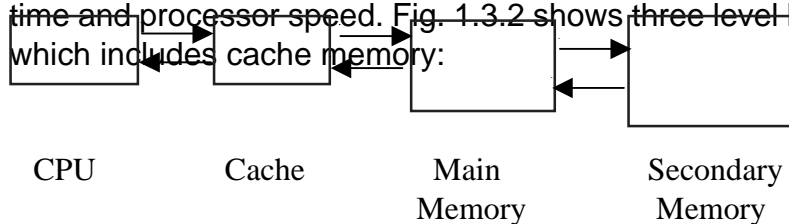
Read Only Memory (ROM) is a non-volatile memory in which all cells are set permanently during manufacturing. It holds the permanent instructions that are needed to the computer all the time it is switched on. The mathematical equivalents, square roots, algorithms, etc. are all set in the ROM storage. An extension of ROM is PROM (Programmable Read Only Memory) and EPROM (Erasable Programmable Read Only Memory).

**2. Secondary Memory:** It is an external storage unit available for the computer system. Data are stored in them in binary codes and are made available to the main storage, when needed. The various memory devices used for secondary memory are:

- a) Floppy disks      b) Winchester disks      c) Optical devices  
 d) Tape devices      e) Hard disks

The total access time to read or write on the magnetic disk is made of two components: Seek time and rotational delay time. Seek time is the time used in moving the read/write heads from one position to another. Rotational delay occurs because the data we want may not be directly under the read/write heads, even though they are located over the correct track. We have to wait for the disk to revolve to the beginning of the desired data. Secondary Memory is considered as a relatively long term, non-volatile storage of data outside the CPU and primary storage. This would make users to store information outside the computer in a non-volatile state and to store large volumes of data.

**3. Cache Memory:** It is a special very high-speed memory used to increase the speed of processing by making current programs and data available to the CPU at a high speed. The cache memory synchronizes the speed difference between main memory access time and processor speed. Fig. 1.3.2 shows three level hierarchy, which includes cache memory:



**Fig. 1.3.2**

## 1.4 Types of Software – Types of Languages – Operating systems

### 1. Types of Software

Software is a general term for a set of instructions that controls the activity of processing by the computer or communications network. Software package is an application, which focuses on a particular subject, such as word processing and is sold to business and the general public. All software packages are accompanied by documentation, which is instruction manual for the software. It is a technical, detailed written description of the specific facts of a program. Computer software is normally classified into two broad categories: application software and systems software.

**a) Application software:** It is a set of one or more programs designed to carry out operations for a specified application. For example, a payroll package produces pay slips and an application package for processing examination results produces mark sheets. Specific purpose application packages have also been developed for specialized areas, such as banking, hospital administration, insurance, publishing, manufacturing, etc.

**b) Systems software:** It is a set of one or more programs, designed to control the operation of a computer system. They are general programs written to assist humans in the use of the computer system by performing tasks, such as controlling all of the operations, required to move data into and out of a computer and all the steps in executing an application program. This support the running of other software, communicate with peripheral devices (printers, card readers, disk and tape devices, etc.). It also supports the development of other types of software and monitors the use of various hardware resources (memory, peripherals, CPU, etc.).

**2. Types of Languages:** Computer language is a system of communication used to communicate between people and the computer. With this, a programmer tells a computer what he wants to do. Computer languages are classified into: Machine Language, Assembly Language and High-level language.

**a) Machine Language:** This is the fundamental language of a computer and is normally written as strings of binary 1s and 0s. It is recognized and converted by computer system into the electrical signals needed to run the computer. Programs written in machine language can be executed very fast by the computer. Writing a program in machine language is so difficult and time consuming that it is rarely used today. It is difficult to correct or modify machine language programs.

**b) Assembly Language:** This is a low-level programming language in which mnemonics are used to code operations and alphanumeric symbols are used for addresses. This language substitutes letters and symbols for the numbers in the machine language program. The translator program, which translates as assembly code into the computer's machine code is called an assembler.

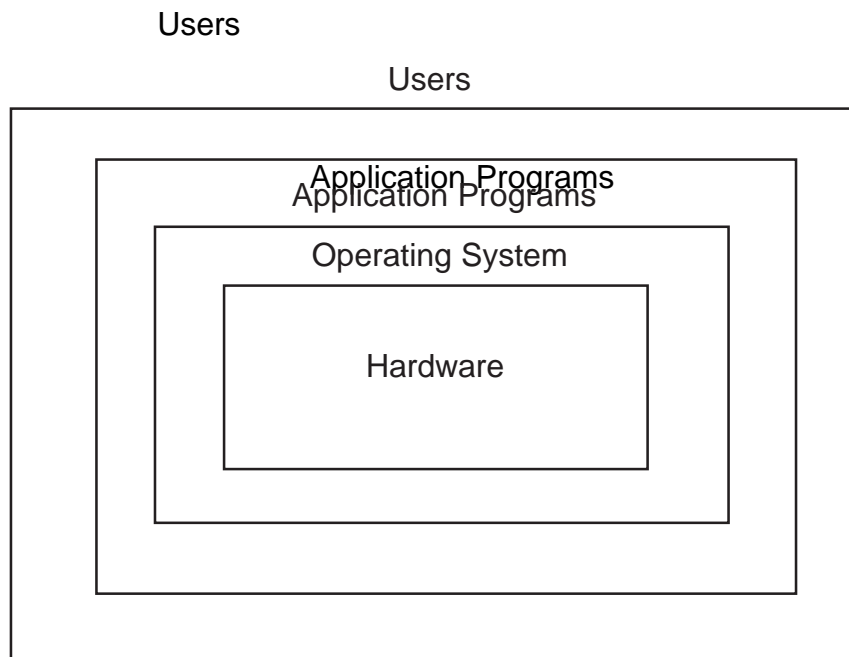
A symbolic program written by a programmer in assembly language is called a source program. After the source program has been converted into machine language by an assembler, is called as object program.

**c) High-level Language:** This is basically symbolic language that use English words and mathematical symbols. This is a programming language whose structure is application oriented and is independent of the structure of the computer. Each statement of such a language is translated into many machine language statements.

**3. Operating Systems:** A set of programs that is used to manage the various resources and overall operations of a computer system. Its prime objective is to improve the performance and efficiency of a computer system. Thus, an operating system is responsible for the smooth and efficient operation of the entire computer system. It makes the computer system user friendly. The operating systems perform the following functions:

- Processor Management – assignment of processors to different tasks being performed by the computer system.
- Memory Management – allocation of main memory and other storage areas to the system programs as well as user programs and data.
- Input/Output Management – coordination and assignment of the different input and output devices while one or more programs are being used.
- File Management – the storage of files on various storage devices and the transfer of these files from one storage device to another.
- It also maintenance of internal clock and log of system usage for all users. It also facilitates easy communication between the computer system and the computer operator. It interprets the commands and instructions.

Fig.1.4.1 shows, the OS tends to isolate the hardware from the user. The user communicates with the OS, supplies application programs and input data, and receives output results.



**Fig. 1.4.1**

Operating systems were designed as single user OS and multi-user OS. MS-DOS is a single user OS, which does not allow two programs, stored in memory to run concurrently protected from one another. MS-DOS is character user interface. UNIX, MS-WINDOWS, OS2 are multi-user OS. These are Graphic user interface.

1. Explain the history of computers.
2. Explain the generations of computers.
3. Draw block diagram of computer. Explain the functions of each unit.
4. Explain the functions of computer peripherals.

## EXERCISE

2  
MS-DOS

### 2.1 System files-Naming of files-Wild card characters

#### 1. System files

MS-Dos means Micro Soft Disk Operating System, which is developed by Micro Soft Company in Assembly language in the year 1980. Dos act as an interface between the user and the computer. It is a set of programs that manages computer resources, that the computers can be used more efficiently. MS-DOS performs the following tasks:

- a. It looks packages like WordStar, Dbase, Lotus, etc.
- b. It allows us to create program and data files and saves them on disk or floppy under the file name we give.
- c. It copies files from floppy to disk or disk to floppy, etc.
- d. It allows us to print files on printer.

The loading of operating system in the computer memory is called Booting. There are two types of Booting:

**a. Cold Booting:** This happens when you switch on the computer.

**b. Warm Booting:** This happens when the computer is already switched on. Warm booting is done by pressing Reset button or by pressing Ctrl+Alt+Del keys simultaneously.  
There are three System files in MS-Dos.

1. COMMAND.COM
2. IO.SYS
3. MSDOS.SYS

IO.SYS & MSDOS.SYS are called as hidden files, which mean the files, which exist physically but not visible. When we execute the DIR command, except COMMAND.COM the remaining system

files are not displayed. The hidden files are the main DOS files which will always interact with BIOS and there by perform the operations. The COMMAND.COM is one of the DOS files, which contain INTERNAL commands. The commands, which are not present in the COMMAND.COM, are known as EXTERNAL COMMANDS.

## 2. Naming of files

DOS maintain our programs, data on disk as files. The files will have a unique name for identifications. The name is given by the creator of the file (i.e. yourself), according to the rules of DOS. The rules are as follows:

1. The file name can be 1 to 8 characters in length.
2. The filename can contain alphabets (A-Z), numbers (0-9) and special characters like \_ (underscore).
3. There should not be spaces in between.
4. The file may have three-character extension, after main file name, followed by dot. Ex: Hari\_2005.dat, October. PAY, MY.DOC

## 2. WILDCARD CHARACTERS

DOS supports two wildcard characters i.e. ? and \*, that allow you to specify a group of file names. ? is used for a single character in the specified position, \* is used for set of characters, starting at the specified position within the filename or extension.

Ex:

1. DIR \*.COM — This lists all files with any primary name and with Extension COM.
2. DIR A\*. \* —Lists all files that start with A.
3. To see files with first two characters BL, third changing, and next two characters ND. The command is DIR BL? ND. \*.  
This displays
 

BLAND.EXE	BLIND.COM
BLOND.EXE	BLIND.COM

Some list of the file name Extensions:

1. .DOS — DOCUMENT FILES
2. .BAS — BASIC FILES
3. .COB — COBOL FILES
4. .PRG — PROGRAMMING FILES
5. .DBF — DATA BASE FILES
- 6 .PAS — PASCAL FILES
7. .EXE — EXECUTIVE FILES
8. .SYS — SYSTEM FILES

## 2.2 Practice on Internal commands

**INTERNAL COMMANDS:** The internal commands are those commands, which are memory resident. They are automatically loaded when the DOS is loaded. The following are the various types of internal commands:

- |          |         |              |            |        |
|----------|---------|--------------|------------|--------|
| 1. DATE  | 2. TIME | 3. CLS       | 4. VOL     | 5. VER |
| 6. REN   | 7. COPY | 8. DIR       | 9. TYPE    | 10. MD |
| 11. CD   | 12. RD  | 13. PATH     | 14. PROMPT |        |
| 15. ECHO | 16. DEL | 17. COPY CON | 18. ERASE  |        |

1. **DATE:** Display or sets the systems date  
Syntax: DATE [MM/DD/YY] — If you invoke DATE command without parameters, DOS displays the current system date and prompts you to enter a new date. Dates are accepted using the format MM/DD/YY.

2. **TIME:** Displays and allows changes to the system time.  
Syntax: TIME [hh:mm:ss: cc] (A)/(P) — If you invoke TIME without parameters, it displays the current system time and prompts you to enter a new time.

3. **CLS:** It clears the screen. Syntax: CLS — The cls command is invoked without parameters, it will erase all characters on the screen and displays the Dos prompt.

4. **VOL:** Displays the disk Volume label. Syntax: VOL (drives:)

5. **VER:** Displays the current DOS version number. Syntax: VER

**6.REN:** It changes the file name with a new file name.

Syntax: REN (drive/path) <old file name(s)><new file name(s)>

Ex: C>REN hari.doc kiran.bas —It renames hari.doc file as kiran.bas

**7.COPY:** Copies and combines files. Can overwrite or erase data.

Syntax: COPY <source file>< target file>

**8. DIR:** Displays a list of files in a directory

Syntax: DIR (drive:\path\file(s)) (/options)

/P: Displays the list of the files in the directory page by page.

/W: Causes only files and extensions to be listed, in the wide format with as many as five file names per line.

/S: Displays files in all sub-directories nested below, the specified directory.

/Alt: Displays hidden files.

/B: Displays files and directory names only.

/L: Displays file names in lowercase.

/O: Lists files in sorted order.

**9. TYPE:** Displays all files on drive, if you give a file name it will display the contents of the file.

**10. MD or MKDIR:** It creates a new subdirectory. Ex: MD raja — It creates a directory with name raja.

**11.CD or CHDIR:** It will move to that directory

**12. RD or RMDIR:** It will remove empty subdirectories.

**13. PATH:** It looks for program files on the sub-directories

**14. PROMPT:** It changes the appearance of the DOS system prompt. Syntax: PROMPT <prompt string>

SS-Dollar sign      SD-Current date      ST-Current Time

**15. ECHO [on/off]:** The prompt will not be displayed on the screen.

**16. COPY CON:** We can create a new file in DOS.

**17. ERASE:** This is used to delete the files.

**18. DEL:** It deletes one or more files.

### 2.3 Practices on External Commands

External Commands are those commands whose files have to present in the working area. The following are the External Commands:

- |             |            |              |           |
|-------------|------------|--------------|-----------|
| 1. APPEND   | 2. HELP    | 3. MORE      | 4. PRINT  |
| 5. REPLACE  | 6. RESTORE | 7. SYS       |           |
| 8. UNDELETE | 9. FORMAT  | 10. UNFORMAT |           |
| 11. TREE    | 12. MODE   | 13. DISKCOPY |           |
| 14. CHKDSK  | 15. BACKUP | 16. ATTRIB   |           |
| 17. XCOPY   | 18. COMP   | 19. FIND     | 20. LABEL |

**1. APPEND:** Establishes a sub directory search path for data files.

Syntax: APPEND [source drive:\path) (; additional drive) (\options)

Options: /E Stores the search path within the dos environment

/X Allows additional DOS commands to access the data search path.

**2. HELP:** Displays short summaries of command syntax.

**3. LABEL:** Adds or modifies a disk volume label.

**4. MORE:** It displays the output one screen at a time.

**5. PRINT:** It prints series of files in background while you continue to work with dos. Options are B-specifies the size in bytes of the printer buffer, D-specifies the output name, M-Specifies the maximum number of internal clock ticks DOS will take to send a character to the printer. Q-specifies the maximum number of files to be allowed in print queue.

Filename/c — Removes the indicated file name from the print queue.

Filename/p —Adds the indicated file name to the print queue.

**6. REPLACE:** Require two parameters source file name and target file name. Options: /A —Adds files. /P —Displays prompt asking you to confirm each copy before copying the file to the target. /R —Disables overwrite protection for read-only files on the target.

**7. RESTORE:** Restore files from disks making use of the backup. It requires two parameters a source drive where the backup files are stored and a target drive usually hard disk.  
Options: /A — mm-dd-yy forces restoration of only those were modified on or after the specified date. /D — Displays files name on the backup disk but do not restore them. /E —hh-mm-ss forces restoration of those files modified at or earlier than the specified time. /M — Restores only those files that were modified since the last backup was made. /N — Restores only those files that were deleted since the last backup.

**8. SYS:** Copies DOS system files to a new disk.

**9. UNDELETE:** Recovers accidentally deleted files. Syntax: UNDELETE (drive path) file(s) (/options). Options: /DT — Forces DOS to use a delete tracking file to locate and recover deleted files. /ALL — Invokes automatic undelete and renaming of all specified files.

**10. FORMAT:** Prepares a blank disk for receiving and storing data. Or creates a new blank disk from a used one. Syntax: FORMAT target drive: (/options) Options: /L — Formats a double disk as a single sided disk. /B — Formats a disk so as to leave room for the system files, although system files are not copied. Cant be used with the /T or /S options. /S —Transfers DOS system files to the formatted disk. /U — All data on a previously formatted disk is destroyed, and you will not be able to unformat this disk later.

**11. UNFORMAT:** Recovers files from an accidental disk format if a disk has been accidentally formatted. Syntax: UNFORMAT drive:(options). Options: L lists the existing partitions, but does not restore them. U — Restores the disk without using the image file.

**12. TREE:** Displays the subdirectory structure of a specified drive. Syntax: TREE (drive:\path) (options). Options: F – Includes the file name in each subdirectory. A – Displays the subdirectory using standard ASCII characters rather than graphic characters. This can speed up printing.

**13. MODE:** Performs various functions relating to the transfer of data between the processor, the screen, the printer and keyboard. It sets the parallel mode. It also sets serial communication protocol. It shifts the screen left or right.

**14. DISKCOPY:** Copies the contents of a floppy disk to another on a track-by-track basis. Syntax: DISKCOPY (source drive:) (target drive) (options)

Options: /V — Performs a validity check on the data copied to the target disk.

**15. CHKDSK:** Analyses, diagnosis and optionally corrects common hard disk errors. Reports on the status of files on disk.

Syntax: CHKDSK (source drive:\path\file(s)) (options)

Options: /F — Enables auto-correction mechanics

**16. BACKUP:** Backs up one or more files from one disk to another.

**17. ATTRIB:** Displays or changes file attributes, read only –r, archive –a, hidden –h, or system-s.

**18. XCOPY:** Copies files (except hidden and system files) and directory trees. Syntax: XCOPY <source file> <destination file> (/A/M)/(D: DATE)

/A	—	archive bit
/m	—	archive bit back up
/d:		date on or after
/p	—	prompt
/s	—	sub directories
/e	—	copy empty directory
/v	—	wait prompt

**19. COMP:** Compares the contents of the two files or sets.

**20. FIND:** Searches for a text string in a file (s) .

/c displays only a count of number of lines that contains the string.

/n displays the line number that includes the string  
/v displays all the lines that do not contain the string  
/i; Ignore the case of letters during the search

3

## MS-Windows

### 3.1 Practice on elements of Windows-98 like My Computer, My Documents, Internet Explorer, Network Neighborhood, Recycle Bin, My Briefcase, etc.

#### 1. Practice on elements of Windows-98

Windows is an extremely good looking and versatile package from Microsoft. The launch of Windows 3.0 in 1989 caused a revolution in the world of GUIs (Graphic User Interface).

**1. My Computer:** It displays the files and folders present in the Computer system. It contains the partitions made to the hard disc (i.e. different drives), floppy drive, and compact disc. It also contains control panel, which customizes the appearance of desktop and configures the computer system. It allows us to set system properties like system configuration details, network identification details, configuration of hardware, user profiles which contain desktop settings and other information related to logon. It also having advanced options like performance- which specifies how applications use memory which affects the speed of your computer, Environment variables – which tell your computer where to find certain type of information, Startup and Recovery – which tell your computer how to start and what to do if an error causes your computer.

**2. My Documents:** A desktop folder that provides you with a convenient place to store and manage documents, graphics, or other files you want to access quickly. When you save a file in a program such as WordPad or paint, the file is automatically saved in My Documents, unless you choose a different folder. On your desktop, it is represented by an icon of a folder with a sheet of paper in it.

Even though My Documents is the default storage location for several programs, your documents are not stored in the same My

Documents folder as another user's if there are multiple user accounts on the computer. Each user has a My Document folder located in the Documents and Settings \ *username* folder. You can change the location of you're my Documents folder by right-clicking My Documents on the desktop, and then clicking **Properties**. In the My Documents **Properties** dialog box, type or browse (click **Find Target**) for the path and folder name where you want to store you're my Documents folder. My Documents also contains the My Pictures folder, which is the default storage location for your pictures when you save them from your digital camera to your computer.

**3. Internet Explorer:** It makes it easier to get the most from the World Wide Web, whether you are searching for new information or browsing your favorite Web sites. And built-in IntelliSense technology can save you time completing routine Web tasks, such as automatically completing Web addresses and forms for you, and automatically detecting your network and connection status.

