

OPERATING SYSTEM

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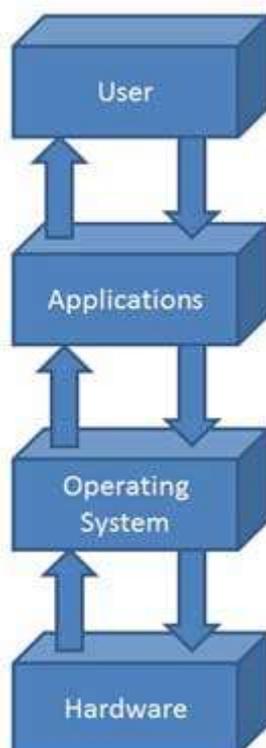
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UNIT-1

Operating System Concepts

The Operating System is a program with the following features –

- An operating system is a program that acts as an interface between the software and the computer hardware.
- It is an integrated set of specialized programs used to manage overall resources and operations of the computer.
- It is a specialized software that controls and monitors the execution of all other programs that reside in the computer, including application programs and other system software.



A computer system consists of hardware and software. Hardware like the system unit, which does all of the processing; the keyboard, through which one enters the

data and commands; the display screen; the printer; the disk drives, whether floppy disk or hard disk drive are the very important parts of a computer system. The hardware cannot do anything without software control. Software provides the instructions that tell the hardware exactly what to do. In general, an operating system is a program that provides an interface between the user, the application program, and the computer. It control input to the computer and output from the computer. More specifically, a disk operating system (DOS) is designed to provide an easy way to use disks for storage. DOS provides a method for organising and using the information stored on disks, application/system programs, and the computer system itself. DOS also instructs the computer how to read the information that you have stored on disk. It also locates the information on the disk or memory and also controls other devices. DOS also controls the saving and retrieving of information on the disk by giving a directory of the files on a disk, and we never need to know the physical location of the data on the disk.

To make a system usable, an operating system is required. The DOS (Disk Operating System) acts as user-interface between you. There are many operating systems like :

- | | |
|------------------------------|------------|
| (i) MS DOS | (ii) Linux |
| (iii) Unix | (iv) Xenix |
| (v) Window-7/ 8/ 10 etc. | |
| (vi) Android OS for Mobiles. | |

You can adopt any operating system. Maximum users are adopting Microsoft Disk Operating System (MS-DOS).

Objectives of Operating System

The objectives of the operating system are –

- To make the computer system convenient to use in an efficient manner.
- To hide the details of the hardware resources from the users.
- To provide users a convenient interface to use the computer system.
- To act as an intermediary between the hardware and its users, making it easier for the users to access and use other resources.

- To manage the resources of a computer system.
- To keep track of who is using which resource, granting resource requests, and mediating conflicting requests from different programs and users.
- To provide efficient and fair sharing of resources among users and programs.

Characteristics of Operating System

Here is a list of some of the most prominent characteristic features of Operating Systems –

- **Memory Management** – Keeps track of the primary memory, i.e. what part of it is in use by whom, what part is not in use, etc. and allocates the memory when a process or program requests it.
- **Processor Management** – Allocates the processor (CPU) to a process and deallocates the processor when it is no longer required.
- **Device Management** – Keeps track of all the devices. This is also called I/O controller that decides which process gets the device, when, and for how much time.
- **File Management** – Allocates and deallocates the resources and decides who gets the resources.
- **Security** – Prevents unauthorized access to programs and data by means of passwords and other similar techniques.
- **Job Accounting** – Keeps track of time and resources used by various jobs and/or users.
- **Control Over System Performance** – Records delays between the request for a service and from the system.
- **Interaction with the Operators** – Interaction may take place via the console of the computer in the form of instructions. The Operating System acknowledges the same, does the corresponding action, and informs the operation by a display screen.
- **Error-detecting Aids** – Production of dumps, traces, error messages, and other debugging and error-detecting methods.
- **Coordination Between Other Software and Users** – Coordination and

assignment of compilers, interpreters, assemblers, and other software to the various users of the computer systems.

HISTORY OF THE OPERATING SYSTEM

The operating system has been developed along with the computers of 1st generation. With the advancement in the technology different operating systems are available in the market. Very earliest computers provided little in the way of support for their users, switches to define a memory address value. Then using a set of switches to specify an instruction word which has then entered into the memory location. This was repeated for each word of the program. So this was a very tedious process. Programming in such a fashion was very time consuming & error prone. However the users of the computer clearly felt that the results they could achieve justified the efforts applied to the task. The first step towards improving & simplifying computer use was to address the problem of loading the program. Reducing the human involvement in this process implied preparing the program in off-line form then transferring this into the computer memory via an input device.

In order to read from a card or paper tape reader a loader (a program which reads from the input device & gets up a program in the memory) had to be established in the computer memory in the first place. Which prompts the question how do you load the loader. One solution is simply to enter the loader manually as before however the idea was born of building into the computer a facility whereby on start up the computer automatically loads a loader program written on the input device. The basic loader then executed & read in a larger, more extensive loader program. Which could then load any user program. This arrangement was referred to as booting a strapping drive from the idea of pulling one self up by the bootstraps. The technique & the term survive to the present day although bootstrapping is generally reduced nowadays to booting. OPERATING SYSTEM is an interface between the user and computer.

Different types of operating system

There are different types of operating systems those are organized by their working.

Serial Processing:

In Serial Processing operating system that use FIFO (First in First Out) technique for processing the process.

Batch Processing:

In batch processing a similar type of jobs prepared and processed.

Multi-Programming:

In Multi programming Operating System Multiple Programs are Executed on the System at a Time.

Real Time System:

Real Time System are used there Requires higher and Timely Response.

Distributed Operating System:

In this Operating system Data is Stored and Processed on Multiple Locations.

Multiprocessing:

In This type of operating system there are two or More CPU in a Single OS. Parallel operating systems: It manage parallelly all running resources of the computer system.

VERSION OF DOS

MS-DOS (MicroSoft Disk Operating System) was originally developed in 1980 for personal computers using Intel's 8086/8088 family of processor chips (CPU).

The needs of users, the requirement of application programs, and hardware capabilities, have all changed since the first release of MS-DOS. In order to maintain DOS as a viable operating system, new releases are made periodically.

Major revisions are signified by the number before the decimal point (e.g.,401). Minor changes are signified by increasing the number after decimal point. For the most part, these minor changes are not noticeable. The DOS programs are on a diskette known as the 'DOS diskette' or the 'System diskette'. Many application programs are considered obsolete the moment a new release is announced, sales of the old version are discontinued and users are offered an upgraded version. This

is not necessarily true with system programs like DOS. However, earlier releases are often sold and supported for some time after the newest version is introduced. This is because the earlier version still has all the capabilities required by some users and new versions are always downward compatible.

PHYSICAL STRUCTURE OF THE DISK

The capacity of a diskette is measured in BYTES(8 Bits). A Byte is a single character; it can be a letter, a number, or a special symbol. The memory capacity measured in the following scale :

8 Bits	=	1 Byte
1024 Bytes	=	1 KiloByte (1KB)
1024 KiloBytes	=	1 MegaByte (1MB)
1024 MegaBytes	=	1 GigaByte (1GB)
1024 GigaBytes	=	1 TeraByte (1TB)
1024 TeraBytes	=	1 PetaByte (1PT)
1024 PetaBytes	=	1 ExaByte (1EB)
1024 ExaBytes	=	1 ZettaByte (1ZB)
1024 ZettaBytes	=	1 YottaByte (1YB)

Information is stored in blocks of 512 bytes; each block is called a SECTOR. The different disk capacities are determined by the number of tracks per side, number of sectors per track, number of bytes per sector and number of sides in use.

Number of tracks per side	=	40
Number of sectors per track	=	*90
Total sectors on one side	=	360
Number of sides in use	=	* 2

Total sectors on both sides 720 KB
As you know, one sector is of 512 bytes and 1 KB=1024 bytes.

Therefore $720/2 = 360$ KB

Information on a diskette is written along the concentric circle which are called tracks. Each track is divided into sections called SECTORS.

INTRODUCTION TO UNIX AND MSDOS

It is useful in a text of this kind to be able to illustrate the principles being explained by reference to specific system. It is even more useful if the example system's are accessible and available to the students. UNIX and MSDOS are most important

operating system in these days. UNIX has been chosen since it is a powerful, multitasking system in wide general use and is sufficiently rich in facilities to provide a good source of techniques.

MSDOS is used as a source of additional examples and view points as the world's most extensively used operating system, everyone working in the fields of computer is familiar with its general nature and has access to an MSDOS machine. It is essentially a much simpler system than UNIX, being only a single user system.

BOOTING SEQUENCE

"Booting up" is a term that simply means "starting your system". You can also boot the system from the beginning and it is called the *cold* boot.

Another way of booting the computer is when the system was already on but it hangs up. This method may be termed as *warm* booting.

Note: The entire procedure of booting takes less than a minute on most machines, hundreds of tests and tiny routines are run, programs load other programs, all of the hardware on your system is configured so that DOS and other programs can use it.

When the BIOS finds a "bootable" (system) disk, it loads the first SECTOR (512 BYTES) of the disk. This first sector, called the *boot record*, contains the BIOS Parameter Block (which stores data about the physical characteristics of the disk, such as sectors per track, heads, disk type, and so on) and a *bootstrap loader* program that immediately starts the first section of DOS by loading the system file IO.SYS (IBMBIO.COM in PC DOS) into memory. This program contains the routines that let DOS and the hardware communicate (the lowest-level routines in DOS). One of the IO.SYS routines, called SYSINIT, then oversees the rest of the boot process.

SYSINIT loads DOS's second system file MSDOS.SYS (IBMDOS.COM in PC DOS) into memory. This program is the DOS kernel, or core of essential DOS routines. Now that some DOS commands (such as DEVICE and INSTALL) can be run, SYSINIT looks for the CONFIG.SYS file in the root directory. CONFIG.SYS sets up your system's memory configuration (including EXTENDED MEMORY

or EXPANDED MEMORY, if available), loads device drivers, sets up disk buffers, sets the location of COMMAND.COM, and so on. (If CONFIG.SYS does not exist, DOS uses standard DEFAULT values for settings such as BUFFERS and FILES).

Next, the DOS command processor COMMAND.COM executes, part of which is loaded into memory, and part of which remains on disk. After the command processor is loaded, DOS is finally installed. Still, the boot process has one last phase. COMMAND.COM always tries to run one batch file first, before turning over control of the computer to the user - it looks for an AUTOEXEC.BAT file. If it finds AUTOEXEC.BAT, it runs their program as it would any other batch file, usually loading TSR's setting up a system PATH, creating a custom command prompt, and so on.

After AUTOEXEC.BAT finishes its work, COMMAND.COM displays the DOS COMMAND LINE interface (or, if you ended your batch file with the DOSHELL command, runs the DOS Shell). That is a complete cold boot.

Warm booting

If you press the Ctrl-Alt-Del key combination to start a WARM BOOT, the early BIOS diagnostic routines do not run: DOS and your drivers and TSRs are simply reloaded.

If the POST routines discover a problem (for example, that the batteries of your system clock have failed), the BIOS starts its own internal SETUP program that tells you what is wrong. It also will usually let you insert the information required to continue the boot process.

If you leave a *data disk* (a disk that does not contain the DOS system files) in drive A, you will see an error message similar to following:

Non System disk or disk error

Replace and strike any key when ready

If you have a floppy-one system, insert a bootable system disk; if you have a hard disk system, simply remove the floppy disk from Drive A and press a key.

Those are the two most common errors that occur during the boot process. However, it's always wise to watch the messages that flash across your screen as your system boots. You might find out that a driver you thought you had loaded correctly is actually not functioning at all, or you might see a message from a TSR telling you that it could not find extended memory and is loading itself into conventional memory.

If a DOS operation or an application program "crashes" and "locks up" your system so that you can not issue any command, always try to perform a WARM BOOT to restart DOS. Although you can always turn off the power and then turn it on again (called a COLD BOOT), a warm boot is preferable for three reasons:

- (a) It is easier than reaching for the power switch, waiting for the system to come to a complete halt, and then flicking on the switch again.
- (b) It is much faster than a cold boot because it bypass all the BIOS's diagnostic routines that check the integrity of hardware such as memory and controller chips.
- (c) It prevents the initial electrical surge that occurs when you turn on your computer with the power switch.

Sometimes your system may hold up so hopelessly that the Ctrl-Alt-Key combination would not have any effect. When this happens, switch off power supply to your computer, wait a few seconds, and then switch power supply on again.

Cold Reboot

A cold boot initiates a complete system startup operation, including the BIOS-driven system diagnostics that precedes the loading and starting of DOS. You perform cold boot when you switch on the computer at the beginning of your computing session or when you reboot your computer by switching off the power switch and then switching it on again.

HOW MS-DOS ORGANISED

The Input/Output system

A system file contains low-level information that DOS needs to be able to configure and use specific hardware devices. For example, DOS's own two system files IO.SYS and MSDOS.SYS include the essential programs that DOS needs to be able to communicate with any of your computer's hardware.

Another system file –

CONFIG.SYS -- contains valuable configuration information for your computer. Most system files, however, are DEVICE DRIVERS that contain instructions that tell DOS how to manipulate specific devices. Those files usually have the .SYS extension, such as MOUSE.SYS, RAMDRIVE.SYS, HIMEM.SYS etc.

The Command Processor

The DOS command processor or the command interpreter is contained in the COMMAND.COM program. This essential program displays your system PROMPT and the COMMAND LINE interface that handles your typed command. The command processor either executes your command itself (if you have used an INTERNAL COMMAND), transfers control to the appropriate program (if you have used an EXTERNAL COMMAND), or displays an error message (if you have used an incorrect command syntax or tried to access an illegal program or device). After your command or program has executed, the command processor might then display a confirmation message (such as "*1 file(s) copied*") before redisplaying the system prompt and a new command line. The command processor also maintains the DOS environment, which holds values for various system variables such as PATH, COMSPEC, TEMP, etc.

Utilities

These utility files are used for specific purposes to enhance the power of the Disk Operating System.

Device name:

A disk drive is an example of a device for storing or retrieving information. But a disk drive is not the only device where DOS sends or receives information. Other devices include the KEYBOARD, the DISPLAY System, and the PRINTER. Therefore, the DOS knows with which device it is supposed

to be communicating at any given time. Each device is given a name. Disk drives are given on letter name:

DOS DEVICE NAME	DESCRIPTION
A:	First disk drive
B:	Second disk drive
C:	First fixed disk drive
D: to Z:	Additional disk drive
CON:	Console (Keyboard and VDU)
PRN:,LPT1:	First parallel printer
LPT2:/LPT3:	Second/Third Parallel Printer
NUL:	Dummy Device, used for testing

DOS always prompts with some drive name while waiting for a command. This drive name is known as a default drive. e.g:A:\>

This signal from DOS contains an important piece of information, that drive, A is the default drive. This means that when we give DOS a command without specifying a disk drive name, it will assume that we mean drive A. Without the default drive feature we will have to enter the drive name with every command for all types of devices.