- When you start typing a frequently used Web address in the Address bar, a list of similar addresses appears that you can choose from. And if a Web-page address is wrong, Internet Explorer can search for similar addresses to try to find a match.
- Search for Web sites by clicking the **Search** button on the toolbar. Then in the Search bar, type a word or phrase that describes what you're looking for. When your search results appear, you can view the individual Web pages without losing your list of search results.
- You can also search directly from the Address bar. Just type common names or words, and Internet Explorer can automatically take you to the site that most likely matches what you are searching for, and list other likely sites as well.
- Go to other Web pages similar to the one you are viewing, without even doing a search. Just use the Show Related Sites feature.
- Once you're on a Web page, Internet Explorer can help you complete entries in any kind of Web-based form. Start typing, and a list of similar entries appears that you can choose from.
- Browse through a list of Web pages you recently visited by clicking the **History** button on the toolbar. In addition you can rearrange or search the History list.

- Listen to broadcast and Internet-only radio stations while you browse. Choose from a wide variety of music and talk radio stations, and add them to your Favorites list. The radio toolbar is available in Internet Explorer when you install Windows Media Player.
- Put shortcuts to your most-used Web pages on your Links bar for quick access.
- Add other frequently visited Web pages to your Favorites list for easy access. Organize your favorite items by using folders, and sort them in the order you want them.
- Choose from your favorite search providers and keep them handy for all your searches.
- Take your favorite Web pages with you: to another computer or browser, or to share with your friends. You can even import bookmarks from Netscape Navigator.
- Mark your favorite Web pages for offline reading, and then view those pages when you're not connected to the Internet. You can update the content any time you're connected, or use a schedule to automatically update it.
- Switch easily between different types of Internet connections without reconfiguring your settings.
- Using Content Advisor, you can screen out objectionable content by using industry-standard ratings that have been defined independently by the Platform for Internet Content Selection (PICS) committee.
- Using security zones, you can set different levels of security for different areas of the Web to help protect your computer.
- Using the optional Microsoft Wallet, you can store your personal credit-card and shipping-address information on your computer, and take advantage of secure providers when you connect to Web sites.

· If your Web browsing takes you to sites written in numerous languages, Internet Explorer can update your computer with the character sets you need to view these sites correctly.

The Internet Connection wizard provides you with an easy way to get connected to the Internet. Whether you've never explored the Internet before or have spent many hours online, the Internet Connection wizard can help you set up a connection.

For new Internet users, the Internet Connection wizard creates an Internet connection for you, and then displays a list of Internet service providers (ISPs) and information about their services. You can sign up for a new account by clicking an ISP in the list.

If you already have an account with an ISP and want to create an Internet connection to your account, the Internet Connection wizard collects all the necessary information from you and then creates the connection. If you are not already running the wizard, you can start it from Internet Explorer as follows:

1. On the **Tools** menu in the browser, click **Internet Options**.
2. Click the **Connections** tab, and then click **Setup**.
3. Follow the instructions on your screen.

**4. My Briefcase:** If you frequently work on files outside your main computer (using a portable computer, for example), you can use Briefcase to synchronize the files with their counterparts on your main computer when you finish working on them. When you reconnect your portable computer to your main computer (or insert a removable disk containing the modified files), Briefcase automatically updates the files on your main computer to the modified versions. You do not need to move modified files out of Briefcase or delete the existing copies on your main computer.

Briefcase stores files and displays their status. For instance, it can show you whether a file is linked to the original file on your main computer, or whether it is an orphan file. This information helps you keep your files organized and prevents you from accidentally deleting or copying over the most recent version of a file.

- Briefcase is the best tool for you if you frequently transfer files between computers using a direct cable connection or a removable disk. Using Briefcase, you can synchronize the files you modified on another computer with their counterparts on your main computer. You can keep your files organized by creating multiple briefcases.
- Offline Files is the best tool for you if you want to work with shared files on a network. Using Offline Files, you can make changes to shared files while disconnected from the network and then synchronize them the next time you are connected to the network.
- To find the copy of the file that is outside Briefcase (which is the counterpart to the copy that is stored in Briefcase), on the **Update Status** tab, click **Find Original**.
- If you want to view the status of the files that are stored in Briefcase and the status column does not appear in the right pane of the Briefcase window, on the **View** menu, click **Details**.

To check the status of files in Briefcase

1. Open Briefcase, and click the file you want to check.
2. On the **File** menu, click **Properties**.
3. Click the **Update Status** tab.

**5. Recycle Bin:** The Recycle Bin provides a safety net when deleting files or folders in Windows. When you delete any of these items from your hard disk, Windows places it in the Recycle Bin and the Recycle Bin icon changes from empty to full. Items deleted from a floppy disk or network drives is permanently deleted and are not sent to the Recycle Bin.

Items in the Recycle Bin remain there until you decide to permanently delete them from your computer. These items still take up hard disk space and can be undeleted or restored back to their original location. When it fills up, Windows automatically cleans out enough space in the Recycle Bin to accommodate the most recently deleted files and folders.

If you're running low on hard disk space, always remember to empty the Recycle Bin. You can also restrict the size of the Recycle Bin to limit the amount of hard disk space it takes up.

To change the storage capacity of the Recycle Bin

1. On the desktop, right-click the **Recycle Bin** icon, and then click **Properties**.
2. Move the slider to increase or decrease the amount of disk space that is reserved for storing deleted items.
  - A deleted item that is larger than the storage capacity of the Recycle Bin will not be saved. It will be permanently deleted.
  - If you want to use different Recycle Bin settings for different drives, click **Configure drives independently**, and then click the appropriate drive tab to change the Recycle Bin settings for that drive.
  - If you want to use the same Recycle Bin settings for all drives, click **Use one setting for all drives**.

To delete or restore files in the Recycle Bin

1. On the desktop, double-click **Recycle Bin**.
2. Do one of the following:
  - To restore an item, right-click it, and then click **Restore**.
  - To restore all of the items, on the **Edit** menu, click **Select All**, and then on the **File** menu, click **Restore**.
  - To delete an item, right-click it, and then click **Delete**.
  - To delete all of the items, on the **File** menu, click **Empty Recycle Bin**.
  - Deleting an item from the Recycle Bin permanently removes it from your computer. Items deleted from the Recycle Bin cannot be restored.

- You can also delete items by dragging them into the Recycle Bin. If you press SHIFT while dragging, the item is deleted from your computer without being stored in the Recycle Bin.
- Restoring an item in the Recycle Bin returns that item to its original location.
- To retrieve several items at once, hold down CTRL, and then click each item that you want to retrieve. When you have finished selecting the items that you want to retrieve, on the **File** menu, click **Restore**.
- If you restore a file that was originally located in a deleted folder, the folder is recreated in its original location, and then the file is restored in that folder.
- The following items are not stored in the Recycle Bin and cannot be restored:
  - Items deleted from network locations.
  - Items deleted from removable media (such as 3.5-inch disks).
  - Items those are larger than the storage capacity of the Recycle Bin.

**6. Network Neighborhood:** In Windows, Network Neighborhood has been renamed My Network Places and is located on the desktop. My Network Places provides a view of all the shared computers, files and folders, printers, and other resources on the Network to which your computer is connected. For you can open My Network Places by double-clicking My Network Places on the desktop.

My Network Places displays all of the shared computers, printers, and other resources on the network to which your computer is connected. You can use the Add Network Place wizard to create shortcuts to network, Web, and FTP servers. Computers Near Me enable you to narrow your search to computers in the same workgroup. To open My Network Places, double-click My Network Places on the desktop.

To connect to a NetWare volume by using My Network Places

1. On the desktop, double-click **My Network Places**.
2. Do one of the following:
  - Double-click **NetWare or Compatible Network**.
  - Double-click **Entire Network**, view the entire contents, and then double-click **NetWare or Compatible Network**.
3. Double-click a tree or volume to see the contents. You can then double-click those contents to see other computers or volumes.
4. Do one of the following:
  - When you find the volume or folder that you want to access, double-click the volume or folder to expand it.
  - To map a local drive to the volume or folder, click the volume or folder, and on the **Tools** menu, click **Map Network Drive**.
  - When you map a network drive, you are connected by default under the user name and password you used to log on. To connect under a different user name, follow the instructions in the Map Network Drive wizard.
  - To view or connect to NetWare resources, you must first install Client Service for NetWare or Gateway Service for NetWare, and the NWLink IPX/SPX/Net BIOS Compatible Transport Protocol.

### **3.2 Practices on Starting a Program like Start Menu, Programs Menu, Documents Menu, Find and Help Menu**

1. **Start Menu:** To start a program each time you start Windows
  1. Click **Start**, point to **Settings**, and then click **Taskbar & Start Menu**.
  2. Click the **Advanced** tab, and then click **Advanced**.
  3. In the Start Menu folder, find the shortcut to the program you want to start each time you start Windows, and drag it to the Startup folder.

- To open the **Taskbar and Start Menu Properties** dialog box, right-click an empty area on the taskbar, and then click **Properties**.
- To add a program shortcut to the **Startup** menu, drag the icon to the **Start** button, the **Programs** menu, and then drop it in the **Startup** menu.

When you click **Start**, you can open programs on your hard disk by using shortcuts. Program shortcuts are usually listed in the **Start** menu and submenus. The program shortcuts, folders, and submenus listed in the **Start** menu come from several places:

- **Previous versions of Windows.** If you upgraded from an earlier version of Windows or Windows NT, your old program groups appear as folders on the **Programs** menu.
- **Windows 2000 Setup.** Windows 2000 Setup adds several standard folders, each of which contains a group of programs. One of these folders is called Startup; the programs within appear on the **Startup** menu and run automatically when you start your computer.
- **Other software setup programs.** The setup programs for any software you install may add folders to the **Programs** menu.
- **Shortcuts.** You can create shortcuts to programs using the **Taskbar Properties** dialog box, or you can drag icons to your desktop or taskbar. Your administrator may also create shortcuts for groups of users.

To start a program by using the Run command

1. Click **Start**, and then click **Run**.
  2. In **Open**, type the path to the item you want to open, or click **Browse** to locate it.
- The **Open** box lists items you have opened recently. Click an item in the list, and then click **OK** to open it.
  - You can open a file or folder or connect to a shared computer by typing its path in the **Open** box. You can also connect to an

Internet or intranet site; for example, to reach the Microsoft Web site, type **www.microsoft.com** in the **Open** box.

## 2. Programs Menu: To start a program

- Click **Start**, point to **Programs**, locate the program you want to start, and then click it.
- After you start a program, a button representing the program appears on the taskbar. To switch from one running program to another, click its taskbar button.
- If a program doesn't appear on the **Programs** menu or one of its submenus, you can perform a search for it, create a shortcut, and then drag the shortcut to the **Start** or **Programs** menu.

To start a program by using the Run command

1. Click **Start**, and then click **Run**.
  2. In **Open**, type the path to the item you want to open, or click **Browse** to locate it.
- The **Open** box lists items you have opened recently. Click an item in the list, and then click **OK** to open it.
  - You can open a file or folder or connect to a shared computer by typing its path in the **Open** box. You can also connect to an Internet or intranet site; for example, to reach the Microsoft Web site, type **www.microsoft.com** in the **Open** box.

**3. Documents Menu:** Documents Menu is a desktop folder that provides you with a convenient place to store documents, graphics, or other files that you want to access quickly. On your desktop, it is represented by an icon of a folder with a sheet of paper in it. When you save a file in a program such as WordPad or Paint, or when you save Web documents from Internet Explorer to your computer, the file or document is automatically saved in Documents unless you choose a different location.

Even though My Documents is the default storage location for several programs, your documents are not stored in the same My Documents folder as another user's if there are multiple user

accounts on the computer. Each user has a My Documents folder located in the Documents and Settings\*username* folder.

You can change the location of your My Documents folder by right-clicking **My Documents** on the desktop, and then clicking **Properties**. In the **My Documents Properties** dialog box, type or browse (click **Find Target**) for the path and folder name where you want to store your My Documents folder.

My Documents also contains the My Pictures folder, which is the default storage location for your pictures when you save them from your digital camera to your computer.

**4. Find:** Unless you specify the */i* switch, find searches for exactly what you specify for *string*. For example, the find command treats the characters “a” and “A” as different. If you were to use the */i* switch, however, find would ignore case and search for “a” and “A” as if they were the same character.

If the string you want to search for contains quotation marks, you must use two quotation marks for each quotation mark contained within the string.

#### **Using find as a filter**

If you omit a file name, find acts as a filter, taking input from the Windows standard source (usually the keyboard, a pipe, or a redirected file) and displaying any lines that contain *string*.

#### **Ordering the command**

You can type parameters and switches for the find command in any order.

#### **Using wildcards with find**

You cannot use wildcards (\* and?) in file names or extensions that you specify with the find command. To search for a string in a set of files you specify with wildcards, you can use the find command in a **for** command.

#### **Using the /v or /n switch with the /c switch**

If you specify the **/c** and **/v** switches in the same command, find displays a count of the lines that do not contain the specified string. If you specify the **/c** and **/n** switches in the same command, find ignores the **/n** switch.

### Using find in files with carriage returns

The find command does not recognize carriage returns. When you use find to search for text in a file that includes carriage returns, you must limit the search string to text that can be found between carriage returns; that is, a string that is not likely to be interrupted by a carriage return. For example, find does not report a match for the string "tax file" wherever a carriage return occurs between the word "tax" and the word "file."

**5. Help:** Provides online information about Windows commands (non-network). Specifies the name of the command about which you want information. If you do not specify a command name, the **help** command lists and briefly describes every Windows 2000 system command.

- There are two ways to get online Help for a command. You can specify the name of the command on the **help** command line, or you can type the name of the command and the **/?** switch at the command prompt. For example, you can type either of the following commands to get information about the **xcopy** command:

**help xcopy**                      **xcopy /?**

The second command is slightly faster. Click **net help** in the Related Topics list for information about help with network commands.

### Net Help

Provides a list of network commands and topics you can get help with, or provides help with a specific command or topic. The available net commands are also listed in the Commands window of the Command Reference under N. Click **Windows Command Reference** in the Related Topics list.

**net help [command]**    **net command {/help | /?}**

**Parameters** none

Type **net help** without parameters to display a list of commands and topics for which you can get help. Is the command you need help with. Don't type **net** as part of *command*. **/help | /?**-Displays the correct syntax for the command. **/help** provides an alternate way to display the help text.

**3.3 Creating and Editing Text files – Deleting and Restoring files and folders****1. Creating and Editing Text files:**

On a computer running Windows 2000 Server, the folders appear in the File Manager directory tree as subdirectories of the directory. To create another subdirectory, you select the directory in which it will appear and choose Create **Directory** from the **File** menu. On a Macintosh computer, you create folders using the **New Folder** command on the **File** menu. You view and use folders in the Macintosh-accessible volume just as you would any other volume, by using the **View** menu to see the folders organized by Name, Date, Icon, Size, and so forth. You cannot, however, designate the subdirectory or folder as another Macintosh-accessible volume when the directory is already designated as a Macintosh-accessible volume.

Edit - Starts MS-DOS Editor, which creates and changes ASCII text files.

```
edit [[drive:][path] filename] [/b] [/g] [/h] [/nohi]
```

**Parameters**

*[drive:][path] filename*

Specifies the location and name of an ASCII text file. If the file does not exist, MS-DOS Editor creates it. If the file exists, MS-DOS Editor opens it and displays its contents on the screen.

**/b** -Displays MS-DOS Editor in black and white. You use this option if MS-DOS Editor isn't displayed correctly on a monochrome monitor.

**/g** - Uses the fastest screen updating possible for a CGA monitor.

**/h** - Displays the maximum number of lines possible for the monitor you are using.

**/nohi** - Enables you to use eight-color monitors with MS-DOS Editor. Usually, Windows 2000 uses 16 colors.

- MS-DOS Editor does not work if the file Qbasic.exe is not in the current directory, in the search path, or in the same directory as the file Edit.com. If you delete Qbasic.exe to save space on your hard disk, you cannot use MS-DOS Editor.
- Some monitors may not support the display of shortcut keys by default. If your monitor does not display shortcut keys, use the **/b** switch (for CGA monitors) and the **/nohi** switch (for systems that do not support bold characters).

## 2. Deleting and Restoring files and folders:

To delete a file or folder

1. Open Windows Explorer.
  2. Click the file or folder you want to delete.
  3. On the file menu, click Delete.
- To open Windows Explorer, click **Start**, point to **Programs**, point to **Accessories**, and then click **Windows Explorer**.
  - Deleted files remain in the Recycle Bin until you empty it unless you press and hold down SHIFT while dragging an item to the Recycle Bin. Then the item is deleted from your computer without being stored in the Recycle Bin.
  - If you want to retrieve a file you have deleted, double-click **Recycle Bin** on the desktop, right-click the file you want to retrieve, and then click **Restore**.
  - You can also delete files or folders by right-clicking the file or folder and then clicking Delete.

To remove items permanently when you delete them

1. On the desktop, right-click **Recycle Bin**, and then click **Properties**.
2. Select the **Do not move files to the Recycle Bin** check box.

#### Important

- If the **Do not move files to the Recycle Bin** check box is selected, you will not be able to recover any items that you delete.
- You can also remove an item permanently by holding down SHIFT while dragging the item to the Recycle Bin.
- If you want to use different Recycle Bin settings for different drives, click **Configure drives independently**, and then click the appropriate drive tab to change the Recycle Bin settings for that drive.
- If you want to use the same Recycle Bin settings for all drives, click **Use one setting for all drives**.

### 3.4 Copying and Moving objects – Drag and Drop feature – using keyboard - using Standard Tool bar – Right Dragging Method

#### 1. Copying and Moving objects:

##### Copying to and from devices

You can substitute a device name for one or more occurrences of *source* or for *destination*.

##### Using or omitting the **/b** switch when copying to a device

When *destination* is a device (for example, Com1 or Lpt1), the **/b** switch causes Windows to copy data to the device in binary mode. In binary mode, all characters (including such special characters as CTRL+C, CTRL+S, CTRL+Z, and carriage return) are copied to the device as data. However, if you omit the **/b** switch, Windows copies data to the device in ASCII mode. In ASCII mode,

such special characters as those previously listed may cause Windows 2000 to take special action during the copying process, as described in the following section.

### Using the default destination file

If you do not specify a destination file, Windows creates a copy with the same name, creation date, and creation time as the original file, placing the new copy in the current directory on the current drive. If the source file is on the current drive and in the current directory and you do not specify a different drive or directory for the destination file, the copy command stops and Windows 2000 displays the following error message:

```
File cannot be copied onto itself - 0 File(s) copied
```

### Using the /v switch

If Windows cannot verify a write operation, it displays an error message. Although recording errors rarely occur with the copy command, you can use the **/v** switch to verify that critical data has been correctly recorded. The **/v** switch also slows down the copy command, because Windows must check each sector recorded on the disk.

### Using the /a and /b switches

The effect of an **/a** or **/b** switch depends upon its position on the command line. When the **/a** or **/b** switch follows the source file name, copy performs as shown in the following list:

**/a** Treats the file as an ASCII (text) file and copies data that precedes the first end-of-file character. Copy does not copy the first end-of-file character or the remainder of the file.

**/b** Copies the entire file, including any end-of-file character.

When the **/a** or **/b** switch follows the destination file name, copy performs as shown in the following list:

**/a** Adds an end-of-file character as the last character of the file.

**/b** Does not add an end-of-file character.

### Combining files with the copy command

If you specify more than one *source*, separating entries with a plus sign (+), copy combines the files, creating a single file. If you use wildcard characters (\* or ?) in *source* but specify a single file name in *destination*, copy combines all files matching the file name in *source* and creates a single file with the file name specified in *destination*.

In either case, copy assumes the combined files are ASCII files unless you specify the **/b** switch.

### Copy files in subdirectories

To copy all of a directory's files and subdirectories, you should use the **xcopy** command.

### Copying zero-length files

Copy does not copy files that are 0 bytes long. Use **xcopy** to copy these files.