DOS & KEY BOARD :

The standard typing keys are the same as typewriter. The Caps Lock key lets you type in uppercase without pressing a Shift key. There are some special character keys such as -

Description	Symbol
Vertical Bar	
Back Slash	\
Tilde	~
Grave	`
Greater Than	>
Less Than	<
Function Keys	F1 to F12

Some special function with Key(s) combination:

Key(s)	Function
Enter	Complete command or end a line.
Ctrl-Enter	Move down one line to continue typing

Backspace	Move cursor left to erase text.
Esc	Discard typed command so you can retype it correctly.
Ctrl-C	Discontinue or cancel program operation.
Ctrl-Num Lock	Pause scrolling of text on screen;
or Ctrl-S	press any key to resume scrolling.
Shift-Print	ScreenPrint characters that are displayed on the screen.
Ctrl-Alt-Del	To reset the system
Num Lock	To use numbers with side pad.
Ctrl	Use with character keys to perform special operations.
F1-F12	Works different in different packages.
Ins	Insert one or more character in a line.
Del	Delete the next character from the buffer.
F6/Ctrl-Z	To save the BAT or Config.sys files.

DOS & DISKS :

Your computer equipped one or more diskette drives. Two floppy drives and Hard Disk with partition. 'A' & 'B' called floppy disks and 'C' is the default drive of Hard Disk. You can do many partitions of the hard disk. 'D' is the default drive of CD ROM and 'F' is the default drive of LAN.

IMPORTANT TERMS & DEFINITION:

Program : The series of instructions written in a form, which understandable to a computer. These instructions are stored in files and instructs the computer to perform accordingly, is called Program.

MS-DOS Prompt : The DOS prompt means by which you enter DOS commands from the Keyboard. The most common prompt is C:> or A:>. If this prompt displayed it means that DOS is ready to accept your commands and process it. The blinking or flashing underline that shows is called cursor where the next character will appear.

C>_
where - (C> = dos prompt) (_ = cursor)

ASCII File : A file consisting characters that conform to the American Standard Code for Information Interchange.

Assembly language : An instruction set comprised of mnemonics that are recognizable by an assembler program such as the IBM Macro Assembler.

Bit : Binary digit; its value is either 1 or 0.

Byte : A computer character made up of eight binary digits.

Command : An instruction that is recognized by a computer program.

Compiler : A computer program used to convert a program written in a high-level programming language like Fortran or Pascal, into machine recognizable code.

File : A program or data file residing on disk.

Extension : One to three optional character that are added to and end of a filename of increased clarity.

File Allocation Table : Part of the DOS directory in which statistical information about each file is kept.

File name : You can use 1 to 8 character name to identify a computer file; and optional 1 to 3 character extension may be used.

Global : Applies to an entire file or disk.

Hexadecimal : The base 16 number system consisting of the digits : 0 1 2 3 4 5 6 7 8 9 A B C D E F.

Interface : The interface means, interconnection between two devices.

Logged disk : The active (or default) disk drive.

ABORT, IGNORE, RETRY, FAIL

Most users see this message quite frequently it signals that DOS is having a problem accessing a specified device usually a floppy disk drive. However this error can

also occur whenever DOS fails to access other hardware devices such as printer.

Example: COPY A:\filename.ext C: (Enter)

A : To abort the command or program that tried to access the available device.

I : To ignore the device problem and continue with the specified command or program.

R : To retry the command after you have corrected the error.

F : To fail the operation but at the current program continue.

BAD COMMAND OR FILE NAME:

It indicate to not get the command file name.

NON SYSTEM DISK ERROR:

It indicate that System Files (Command.com, IO.SYS, MSDOS.SYS) are not available for booting the system.

ACCESS DENIED:

This error message signals that your last command tried to manipulate a file or a directory in a way that DOS does not permit you is used an illegal command. The most common error that generate this message are:

1. You tried to use DOS command to change or delete a READ ONLY file.
2. You tried to access a locked or write protected file on a network.

ALT KEY

Programs often use this key in combination with other keys as a means of generating commands like CTRL key is used to generate commands.

To generate the foreign scientific & graphics characters of the extended ASCII character set. Press the ALT key and hold it down as you type the characters ASCII code.

Example: To generate the upper case Greek letter sigma hold down the ALT key & type 228 & the release the ALT key. To insert one of the extended ASCII character into a document created by DOS editor press P and the press ALT key along with the ASCII code of the character.

BIOS

This is basic I/O system refers to a series of essential rules or instructions that allow your computer hardware and operating system to communicate with other device and programs. These basic instructions are coded into a computer's ROM (read only memory) chips and cannot be altered because they are unchanging and always available at specific addresses in memory, all perform can access then to perform their basic I/O operation thus they from the lowest level interface in your system between DOS and yours performs and I/O device as the key board. Monitor, disk drive, and printer. BIOS also contains a set of routines that boot (start) your system. IBM computer includes a copy right a set of BIOS instructions that only their computer may use however other companies have created BIOS: that acts like the IBM instructions without using the same codes. If you own an IBM compatible computer, the BIOS manufacturer's copy right messages and version number is displayed every time you turn on your computer.

SECTORS:

It specifies the number of sectors that DOS can read in a single I/O operation. The default for it is 1. However values can be 1 through 8.

Note: Normally 20 BUFFERS are sufficient and optimum setting for most DOS application packages.

CACHE:

A Cache is an area of RAM set aside for storing information frequently used by.... so that don't have to access slow mechanical disk drive for the information. Disk I/O Data based programs benefit more than most other programs because of their frequent Disk access, generated by constant saving, retrieving, updating of files. Disk cache is an intermediary between the disk and your program. When a program requests the data from the disk drive DOS sends copies to the program in RAM but also stores the data in Cache. When the program is changing the data .. returns it to the disk. DOS stores and tries to modify data in the Cache although the program might change several items of data and send them to the disk for safe keeping DOS actually stores

these changes in the cache only when the program finishes making change in the data or the cache becomes filled thus DOS copies all the modified data in the cache to the disk for the storage. This single transfer is much more efficient than writing small .. of modified data of the disk.

CONVENTIONAL MEMORY

This is the first 460kb of RAM (random access memory) in an IBM compatible computer running DOS. This area of memory is where programs are loaded and executed. It was once referred to as a huge work space when the personal computers were introduced in 1981. The first IBM PC uses an INTEL 8088 microprocessor. IBM chooses that chip not for its computing power but because it was cheap and could accept 8 bit peripheral devices. The 8088 was somewhat out of date even in 1981. The cause of all our current memory limitation problems stems from the fact that 8088 uses only 20 bits to address its memory so it can address only 2^{20} bytes i.e 1048576 bytes or 1MB.

CLUSTER

In floppy and hard disk a CLUSTER is a unit of storage that consists of one or more sectors. A cluster is referred to in many DOS informational displays as an ALLOCATION UNIT. It can be a combination of two, three or more sectors depending upon the size and type of Disk in use.

UNIT-2

Internal Commands in MS-DOS

GETTING STARTED WITH DOS

The very first thing we need to know is: How does DOS settle in the computer's main memory from disk?

--- how to tell DOS to do some work?

All computers have special programs built into it, which is stored in ROM(Read Only Memory). This program knows how to start DOS, it is usually called Bootstrap loader. The simple startup program reads the very first part of the system diskette where the DOS startup Program is written, which is called BOOT RECORD.

The bootstrap operation works in three stages. First, there is a program in ROM, which is executed, i.e. BOOT.