### Changing the time and date of a file

If you want to assign the current time and date to a file without modifying the file, use a command in the following format. The commas indicate the omission of the *destination* parameter.

Copy /b source+,

**Move** – Moves one or more files from one directory to the specified directory.

Move [**/y** | **/-y**] [*source*] [*target*]

### Parameters

**/y** - Suppresses prompting to confirm you want to overwrite an existing destination file.

The **/y** switch may be preset in the COPYCMD environment variable. This may be overridden with **/-y** on the command line. The default is to prompt on overwrites unless the **copy** command is being executed from within a batch script.

**/-y** - Causes prompting to confirm you want to overwrite an existing destination file.

*Source*- Specifies the path and name of the file or files to move. If you want to move or rename a directory, *source* should be the current directory path and name.

*Target*- Specifies the path and name to move files to. If you want to move or rename a directory, *target* should be the desired directory path and name.

## 2. Drag and Drop feature:

To move files by dragging:

1. Open Windows Explorer. Find the file or folder you want to move.
3. Make sure the destination for the file or folder you want to move is visible.
4. Drag the file or folder to the destination.
  - To open Windows Explorer, click **Start**, point to **Programs**, point to **Accessories**, and then click **Windows Explorer**.
  - If you drag using the right mouse button, a menu appears with the commands **Move Here**, **Copy Here**, **Create Shortcut(s) Here**, and **Cancel**. Click the command you want.
  - To copy the item instead of moving it, press and hold down CTRL while dragging.
  - If you drag an item to another disk, it is copied, not moved. To move the item, press and hold down SHIFT while dragging.

To drag by using MouseKeys

- To move the pointer over the object you want to move or over the area you want to move to, press the arrow keys on your numeric keypad.
- To hold down the mouse button, press the INSERT key on your numeric keypad.
- To release the mouse button, press the DELETE key on your numeric keypad. Make sure MouseKeys is turned on.
- To change accessibility settings from Control Panel, click **Start**, point to **Settings**, click **Control Panel**, and then double-click **Accessibility Options**.
- If MouseKeys doesn't function, press NUM LOCK, and then try MouseKeys again.

- To specify whether NUM LOCK must be on or off for MouseKeys to function, on the **Mouse** tab, click **Settings**, and then for **Use MouseKeys when NumLock is**, click **On** or **Off**.
- To change the pointer speed and acceleration when using MouseKeys, on the **Mouse** tab, click **Settings**, and then move the sliders to adjust the pointer speed and acceleration.
- To temporarily increase or decrease the pointer speed, on the **Mouse** tab, click **Settings**, and then select the **Hold down Ctrl to speed up and Shift to slow down** check box.

### 3.5 Printing from Windows

To Print a document

1. Open the document you want to print.
  2. On the **File** menu of the program you are using, click Print.
- In the Print dialog box you can see the number of documents waiting to print on any printer installed on your computer by right-clicking the printer in **Select Printer** and then clicking **Open**.
  - If you are logged on to a Windows 2000 domain running Active Directory, you can click **Find Printer** to search for a printer on the network with the capabilities you want, such as high-speed or color printing. For more information on searching for a printer see Related Topics.
  - To store a document as a file rather than sending it to the printer, click the **Print to file** check box in the Print dialog box.
  - For easy access to your printer, you can create a shortcut to it on the desktop. You can double-click the shortcut to open the print queue and view the documents waiting to print. For more information on how to create a shortcut, see Related Topics.
  - You can print a document without opening it by dragging its icon to a printer in the Printers folder or to a shortcut on your desktop.
  - While a document is printing, a printer icon appears next to the clock in the status area on the taskbar. When this icon disappears, it means that your document has finished printing.

## 4 MS-WORD

### 4.1 Creating, Opening and Modifying Documents

**MS-WORD** is an advanced word processing product by Microsoft for IBM-AT and compatibles. It can integrate information from non-Word programs like spreadsheets, databases, graphic sources, etc., and ensures that MS-WORD documents are automatically updated when those outside information sources change.

To start word, click on the **start** button and place the pointer on the **Programs** item. A sub menu of the programs item is displayed. In this menu click on the item which shows **Microsoft Word**. The word document window has the following basic components:

1. Title bar
2. Tools bar
3. Menu bar
4. Ruler bar
5. Status bar
6. Scroll bar
7. Work space

**1. Title bar:** It will display the name of the currently active Word document.

**2. Tools bar:** Word has two most commonly used tool bars- Formatting tool bar and Standard tool bar. These are displayed just below the title bar.

**3. Ruler bar:** The ruler bar allows you to format the vertical alignment of text in a document. It can also be used to set tab stops on a line.

**4. Status bar:** It displays information about the active document or the task on which you are currently working. This includes the page number that you are on, the column and line number on which you have positioned the cursor and so on.

**5. Scroll bar:** It helps you scroll the contents of a document. You can do so by moving the elevator along the scroll bar, or by clicking on the buttons with the arrows marked on them, to move up and down a page.

**6. Workspace:** It is the area in the document where you enter the text of your document.

Select the option File from the Menu bar. A drop down menu will be displayed. From the menu, choose the option new. The New dialog box will be displayed. Word will prompt you to choose a document template. There are various types of templates available, choose Normal for general purpose and click on OK. A new document window will be displayed for you to enter your text.

Now type the text in the document. At the end of a line, the text will automatically word-wrap to the next line in case it does not fit on the current line. It is not necessary to press the <Enter> key. When the end of a paragraph is reached, the <Enter> key has to be pressed to insert a blank line before the next paragraph.

When you enter your text, you are quite likely to make mistakes. Correction of these mistakes is called editing. Editing text is an essential feature of a word processing package. The following keys are used to move around in a document:

Left arrow ( ) – Left one position	Right arrow ( ) – Right one position
Up arrow( ) — Line above	Down arrow ( ) — Line below
<Ctrl> Ctrl and left arrow	Previous word
<Ctrl> Ctrl and right arrow	Next word
<Home> Home	Beginning of a line
<End> End	End of line

To insert characters, position the cursor at the point where the characters have to be inserted and type them. The button *OVR* on the status bar will appear dim when word is in the insert mode and highlighted when it is in the overwrite mode. The insert key can be used to toggle the mode of operation. In the insert mode you can insert as many characters as you desire. Word automatically reformats the paragraph and moves words that do not fit on the current line to the next line or the current page to the next page as the case may be.

By pressing either the <Backspace> or the <Del> key, a character is removed from the working copy. The <Del> key removes a character from the current cursor and moves the cursor

one position left. Lines can be inserted by pressing the <Enter> key when the cursor is either at the beginning or the end of the line.

When you key in your document, the document is stored in the internal memory of the machine. In order to preserve the document for future use, you must save it on the disk. To do so,

- Click on the option File on the Menu bar. The same drop down menu that was displayed while creating the document will be displayed.
- Select the option Save from the drop down menu. The Save As dialog box will be displayed.
- Key in the name of the new file in the File Name text box and click on OK. By default the new document will be saved as a word document, with an extension DOC.

To open an existing document, select the option Open from the File drop-down menu. The Open dialog box will be displayed. Select the directory where the document is stored from the list of directories displayed. Enter the file name to be retrieved or click on the name of the file in the Files list and click on OK to complete the process. The document will be displayed.

**Note:** The students are advised to practice on how to create, edit and save files in MS-WORD. Also practice different options present in drop-down menus of Menu bar.

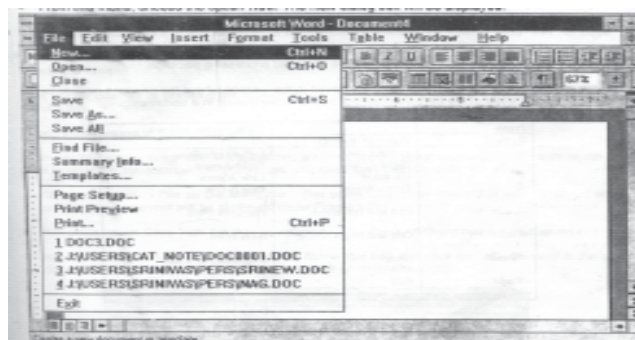


Fig. 4.1.1

## 4.2 Practice on changing page layout, setting of tab stops, Text block Operations

**1. Changing page layout:** After having created a draft copy of a document you may find the format of the page is not what you want it to be. Margins, left, right, top and bottom may have to be altered, to suit your requirements. Margins refer to the logical boundary of the text on your document. To change margins:

- Select the option Page Setup from the file menu. The Page Setup dialog box will be displayed.
- Click on the tag Margins. Enter the size (normally in inches) of the Top, Bottom, Left and Right margins in the text boxes.
- To take printout of the Document you need to change the page-size for this select Paper Size, enter the width and height of the page in the boxes. Alternately, you can click on Paper Size to get a list of standard paper sizes from which you can choose.
- Orientation refers to the manner in which a document is printed. There are two types: Portrait and Landscape. In Portrait orientation, the page is longer than it is wide. In Landscape orientation, the page is wider than it is long.

**2. Setting of Tab Stops:** When you are creating or editing a document, you can set the distance that the cursor must skip on each depression of the tab key. This allows easy movement of the cursor while typing large volumes of text. This is particularly useful, when creating documents that contain columns of text. To create a Tab Stop:

- Click on the Ruler bar at the position where you want a tab stop. An L shaped mark will be displayed on the ruler indicating the position of the Tab Stop.
- To remove a tab stop, position the mouse pointer on the tab on the ruler bar and double click on it. The *Tabs* dialog box will be displayed.
- Click on Clear and then on OK to remove the tab. If all the tabs are to be removed, click on *Clear All* before clicking on OK.

**3. Editing Text-Block Operations:** Consider a situation where you have typed a large document. You realize that a paragraph has been typed twice. To delete this paragraph, you can press the <Del> until the text is deleted. This is a very tedious process. A better option would be to mark the entire block and then press <Del> button on the keyboard to delete the text.

Editing a group of words, a paragraph or a group of paragraphs in a document involves block operations. Blocks are of two kinds: 1. Text Blocks      2. Rectangular Blocks

**1. Text Blocks:** A text block consists of lines, sentences or paragraphs. They extend across a page or pages, although they need not begin or end at a margin. To mark the text block:

- Position the cursor at the beginning of block to be marked.
- Hold down the left mouse button and drag the mouse across the text. The selected text will be highlighted.

**2. Rectangular Blocks:** A rectangular block as the name suggests, is a rectangular block of characters, across lines or pages. Notice that the highlighted block does not cover entire lines of text. To mark a rectangular box of text:

- Hold down the <alt> key and drag the mouse across the text, with the left button held down.

**Cutting and pasting:** Very often, after creating a document, we find it necessary to rearrange the text, by moving paragraphs from one location to another. This is referred to as a cut and paste operation.

To cut text:

- Mark the text as described earlier.
- Move the cursor pointer such that it points at the highlighted text, and the right mouse button. The *short cut* menu will be displayed.
- Select Cut from the options provided. The text will be removed and copied to the Clipboard.

To paste the cut text:

- Position the cursor at the location where the text is to be pasted, and right click the mouse. The *Short Cut* menu will be displayed.
- Select Paste from the options available and the text will be copied from the Clipboard to the current cursor position.

**Copying and Pasting:** It is possible to make a copy of a block of text in another part of the same document, or for that matter, in a different document altogether. To do this

- Mark the text to be copied.
- Right click on the highlighted text and choose Copy from the Short Cut menu that is displayed.
- Move the cursor to the location where you want to paste the text. In case the location is in a different file, the file will have to be opened before doing the pasting operation.
- Right click and paste the text by selecting the option *Paste* from the *short cut* menu.

**Alignment of Text:** It refers to the position of the text relative to the margins. Text can be centered, right aligned, left aligned or justified. To right align a paragraph, position the cursor on any one line within the paragraph and click on the Align Right button or, the Formatting toolbar. To left align a paragraph, is the default mode, position the cursor on any line within the paragraph and click on the Align Left button on the Formatting toolbar. To center a line of text, position the cursor on the line and click on the button Center on the Formatting tool bar. This option is generally used for centering heading text and not for complete paragraphs.

**Changing Text Attributes:** This determines the way in which text is displayed on the screen. In a professional document, certain words need to be emphasized more than the rest of the text. The words can be underlined, **highlighted** or *italicized*.

To make the text bold:

- Mark the text using the mouse.
- Click on the bold button on the Formatting toolbar.

To underline the text:

- Mark the text using the mouse.
- Click on the Underline button on the Formatting toolbar.

To italicize the text:

- Mark the text using the mouse.
- Click on the Italic button on the Formatting toolbar.

Note: Students are advised to make use of these features described above, and can perform a fair amount of formatting the document. This will make your documents a little more presentable than, when you created a document for the first time.

**Exercise:** Create a file with name SAMPLE.DOC type some text and adjust the page layout as follows:

Top=2 Bottom=2                      Left=0.75      Right=1.25  
From Edge    Header=0.9    Footer=0.9

- Orientation should be Landscape
- All headings should be in bold
- All information in brackets should be italicized
- Mark the entire text and view it with different alignment settings centered, right aligned, left aligned and justified

### **4.3 Practice on Formatting Text – Customizing paragraph formats – changing font styles and size – working with tables and printing documents**

#### **1. Customizing Paragraph Formats:**

To format the texts use the paragraph format option of MS-WORD. For this,

- Select the option Format from the Menu bar. A drop down menu will be displayed.

- Select Paragraph from the menu. The paragraph dialog box will be displayed. Enter the settings of your choice and click on OK to complete the process.

Indentation determines the position of text relative to the left and right margins. To indent text with the left and right margins, you:

- Enter the indent distance in inches in the Indentation left and Indentation Right text boxes.

In addition, you can also specify the type of indentation you want for the first line of each paragraph. The option special gives you a choice of three sub options:

- None, which aligns first line of the selected paragraph with the left indent.
- First Line, which indents the first line of the paragraph by the amount you specify in the By box.
- Hanging, which shifts lines after the first line of the selected paragraph to the right by the amount you specify in the By box.

Setting inter-paragraph spacing: The option Spacing determines the space between lines and between paragraphs. You can specify the amount of space above the first line of a paragraph in the *Before* text box and the amount of space below the last line of a paragraph in the *After* text box.

Setting inter-line spacing: Line spacing determines the amount of vertical space between lines of text within a paragraph. The options available with Line Spacing are:

- Single, which sets the line spacing for each line to that of the largest font in the line.
- 1.5 lines, which sets the line spacing to one-and-a-half times that of single line spacing.
- Double, which sets the line spacing to twice that of the single line.
- Exactly, which sets a fixed line spacing.

- At least, which sets a minimum line spacing that Word can adjust to accommodate larger sized fonts.
- Multiple, which allows the line spacing to be decreased or increased by percentage.

**2. Changing Font Styles and Size:** Font refers to the manner or style in which text is displayed in your document. You can change the font of a paragraph or a block of text. To change text font:

- Position the cursors on any line in the paragraph, or mark the text whose font is to be changed.
- Click on the option Format on the Menu bar and select Font. The Font dialog box will be displayed.
- Select the font you require from the Font list, font style from the Font Style list and character size from the Size list. You will see a preview of what your text will look like in the Preview Window.
- Click on OK to complete the task. The font will be applied to your text.

### 3. Working with tables and printing documents

A table is an arrangement of text in the form of columns and rows. Tables are often used to compare two sets of data. To create a table:

- Click on the option Table on the Menu bar.
- Select the option Insert Table.
- Specify the number of rows and columns; enter the column width in the Column Width text box.

**Find and Replace Option:** The find and replace option of Word is a convenient way of searching for a word in a document and replacing with some other text. It can be used in situations where an error has been committed consistently in a document and has to be corrected, to replace every occurrence of Word. To do this:

- Click on Edit on the Menu bar and select the option Replace. The Replace dialog box will be displayed.

- Enter the text to be searched for in the Find What text box and the text to replace it with in the Replace With text box.
- Click on Replace to replace each occurrence, one by one or Replace ALL to replace every occurrence with the new contents. Click on Find Next to skip to the next occurrence of the search word.

**Printing a Document:** Like all Word Processors, Word allows you to make a copy of a document on paper. Before printing a document, it is necessary to setup the printer. This is because, printers are of different kinds and therefore, you have to tell Word what kind of printer you are using, before you actually print your document. If the printer has not been setup properly, the document may not be printed as expected. For this,

- Click on the option File on the Menu bar and select the option Print. The Print dialog box will be displayed. Alternatively you can use the Short Cut <Ctrl><P>
- Click on the button Printer, to set up the printer, if you have not done so already. The Print Setup dialog box will be displayed.
- From the list of printers available, select the printer, which matches your printer's configuration.
- Click on Set Default Printer, to make this your default printer set up. The Cancel button will change to a Close button.
- Click on Close. The Print dialog box will be displayed once again.
- Enter the number of copies required in the Copies text box.
- Click on the option ALL to print the entire document, Current to print the current page or enter the page numbers to be printed in the Pages text box. Click on OK to start printing.

**Exercise:** Create a document using the following text and Word features: The text in main document should be in the font Arial. The font size of the body text should be 12 and that of the title should be 16. The comparison data should be in a table.

## **The Printer**

The output on the **VDU** cannot be stored for later reference. For a permanent output, you would require a printer, which is also a common output device. Using a printer you can obtain output on paper. Another output device that produces output on paper is the **Plotter**.

Printers are capable of printing at very high speeds. Two printers commonly used with the PC are the dot-matrix printer and the laser printer.

A comparison between these two printers is given below.

### **Dot-matrix printer**

Prints characters in  
The form of dots

Speed: 150-240  
Characters per second

Inexpensive

### **Laser printer**

Prints fully formed  
characters

Speed: 8 pages per  
minute or more

Expensive

## **5.1 Working with Excel Work sheet-Formatting-Entering Formulae-**

### **Inserting Rows and Columns**

#### **1. Working with Excel Work Sheet:**

A spreadsheet is a generic term for a software package that simulates a paper worksheet often used by people in management. It supports fast calculations, what-if analysis, charts, and automatic recalculation and has other powerful features. The Excel package is very similar in function to any other spreadsheet package. One aspect in which the Excel worksheet is different is that it can hold not only data and formulae, but also graphic objects like pictures and images. Excel uses data from the worksheet and displays it graphically along with the worksheet. Excel also allows you to define macro, which you can use to combine a series of actions to automate your work. These macros are stored in macro sheets. In Excel, you can set up a group of cells as a database. You can find, update and add records. You can extract records that match any criteria that you specify. Some features of Excel:

- The intersection of a row and a column is called a cell. Excel has 16384 rows and 256 columns.
- Each cell has a unique address and is referred to by a row number and column letter combination. An example of a cell address is G8, where G is the column letter and 8 is the row number.
- Operations are usually performed on range of cells. A cell range is a group of contiguous cells, for example G4:G7. Excel uses a : (colon) to denote a range of cells.
- Users have to enter the necessary data in cells. The data can be labels, values or formulae.