Internal and External Commands

Broadly we classify the functions performed by DOS into two categories. One category of jobs it performs *automatically*. Whereas the other category of jobs it performs when it is specifically asked for. These two kinds of jobs are termed as *internal* commands and *external* commands respectively. Thus the entire set of commands available in DOS can be divided into two types. These are:

- (a) Internal commands
- (b) External commands

Internal Commands

The internal commands are such programs in DOS which get loaded in the memory of your PC automatically along with DOS at the time of booting. These commands will be available so long as the machine is kept on. Some of the internal commands that you will be using very often are *dir*, *del*, *rename*, *copy*, *type* etc.

External Commands

External commands are such short programs or utilities which are available on your floppy/hard disk and are loaded in the memory of the PC when specially asked for. Some of the external commands that you will often use are *format*, *chkdsk*, *print*, *diskcopy* etc.

How to use DOS command in Windows :

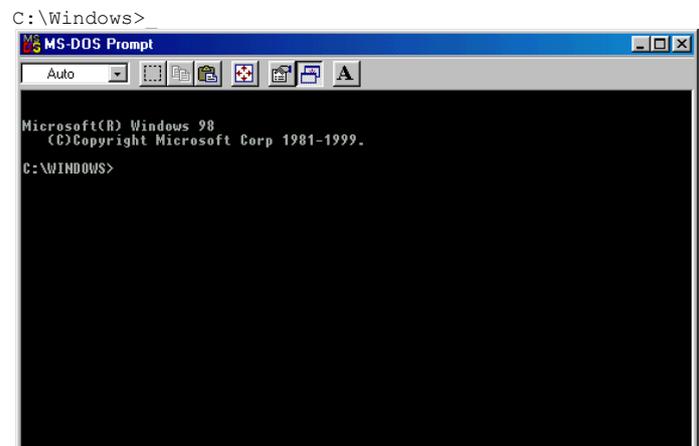
Users of any Windows system can invoke a command prompt by performing the following steps:

1. Click **Start**.
2. Select **Run**.
3. In the "Open:" field, type **command**.
4. Click **OK**.

A command prompt window is generally white or gray text on a black background. The prompt itself usually takes the following form:

X:\PATH>

where "X" represents the letter of the active drive, and "PATH" refers to the present working directory. Here's an example of how a DOS command prompt commonly looks:



INTERNAL COMMANDS

GENERAL COMMANDS:

DATE

Use : This command is used to see the system date and to change the system date. Type DATE and press Enter on the DOS prompt.

Syntax: C:\>DATE (Enter)

The following screen displayed.

**Current date is Tue 1-01-2016
Enter new date (mm-dd-yy):**

Type the current month, day and year in the form 09-01-94 or 09/01/94 and press Enter. If the current date is right, you can press Enter in new date.

T I M E

Use : This command is used to see the system time and to change the system time. Type TIME and press Enter on the DOS prompt.

Syntax: C:\>TIME (Enter)
The following screen displayed.

Current time is 8:42:28.45a
Enter new time :

Type the current time. The time expression is given in :

*hours:minutes:seconds.hundredth
s of a second* The MS-DOS
(4+) Time commands
support 12-hour time notation. To
use 12-hour times, time are
entered with an a or p.

Example: TIME 10:15a
TIME 10:15p
If you wish to use the 24-hour
time notation, use 10:15 and
22:15 in place of 10:15a &
10:15p.

TO CHANGE THE DRIVE

Use : It is use to change the drive,
where you want to work.

Syntax: C:\ A: (Enter)
A:\

VER

Use : The VER command check the
display to see what version of DOS
your system is using. To run the
VER program, type VER and press
Enter. A screen message display as
under.

Syntax : C:\>VER (Enter)
MS-DOS Version 6.22

VOL

Use : It is used to display the volume
label of the disk (A: / C:)

Syntax : C:\>VOL (Enter)
Volume in drive C is KCRI

CLS

Use : This command is used to clear the
screen.

Syntax : C:\>CLS (Enter)

PROMPT

Use: It is used to configure a DOS
prompt to your choice. Default
DOS prompt is A:>, C:>. The
prompt command gives you the

ability to make the prompt more
meaningful. When entering the
Prompt command, it is
followed by a space and either
text or a dollar sign (\$) followed
by special characters.

Syntax: C:\>PROMPT KCRI (Enter)
KCRI
C:\>PROMPT \$P\$G
C:\>
C:\>PROMPT \$P\$G\$D
C:\>Fri 01-01-1997

\$(x) Description

- Moves the cursor to the next line
(carriage return/line feed)
- \$ Displays \$ (Dollar Sign)
- b Displays | (vertical bar)
- d Displays the system date
- t Displays the system time
- e The Escape character (^[)
- g Displays > (greater than)
- l Displays < (less than)
- h Back spaces (and erases) the
previous character.
- n Displays the default drive letter
- p Displays the default drive and
directory path name.
- q Displays = (equal sign)
- v Displays the DOS version number.

DIRECTORY COMMANDS:**DIR**

Use : The DIR command is used to
display directories and filenames
alongwith file, extension, size,
creation date & time on your
screen.

Syntax: DIR (Enter)

Example :

```
COMMAND  COM  54750   10/10/90  8:15a
WS4      <DIR>           02/24/97  1:10a
DBASE    <DIR>           02/24/97  1:10a
CONFIG   SYS     54     10/11/96  2:28p
KCRI     EXE  12674  10/11/96  2:35p
          5 file(s)          67,478 bytes
          1,959,936 bytes free
```

Switches : You can use the DIR
command with the following
switches.

C:\>DIR A: Lists a directory of the
specified disk A:.

C:\>DIR/P Pauses the directory listing
when the screen is full. Press
any key to see the next screen.
(Similar as DIR|MORE).

C:\>DIR/W Displays a wide directory; omits file size, date and time information.

C:\>DIR/A:H Display the hidden files.

C:\>DIR/? Display directory command help.

C:\>DIR k*.* Display all files name start with 'K' character.

C:\>DIR k??.* Display files name start with 'K' upto 3 characters.

C:\>DIR ????.* Display files upto 4 character's name.

C:\>DIR k*.pm4 Display all files name start with 'K' character having pm4 extension.

CD OR CHDIR

USE : This command is used to change another directory. Type CD\

Syntax : C:\>CD\Directory's Name (Enter)
C:\>CD Director's Name (Enter)
C:\>CD\ (Enter) (To return on DOS prompt from sub-directory)
C:\>CD.. (Enter) (To return back one sub-directory Ex. C:\WS4\ABC> CD.. (Enter) you will be at C:\WS4>)

MD OR MKDIR

Use: This command is used make (or create) a new directory or subdirectory.

Syntax: MD Directory's Name

Ex. C:\>MD XYZ

(It will create new directory XYZ)

MD Path name Directory's Name Ex. C:\>MD A:\XYZ

(It will create new directory XYZ at A Drive)

RD/RMDIR

Use : This command is used to remove the directory / sub-directory. But directory should be empty. First you will delete the files than remove the directory.

Syntax : RD directory's name

Example: C:\>RD WS4

PATH

Use : The PATH command is used to provide access to files located in other directories or on other disks. The PATH command is

generally used in autoexec.bat file.

Syntax: PATH (enter)

(It will show the current path. If path not defined in autoexec.bat file, it will show "No Path")

PATH = c:\basic;c:\ws4;

d:\windows

(Use semicolon (;) between paths if you define more than one path.)

FILE MANAGEMENT COMMANDS

COPY

Use : This command is used to copy one or more files from one directory to another directory/disk with the same filename, date & time, or different file name, and create new file with CON (as defined in next command). Copy command also copy two files in one file.

Syntax : COPY sourcefile targetfile

sourcefile = where data is available.

Targetfile = where you want to copy.

Note : Give Drive name\directory's name\ file name with ext.

Example: COPY c:\>basic\kcri.bas a:

It will copy kcri.bas in 'A' drive.

COPY c:\basic\kcri.bas a:\basic

It will copy the file kcri.bas in basic directory of drive A.

COPY c:\basic*.BAS a:

It will copy all files which extension is BAS to drive A.

COPY c:\basic\k*.BAS a:

COPY c:\basic\kcri.bas a:\xyz.bas

It will copy of file kcri.bas in drive A in the name & style as xyz.bas.

Syntax : COPY filename.ext target

(First go to source disk and use above command).

Syntax : COPY first+second a:\new

COPY *.TXT ALL.TXT

(It is used to copy the files more than one like append ; Use /A with ASCII text file and /B with Binary file)

Syntax : COPY kcri.cob NUL

(Used for testing. NUL is a dummy device name).

Syntax : copy b:kcri.txt

(Makes a copy of KCRI.TXT which is located on the disk in drive B.

COPY CON

Use : This combination of two or more lines copies what is typed on the screen. In the end press Ctrl-Z(or F6) for saving. It is used to make BAT files, autoexec.bat, config.sys etc.

Syntax: COPY CON filename.ext (Enter)

Message (enter)

Message (enter)

Ctrl-z (enter)

Example: Copy con KCRI.BAT

g:

CD\ws4

ws

(Ctrl Z)

(Now type KCRI to run the KCRI.BAT file. It will execute as per instructions and will open the WS programme.

Note : Some examples of Autoexec.Bat and Config.sys are given later.

DEL/ERASE

Use : This command removes files from a diskette. You can use DEL or ERASE for removes the files.

Syntax: DEL filename.ext ERASE filename.ext

DEL *.* (to remove all files)

DEL c:\pm4\kcri.pm4 (with path)

DEL *.pm4/P

(Use switch /P, which displays each filename prior to deletion. Type 'Y' or 'N'.)

Example: DEL *.BAK/P

C:\abc.bak Delete(Y/N)? Y

C:\kcri.bak Delete(Y/N)? N

RENAME/REN

Use : It is used to rename a file.

Syntax : REN old_File_name new name

Example REN kcri.bak ktc.txt

REN c:\basic\kcri.bak ktc.txt

UNIT-3

MS-DOS External Commands

EXTERNAL COMMANDS

DISK MANAGER COMMANDS

FORMAT

Use : This command prepares a new disk for use by create the tracks and sectors that are readable by DOS. We use this command on used floppy disk. DOS 5+ introduced a safe FORMAT command and the ability to UNFORMAT the formatted disks. At the time of formatting, it saves the data at other place, which you can recover by unformat but there are no guarantees that all data will be restored.

Syntax : Format (Enter)

(Format the disk in the default drive)

Format A: (Enter)

(Format the disk in drive A)

Format A:/S

(Format the disk in drive A and transfer the DOS after formatting (COMMAND.COM, IO.SYS & MSDOS.SYS))

Ex.: Type FORMAT A:/s and press Enter. Notice the following display.

Insert new diskette for drive

A:
and press ENTER when ready

Insert the disk to be formatted and press Enter. "Formatting...." display. It after formatting it display

```
Format complete
System transferred
xxxx bytes total disk space
xxxx bytes used by system
xxxx bytes available on disk
```

Format another (Y/N) ? _
Type Y, if you want format another disk otherwise type N.

Syntax: FORMAT /1

(Format the disk as single sided)

FORMAT A:/V:labelname (upto

11 chr)
(Format the disk A and it will not ask for volume label. You can define the volume label by using V:kcricr

FORMAT A:/4

(Format a 360K capacity floppy disk in a high density (1.2MB) Floppy Drive.)

FORMAT A:/U

(Formatting unconditional, which destroys all data, you can not run unformat command. It will not read the disk at the time of formatting.)

FORMAT A:/Q

(It is used for quick formatting. It takes less than 10 seconds time. It does not scan the disk for bad areas.)

LABEL

Use: The LABEL command is used to create, change or delete the volume label on a disk. The label name should be upto or less than 11 characters. It also ask the label name after formatting a disk.

Syntax: LABEL A: (Enter)

It will display as under :

Volume in drive A is KCRI

Vol.label (11 chr.Enter for none)?

....

Ex. : Volume in drive A has no label

Vol.label (11 chr.Enter for none)?

....

Type the volume label upto 11 characters.

CHKDSK

Use: It is used to check the status of a selected disk.

Syntax: CHKDSK (Enter)

CHKDSK Drivename (Enter)

Ex.: CHKDSK A: (Enter)

It display the following message after check the disk :

```
362496 bytes total disk space
108544 bytes in 15 user files
253952 bytes available on disk
1024 bytes in each allocation unit
354 total allocation units on disk
248 available allocation units on disk
655360 total bytes memory
525504 bytes free
```

Syntax: CHKDSK /V

(Displays all directory & file as it is encountered by the program. Also displays disk error information.)

Syntax: CHKDSK /F

(It is used to recover or fix disk space that has been misallocated in the directory. It recovered disk space in files as FILE0000.CHK, FILE0001.CHK etc.)

DISKCOPY

Use: This command is used to make a target disks similar as source disk. Both disks (source & target) should be same, means if you have 1.2MB source disk, your target disk should be 1.2MB. Diskcopy, copies the files on same track & sectors as per source disk.

Syntax: DISKCOPY A: A:
(If you have single drive system)

DISKCOPY A: B:
(If you have two same disks on system)

Note: When copying is complete, the prompt "Copy another (Y/N)?" is displayed. Typing N discontinues the process and returns to the system prompt. Typing 'Y' lets you repeat the diskcopy command, allowing you to make multiple copies of the source disk.

Caution: If the target disk is unformatted, diskcopy formats during the copy operation. This also destroys the files that are on target disk.

DOS UTILITY COMMANDS**UNFORMAT**

Use : Restores a disk reformatted by the FORMAT command. Suppose that you have formatted a disk. The UNFORMAT command may be able to recover the data.

Syntax: UNFORMAT C: (Enter)
drive Identifies the drive to be unformatted.

UNFORMAT recovers the data on a disk by restoring the former root directory and FAT, which are stored in the mirror image file. As long as nothing was added to the disk after the formatting, this should completely restore its former contents. But, if anything was added, you might find that some files have been ruined. Even so, that might be better than losing all the former data on the disk.

Unformatting can encounter two major problems. The first comes when UNFORMAT can not find the mirror file. UNFORMAT can try to rebuild the disk's directory structure from scratch by searching the clusters for directory entries,

but this process does not produce the best results.

UNDELETE

Use : It is used to undelete the deleted files. It will ask first character of file name. But the area of file located should not be used by another file. If another file occupy the said area, this command fails to undelete the file.

Syntax: UNDELETE (Enter)
Undelete command enables or disables deletion protection as well as reports protection status. If you want to use Delete Sentry or Deletion Tracking, you must load the UNDELETE TSR and specify which drives should be protected. You can set up Delete Sentry by loading its TSR with a command using the following syntax:

UNDELETE /S [drive].....

For example, the following command installs Delete Sentry to protect drive D: UNDELETE /SD (enter)

SYS

Use : It is used to make a disk bootable either to Floppy disk or harddisk disk. This command transfers the system files. The system files copied on boot area of the disk.

Syntax: C:\SYS A: (Enter)
(To make bootable to drive A)

TREE

Use: This command displays all directory and sub directories.