- The currently active cell is denoted by the position of the cell pointer. It is possible to enter or modify the contents of only the current active cell.
- You can make a cell active by pointing and clicking the mouse or by using the cursor movement keys on the keyboard.
- Excel provides the user with Toolbars. This feature of Excel allows you to carry out common commands quickly by clicking on the appropriate button.
- The software does calculations once the type of computation has been specified and the result is displayed in the marked cell.
- Scroll bars can be used to move up and down or left and right on the screen. They are displayed at the bottom of the worksheet.
- The Principal activities of a spread sheet program are:

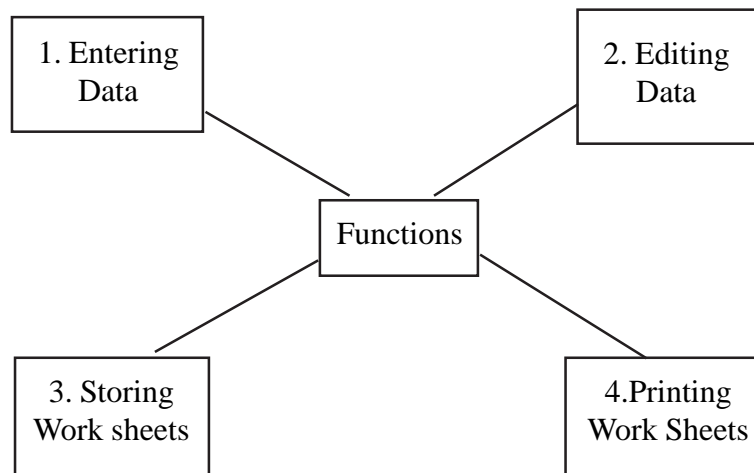


Fig. 5.1.1

Fig 5.1.2 Excel worksheet

PRODUCT DETAILS	RATE	QTY	GROSS	DISC PERC	DISCOUNT	NET AMOUNT
Computer	45550.00	10	455500.00	5	22775.00	432725.00
Printer	10345.00	10	103450.00	5	5172.50	98277.50
UPS	11120.00	10	111200.00	5	5560.00	105640.00
Scanner	35000.00	10	350000.00	5	17500.00	332500.00
Total						983142.50
Average						242295.63
Maximum						432725.00
Minimum						98277.50

## 2. Formatting a Worksheet

The appearance of data in a worksheet can be enhanced. This is called formatting. By default, when labels are entered they are left justified i.e. they appear on the left of the cell. Labels can also be right justified or centered across a cell. You can display data by making it Bold, italicized, or underlined.

Numeric data can also be formatted. Values can be displayed with commas, the percent symbol and currency signs. It is important to note that though the displayed values contain alphanumeric characters like the comma, the dollar sign or the percent symbol, internally they are stored in a purely numeric form in the memory.

Another feature that helps in formatting cells is the shortcut menu. The most commonly used commands for a selection are placed in a single menu. All you have to do is select the cell or range of cells that you want to work on and click the right mouse button. A shortcut menu is displayed and you can choose what you want from this menu.

To format a cell entry:

- Select the cell to be formatted and click the right mouse button to open the shortcut menu

- Select Format Cells from the Shortcut menu.
- Choose the type of formatting (Currency, percentage, number) to be done from the Category list in the Format Cell Dialog box.
- Select the specified format to be applied from the formats available in the Format Codes list and click on OK to complete the process.

### 3. Entering Formulae

A formula defines a relationship between cells. It specifies Excel what operations are to be performed on the values of the cells it relates. It usually contains arithmetic values, expressions, cell addresses or ranges. It can be created using arithmetic operators like +, -, \*, /. A formula in Excel is preceded by the = sign. As a formula is being entered, it gets displayed on the *Formula bar*. It is just above the worksheet and also displays information about the active cell.

The Formula bar displays two other buttons – the Enter and the Cancel buttons. They perform the same functions as the <Enter> and the <Esc> keys. These buttons appear only when you are entering data into a cell. Formulae are entered in the cells by simply typing them. Excel offers *Function Wizard*, which is available on the standard toolbar. Let us look at some of the statistical functions that Excel offers,

The function,           =SUM (<cell range>)

Adds the values of cells listed in the cell range. For example, =SUM (G6:G9) would compute the total of the values stored in the range of cells G6 to G9.

To compute the average of a range of cells, the function =AVERAGE (<cell range>) can be used. For this you do the following:

- Mark a cell as active cell by clicking on it.

- Click on the Function Wizard, which is on the Standard tool bar.
- From the Function Category select the option Statistical.
- A list of statistical functions available will be displayed in the Function Name list. Select the option AVERAGE and click on Next.
- Another dialog box will be displayed, enter the range of cells on which the AVERAGE function is to be applied in the Text box, number 1. If the average function is to be applied to more range of cells, you specify the ranges in the Text boxes, number 2, number 3 and so on.
- Click on Finish to complete the operation.

#### 4. Inserting Rows and Columns

Sometimes, after creating a worksheet, you find that a new set of information has to be added either a row or a column of data. To insert a new row and a new column, you do the following:

- Position the Active Cell pointer on the row where a new row is to be inserted.
- Click on *Insert* in the Menu bar and select Rows. Now a new row will be inserted before the row where the cell pointer was positioned.
- Position the Active Cell pointer on the column where a new column is to be inserted.
- Click on *Insert* in the Menu bar and select columns. Now a new column will be inserted on the left side where the cell pointer was positioned.

A worksheet created needs to be saved on to the disk for later use. For this click on File option in the Menu bar, click on *Save*. Excel will prompt you for a file name. You type the file name and click on OK. Excel worksheets have a default extension name of XLS.

To print your worksheet, you can either use the Print button on the Standard toolbar, or the Print command on the File Menu.

When you use the Print button, your worksheet is printed immediately to the default printer using the current print options. When you select Print command from the File Menu, a print dialog box will be displayed. Here you can make additional choices before printing, such as number of copies or selected pages to print.

**Exercise:** Vikram Business Solutions wants to analyze the trend of sales of the following products, over the last quarter. You have been assigned the task of creating a worksheet as shown below:

- The total quantity sold for each item.
- The value of each item
- The average quantity sold for each item, month-wise
- The total value of all the products
- The average value of all the products.
- Change the value of the printers sold in February to 11 and observes the changes in Total and Average sales and the average for month.

### Vikram Business Solutions

Product Details	<u>Quantity sold</u>			Price per unit	total Qty	sales
	Jan	Feb	Mar			
Computers	29	20	30	40000	79	3160000
Printers	7	3	9	12000	19	228000
UPS	10	15	30	10000	55	550000
Scanners	1	0	3	45000	4	180000

## 5.2 Practice on Range and Series-Moving and copying cell contents- Creating summary reports

### 1. Practices on Range and Series:

Any rectangular group of cells on a worksheet is called Range. You can refer to a range by listing the cell reference

for the first cell in the range, followed by the last cell in the range, for example B1:D4. You use ranges often to refer to similar data that falls within a rectangular area on the worksheet, such as sales data for a particular project. When you need to refer to range in a formula, you can either identify the range by its cell references, or you can name the range and then use the name in the formula. Naming range can save you time and effort. Since a name is easier to remember than the beginning and ending cell references for a range.

To select a range of cells, you drag the cell pointer from one corner of the range to the opposite corner. The corner where you begin your selection is the active cell. When you select a group of cells, a dark border is displayed around the outside of the selection and the cells in the selection have a dark background. The above cell within the selection has a light background.

Creating name for a range is easy. You can either select the range or use the Name box on the Formula bar to define a name or you can create names automatically based on row or column headings. You can also use the Name command on the Insert menu to define names.

- Select the range.
- Click in the Name box on the Formula bar, and then type the name for the range.
- For larger ranges with row or column headings, first select the range and from the Insert Menu, you choose Name and then choose Create.

Series – you may often need to enter a series of dates or numbers on your worksheet. Some times you need to enter the series January, February, March and so on. You do not have to type the values one by one. Excel will do it for you. You enter the first two values in the cells that will be at the beginning of the series, then select the two cells and drag the *Fill handle* across the cells that you want to fill. Excel will automatically enter the rest of the values for you. The *Fill handle* is cross-shaped and appears at the corner of the selected cells. Alternatively you can:

- Enter the first value and select the range to be filled
- Choose Edit from the Menu Bar
- Choose the option Fill followed by Series.
- Specify the type of series. If the series is numeric, specify the *Step value* by which the series value will step and the *Stop Value* which will specify the last value till which series has to be generated.

## 2. Moving and Copying Cell Contents

Similar to other applications on Windows, Excel lets you use the Cut, Copy and Paste commands from the Edit menu. It also lets you do it much faster by using the drag and drop technique. To move the contents of cells:

- Select the cells.
- Click the left mouse button on the outer border of the cells.
- Drag the cells to the new location and release the mouse button.

To copy the contents of cells:

- Select the cells and hold down the <Ctrl> key
- Click the left mouse button on the outer border of the cells
- Drag the cells to where you want to copy them, and release the mouse button and the <Ctrl> key.

Let you may want to copy the value of a cell without copying the formula behind the value or you may want the cell without the value. You can do this by using the Paste Special command from the Edit menu. For this:

- Select the cell whose characteristics you want to copy
- Choose Copy from the Edit menu
- Select the cell where you want to copy the value

- Choose Paste Special from the Edit Menu.
- From the Paste Special dialog box, choose the characteristic you want to copy by clicking on the appropriate button; Values in this case and click on OK.

### 3. Creating Summary Reports

You need a way to show as much information as is necessary in your report. Rather than showing all of the details in your worksheet you can determine the level of detail that will appear in your report when you use subtotals and worksheet outlining. You can show all of the information, show only subtotals and grand totals or show only grand totals, depending on the purpose of your report.

When you are preparing a report or organizing your data, you often need to summarize the information. With Excel, you can add subtotals automatically without manually adding space for them or entering formulas.

For example in a worksheet containing details of employees, you need to obtain the subtotals of their salaries grouped together on their departments. With Microsoft Excel, you can do this by creating subtotals for your data automatically using Subtotal command. Before you use the Subtotals command you need to sort your data to arrange it logically. Selecting Sort Option from the Data Menu can do this. This will ensure, that you are adding the subtotals at logical points in your worksheet.

- Select the option Data menu from the Menu bar.
- Choose Subtotals.
- Select the field at the change of which the subtotals have to be displayed.
- Select the function to be applied.
- Select the field to which subtotals are to be added from the Subtotal Dialog box.

An outline lets you display different levels of information on a worksheet. You can collapse and expand the rows and columns of your worksheet. If you have several rows of data followed by subtotals, you can collapse the rows on your worksheet and display only the rows that contain the subtotal information. All the other rows will then be hidden.

To automatically outline your worksheet, you:

- Select the option Data from the Menu bar
- Choose the option Group and Outline
- Select the option *Auto Outline* from the submenu
- To outline a group of cells, first select the range of cells.
- Select Data from the Menu bar.
- Choose the option Group and outline.
- Select the option Group from the submenu. You specify whether you want to Outline Rows or Columns in the Dialog box that is displayed.
- Click on the Demote/Promote tool. To clear outline from the Group and outline submenu of the Data option in the Menu bar.

### **Exercise**

1. Prepare a worksheet with details of Roll Number, Name, Marks1, Marks2, and Marks3, total, average. Enter some data into the sheet. Do the following:

- Compute the total marks scored by each student. Use the copy technique that you have learned.
- Compute the average marks scored by each student. Use the copy command to simplify the process.
- Find the average marks scored by the entire class. Copy the formula and modify it to include the desired range.

- Move the details on row 8 , down by three rows to accommodate three new records.
- Copy the names and average marks of the top three students to another portion of the worksheet.
- Outline the worksheet so that details of marks1, marks2 and marks3 are not visible on the screen.

2. Metro TV Productions is a small firm that produces weekly television serials. Grissoms, Robert and Sarah own it. Robert heads the marketing division where as production department Sarah handles. Actors, actresses and directors are employed on a contract basis and receive salaries at the end of each month during the period of the contract. Metro TV has people who are permanently on the rolls of the firm. Besides marketing and support staff, film editors, cameramen and the like are permanent employees. For each script, scriptwriters receive payment in full on delivery.

The firm has office on rent basis and the other expenses that the firm incurs are on account of film, tapes, stationary and advertising. You need to prepare a worksheet that holds the data on the monthly expenses of the firm for the six-month period.

	April	May	June	July	Aug	Sept
Salaries						
Contract	25000	55000	40500	50000	60000	70000
Payment	30000	30000	30000	30000	30000	30000
Rent						
Studio	32000	56000	54780	67980	87000	89000
Cameras	6789	8987	9000	12000	11000	9000
Lights	7855	7000	5000	5555	4560	4000
Props	8960	6000	10924	15000	9000	10000
Miscellaneous						
Tapes	7885	6000	7800	7500	9800	9700
Film	8950	8495	9980	11029	11098	24090
Stationary	1200	1490	1340	1600	980	900
Advertising	10000	15000	17000	10000	16000	25000

### **5.3 Formatting worksheets - Linking Work Sheets – Working with Graphic Data**

#### **1. Formatting worksheets**

Let your work involves long hours of starting at a worksheet on the monitor, then it may be a good idea to make it as pleasing to the eye as possible. Excel makes this possible by allowing you to format your worksheet to suit your needs and tastes. Excel lets you change the appearance of the text in your worksheet. It handles fonts as most other Windows applications do. The term Font refers to the style of the next. You can change the font, size, attributes and color. To change font:

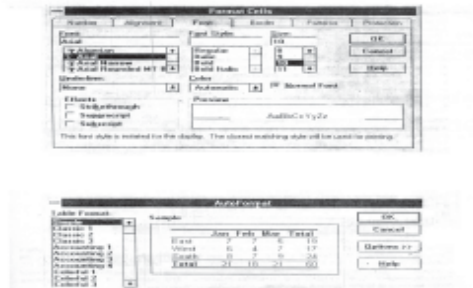
- Select the cells whose font has to be changed
- Right-click on the selected range
- Choose the Format Cells option from the Shortcut menu and click on the tag Font.
- In the Font Dialog box, you select Font, size, Font-style, Effects and Color as you desire.

You can reduce your formatting work by using the AutoFormat utility. AutoFormat allows you to apply a standard format to a group of cells instantaneously. Excel provides several standard formats that you can choose from. To apply a standard format:

- Select the cells you want to format
- Choose the Auto Format option from the Format menu
- Select a format from the Table Format list and click on OK.

The range of cells will now have the selected format. In the sample box you can see a sample of what the format looks like. By default, all the formats are applied. If you want to apply only some formats, you click the Options button and disable the ones you do not want.

Fig 5.3.1



## 2. Linking worksheets

In Excel, you can link cells in one worksheet to cells in another. The first worksheet is referred to as Source worksheet and the second worksheet is referred to as Destination worksheet. Linking saves you the trouble of updating changes to worksheets that share values. To place a linked copy of cells from one worksheet into another:

- Ensure that both the source and destination worksheets are open.
- Select the cells that you want to link, in the source worksheet.
- Right-click on the selected cells and choose Copy from the *Shortcut* menu. Activate the destination worksheet.
- Select the cell that will be the upper left corner of the target range of cells. Choose Paste Special from the Edit menu.
- Click on Paste Link to complete the process.

Now the destination worksheet contains the copy of the linked cells from the source worksheet. Any change made in the source worksheet will be reflected in the destination worksheet as well. To ensure that your worksheets link successfully, you follow these simple rules:

- Save the source worksheet before linking it to another.

- Rename linked worksheets using the Save As option from the File menu. Using the File Manager or a DOS command may disconnect the links.
- Store linked worksheets in the same directory.

**Exercise:** Consider a company Varsha Business Machines is a company that offers Computer hardware and Software products. It has three divisions: the Micros division, the Software division and the Power Products division. The Micros division deals in IBM PC products. The software division makes customized and packaged Software. The power products division deals in UPS and Stabilizer products. The manager of each of the three divisions reports to the General Manager Sales (GM).

At a meeting with the GM, the three Divisional Managers set their targets for the year. The GM's office monitors the sales made by the divisions. Every quarter, the GM compares the actual sales made with the targets. The GM maintains a worksheet called MONITOR.XLS that has the quarter-wise targets for each division.

Every month, each Divisional Manager sends the figures of actual sales made. The GM maintains these figures in another worksheet called SALES.XSL. The GM has linked the two worksheets, SALES.XSL and MONITOR.XSL. As each month's details come in they are entered in SALES.XSL. As soon as the month's data is entered in the file, the data is automatically added to the actual sales in the worksheet MONITOR.XSL. Therefore all changes made in one worksheet are immediately reflected in the other one.

Prepare two work sheets SALES.XSL and MONTOR.XSL. Enter some data based on the above description. Link them and check that all changes made in one worksheet are immediately reflected in the other.

### 3. Working with Graphic Data

Very often, your worksheet must do more than just store data. Sometimes, you need to use the data for presentations. The best

way to do this is to use charts. A picture is worth a thousand words or in this case, worth more than a thousand rows and columns of data. Excel charts are simple to create. It provides the *ChartWizard* tool that simplifies creation of charts. The chart and worksheet data are linked, so you need not worry about changing the chart if you have changed the data.

The following types of business graphics shall be included in the Excel sheet: Line, Pie, Scatter, Bar and Area. Each type of chart is available in several formats. Charts are embedded in the worksheet and can be viewed along with the data. When you save the worksheet, the chart is saved with it. When you print the worksheet, the chart is printed with it.

To create a chart:

- Select the data you want to put into the chart
- Click on the ChartWizard tool.
- Place the cursor on the worksheet at the position where you want the chart, and drag the mouse until the box is the size you want the chart to be.
- The first Dialog box asks you to confirm the range of cells you have selected. If the selection is correct, you click on Next to continue. If it is not, then you edit the cell reference in the range box.
- The second dialog box asks you to select the type of chart you want. Click on the charts picture and then click on Next to continue.
- The third dialog box will show you the formats that are available for the chart type that you have selected. Click on the picture of the chart format that you want and click on Next.
- In the fourth dialog box specify how the data must be plotted on the chart. You will see a preview of your chart in the Sample chart window. Excel makes use of default settings for you. If you want to change any of these settings, you use the following options:
  - The Data Series button lets you choose whether to plot graphs for each row or for each column.

- The Use First Column text box lets you enter the number of columns, starting from the first column in the data range, to be used as Labels.
- The Use First Row Text box lets you enter the number of Rows, starting from the first Row in the data range, to be used as Labels. Titles or Legends depends on the type of chart.
- In the fifth dialog box, you must specify whether the chart has a Legend and create a title and axis labels. To add a legend, select Yes for Add a Legend? To create a title, type the title text in the Chart Title Text box. To create labels for the axes, type the label text in the appropriate Axis Titles Text box.
- Click on Finish to create the chart. The chart will appear on that portion of the worksheet defined earlier.

### **Exercise**

1. Using the worksheet created for Metro TV productions, perform the following tasks:

- Create another worksheet SUMMARY.XLS which has the totals of Salaries, Rent and Miscellaneous expenses, month-wise. Any change to the original worksheet should be reflected in the new one.
- Using this worksheet, create a pie chart to depict the total expenses of Metro TV on salaries, rent and miscellaneous expenses. Format the worksheet.

2. Create a six months (i.e. from January to June) sales data for a company, which manufactures FMCG (Fast Moving Commercial Goods) goods like soaps, washing powder, Toothpaste, shampoos, hair oil. Enter some data regarding sales for the above goods in a worksheet called SALESDET.XLS.

- Create a quarterly details from the data in the worksheet SALESDET.XSL. Name it as SALESQRT.XSL.
- Link this new worksheet to SALESDET.XSL.
- Create a chart that depicts the sales trends from January to June. Embed this chart in the worksheet.
- Format both the worksheets. Create different formats using Auto Format.

# 6 POWER POINT

## 6.1 Practices on Power Point Slides

Power Point allows you to create all that is required to make successful presentation – slides, handouts, speaker’s notes and outlines. It also has a set of tools – wizards, templates and Auto Layouts – which can help you create presentations quickly and easily. The display information is very important aspect of any presentation. Most speakers use slides for displaying information. However, all the information is not displayed on the slide. In addition to slides on would also require handouts to be given to the audience, a set of notes and an outline of the presentation for the presenter. These can be created using the slides.

**Slides:** These are one of the components of a presentation. These are the individual pages of a complete presentation. Power point slides can contain the following components:

- a) Titles      b) Graphs      c) Draw objects      d) Shapes
- e) Clip Art      f) Draw Art

To make a good slide, you must understand the basic components of a slide.

- Title: A descriptive heading identifying a slide.
- Subtitle: A distinctive message or brief description of the slide’s data. It emphasizes the slides central idea.
- Footnote: It indicates the source of the slide’s data.
- Border: A frame for the slide. It keeps the viewers attention.
- X-axis: The horizontal axis of the graph. When you are making a graph, place groups (such as dates, time, items, places, etc) along this axis. A title describing the data that is displayed should also be mentioned along the x-axis.
- Y-axis: The vertical axis of the graph. It contains numbers such as currency or units. A title describing the data that is displayed should also be mentioned.

- Series: A set of numerical data. Sometimes on graph depicts more than one series. A label identifying a single series should also be mentioned.
- Legend title: A label that identifies a group of series.

The following are some basic types of slides that are most often used in presentation.

- Text Slides: Display non-numerical data. They can also be used to highlight your main ideas.
- Pie charts: Compare the relative proportions of the parts that make up the whole. The circular pie represents the whole, and the size of each sector of the pie shows its share.
- Bar and Column charts: Show the value of an item as it varies at precise intervals over a period of time. They can also be used to compare the values of related items.
- Area charts: Combine lines with patterns or colors to indicate volume. These are used to show the cumulative total of several series and changes in volume over a period of time.
- Line charts: Depict trends over a period of time. They are also used to show the value one variable with respect to another variable.
- Organization charts: Depict an organizations structure. They show who is responsible of what and who reports to whom. Thus it shows the hierarchy and formal lines of communication.
- Slides with mixed content: Can contain a mixture of text, graphs and other objects. Effective use of such slides can improve communication and impact.

## 6.2 Creating a Presentation

Creating a presentation involves creating slides. Power point offers four options to do so. The first two are the wizards AutoContent and Pick-a-look, the other two are Template and Blank Presentation. The Blank presentation option allows you to load the PowerPoint default presentation or a presentation that you have set up. To start with you will use the Blank Presentation option to create a presentation afresh. To do so, you:

- Click on the option **New** from the **File** menu. The **New Presentation** dialog box will be displayed.
- Choose the option **Blank Presentation**. The **New Slide dialog box** will be displayed.
- Choose the type of format that you require from the options provided in Choose an Auto Layout and click on OK. A new slide with Placeholders will be displayed.

**Creating a title slide:** A title slide is the first slide that will be displayed in your presentation. As mentioned earlier, a Title Slide should be divided into three parts: the top part for the title of the presentation, the middle for the topic and the bottom for the date and location of the presentation. To create such a slide:

- Choose the **Title Slide** in the **Auto layout** dialog box.
- Click on **Click to add title** and key in the title. Font size and font type can be changed by highlighting the text using the Shortcut menu.
- To add subtitle, click on **Click to add sub-title** and enter the text.

After creating the title slide, you move on to creating the rest of the Presentation. Presentation's, especially those used for training, normally start with a set of objectives. The objectives should be bulleted to focus the attention of the viewer on a particular line of text. Bullets can be indented to bring out the hierarchy of topics on the slide. The Bulleted list option allows you to create such a slide. To do so, you:

- Invoke the creation of a new slide by clicking on the **New Slide button** on the status bar at the bottom of the screen.
- The **Auto Layout** dialog box will be displayed. Select **Bulleted List** from the options available and click on OK. A new presentation screen will be displayed.
- Click on **Click to add title** and key in the title text in the **Title Placeholder**. Alter font type and size, as you desire.

- Click on **Click to add buffeted** text and key in the text for the first bullet.
- Click on **the Bullet On/Off button** in the formatting toolbar to undo the bullet style applied to any line of text.
- Click on the **Demote [Indent more]** button on the formatting tool bar to demote/indent a bullet to the next lower level.
- Click on **Promote [Indent less]** to promote a bullet to the next higher level.
- After finishing the creation of slide save them in a PPT file.

**Exercise:** Create a new presentation (see Fig.6.2.1)

- Select the Title Slide Auto Layout.
- Add the title Global Travel and the sub-title Other Available Services.
- Add a new slide by using the Bulleted List Auto Layout.
- Add the title Member Services.
- Add bullets for the following items:
  1. Brochures and Maps
  2. Global Advantage Club
  3. Accommodation Options
- Add two second level bullets under “Accommodation Options”:
  1. Hotels and Motels
  2. Bed and Breakfast
- Switch to the Outline view and move “Accommodation Options” (with sub-bullets) to the top of the slide (the first bullet).
- Save and close the file.

1	<input type="checkbox"/> GLOBAL TRAVELS Other available services
2	<input type="checkbox"/> Member Services <ul style="list-style-type: none"> <li>- Accommodation options             <ul style="list-style-type: none"> <li>- Hotels and Motels</li> <li>- Bed and Breakfast</li> </ul> </li> <li>- Brochures and Maps</li> <li>- Global Advantage Club</li> </ul>

**Fig . 6.2.1**

## 6.2 Creating a Graph

In any business presentation, facts and figures are best represented as graph: Power Point provides you with a number of different graphs that you can choose to display your information. They are:

- Pie charts, 2D and 3D
- Bar charts, 2D and 3D
- Column charts, 2D and 3D
- Line charts, 2D and 3D
- Area charts, 2D and 3D
- Scatter diagrams
- Surface charts
- Doughnut charts
- Radar charts

A graph can be created and viewed in different formats as a pie, column, and so on. Legends, titles and data labels can be added to improve readability. To create a graph:

- Click on **New Slide button** on the status bar
- Select **Graph** from the available options and click on **OK**.
- Add a title by clicking on **Click to add title** and key in the required title.
- Double click on **Double click to add graph**.

- Type some sample data in the **Datasheet**.
- Click on the **Graph placeholder** to return to the slide.
- You can change the Graph Type, for this Double click on the **Graph placeholder**.
- Click on the **Change Chart Type** button on the **Standard toolbar**.
- Select the type of **Chart** you want by clicking on the icon.
- You can group the data by using Graph placeholder. Select the option Group from the Format menu. Select the subtype from the options available and click on OK to complete the process.
- To create a title for a graph, double click on the Graph placeholder and select the option Titles from Insert menu.
- Select the type of titles you desire by clicking on the check boxes Chart Titles, Values [Z] Axis, Values [X] Axis, Values [Y] Axis.
- Click on OK to complete the task.

### **Exercise**

1. Create a PowerPoint presentation.
2. Create a slide.
3. Add charts to the presentation
4. Change the bullet style in the first level
5. Also change the bullet style in the second level.

**7.1 Concepts of Compute Networks – LAN, WAN**

Early computers were being used as stand-alone systems in organizations fulfilling their own requirements. With widespread use of computers there was a realization that it would be advantageous in many situations to use computers from remote points. It was also felt that connecting computers together via telecommunication lines would lead to widespread availability of powerful computers. Very often information may have to be transferred from one computer to another computer. For this the computers have to be connected, such a connection of a number of computers is known as Computer Network.

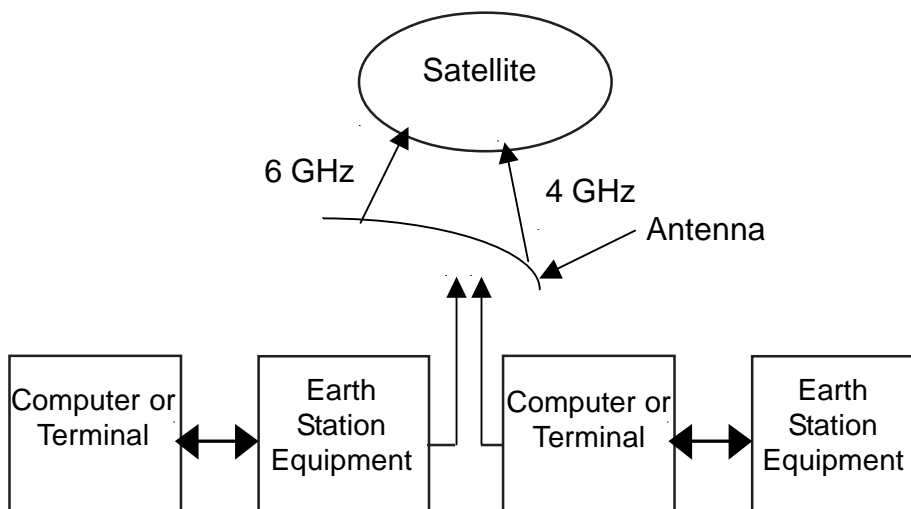
Computer networks are mainly used to connect a number of widely dispersed computers. The main objective of such an interconnection is to allow users of the network to access specialized library programs, databases, etc. In India, NICNET connects PCs located in all district headquarters with a large computer at the National Informatics Centre in Delhi. This network is used to gather data for national planning. Another network in India is the ERNET (Educational & Research Network), which is used to connect computers at IITs and many educational and research organizations. Another major network is the network maintained by Indian Railways for railway reservations. Using this network a passenger can book tickets on most major trains anywhere in India. Indian Airlines also maintains a network for airlines reservations.

Internet is a worldwide network of computers. Several thousands of individual computer networks are interconnected to form the Internet. Internet provides electronic mail, telnet (remote login to computers), file transfer services and enormous amount of information through various discussion groups and information retrieval facilities.

Various methods are available for communication between computer networks. Physical communication media are the

physical channels through which information is transmitted between computers in a network. Media may be classified as *bounded*, for example, wires, cables and optical fibers; or *unbounded*, for example, airwaves through which radio, microwave, infrared and other signals are transmitted.

Communication satellites are launched either by rockets or by space shuttles and parked in a geostationary orbit at 36000 km above the equator. It acts as a microwave relay station in the sky. Microwave signal at 6 GHz is beamed to it from a transmitter on the earth. It is amplified and retransmitted to the earth at 4 GHz by a system called *transponder* mounted on the satellite. Figure 7.1.1 shows a satellite communication link.



**Fig 7.1.1**

**Local Area Networks (LAN):** A local area network is a digital communication system capable of interconnecting a large number of computers, terminals and other peripheral devices within a geographical area, typically under 1 km across. LANs normally operate within a compact area such as an office building or a campus. The topology (different patterns of interconnections between computers are known as network topologies) of connection of computers in a LAN are:

- **A star network**
- **A multidrop (or bus based) network**
- **A ring topology**

The multidrop or bus topology is very popular as it is not expensive, standardized and supported by all computer vendors. It is called as Ethernet connection. Ethernet, developed by Xerox Corporation, uses a coaxial cable for data transmission. Special integrated circuit chips called controllers are used to connect equipment to the cable, and small boxes called transceivers transmit and receive cable data at each station. Ethernet allows data transmission at the rate of 10 Mbps (10 million bits per second).

The ring topology is now being used for highly reliable high speed LANs using fiber optic transmission. This allows data transmission at the rate of 100 Mbps.

**Wide Area Network (WAN):** A *wide area network* is a digital communication system, which interconnects different sites, computer installations and user terminals, and may also enable LANs to communicate with each other. This type of communication network may be developed to operate nationwide or worldwide. In a WAN, the transmission medium used are normally public systems such as telephone lines, microwave and satellite links.

The ARPANET of the Advanced Research Projects Agency of the U.S. Department of Defense is an example of WAN. This network connects about 40 universities and research institutions throughout the US and Europe with about 50 computers ranging in size from mini to super computers. Another example of a WAN is the INDONET, which is being planned by the Computer Maintenance Corporation, India. It links three IBM/4361 systems one each at Mumbai, Calcutta and Chennai and a PDP 11/44 system at Delhi. It is a network of large computer centers to give nationwide access and processing facilities.

#### **Differences between LAN & WAN:**

1. A LAN is restricted to a limited coverage area of a few kilometers, but a WAN can be used for greater distances and may operate worldwide.

2. The cost to transmit data in a LAN is negligible since the transmission medium is usually owned by the user organization. However, in case of WAN, this cost may be very high because the transmission medium used are leased lines or public systems such as telephone lines, microwave and satellite links.
3. In LAN, the computers, terminals and peripheral devices are usually physically connected with cables. Whereas, in a WAN there may not be direct physical connection between computers.
4. Data transmission speed is much higher in LAN than in WAN.
5. Fewer data transmission errors occur in case of a LAN as compared to WAN.

## 7.2 Connecting and working on Internet

The computers are interconnected through LAN or WAN to share files, data, expensive peripherals such as fast printers, large disks, graphics workstations, etc. Various computer networks within a country can be interconnected. Country networks can in turn be connected to networks in other countries. In this case one needs interoperability. By interoperability we mean the ability of diverse computers from different vendors and with different operating systems to cooperate in solving computational problems. It should be possible for users to use the network without knowing the details of the hardware, communication method, etc. Such a worldwide network is now available and is called the Internet. Internet is now widely used all over the world including India. Internet provides the following services, which are possible due to the interoperability between networks.

**Electronic Mail:** This is an application in which any user on a network can send/receive letters on his computer to/from any person in the world who has an electronic mail address. Internet provides a worldwide electronic mail facility. The general format of internet email address is: <name of addressee> @<identity of service provider>.

**File Transfer:** Mail is intended for short messages. A file transfer program is available in Internet, which allows transferring a large file containing programs or data from a computer in any part of the world to another. The system provides authorization of persons allowed to copy the file. The file transfer is reliable. The rules used in Internet for file transfer is called file transfer protocol or ftp.

**Remote Login:** By remote login (telnet access) we mean a user sitting on his terminal logging on to a machine located anywhere in the world. The user must have login account and password to access the remote computer. This is an extremely useful facility. For example, a company in India can develop and install software for a company in U.S.A. and continue to maintain it from India. The persons in two countries can communicate using email, file transfer and remote login.

To connect to Internet, you need a computer terminal with a modem, a phone line and an Internet Service Provider (ISP). An ISP is a company that provides you with Internet connection service through your phone line. You will find a wide range of ISPs that provide different services. Then you should have an account with Internet Service Provider. If you want to connect to Internet, you need to install Internet explorer or Netscape Navigator in your system. Whenever you double click on this, it will display a web page where you type the address of (Ex: [www.yahoo.com](http://www.yahoo.com)) a company.

Then another page is displayed with the details of the company. Like this you can search for any information. If you have business contacts, friends in another part of the world, you can communicate with them in seconds by e-mail. You can send and receive messages immediately. Many web pages link to other web pages, so it is easy to browse or surf a large amount of information by just clicking with your mouse.

There are many search engines (Ex: [www.google.com](http://www.google.com)) available on the Internet, by which we can search for any type of information. Even if you do not know the web page address, you can find them with the help of search engines.

# 8 AUTOCAD

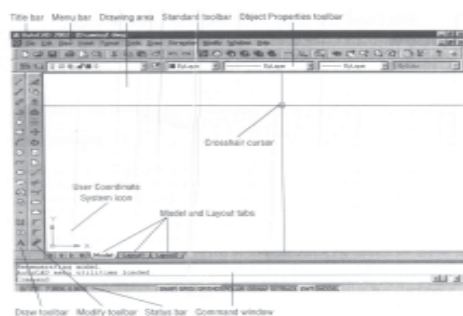
## 8.1 Basic Concepts on Starting up AutoCAD – Command Window – Drop Down Menus - Toolbars

### 1. Basic Concepts on Starting up AutoCAD

AutoCAD is a software package which is used to design and drawing of various engineering components. It is the drafting and design program that has become the industry standard in architecture, landscaping, engineering and construction.

Install AutoCAD using the default settings on your system. Now go to Start → Programs→AutoCAD, the Startup dialog box will be displayed. It has four buttons in the upper-left corner. The first two let you set up a new drawing and choose an existing drawing to revise or update. The second two use templates and wizards to initiate advanced setup routines. To create a new drawing:

- Click the Start from Scratch button.
- Select the English (feet and inches) radio button in the rectangular area titled Default Settings.
- Click OK. Now AutoCAD Graphics window (Graphical User Interface – GUI) will be displayed



**Fig.8.1.1**

The AutoCAD Graphics window has title bar, the menu bar, and two toolbars. The title bar is analogous to the title bar on any Windows program. It contains the program name (AutoCAD) and the title of the current drawing with its path. Below the title bar is the menu bar, where you will see the drop-down menus, the first two on the left and the last one on the right are Microsoft menus (meaning that they appear on most Windows applications). Below these menus is the Standard toolbar, which contains 30 command buttons. Just below this toolbar is the Object Properties toolbar, which contains three command buttons and five drop-down lists.

The blank middle section of the screen is called the drawing area. At the bottom of the drawing area, there are three tabs: a Model tab and two Layouts tabs. These are used for switching between viewing modes. Below this, a *Command window* where you tell the program what to do and where the program tells you what's going on? Below this, a Status bar where there are eight readout buttons that indicate various drawing modes. On the left end of the Status bar, you will see a coordinate readout window.

## 2. The Command Window

Just below the drawing area is the Command Window. This window is actually separate from the drawing area and behaves like a Microsoft Windows window; that is you can drag it to a different place on the screen and resize it. The command window is where you tell the program what to do, and where the program tells you what's going on. It's an important area and you will need to learn about how it works in detail. Generally there are three lines of text visible in the command window.

The number of lines of text in the Command window can also be set in the Options dialog box. Click **Tools → Options** and activate the Display tab. In the Window Elements area, set the Text Lines in Command Line Window setting to 3. Then click the Apply button and the OK button.

The command window is very important. It is here that you will give information to AutoCAD, and where AutoCAD will prompt you as to the next step in executing a command. It is a good practice

to get into the habit of keeping one eye on it as you work on your drawing. Most errors are made from not watching it often.

### 3. Drop-Down Menus

The menu bar, just below the title bar, consists of 11 words and an icon. Click any of these and you will find a drop-down menu. The icon on the left end, as the File and Edit options, are Microsoft menus that come with all Windows compatible applications. The menu associated with the icon contains commands to control the appearance and position of the drawing area. Commands in the File menu are for opening and saving new and existing drawing files, printing, exporting files to another application, choosing basic utility options, and exiting the application.

The Edit menu contains the Undo and Redo commands, the Cut and Paste tools, and options for creating links between AutoCAD files and other files. The Help menu (the last menu on the right) works like all Windows help menus. The other eight menus contain the most often-used AutoCAD commands. You should practice all the commands present in menus; it will be immensely helpful in finding the command you want. Here is a short description of each of the other AutoCAD drop-down menus:

**View:** Contains tools for controlling the display of your drawing file.

**Insert:** Has commands for placing drawings and images, or parts of them, inside other drawings.

**Format:** It is where you will find commands for setting up the general parameters for a new drawing.

**Tools:** Contains special tools for use while you are working on the current drawing, such as those for finding how long a line is or for running a special macro.

**Draw:** Holds the commands for putting new objects (like lines or circles) on the screen.

**Dimension:** It is where you will find commands for dimensioning a drawing.

**Modify:** It has the commands for making changes to objects already existing in the drawing.

**Window:** It has the options for displaying currently open windows and lists currently open drawing files.

#### 4. Toolbars

Just below the drop-down menus, a most extensive tool bar called Standard toolbar appears. It has 30 icons, but don't appear as buttons until you put the pointer arrow on them, and then they are highlighted. They are arranged into 10 logical groups. The icons on the left half of the Standard toolbar are for commands used in all Windows-compatible applications. The icons on the right half of the Standard toolbar are AutoCAD commands that you will use during your regular drawing activities for a variety of tasks. These commands can do a number of things, including:

- Link up and communicate with other AutoCAD users through the Internet.
- Change the view or orientation of the drawing on the screen.
- Change the properties of an object, such as color or line type.
- Borrow parts of a drawing to use in your current drawing.
- Force a line you are drawing to meet another line or geometric feature at specified points.

A few icons on the Standard toolbar have a little triangular arrow in the lower-right corner. These arrows indicate that more than one command can be found through these icons. These are called toolbar flyouts.

There are 26 toolbars in all, and only four are flyouts. Any of these flyouts can be called up as a regular toolbar, independent from the Standard toolbar.

Each toolbar can be customized and you can build your own custom toolbars with only the command buttons you need for your drawing. You can even design your own buttons for commands that aren't already represented by buttons on the toolbars. These activities are for more advanced users.