Syntax: TREE (Enter)
TREE A: (Enter)

Ex. TREE C: (Enter)
It displays as under :-

```
C:.\
|-----      WS4
|-----      BASIC
|      |----- XYZ
|      |----- RAM
|-----      LOTUS
```

DELTREE

Use: It is used to delete an entire directory structure i.e. directory, sub directory & files. When you use deltree, it will take confirmation from you before deleting the entire directory.

Syntax: DELTREE DirectoryName
DELTREE DirectoryName/Y
(confirmation with command)

Ex. DELTREE Basic

MOVE

Use: This command is used to move files from one directory to another on the same disk.

Syntax: MOVE Sourcename TargetDrive\Dir

Example: MOVE F:\TEMP*.BAT H:\student

MORE

Use: This command is used to pause vertical scrolling on the display screen with message ----MORE---- at the bottom. You can use this command with Pipe (|).

Syntax: DIR|MORE (Enter)

Ex. TYPE filename | MORE.

BACKUP

Use: This command is used to copy files automatically from Hard disk to floppy disk of selected files. (Ver - 6). If the files copied exceed the capacity of the target floppy disk, a message displayed - Insert target disk 2.

If the size of one file is more than 1.44MB you can not copy the file on floppy disk. You can take only backup of the file.

Syntax: **BACKUP C:\path A: (Enter)**

It display the following message:

C:\ BACKUP C: A: (Enter)

Insert backup diskette 01 in drive A:

Warning: Files in the target drive A:\root directory will be erased Press any key to continue

RESTORE

Use: This is command is used to copies files back to a hard disk which are copied by BACKUP command.

Syntax: RESTORE A: C: (Enter)

Insert backup diskette 01 in drive A:

Strike any key when ready...

RESTORE A: C: /S (Enter)

Copies all files from drive A to C to make itself directory & sub directories in drive C.

ATTRIB

Use: It is used change the attribute of the file. Like Read Only, Hidden, Archive & System attributes.

Syntax: **ATTRIB +H Filename.ext**

(It is used to hidden the file)

ATTRIB -H Filename.ext

(It is used to unhide the hidden file)

ATTRIB +R Filename.ext

(It is used to make a Read-only File, you can not delete these type files)

ATTRIB -R Filename.ext

(To change the attribute from Read only)

ATTRIB +A (For Achieve attribute)

ATTRIB +S (For System attribute)

XCOPY

Use: It is used to selectively copy files from one disk to another disk.

Syntax: XCOPY Source Target

XCOPY a: c:\path

At a minimum, the **xcopy** command requires a source file name, which may include wildcard characters, plus optional drive letter and subdirectory path. You may provide a target parameter as well which may be another file name, drive letter, subdirecotry path or combination of the three. If you do not include a target, XCOPY will attempt to copy the sourcefiles on to the currently logged drive and subdirectory.

The source and target parameters may not duplicate the same file name and location. In other words, the XCOPY command will not copy a file on to itself.

If you use wildcard characters to indicate multiple sources files and the target does not include a file name, copies of each file matching the source specification will be made in the target location.

If you indicate multiple sources files and the target file name also includes wildcard characters, DOS will attempt to rename the target files in accordance with wildcard conventions that you indicate. For Predictable results, keep the wildcard character specification consistent between the source and target file names.

Switches

/D XCOPY a: C:/D:06-21-96

Copies all files that date on or after 06-21-96.

/S XCOPY A:\BASIC C:\basic /S

It will copy all files from A:\basic to C:\basic inclusive of all subdirectories in basic directory. It create itself directory on target disk.

- /P Display a (Y/N)? prompt before copying a file to allow selection.
- /V It verifies that data is written properly.
- /W change disks in the source drive if necessary.

MODE

Use: This command is used to control the display output like - Width (40/80 character per line), Monochrome or colour etc.

Syntax: MODE 40

Display 40 characters per line

MODE 80

Display 80 characters per line

MODE BW40

Display 40 chr. Per line in Black & white.

MODE CO40

Display 40 chr.per line in colour.

MODE MONO

Display output to mono board.

DEFRAG*

Use : It is used to optimize a disk. The DEFRAG program is used to collect the files back into continuous disk sector.

Syntax: DEFRAG drivename (Enter)

FDISK*

Use: It is used to create new partition table on hard disk. Starts the Fdisk program, which configures a hard disk for use with MS-DOS. Fdisk displays a series of menus to help you partition your hard disk(s) for MS-DOS.

Syntax: FDISK (Enter)

You can use Fdisk for the following tasks:

- a) Creating a primary MS-DOS partitions.
- b) Creating an extended MS-DOS partition.
- c) Setting a partition to active
- d) Deleting a partition
- e) Displaying partition data
- f) Selecting the next hard disk for partitioning. If a system has multiple hard disks.
- g) Changing the size of a partition.

Note: The maximum partition size is 2 gigabytes. Fdisk does not work on a network or an Interlnk drive. Fdisk works only on hard disks physically installed on your computer.

CAUTION : Do not experiment with Fdisk. If you accidently delete a drive or partition, you will

lose data from your hard disk. Deleting a partition deletes all the data stored on that partition.

INTRODUCTION TO SIMPLE BATCH FILE

Batch files are ASCII text files that store a series of commands that are later automatically executed line by line when you run the file. A batch file must always use the file name extension .BAT; that is how DOS knows that it should turn over the contents of that file to the *batch processor*, which runs the file and executes its commands. You can include the following elements in batch files:

DOS commands

Program names

Batch language commands

command-line and environmental variables

A batch file is program. To run it, simply enter its name.

If you use a DOS command or a program name within a batch file, when you start that batch file, the command is executed (or the program is run) exactly as if you had typed it from the command line. For example, if you create a batch file named COPYDIR.BAT (with a text editor such as EDIT or EDLIN), and then enter the following two commands in the file:

COPY *.* A: (enter)

COMP *.* A: (enter)

You have essentially created a new DOS command. Now, whenever you type COPYDIR, the COPY command copies all of the files in your current directory to drive A, and then the COMP command automatically compares all of the copied files.

You can also use batch files to run programs that require some initial setup.

CONFIGURING THE SYSTEM

Configuring a system means that hardware and software of your PC are so adjusted that they can operate with maximum efficiency. There are two files namely Config.sys and Autoexec.bat which are so designed that the system operates in optimal way.

Config.sys

The CONFIG.SYS file is a special modifiable ASCII text file that DOS automatically reads when you first BOOT

your computer. It sets up an initial configuration for your computer. It loads DEVICE DRIVERS (such as ANSI.SYS) that let you control hardware on your system. It also configures memory (such as HIMEM.SYS), issues commands (such as BREAK=ON), loads programs (such as FASTOPEN), and specify the locations of special files (such as COUNTRY.SYS).

AUTOEXEC.BAT File

This AUTOMATICALLY EXECUTED BATCH file is the first that DOS runs after you BOOT (start) your computer. Although many people regard the running of the AUTOEXEC.BAT as the last phase of booting up, you should actually look at it as your first command of every session with the computer. It lets you run all of the commands and programs that you need during each session but are lost every time you turn off the power. This entry shows you exactly what commands to place in AUTOEXEC.BAT as you construct this file for your own system.

Although your system is not required to have an AUTOEXEC.BAT file, it can save you time, provide convenience, help you use the memory of your system more efficiently, and make your system much safer to use. Running this file is actually what your computer is all about - automating all of your routine, but essential, operations.

First of all, AUTOEXEC.BAT is BATCH FILE, and as such, it must be a text file; that is, it must contain only ASCII characters, on control or formatting codes DOS 5's EDIT program is the perfect tool for creating and modifying your AUTOEXEC.BAT and CONFIG.SYS files it's easy to use, and it creates text files by default.

EXERCISE

1. What do you understand with Error Messages? Write the detail of ABORT, IGNORE, RETRY & FAIL.
2. How to use ASCII characters by using Alt Key. Make a directory using ASCII character?
3. What do you understand with CONFIG.SYS file.? How many FILES = (n) and BUFFER=(n) write in the Config.Sys file. What is use of BUFFER?
4. What do you about DEVICE. How you select the device drivers?
5. What is CACHE Memory. And what is Conventional Memory?

6. What do you understand with DOS? Write the History of operating system.
7. Copy you prefer MSDOS as operating system. What is difference between Unix & MSDOS?
8. Write short note on the following
 - (i) ASCII file
 - (ii) Compiler
 - (iii) File & extension
 - (iv) Interface
 - (v) COM 1
 - (vi) COM 2
 - (vi) LPT 1
9. What is booting process?
10. How can you create a .BAT file? What is use of .BAT file?
11. You have 60 directories & sub directories in drive G:\. One file namely 'AJAY.BMP' in above these directories. How can you search the location of file 'AJAY.BMP'.
12. You created a file 'GAURAV.BAT'. Now you want to change its name 'GARIMA.BAT'. How can you change.
13. You have single drive PC. There is no hard disk. You have a file 'KCRI.PM4' on a floppy disk. How can you copy KCRI.PM4 to another floppy.
14. What is the differences between CD\ and CD..?
15. How can you see the contents of the text file on DOS Prompt?
16. How can you change your DOS prompt as KCRI?
17. If you want to get your changed prompt after reset the system. What will you do?
18. What is difference between COPY, XCOPY, DISKCOPY and BACKUP command.
19. Why you use MORE command?
20. You have a floppy with some data file. How can you make the said floppy bootable without lost the data?
21. If you want to format a 360KB capacity floppy. What command will you use?
22. What is use of TREE command?
23. Which command stores all DOS command which you are using?
24. How can you hidden your directory?
25. In a directory you have three files:
 - (i) KCRI.BAT
 - (ii) KCRI.EXE
 - (iii) KCRI.COM

When you type KCRI (Enter) which file will run from above list.

26. How will you make the BATCH file. What is the use of BAT files.

Write True/False to the following sentence:

1. You can work on a computer without any operating system.
2. WordStar is an operating system.
3. Microsoft Disk Opening System is the full form of MSDOS.

4. Three MS-DOS files (i) COMMAND.COM (ii) IO.SYS (iii) MSDOS.SYS are essential to boot a system.
5. 'NUL' is a dummy drive.
6. A PC-AT can have 3 Floppy Drive and 1 Hard Disk.
7. COPY CON file can save by ^Z.
8. Only empty directories may remove by RD command.
9. CLS is used to delete the file.
10. BACKUP command used in MSDOS Ver.6.22.
11. You can undelete a deleted file as and when you want.
12. MOVE command copy a file in hard disk.
13. You can use Unformat command after using Format a:/u/q.
14. DELTREE deletes files including directory & subdirectories.
15. Without MSDOS, you can not use to a Personal Computer.
16. To make same disk, you use DISKCOPY command.
17. You can print a file on dos prompt using RESTORE command.
18. RESTORE command used to copy the BACKUP files on Harddisk.
19. Backup takes from A to C drive.

Fill in the blanks:

- a) You can delete a directory by using _____ command.
- b) Erase command delete the _____.
- c) You can run g:\ws\ws.exe file at h:\student prompt by using _____.

UNIT-4

Introduction to Windows 7

An operating system, sometimes called an “OS”, is the main program the computer uses to function properly. Operating systems act as a link between you, the user, and the programs you use on a computer. Different types of computers use different types of operating systems. The majority of computers used at BGSU either run Microsoft Windows or the Mac OS. While files can be shared between these two types of systems, they are generally incompatible.

The tutorial on this page will explain how to use a PC, which (on campus) will soon use the Windows 7 operating system. To understand how to use a computer running Windows 7.

Windows Features

Most PCs run on an operating system called Windows. This particular tutorial deals with the Windows 7 professional version of the Windows operating system. The operating system is what allows you as the user to access the information in the computer. To understand how to use a computer, it is important to know several features of the Windows system.

Desktop

The desktop is the area you see when the computer is not running applications. It consists of the icons on top of it, as well as the Start button and other features. The desktop can be used to temporarily store information or to move around documents and windows.

Icon

Icons are little pictures that represent different programs or saved items. Double-clicking on the icon accesses the information icons represent.

Window

Each application opened will appear in its own window, or its own little section of the

screen. Windows can be moved and resized so that you can operate many different applications at the same time. To learn how to manipulate windows, refer to the Manipulating Windows portion of Level.

Dialogue Box

When you ask the computer to do certain commands, such as to save your work, the computer will need more information from you, and this will appear in a dialogue box. These boxes contain options and commands for the computer to execute.

Start Menu

In the lower left-hand corner of the Windows screen is the Start button. When you click on the button a menu will appear, which we will call the Start menu. This menu gives you access to all the different parts and functions of the computer.

Task Bar

At the very bottom of the screen is a horizontal bar called the task bar (Figure 1). This bar contains (from left to right) the Start button, shortcuts to various programs, minimized programs, and another section of shortcuts that includes sound volume, printers and the time.



Figure 1. Task Bar

Tab Menu

Tab menus, which are often present in dialogue boxes, are menus that represent many different “pages” of information. To access each “page,” click on the tab at the top of the dialogue box.

Start Up, Shut Down

Once you understand what all of the different parts of the computer do, you can begin to use it.

Start Up

First of all, you will need to turn the computer on. Do this by pushing the power button on the front of the computer unit. The computer takes a few minutes to start up, so be patient.

Shut Down

To shut down, click with your mouse on the button in the lower left-hand corner of the screen labeled Start. On the menu that pops up, you have multiple options for exiting your windows computer. Options are Shut Down, Switch User, Log Off, Lock, Restart, Sleep and Hibernate. Choose the Shut down button in the lower right hand corner to turn the computer off. To switch to another user, press the arrow next to the Shut down button and click Switch user. To Log off of the computer, click the arrow next to the Shut down button and click Log Off. If you would rather just lock the computer, blocking anyone else from using the computer with out your password, choose Lock.



Figure 2. Shut Down Menu.

Stand By

When a computer is left alone for a while, it goes into “sleep” or “stand by” mode to save energy. In stand by mode, the computer slows down its inner processes because they are not being used. The computer also blacks out the monitor. If you wish to use a computer and the monitor is dark, check to see if it is in stand by before you try to start it up. Usually, the computer has a green light on or near the power button that signifies that it is on, but in stand by mode. To “wake it up,” move the

mouse or hit a key on the keyboard. In about 8-10 seconds the computer will wake up and be fully functional. If you do not realize that the computer is in stand by and you try to turn it on with the power button, the computer will wake up and a dialogue box will appear, but it will not damage the computer.

Opening and Closing an Application

To Open an Application you have two options:

1. Open the Start Menu and click on the name of the application.
2. Find the icon for the application and either double click it or right click and choose Open.

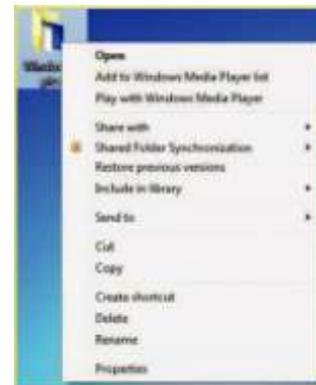


Figure 3. Open Applications.

To Close an Application:

1. Most applications can be closed by going under File menu and selecting Quit or Exit. If no file menu is available, click on the “X” button in the upper right-hand corner of the application’s window.