You will develop your own preferences for the layout of the AutoCAD Graphics window, including:

- Which toolbars are docked and where
- The shape of the crosshair cursor
- The background color of the drawing area

These features can be controlled from the Options dialog box. If you share your workstation with others, you will find it convenient to set up a profile and save it. That way, if someone changes the organization of your Graphics window, you can quickly restore your preferences. For this,

- Click Tools→Options, then click the Profiles Tab to make it active.
- Click the Add to List button. The Add Profile dialog box will appear.
- Type the name of your profile. You can also type the description.
- Click Apply & Close. If you make any changes to the toolbars, these settings will be saved as your profile.

**Note:** The students are advised to go through the commands in Standard tool bar and familiar with their use. Create your own profiles. Control and manipulate the toolbars. Place some of the tool bars in another location on the drawing area. Try out the steps to dock Draw and Modify toolbars on the left side. This arrangement of the toolbars will be convenient because commands on these four toolbars are used often.

## 8.2 Practice on Basic Commands – Line command – Drawing the Box -

**1. Basic Commands:** To work with the basic commands in AutoCAD, create a new drawing area. For this choose **File→New**. In the Create New Drawing dialog box, be sure English is selected, then click the Start from Scratch button and click OK to start a new drawing. Be sure that the Draw and Modify toolbars have been docked on the left side of the drawing area. If you make a mistake and pick the wrong part of a line or the wrong line, press Esc to end the command and then type **u** and press Enter key. This will undo the effect of the last command.

**a. Line Command:** It draws a line between two points that you can choose any where within the drawing area. It can be started by selecting Line button from Draw toolbar or by choosing Draw→Line on the menu bar, or by typing L on the command window.

**b. Drawing the Box:** Select Line button from the Draw toolbar, at the Specify First point: prompt in the Command window, type in 3,3 press Enter key, which is an absolute Cartesian coordinate and will be the first point. Then type @6,0 press Enter key, type @0,5 press Enter key, type @-6,0 press Enter key. Now type **c** and press enter key to close. Now a box appears on the screen.

**c. Erase:** Used to erase the objects on the drawing area. For this choose Modify→Erase from Modify toolbar. The cursor changes from the crosshair to a little square. This is called the *pick box*. Place this *pick box* on one of the lines and click. Press enter key, the objects are erased.

**d. Offset:** This is used to create lines at equidistant from the lines already drawn. The offset command has three steps: Setting the offset distance, Picking the object to offset, and indicating the offset direction. Choose Modify→Offset from the toolbar or type **o** and press enter key on the command window. Specify offset distance.

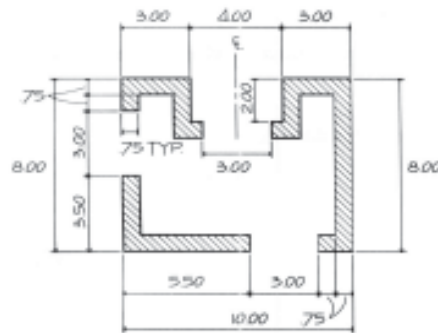
**e. Fillet:** It allows us to round off a corner formed by two lines. You control the radius of the curve. Choose Modify→Fillet from the

menu bar, or type **f** and press enter key. The default fillet radius is 0.5 units, but you want to use a radius of 0 units, type **r** press Enter key and then type 0.

**f. Extend:** The Extend command is used to lengthen lines to meet other lines or geometric figures. First, you will pick the boundary edge or edges, and second, you will pick the lines you wish to extend to meet those boundary edges. After selecting the boundary edges, you must press Enter key before you begin selecting lines to extend.

**g. Trim:** This is used to trim away (remove) the lines to complete the opening. To do this, first select reference lines (cutting edges) press Enter key. Now pick the lines between reference lines press Enter key. The lines are trimmed away.

**Exercise:** Draw the following object shown in



**fig 8.2.1**

Follow the steps:

- Draw the outside edge of the shape.
- Offset the outside lines to create the inside wall.
- Fillet the corners to clean them up.
- Use Offset, Extend and Trim commands to create the three openings.

## 2. Drawing Units

There are five kinds of linear units in AutoCAD. Angular units can also be one of five different types. You can select the type of units to use, or accept the default decimal units. When you start a new drawing using the Start from Scratch option, AutoCAD brings up a blank drawing called Drawing1.dwg with the linear and angular units set to decimal numbers. The units and other basic setup parameters applied to this new drawing are based on a prototype drawing, or drawing template, with default settings. You can choose another template file as a prototype drawing, or you can create your own set of prototype drawings. For this,

- Start up AutoCAD by clicking Start from Scratch button in the Startup dialog box. Select English and click OK. Make the entire Status bar buttons except Model are clicked to the off position, that is they will appear unpushed.
- From the format menu, select Units. The Drawing Units dialog box appears. In the Length area, Decimal is currently selected. Similarly, in the Angle area, Decimal Degrees is the default.
- In the Length area, click the arrow in the Type drop-down list and select Architectural. These units are feet and inches. When the linear units specification was changed from Decimal to Architectural, the number in the Precision drop-down list on the left changed from 0.0000 to 0' -0 1/16 ". At this level of precision, linear distances will be displayed to the nearest 1/16".
- Select some of the other Length unit types from the list and note the way the units appear in the Sample Output area at the bottom of the dialog box. Then select Architectural again.
- Click OK in the Drawing Units dialog box to close it. Notice the coordinate readout in the lower-left corner of the screen. It now reads out in feet and inches.

## 3. Drawing Size

The default drawing area on the screen for a new drawing is 12 to 16 units wide and 9 units high. After changing the units to Architectural, the same drawing area is now 12 to 16 inches wide

and 9 inches high. You can check this by moving the crosshair cursor around on the drawing area and looking at the coordinate readout. The drawing area can be made larger or smaller through a process known as zooming in or out. A tool called grid will help you to draw and to visualize the size of your drawing.

**Grid:** The grid is a pattern of regularly spaced dots used as an aid to drawing. You can set the grid to be visible or invisible. The area covered by the grid depends on a setting called drawing limits. Use Zoom In and Zoom Out commands to vary the view of the grid and then change the area over which the grid extends by resetting the drawing limits. Before doing this, turn off the User Coordinate System icon in the lower-left corner of the drawing area.

The Drawing Limits setting records the coordinates for the lower-left and upper-right corners of the grid. The coordinates for the lower-left corner are 0,0 by default, and are usually left at that setting. You only need to change the coordinates for the upper-right corner. Drawing Limits setting controls the size of the grid, you need to change it.

**Exercise:**

1. Practice the following:

- a) Set up linear and angular units for a new drawing
- b) Make the grid visible and modify its coverage
- c) Use the Zoom In and Zoom Out features
- d) Activate the Snap mode and change the Snap and Grid spacings.
- e) Draw lines using Grid, Snap, and the coordinate readout.
- f) Create a new folder on your hard drive from within AutoCAD.
- g) Give a name and save your file.

## 2. Prepare the following drawings:

Project 1:	Building size:	125'x85'
	Units:	Architectural
	Drawing Limits:	200', 150'
	Grid/Snap Spacing:	5'
Project 1:	Building size:	87'x60'
	Units:	Architectural
	Drawing Limits:	120', 90'
	Grid/Snap Spacing:	3'
Project 1:	Building size:	12' -6"x14'-6"
	Units:	Architectural
	Drawing Limits:	16', 20'
	Grid/Snap Spacing:	6"

### Summary of procedure:

1. Set the units
2. Set the drawing limits
3. Set Grid spacing to 0 and Snap spacing to the given distance.
4. Turn on Grid and Snap
5. Zoom to all
6. Draw the rectangle

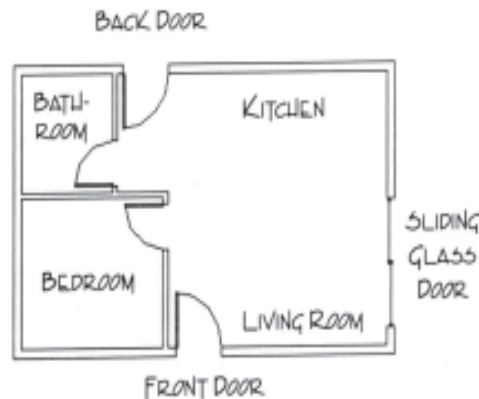
## 8.3 Laying out the walls – Creating Doors & Windows

### 1. Laying out the walls

For most floor plans, the walls come first. Fig. 8.3.1 shows the basic floor plan of a building. Draw four exterior wall lines (rectangle with size 25' x 16') using line command. You will need to create an inside wall line for the exterior walls and then make the three new interior walls. The wall thickness will be 4" for interior walls and 6" for exterior walls, as exterior walls have an additional layer or two of weather protection, such as shingles or stucco. Finally, you will need to cut five openings in these walls (interior and exterior) for the doorways.

- Create a new file and name it as Cabin01.dwg. Draw a rectangle with size 25' x 16'.

- On the status bar, click the Grid and Snap buttons to turn them off. Then start of Offset command by clicking on the Modify toolbar. You can also start the Offset command by typing `o` and press Enter key.



**Fig.8.3.1 : The Basic Floor Plan**

- Give values at the Offset distance: prompt, type 6 in the command window. No need to enter inch sign ("), but you are required to enter the foot sign (').
- At the Select object to offset: prompt, click one of the four lines. Click in a blank area inside. The first line is offset 6" to the inside. Continue doing this until you have offset all four outside wall lines to the inside at the set distance of 6". Then press Enter key to end the Offset command.
- Clean up the corners with the Fillet command. Click Modify→Fillet button and type `r`, then type 0 to set the Fillet radius to zero. Click any two lines that form an inside corner. Be sure to click the part of the lines you want to remain after the fillet is completed. Both of the two lines will be trimmed to make an inside corner. Continue doing this until all four corners have been cleaned up.
- Create the interior wall lines by offsetting the exterior wall lines. Start the Offset command, at the Offset distance: prompt, type 9'4 and press Enter key. Leave no space between the foot sign (') and the 4.

- Click the inside line of the left exterior wall. Click in a blank area to the right of the selected line. The line is offset 9'-4" to the right. Press Enter key twice. The Offset command is now restarted, and you can reset the offset distance. Type 4 and press Enter key to reset the offset distance.
- Click the new line that was just offset, and then click in a blank area to the right of that line. You have created a vertical interior wall. Press Enter key twice to stop and restart the Offset command.
- Type 6.5' and press Enter key. This sets the distance for offsetting the next wall. Pick a point on the inside, upper exterior wall line. Click in a blank area below the line selected. The inside exterior wall line is offset to make a new interior wall line. Press Enter key twice to stop and restart the Offset command.
- Type 4 and press Enter key. Click the new line and click again below it. A second wall line is offset to make a new interior wall line. Press Enter key to end the Offset command.
- Repeat the procedure to create the bathroom wall that you used to make the first two interior walls.
- Now clean up the inside corners of the interior walls and bathroom walls using Fillet and Trim commands. Use the Zoom command to get a better look while cleaning.
- There are five doorway openings, two are on interior and three are on exterior walls. To make Exterior openings, start the Offset command, then type 6 and press Enter key to set the distance.
- Click one of the two interior lines, and then click in a blank area to the right of the line that you selected. Now do the same thing to the second wall. For this, end and restart the Offset command by pressing Enter key twice, then type 3' and press Enter key to set a new offset distance and offset the new lines to the right. Next, you will need to extend these four new lines through the external walls to make the jamb lines.
- End the Offset command then type **ex** on the command window. Select the upper and lower horizontal outside, external wall lines as boundary edges for the Extend command, and press Enter key.

- Click the four lines to extend them. The lines are extended through the external walls to make the jambs. End the Extend command by pressing Enter key.
- Now trim away the excess part of the jamb lines and then, the wall lines between the jamb lines. Use Trim command for doing this.
- The two interior openings shall also be made using the same procedure.
- To make 7' opening on the right side of the building, Offset a wall line 12". Offset the new line 7'. Extend both new lines through the wall. Trim the new lines and the wall lines to complete the opening.

## 2. Creating Doors

In a floor plan, a rectangle or a line for the door and an arc showing the path of the door swing usually indicates a door. Generally, the door's position shown at 90° from the closed position. Swinging doors are generally used. Follow the procedure to draw Swinging doors:

- Choose Tools→Drafting Settings, click the Object Snap tab to activate it, be sure that all check boxes are unchecked in the Drafting Settings dialog box. Then click OK.
- At the Command: prompt, move the cursor to the Standard toolbar and click the Zoom Window button. Pick two points to form a window around the front doorway opening.
- Choose Draw→Rectangle; pick two points to represent opposite corners of the rectangle. Use Object Snaps (or Osnaps) to pick specific points on objects such as endpoints, midpoints, the center of a circle, etc.
- Move the cursor onto the Temporary Tracking Point button on the Standard toolbar and hold down the left mouse button. The Object Snap flyout opens and you see all the Object Snap tools.
- Holding the left mouse button down, drag the cursor down the flyout to the Endpoint button, and release the mouse button.

The prompt line now displays the addition of `_endp` of. This activates the Endpoint Object Snap. Move the cursor near the upper end of the left jamb line. When the cursor gets very close to a line, a colored square appears at the nearest endpoint.

- Move the cursor until the square is positioned on the upper end of the left jamb line, and then click that point. The first corner of the rectangle now is located at that point. Move the cursor to the right and slightly down to see the rectangle being formed.
- When the Command window shows the Specific Other corner point, type `@3',-1.5` and press Enter key in the command line. The rectangle is drawn across the opening, creating a door in a closed position.
- Rotate the door around its hinge point, through an arc of  $90^{\circ}$  in the counterclockwise direction, making it a rotation of  $+90$ . Use Rotate command to rotate the door.

### 3. Creating Windows

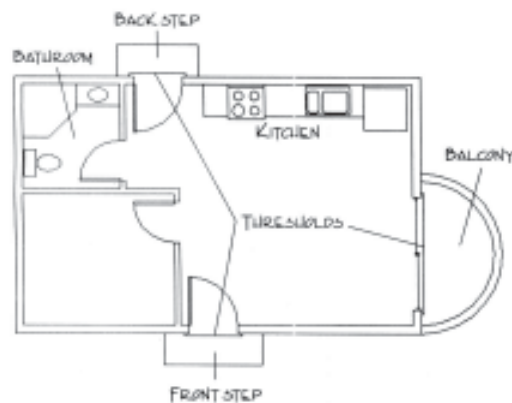
Create a window block, and then go from room to room to insert the block into the walls. The window in the floor plan can be created from one block, even though they are different sizes.

- Click the Layers list on the Object Properties toolbar to open the drop-down list and select 0 layer.
- Right-click the Osnap button on the Status bar and pick Settings from the shortcut menu. Add check marks to Midpoint and Perpendicular Osnaps. Then click OK.
- Pick two points to be opposite corners of the zoom window. Start the Line command, then click the Nearest Osnap button from the Object Snap toolbar or the Osnap flyout on the Standard toolbar. The Nearest Osnap will allow you to start a line on one of the wall lines.
- Move the cursor to the Upper wall line, a little to the left of the center of the screen and, with the hourglass symbol still displayed, click. A line begins.

- Move the cursor to the lower wall line. A colored perpendicular icon will appear directly below the point you previously picked. When it is displayed, click. The line is drawn between the wall lines.
- Using the Offset command, set offset distance to 12". Pick the line you just drew, and then pick a point to the right of that line. The line is offset 12" to the right. Using Line command, draw a line at midpoint. The three lines you have drawn will make up a window block. They represent the two jamb lines and the glass.
- Insert windows by varying the X scale factor from 2 to 6, you will be able to create windows 2', 3', 4', and 6' wide.

#### 8.4 Drawing the Steps and Thresholds – Balcony – Laying out the Kitchen and Bathroom

##### 1. Drawing the Steps and Thresholds



**Fig. 8.4.1**

Figure shows a floor plan with front and back steps, thresholds, a balcony, and kitchen and bath fixtures. Use a width of 2' for the front and back step, and lengths of 6' and 5' respectively. The three thresholds extend 2" beyond the outside wall line and run 3" past either jamb line.

**The Front step:** Open the drawing, which shows the floor plan. Check all buttons on the status bar except Model are in the off

position. Use zoom command to get big picture of the front step. Start the Line command; pick a point at the lower end of the left jamb line. Right-click the Polar button on the status bar at the bottom of the screen, then click settings. The Settings dialog box comes up and the Polar Tracking tab is active. In the polar Angle Settings area, set the Increment angle to 90.00. Hold the cross-hair cursor, a dashed line called a temporary alignment path is displayed along with a tool tip that identifies the alignment path as a Polar one, and a relative Polar coordinate that confirms the angle to be 270°.

While the alignment path and tool tip are visible, type 2' press Enter key. A 2' vertical line is drawn. When the line command is running and the cross hair cursor is held always from the last point, you can enter a distance, and the line will be drawn to the desired length in the direction of the cursor. Press Enter key to end the Line command. Type o [press Enter key] to start the Offset command. Type 1'6" [press Enter key] for an offset distance, and offset this line to the left. Similarly offset a new line to the right at a distance of 6'. Erase the original line and draw a line from the lower end points of these two new lines to represent the front edge of the step. Use the Endpoint Osnap for each point picked. Save the document.

**The Back Step:** Zoom into the back step area. Start Line command and pick the temporary Tracking point button on the Object Snap toolbar. Draw the side of the step using Direct Entry technique with Polar tracking. Hold the cross hair cursor, type 5' [press Enter key], the front edge of the step is drawn. Select perpendicular Osnap from the Object Snap toolbar and move the cursor to the outside wall line, click the mouse button. The right edge of the step is drawn and the back step is complete.

**The Thresholds:** These are generally used on doorway openings where the level changes from one side of the opening to the other. Generally, the lip of each threshold is offset 2" from the outside wall, and each edge runs 3" past the doorjamb. You will use the Temporary Tracking point tool with Polar Tracking and Direct Entry to draw the thresholds. To draw the front door entry follow the steps:

- Zoom into the opening, start Line command and click the Temporary Tracking Point button and the Endpoint Osnap button from the Osnap toolbar.
- Click the outside endpoint of one of the jamb lines, then move the cursor along the wall line away from the opening until the Polar alignment path and tooltip appear.
- Enter the distance that the threshold extends past the jamb (3"), move the cross hair away from the wall line in a horizontal or vertical direction until the Polar alignment path and tooltip appear.
- Enter the overhang distance of the threshold, move the crosshair in a direction perpendicular to the last point of the last segment drawn, until the Polar alignment and tooltip appear.
- Enter the length of the threshold (it is the length of the opening + 6"). Invoke the Perpendicular Osnap and hold the crosshair back on the wall line, then click. Press Enter key to end the Line command.

Direct Entry of Distances is a method used to specify distances for line segments. In this method, you position the crosshair in such a way that the direction from the last point picked indicates the direction for the next line segment. Then you just type in the distance. There is no need to use either the relative polar or relative Cartesian coordinates. This technique is primarily used with Polar tracking to draw line segments that are oriented at a preset angle, in this case,  $90^{\circ}$ ,  $180^{\circ}$ ,  $270^{\circ}$ , and  $0^{\circ}$ . Direct Entry can also be used with the Copy and Move commands to specify displacement of selected objects being moved or copied.

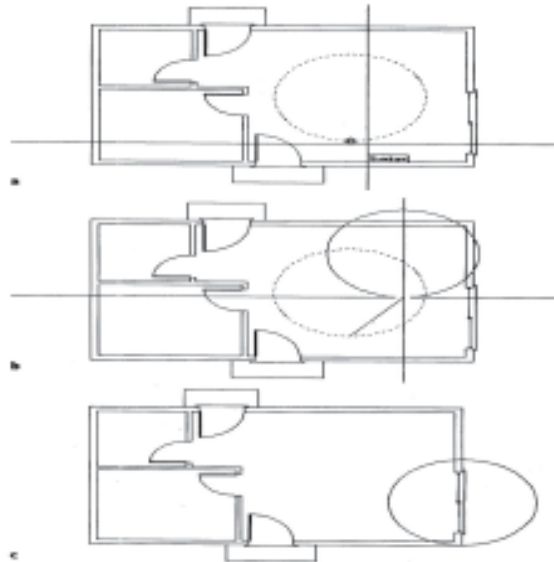
## 2. The Balcony

The balcony is made up of two semi-circles. The easiest way to draw an arc is to draw a circle, trim the circle to make the arc. Follow the steps to draw Balcony:

- Select Draw→Circle; there are six options for constructing a circle. Select the Center, Radius option. The command window will prompt you to specify a point as the Center of the circle.

The center of the balcony is 5' above the lower-right corner of the outside wall line.

- Establish a center in the largest room; type 5' [press Enter key]. The circle is drawn. Click the move button on the Modify tool bar. The cursor changes to a pick box. Select the circle and press Enter key.
- On the Object Snap toolbar or flyout, pick the Quadrant button. Select the circle somewhere near its bottom extremity. An image of the circle is attached to the crosshair cursor. Turn Polar Tracking off by clicking the Polar button on the status bar.
- Move the crosshair cursor around to see that the lowest point on the circle is attached at the crosshair (Figure 8.4.2b). This point on the circle needs to be placed at the lower-right corner of the outside wall line.
- Select the Endpoint Osnap, then pick the lower-right corner of the cabin. The circle is positioned correctly for the balcony (Figure 8.4.2c). Now you can use the existing wall lines to trim the circle into a semicircle.
- Start the Offset command, set the distance for 6", and offset the semi-circle to the inside. The balcony is complete.



**Fig 8.4.2**

### 3. Laying out the kitchen and Bathroom

**a) Laying out the Kitchen:** Generally the kitchen will have a stove, a refrigerator, and a Counter with a sink. The refrigerator is set 2" away from the back wall.

- Offset the right inside wall line 3' to the left. Then offset this new line 9'-10" to the left. Finally offset the upper inside wall line 2' down.
- Use the Fillet command with a radius of zero to clean up the two corners.
- Select the Rectangle button on the Draw tool bar, and then click the Temporary Tracking Point Osnap option. Use Endpoint Osnap to select a base point at the upper end of the right side of the counter.
- Hold the cursor below the point, type 2 and press Enter key. This starts the rectangle 2" away from the back wall, along the side of the counter. To simplify the opposite corner of the rectangle, type @32,-32 .
- For the stove, right click the mouse. A shortcut menu pops up next to the crosshair cursor. Click Repeat Rectangle. Now pick the upper end of the left side of the counter as the tracking point. Hold the cursor directly to the right of that point and type 2 [press Enter key]. Then type @27,-26 to complete the rectangle.
- Use the Trim command to trim away the front edge of the counter at the Stove. Zoom into a closer view of the stove using the zoom window. Offset the wall line down 2.5". When you pick the line, pick it somewhere to the right or left of the stove. Then, after it is offset, trim it back to the sides of the stove.
- The next step is to lay out guidelines to locate the centers of the burners. Now draw a circle for one burner, copy it to the other three burner locations, and then change the radius of the left front burner.
- Now draw a double sink, with one basin larger than the other. Use Offset, Fillet and Trim commands.

## b) Laying out the Bathroom

The bathroom has three fixtures: sink, shower, and toilet. Follow the steps to draw the Bathroom:

- Zoom the bathroom view, start the Rectangle command, select the first point, move the cursor to the upper-left inside corner of the room click the left mouse button. The first corner of the square is placed. For the second point, type @40, -40 [press Enter key].
- Start the Line command and move the cursor near the midpoint of the bottom line of the square, click. Move the cursor near the midpoint of the right side of the rectangle, Click again. Use this line as a cutting edge and trim away the lower-right corner of the shower rectangle. This completes the shower.
- Zoom into the sink area; Offset the top inside wall line down 16". Then use the shower wall as a cutting edge and trim back the line.
- Click the Ellipse button on the Draw toolbar, type c [press Enter key] to select the Center option. Click the Temporary Tracking Point Osnap button and then move the cursor near the midpoint of the newly offset line. Establish a tracking point, move the crosshair cursor directly above the tracking point.
- When the dotted tracking path and the Track Point tooltip appear, type 8 pr ess Enter key to locate the center of the counter. The command window will prompt you for the location of the ends of two perpendicular axes. You will start with the left/right axis and enter the distance using Direct Entry and Polar Tracking, as you did for the steps.
- Hold the crosshair cursor directly to the right of the center point. Type 7 press Enter key. Hold the crosshair cursor directly above the center and type 5 press Enter key. The ellipse is constructed, and the sink fixture is complete.
- Zoom into the toilet area, position it in the lower-left corner of the drawing area. Hold down the left mouse button and drag the hand up and to the right. When the toilet area comes into view, release the mouse button.

- Position the cursor near the top of the drawing and hold down the left mouse button. Drag the cursor up and down, release the mouse button. With the Rectangle command, draw the toilet tank a few inches to the right of the wall. The offset the left wall line 1" to the right to make a guideline.
- Using Move command, position the Rectangle 1" from the left wall and centered between the shower and lower wall. Erase the guideline. Using the Ellipse command, place the cursor at center point and type 6 [press Enter key]. The ellipse is complete, and the toilet is finished.

### **Exercise**

1. Using standard dimensions, create the following floor plan with some basic furniture. Use the following techniques:

- Use the Temporary Tracking Point tool to create and use tracking points.
- Use the Quadrant and Intersection Osnaps, set up and use running Osnaps.
- Move around the drawing area with Realtime Zoom and Pan
- Use the Trim, Circle and Ellipse commands
- Use guidelines to locate the center of circles for a stove top



**Fig. 8.4.3**

## 8.5 Drawing the Roof – Develop the drawing depicting the Reinforcement details of typical elements like column, footing, beams and slabs

### 1. Drawing the Roof

To draw the Roofline (let it be a hip roof) in floor plan, the following lines have to be drawn to represent different parts of the roof:

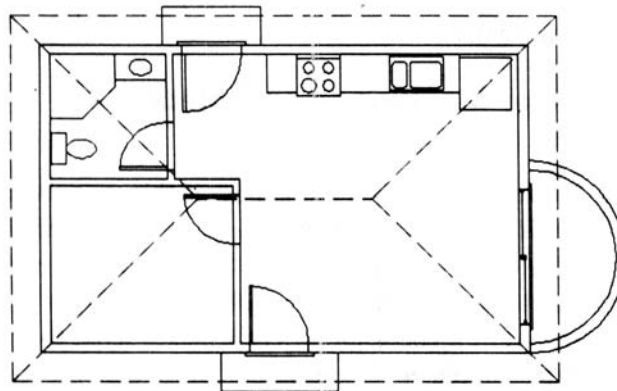
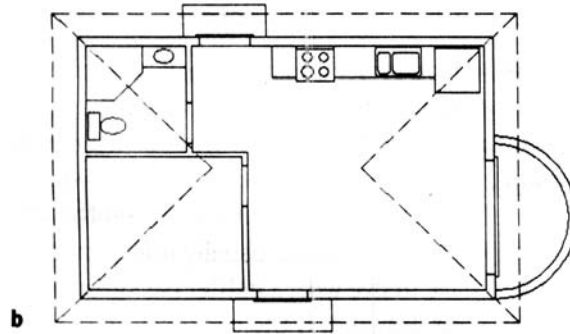
- Four eaves lines around the perimeter of the building, representing the lowest edge of the roof.
- One ridgeline, representing the peak of the roof
- Four hip lines, connecting the end points of the eaves line to an endpoint of the ridgeline.

**Creating the Eaves:** The roof is cantilevered out beyond the exterior walls the same distance on all sides of the building; we can generate the eaves lines by offsetting the outside wall lines.

- Using Offset command, draw lines on four sides of the building with an offset distance of 1'-6".
- Using Fillet command (make sure that the radius is set to zero), click any two lines representing adjacent sides of the building. Click the half of the line nearest the corner that the two selected lines will meet. The lines extend to meet each other and form a corner.
- Pick two more adjacent lines that will meet at another corner. Start the Fillet command again and keep picking pairs of lines until all the corners are filleted and the result is a rectangle that represents the eaves of the roof surrounding the building, offset 1'-6" from the outside exterior walls.
- Move the eaves lines onto the Roof layer, for this select the four eaves lines, and then click the Layer Control drop-down list on the Object Properties toolbar.
- Click Roof, now the eaves lines are on the Roof layer. Press Esc to remove the grips.

### Drawing the Hip and Ridge Lines:

- Make Roof layer as the current layer, using Line command, draw a line starting at the lower-left corner of the roof and to the right up at an angle of approximately  $45^{\circ}$  until the Polar tracking path with its tooltip appears. While the tracking path is visible, type 15' press Enter key .The first hip line is drawn.



**Fig.8.5.1 : The Completed Roof**

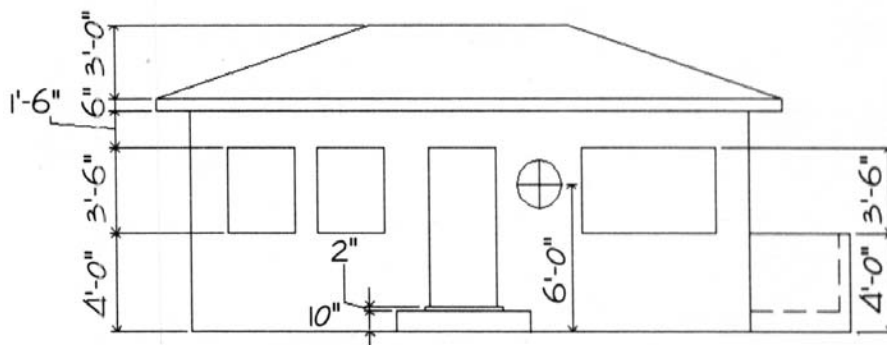
- Using Line command, draw a line starting at the upper-left corner of the roof and to the right at an angle of approximately  $45^{\circ}$  until the Polar tracking path with its tool tip appears. Type 15' press Enter key. The second hip line is drawn.
- The two hip lines need to be filleted together at their intersection, but the bedroom door is in the way. For this, start Fillet command (set the radius to zero) click the two diagonal lines at a place that is close to their intersection. The lines are filleted together.

- Now copy these two diagonal lines to the right side of the roof. Start Mirror command; select the two diagonal lines, then press Enter key. Click the Midpoint Osnap button and place the cursor on the horizontal eaves line. Then move the cursor down into the living room, keeping it directly below the point just picked, and when the tracking line and Polar tooltip appears, click space bar. Press enter Key when asked whether to delete old objects. The diagonal lines from the left are mirrored to the right.
- Now draw the ridgeline. Start Line command, pick two intersections of the diagonal lines, then press Enter key. Open the Layer Control drop-down list and turn on the Doors layer. Then click the roof layer to close the drop-down list. This completes the ridgeline and finishes the roof. Save this drawing.

## 8.6 Generating Elevations – Drawing the Front Elevation – Putting the door, step, windows–Finishing touches–Hatching the front Elevation

### 1. Generating Elevations – Drawing the Front Elevation

The front elevation is drawn using techniques similar to those used on a traditional drafting board. You will draw the front elevation view of the floor plan below it by dropping lines down from key points on the floor plan and intersecting them with horizontal lines representing the heights of the corresponding components in the elevation. Fig. 8.6.1 shows the floor plan and the front elevation of a building. Follow the steps to draw this:



**Fig 8.6.1**

- Check the Status bar to see that Polar, Osnap, and Model are in the On position while the other buttons are off. Draw a horizontal ground line across the bottom of the screen using the Line command.
- Offset the ground line 10" up to mark the height of the step. Then offset this new line 2" up to mark the top of the threshold.
- Offset the ground line 4" up to mark the top of the balcony wall and the bottom of the windows. Offset the bottom line for the windows 3'-6" up to mark the top of the door and windows.
- Offset the top line for the windows and door 1'-6" up to mark the soffit and roof. Offset the soffit line 6" up to mark the lower edge of the roof's top surface. Offset this lower edge of the roof's top surface 3' up to mark the roof's ridge.
- Now drop lines down from the points in the floor plan that coincide with components that will be visible in the front elevation. The front elevation will consist of the balcony, front step, front door, and windows, the front corners of the exterior walls, and parts of the roof.

To draw the roof in elevation, follow the steps:

- Using Line command start a line from the right endpoint of the ridgeline of the roof. Then click the Snap to None Osnap button on the Object Snap toolbar. Draw the line straight down past the soffit line.
- Click this line to activate grips. Select the grip at its upper end point. Press the spacebar once to access the Move command.
- Type c [press Enter key] and then click the lower-right and lower-left corners of the roof, and the left endpoint of the ridgeline.
- Type x [press Enter key] to end the Move command, then press Esc to remove the grips. Start the Trim command and select the two lines dropped from the ridgeline. Press Enter key.
- In the elevation, pick the ridgeline to the left and right of these dropped lines. The ridgeline is trimmed back to its correct length.

Erase the two dropped lines that were just used as cutting edges.

- Restart the Trim command; select the two lines dropped from the corners of the roof, the horizontal soffit line, and the line 6" above the soffit line to be cutting edges-four lines in all. Press Enter key.
- To do the trim, click the dropped lines above and below the two horizontal cutting edges, then click the two selected horizontal lines to the left and right of the dropped lines – eight picks in all. Press Enter key, the roof edge is complete.
- Use the Line command to draw the two hip lines from the roof edge to the ridgeline.

## **2. Putting in the Door, Step, and Windows-Finishing touches**

To finish the front elevation, we need to put in the front door, windows, front step and threshold, and a few finishing touches.

- Draw a line from the left end of the leftmost window in the front wall of the floor plan to the ground line. Follow the same process in steps 2 and 3 of the "Drawing the Roof in Elevation" to copy this line to (a) each endpoint of the jamb line of each window in the front wall, except the 2' circular one to the right of the front door, and (b) each edge of the front door opening.
- Type x press Enter key to end the Move command, press Esc to remove the grips. Trim all these lines. Create the step first. For cutting edges, select the two lower horizontal lines and the two outer vertical lines. To trim, pick each of these lines in two places above and below, or to the left and right of the step.
- To create threshold, for cutting edges, select the four lines that form the outside edges of the threshold. To trim, pick each of these lines (except the line that forms the top of the step) in two places above and below, or to the left and right. Trim the left and right edges of the door up to the top of the threshold.
- Offset the ground line up to 6'. Click the 2' window in the floor plan, draw the line down through the newly offset line, draw a

circle using the intersection of these two lines as the center with a radius of 12". Trim the lines passing through the circle in four places outside of the circle.

- Offset the vertical line representing the balcony's right edge 6" to the left. Then offset the ground line up 10". Fillet these two lines at their intersection with a radius of zero. Then trim the balcony floor line back to the right wall line.
- Select these two new lines, click the Properties button, click Line type in the Properties dialog box and click Dashed. Close the Properties dialog box and press the Esc key. The lines are changed to dashed lines to indicate that they are hidden in the elevation. Save this drawing.
- Finishing touches: to enhance the appearance of the elevation add detail to the windows and door, and place an extra step leading to the front step.

### 3. Hatching the Front Elevation

Hatches can resemble the surfaces of various building materials. To give texture to an AutoCAD drawing, a drafter will hatch in areas or fill them in with a solid color. Solid fills in a drawing can give a shaded effect when printed. In floor plan, the inside of full-height walls are often hatched or filled to distinguish them from the low walls. Wooden or tile floors can be hatched to a parquet or tile pattern. In a site plan, hatches are used to distinguish between areas with different ground covers, such as grass, gravel, or concrete. When working with elevations, the surfaces can be hatched to show shading and shadows. Hatches and fills are widely used in details as a tool to aid in clear communication. To get the best visual effect from putting hatch patterns on the front elevation, change the background colour for the drawing area to white. For this, choose Tools→Options and click the Display tab. Click the Colors button and make the change. Create new layers for the hatches and assign colors to them.

- Open the drawing, which contains the floor plan and front elevation only. Set up three new layers as:

Layer Name	Color
Hatch-elev-brown	42
Hatch-elev-gray	Light gray (8)
Hatch-elev-black	Black (White) (7)

- Make the Hatch-elev-gray layer current. Click the Hatch icon on the draw toolbar. The Boundary Hatch dialog box comes up. Here you can choose a pattern, set up the patterns properties, and determine the method of specifying the boundary of the area to be hatched.
- Move to the right of the Pattern drop-down list and click the Browse button. The Hatch Pattern Palette dialog box comes up. Of the four tabs, ANSI will be active and the ANSI31 pattern will be highlighted.
- Check the Other Predefined tab. Find the AR-RROOF pattern and click it, then click OK. In the Boundary Hatch dialog box, note that AR-RROOF has replaced ANSI31 in the Pattern drop-down list. A new pattern is displayed in the Swatch preview box. Set Scale and Angle settings to 0.00 and 6. Click the Pick Points button.
- In the elevation view, click the middle of the roof area. The lines that form the boundary of the roof area, forming an outline of the area to be hatched. Click OK in the Boundary Hatch dialog box. The hatch is now placed in the roof area.

1. Create a Hatch Pattern for the roof in plan view – Make the following changes and additions: (See Fig 8.6.3)

- Make the Roof layer current and change its line type from Dashed to Continuous. Turn off all other layers.
- Put a chimney in the roof with Rectangle 2'-8" by 3'-0", with a circle of radius 8" inside. The circle is centered horizontally and its lower quadrant point is set 4" up from the lower edge of the rectangle.

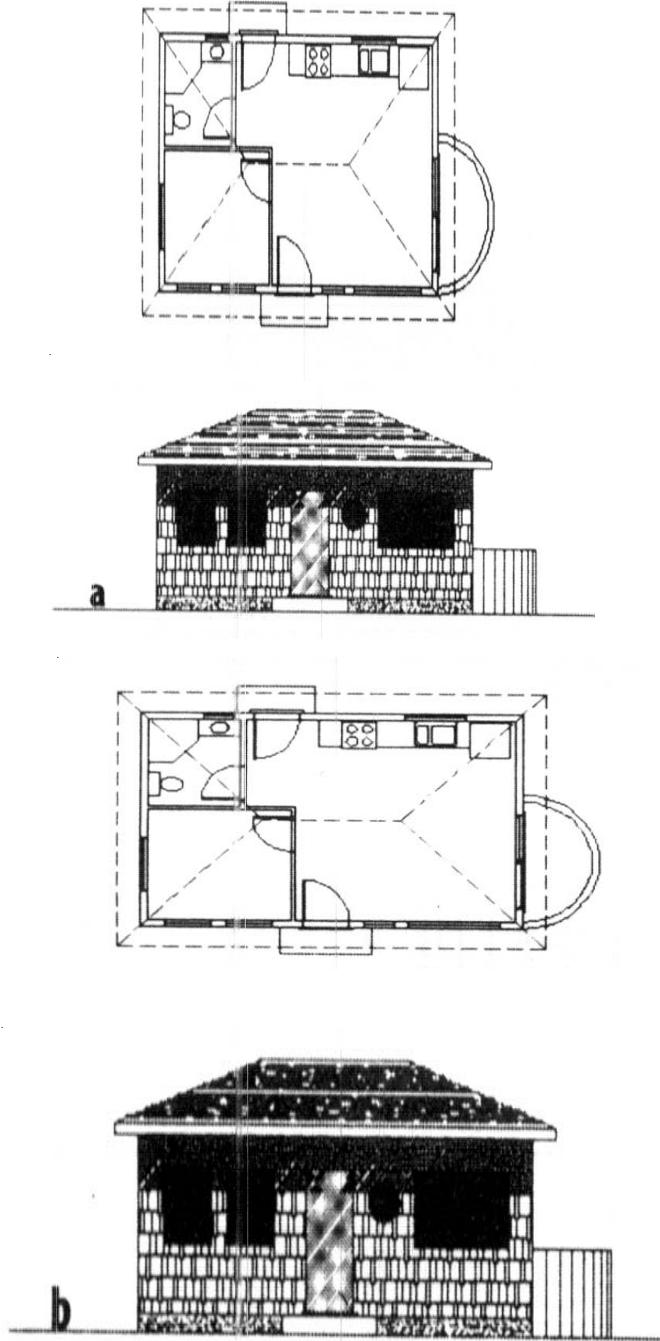


Fig. 8.6.2

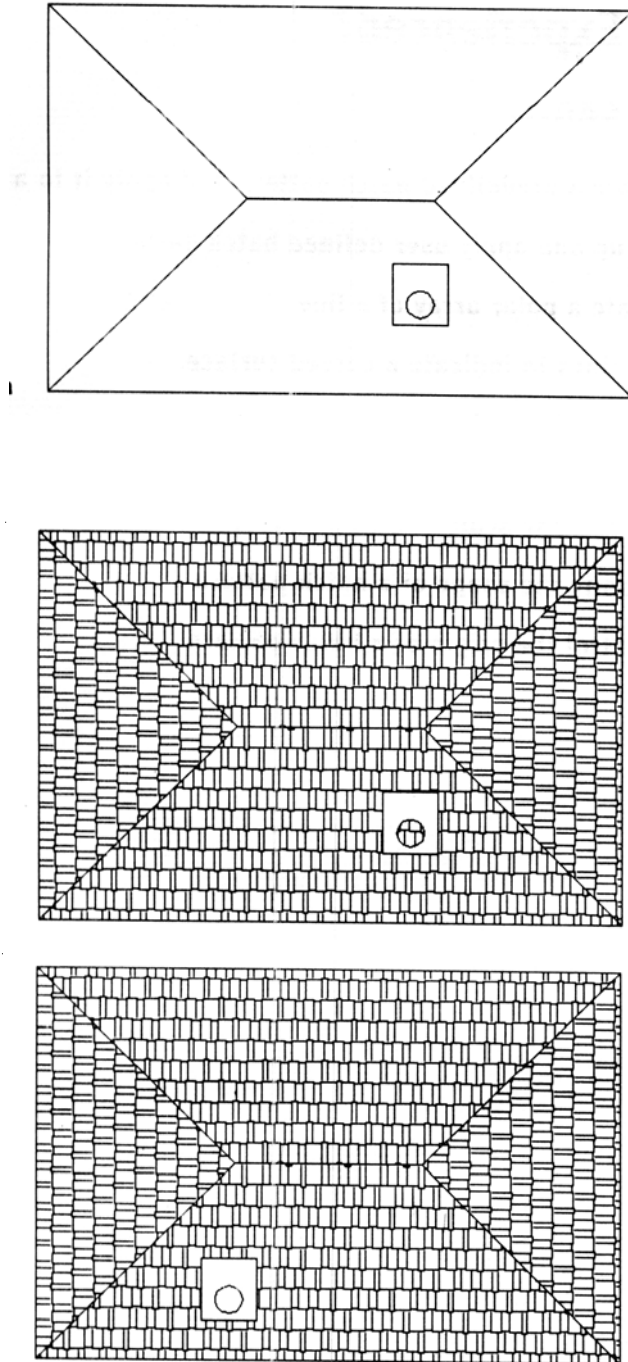


Fig. 8.6.3

- Create a new layer called Hatch-plan-roof. Assign the same color you are using for the Roof layer. Make this new layer current.
- Now apply the AR-RSHKE pattern to each quadrant of the roof, changing the rotation angle by 90° for each adjacent area. Use a scale of 1.0000. When you pick the quadrant with the chimney, pick a point in the quadrant that is outside the chimney rectangle.
- Double click the hatch in the quadrant that contains the chimney. In the Hatch Edit dialog box, click the *advanced* tab to make it active. In the Island Detection area, select the Outer option, then click OK. Now the hatch pattern does not appear in the circle.
- Move the chimney rectangle and circle to a different location in the quadrant and see the results. See what happens if you move the chimney lines to a different quadrant, to a location completely off the roof.

2. Practice the following on a drawing containing floor plan and elevation

- Create a predefined hatch pattern and apply it to a drawing
- Set up and apply user-defined hatch patterns
- Create a polar array of a line
- Use lines to indicate a curved surface
- Modify the scale of a hatch pattern
- Modify the shape of a hatch pattern
- Control the origin of a hatch pattern

## **8.7 Controlling text in a drawing – Setting up Text styles – Using Single line Text - Placing Room Labels in the floor plan – Creating a Title Block and Border**

### **1. Setting Up Text Styles**

It is necessary to use text in the drawings to include titles of views, notes, and dimensions. Each of these may require a different height, orientation, and style of lettering. AutoCAD offers two types of text objects: single-line and multi-line text. A text style consists of a combination of a style name, text font, height, width factor,

oblique angle, and a few other static settings. These text style properties will be specified with the help of a dialog box that comes up when you start the Style command. Follow the steps to define Text Style:

- Open a drawing having floor plan and elevation. Create a new layer named Text1. Assign it a color and make it current. Freeze the Hatch-plan-floor and Hatch-plan-wall layers.
- Start the Style command by typing **st** [press Enter key]. A Text Style dialog box will appear. Click New, the New Text Style dialog box comes up. There is a Style Name text box with Style1 in it, highlighted. Enter a new style name.
- Type **Label** [press Enter key], Label appears in the Style Names drop-down list. Select romans.shx font. Set a height of 1'-0". Keep all other parameters at their default settings.
- Click Apply in the dialog box. Now Label text style is saved with the current drawing, and becomes the current text style.

## 2. Using Single – Line Text

The first task is to put titles in for the floor plan and front elevation, using the new Title text style. The titles need to be centered approximately under each view. If we establish a vertical guideline through the middle of the drawing; we can use it to position the text.

- Open a drawing which contains floor plan and elevation. Set up Osnaps and Status bar such that Polar and Osnap are on and Endpoint and Midpoint Osnaps are running. Drop a line from the mid point of the ridgeline in the floor plan, down through the front elevation, to a point near the bottom of the screen. Offset the bottom line of the front step in the floor plan down 4'.
- Choose Draw→Text→Single Line Text. This will start the Dtext command. Type j [press Enter key], all the possible justification points appear in the prompt. Type c [press Enter key] to choose Center as the justification.
- Hold down the Shift key and click the right mouse button. A menu of Osnap options appears on the screen, select

*Intersection* on the menu and pick the intersection of the guideline and the offset line.

- For rotation, press Enter key to accept the default angle of 0°. An “I” cursor will be positioned at the intersection. With Caps Lock on, type **floor plan** [press Enter key]. The text is at the intersection and the cursor jumps down to allow you to type another line.
- Press Enter key again to end the Dtext command. The text is centered relative to the vertical guideline and sits on the offset line. Offset the ground line of the elevation down 4'. Start the Dtext command again and repeat steps 2-5 above, this time entering **front elevation** (again with Caps Lock on). When finished, erase the offset lines and the vertical guideline.

### 3. Placing Room Labels in the Floor Plan

Text for the room labels will use the Label text style, so you need to make that style current before you start placing text. For this used Dtext command by using the Style option.

- Pan the drawing down and zoom into the floor plan. Click the Polar and Osnap buttons on the Status bar to turn these features off.
- Start the Dtext command, at the prompt type s [press Enter key] to choose the Style option. Type ? [press Enter key two times] to see a list of defined text styles.
- Type s [press Enter key], again type Label [press Enter key] to make Label the current text style. Press F2 to close the text screen and return to the drawing. Pick a point in the kitchen a couple of feet below and to the left of the oven.
- Press Enter key at the Rotation prompt. The text cursor appears at the point you picked. With Caps Lock on, type Kitchen [press Enter key], living room [press Enter key], bedroom [press Enter key], bath [press Enter key two times], the Dtext command ends. Now you will have four lines of text in the kitchen and living room area.

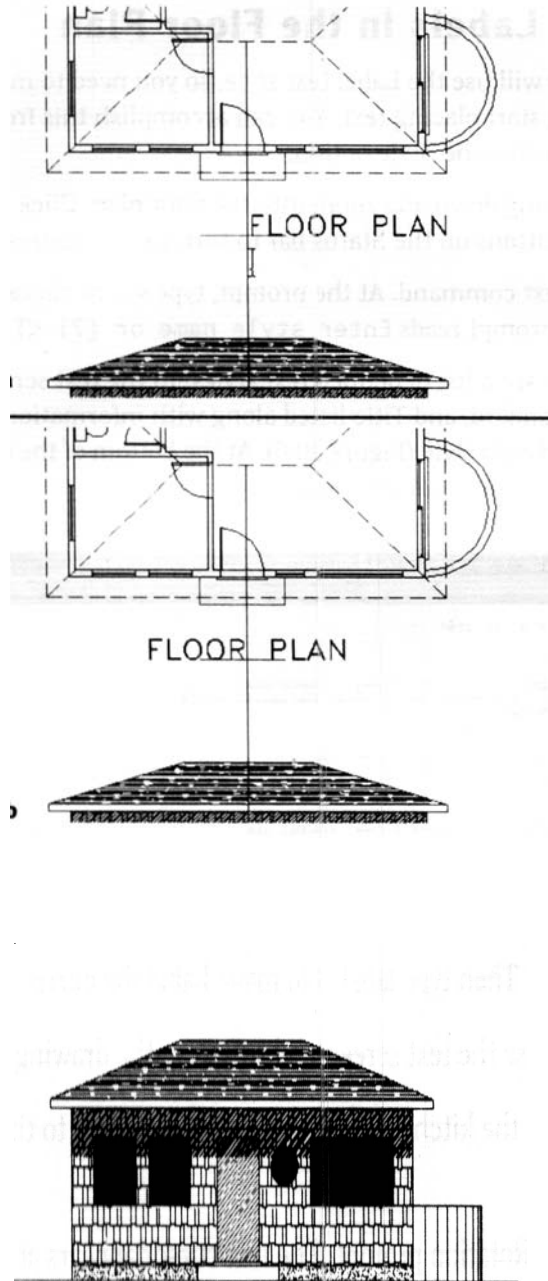


Fig. 8.7.1

- Now move the text to the respective rooms, Click anywhere on the text say BATH, one grip appears at the justification point of the text. Click the grip to activate it. The BATH text is attached to the cursor and moves with it. The Stretch command automatically starts. Since text can't be stretched, the Stretch command functions like the Move command.
- Be sure that Ortho, Polar, Osnap, and Otrack are turned off. Move the cursor to the bathroom and click a location to place the word in such a way that the letters don't touch any fixtures or walls. The Move command automatically ends when you complete a move. Repeat the procedure to move all other text.

#### **4.Creating a Title Block and Border**

The first step in creating a title block and border for the drawing is deciding on a sheet size for printing the final drawing. The border of the drawing will be set in from the edge of the sheet.

- Create a new layer, name it as Tblk1. Leave the default color assigned and make this layer current. Start the Rectangle command, at the prompt, type 0,0 [press Enter key]. Then type 68', 88' [press Enter key]. A rectangle is drawn that extends off the top of the screen.
- At the command: prompt, click the rectangle to turn on the grips. Grips appear at the corners of the rectangle. Click the lower-left grip. Press the spacebar once. Then move the rectangle over the drawing, click. Then press Esc to turn off the grips. The rectangle is positioned around the drawing and represents the edge of the sheet.
- Offset the rectangle 3' to the inside. Double-click the inside rectangle. This brings up the Properties window. In this change the Global Width of Geometry settings from 0" to 3". Close the dialog box and press Esc to remove the grips.
- Zoom to Extents, then Zoom out a little to create a view in which the drawing with its border nearly fills the screen. The outer rectangle represents the edge of the sheet of paper; the inner rectangle represents the drawing's border.

- **Title Block:** The title block is a box that contains general information about a drawing, such as the name of the project, the design company, and the date of the drawing. It will be set up in the lower-right corner of the border and will use the same special line-the polyline-that was used in the Rectangle command.
- Click on the Polyline icon on the Draw toolbar. The Specify start point: prompt appears in the Command window. Click Polar on the Status bar and select Temporary Tracking Point Osnap. Click the lower-left corner of the border and hold the cursor directly above that point. When the vertical tracking path appears along the left boundary line, type 12' [press Enter key]. This starts a polyline on the left side of the border 12' above the lower-left corner.
- Now set the line width to 3" by typing w at the command prompt. Hold the crosshair cursor on the right side of the border. When the perpendicular icon appears on the borderline, click. Then press Enter key. The first polyline segment is drawn.
- Restart the Polyline command. Choose the Midpoint Osnap and start a new segment at the midpoint of the line already drawn. Move to the bottom of the border near its midpoint. Run Perpendicular Osnap is activated, click. The left edge of the title block is drawn. Press Enter key to stop the Polyline. Trim the left half of the first Pline drawn. Offset the horizontal Pline down 4'. Then offset this new line down 3'. Then offset this new line down 2'-6".
- Using Midpoint Osnap, start a Pline at the midpoint of the third horizontal line down. Then end the segment at the bottom of the border. Trim the right side of the line just above the bottom of the border, back to the line just drawn. The lines for the title block are over.
- **Putting Text in the Title Block:** First we need to put labels in some of the boxes to identify what information will be shown there. For this, Choose Format→Text Style. The Text Style dialog box appears. Click New and type Tblk-label and click OK. Leave the font set to romans.shx, but change the height to 8". Then click Apply & Close.

- Be sure Caps Lock is on, then type *dt* press Enter key to start the Dtext command. Click the Snap to None Osnap button. Then pick a point in the upper-left corner of the upper box of the title block. Press Enter key at the rotation prompt. Type **project:** press Enter key two times. Now **PROJECT:** will be placed in the upper box. Repeat the procedure to type all other text in the boxes. Fig. 8.7.2 shows a sample title block.

Fig. 8.7.2

PROJECT:	
DRAWN BY:	SHEET NO.:
DATE:	

### **Exercise**

1. Prepare a drawing with floor plan and front elevation, practice the following:

- Set up various text styles – Use Title and Label text styles
- Place single-line text in the drawing for titles and room labels
- Construct a title block and place text in it

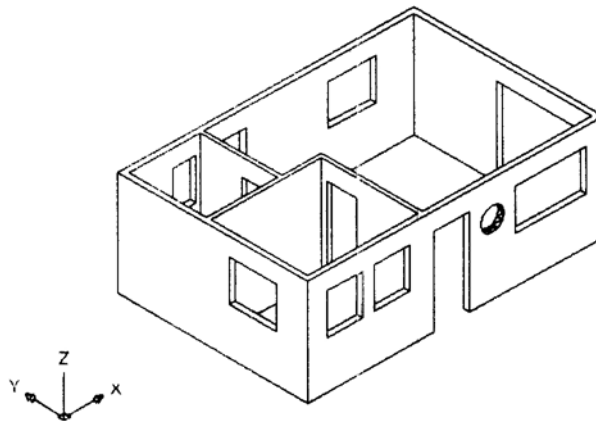
### **8.8 Develop a 3-D drawing of a building and obtain different views – Practice on printing on AutoCAD drawing**

#### **1. Develop a 3-D drawing of a building and obtain different views**

AutoCAD's 3D features are used to create either perspective drawings or simple 3D models. A 3D computerized model of a building that can be rotated and viewed from any angle, as well as from the inside building. Open a drawing, which has floor plan, make the Walls layer current and turn off all other layers. Follow the procedure to make a 3D model:

- Choose View→Display→UCS Icon→On, the UCS Icon appears. Now you will change the view of the plan, choose View→3D Views→ SW Isometric (SW means from the southwest). Zoom out and pan down to put the walls in 3D.
- Set the Endpoint Osnap to be running, and Polar and Ortho are turned off. Create a new layer called 3D-Walls, assign it color 22, and make it current. Choose Draw→Solids→Box. Click the lowest corner of the walls, and then click the uppermost corner. Specify the height 9'. A box is drawn over the entire floor plan.
- Restart the Box command and make another 9' high box in the living room. Pick the inside corner to the left of the front door and the inside corner. Create a third box in the remaining part of the living room. Make 9' boxes at the interior corners of the bedroom and bathroom.
- Choose Modify→Solids Editing→Subtract. Pick the large outside box, then press Enter key. Pick the four smaller inside boxes and press Enter key, they are removed. Choose View→Hide. Hidden lines are removed and you can see solid walls. Choose View→ Regen to restore the hidden lines.
- **Cutting Doorway Openings:** Create a new layer called 3D-Doors and make it current. Freeze the 3D-Walls layer. Bring up the Solids tool bar to the screen and dock it on the right side of the drawing area.
- Make a box for the front, bedroom, and balcony door openings. Click opposite corners of each opening, then enter 7'6 press Enter key. Copy the front door box to the back door opening, and the bedroom one to the bath opening.
- Zoom Previous, thaw the 3D-Walls layer. Choose Modify→Solids Editing→Subtract. Click the wall solid, then press Enter key. Click the five boxes openings, and press Enter key.
- Choose View→Hide, the doorway openings have been cut. Choose View→Regen to restore the hidden lines.
- **Cutting Window Openings:** Create a new layer called 3D-Windows and make it current. Freeze the 3D-Walls layer and turn on the Windows layer.

- Use the Box command to create six box solids that are 3'-6" high at each of the windows. Using the Move command, move the window boxes up 4'.
- Choose Modify→Solids Editing→Subtract. Click the wall solid, then press Enter key. Pick the six window boxes, then press Enter key. The window openings are cut out of the walls.
- To create a circular window, click the Cylinder icon on the Solids tool bar, use Insert Osnap to locate the center point of the 2' window. Specify the radius for the base of the cylinder by using Endpoint Osnap and clicking the point where one of the window jamb lines meets the front wall.
- Specify the height of the cylinder by typing 6 press Enter key. Using Move command, Polar Tracking, and Direct Distance entry to move the cylinder up 6'.
- Choose Modify→Solids Editing→Subtract. Click the walls solid, press Enter key, then click the round window and press Enter key again. Figure 8.8.1 shows the finished 3D-Model of a building.

**Fig. 8.81**

## 2. Practice on printing an AutoCAD drawing

Now we need to print the drawing using the default system printer, which is set up for an 8.5" x 11" – format laser-jet printer. The first step is to assign line weights to the visible layers.

- Click Cancel to close the Plot dialog box. Then click the Layers button on the Object Property toolbar. The Layer Properties Manager dialog box comes up.
- Click the Dim1 layer to highlight it. Hold down the Ctrl key and click the three Hatch-elev layers and the Roof layers to select them. Then release the Ctrl key. In the Line weight column, click one of the highlighted Default words. Click 0.005". Then click OK.
- Click on the Balcony layer near the layer's name. Hold down the Ctrl key and click on Fixtures, Headers, and Steps. Click one of the highlighted Default words. Click 0.008". Then click OK. Click the Walls layer and use the same procedure to assign a thickness of 0.014". Click OK to close the Layer Properties Manager box.
- Now Click the Plot button on the Standard toolbar. Check the printer, Paper Size and Paper Units. Select Window radio button in the Plot Area of the Plot dialog box. Be sure Portrait is selected in the Drawing Orientation area at the top.
- In the Plot Scale area, open the Scale drop-down list and select 1/8" = 1'0". In the Plot offset area; click the Center the Plot check box. Now we need to preview the printing setup.
- In the Plot dialog box, click the Full Preview button; it displays a full view of the drawing. Check the print was oriented correctly or not. At the bottom of the Plot dialog box, click OK. The computer will send it to the printer.

## **REFERENCES**

- |                                     |          |                      |
|-------------------------------------|----------|----------------------|
| <b>1. Fundamentals of Computers</b> | <b>-</b> | <b>V. Raja Raman</b> |
| <b>2. Computer Fundamentals</b>     | <b>-</b> | <b>P.K. Sinha</b>    |
| <b>3. AutoCAD 2002</b>              | <b>-</b> | <b>David Frey</b>    |
| <b>4. MS-Office Manual</b>          | <b>-</b> | <b>Microsoft</b>     |