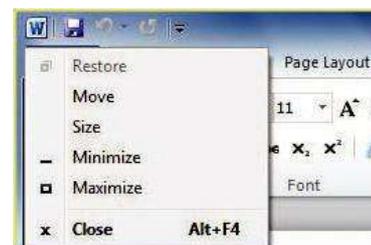


Figure 4. Close Applications

Manipulating Windows

The sizes of the windows on your screen can be changed so that more windows are visible. Following is a list of common features that can be implemented on all windows.

Maximize

This function allows you to concentrate on one application by making its window cover the entire screen.

Minimize

This function allows you to keep an application running, but remove it from the desktop area so that other applications can be accessed. The minimized program becomes a bar at the bottom of the screen, and can be accessed by clicking on the bar.

Resize

If an application window is not maximized, it can be resized so that more or less of the content can be seen. If you move your mouse pointer to one of the edges of the window, it will become a two-way arrow. At this point, hold down the left mouse button and drag the perimeter of the window in or out. When you release the mouse button, the window will resize to your specifications.

Close

This function closes and exits the application you are running. However, if you are running an application such as Microsoft Word, the window of each document will have a close button, and clicking this button will only close that particular document, and not the entire program. It is important to always save your work before using the close feature, as any unsaved changes will be lost.



Figure 5. Manipulating Windows

Saving

Saving material onto a disk stores that material so that it can be accessed again. Any work you do on the computer should be saved, including papers and other assignments. Although you may be working in different applications, the saving procedure is generally the same.

1. Insert a disk into the correct disk drive.
2. Go under the File menu in the application, and choose "Save As."
3. When the Save As dialogue box appears, click the arrow button next to the Save In box. This will cause a menu of save options to appear.
4. To save on your removable disk, choose either the Zip Drive.
5. Type in a filename that will identify your document at the bottom of the box.
6. Click the Save button located in the lower right-hand corner of the box.

To resave work as you continue, you only need to click on the save icon or go under File > Save.



Figure 6. Save Dialog Box

Tips For Saving

- Save often. This is by far the most important step in the saving procedure. The more you save, the less chance you have of losing any of your hard work. Errors and freeze-ups can occur, and unsaved work will be lost. Also, always save before printing because this is the time when many errors occur.

- Use specific filenames. When naming your saved works, label them with detailed names so for easier identification when you go to find them again.

- Back up your saved works. Disks have been known not to not certain saved works because of errors.

Make sure you save important works on two disks so that if one disk fails, you have a backup copy on another disk.

Deleting Files

If you choose to delete an item from your disk or from the computer's hard drive, you will need to access the Recycle Bin. It is important to remember that you may only delete items from the hard drive that you have created. To delete an item from a disk or the hard drive, use the following steps.

1. If it is on a removable disk, first insert the disk into the correct drive. Next double-click on the My Computer icon on the Desktop. Choose the drive that the item is located on by double clicking the appropriate drive

icon. Open the file that the item is located in.

2. Left-click on the item that you wish to delete and hold the button down.

3. Drag the item out of the window it is in and place it over the Recycle Bin located on the Desktop.

4. When the Recycle Bin is highlighted, release the button. The item should disappear from the drive.

5. When the dialogue box appears asking you if you are sure you want to delete this item, click Yes.



Figure 8. Delete Files

When you deposit items in the Recycle Bin, they will not be permanently removed from the computers memory without you telling it to do so. If you decide you still want to keep something, double-click on the Recycle Bin and drag the item back out. To permanently erase an item from the computer, right-click on the Recycle Bin and choose Empty Recycle Bin. Remember, once you empty the Recycle Bin, the items inside will be permanently erased from the computer's memory.



Figure 9. Empty Recycling Bin

Help Option

Located in the Start menu is the Windows Help and Support option. If you have any problems with the Windows systems or have questions about how to do something, the Help option may have the answer. If the computer does have the Help option, follow these steps to use it.

1. Select Help and Support from the Start menu.



Figure 10. Help and Support

2. Choose to view Help and Support by one of the following categories: Index, Support, History, Favorites, or Options. Select the category that you would like by clicking the appropriate button.
3. Click on the heading of your choice in the list located on the left side of the screen, or if you are in the Index category, click on Locate in Contents to type in a keyword.



Figure 11. Help and Support Center

Common Do's and Don'ts

Computers are powerful machines that can aid us in many of our everyday tasks. Computers are, however, rather fragile and should be treated in a respectful manner. Following is a list of dos and don'ts that will preserve the life of the computer while letting you get the most out of the machine.

DO:

- Save your work often. This prevents the loss of hours of work.
- Back up your work in case of disk malfunction.
- Ask lab staff for help at any time.

Shut down the computer when you are finished. This means do not press the power button, but go through the shut down procedure under the Start menu.

DON'T:

- Eat or drink around a computer. Spilled drinks and food can harm a computer's hardware. Food and drinks are not allowed in on-campus labs, but if for some reason you do spill something on a computer, report it to the staff on duty immediately.
- Strike the computer or physically abuse it.
- Print more than one copy of your work in the computer labs. The printers are for printing work, and not to do the job of a copy machine.
- Change the settings of on-campus computers. If you are having problems, please ask the lab staff for help.

The Start Menu

In the bottom left-hand corner of the Windows screen is a button with the windows icon. This button displays a menu that gives you access to many of the computer's features. Once the Start menu is

opened, all you have to do is highlight what you want and more options will appear. Here we will discuss the many features and uses of the Start menu from top to bottom.



Figure 12. The Start Menu

New Office Document

This feature acts as a shortcut for opening a new document in Microsoft Office. You can choose from a variety of document formats.

Open Office Document

This feature acts as a shortcut for accessing a saved document or file.

Windows Catalog

This item opens Internet Explorer to a site in which you can purchase products built for Windows systems.

Windows Update

This item opens Internet Explorer to a site in which you can download updates for your Windows operating system.

Programs

This prompt will open another menu filled with more options. These options are all programs that the computer can run. To see what the Programs menu has to offer, refer to the Programs page.

Documents

This item allows you to temporarily store saved works.

Settings

This menu contains access to the Control Panel as well as your Fonts, Network Connections; Printers and Faxes; and Taskbar and Start Menu. Through these options you can customize the appearance and functions of your computer.

Search

This menu allows you to find anything on the computer or the internet.

Help and Support

This feature will open the Windows Help and Support Menu. To use this feature, refer to the Help Option section of Level I.

Run

This item allows you to run programs located on a disk, CD, or on the internet.

Log Off

This allows you to log off the computer. (It is not important for use in your own home or in a computer lab).

Turn Off Computer

When this phrase is clicked, the Shut Down menu will appear, allowing you to hibernate, shut down, or restart the computer. To use this feature, refer to the Start Up and Shut Down portion of Level I.

Computer Freezes

There are often times when you are working on a computer and it “freezes”—that is the mouse and keyboard no longer affect the computer. No matter what you click on, nothing happens. Sometimes the mouse cursor won’t even move on the screen. This may happen for a number of reasons including memory fill-up or glitches in the system. This problem, however, can often be fixed. If your screen freezes (this is sometimes referred to as crashing) and nothing seems to be happening, use these steps to unfreeze it. It is important to remember, however, that these steps will not always fix the situation, and sometimes the only thing left to do is turn the computer off by pushing the power button.

1. Press Ctrl+Alt+Del. This will cause the computer to show a dialogue box that lists the current applications that are running on the computer. Most likely, the application you are using will be listed here at the top, often

with the phrase “not responding” behind it. This means that the particular application you are running has frozen and you need to shut this application down.

2. Click on the application causing the problem, and then click the End Task button.
3. Another dialogue box will appear and ask you to confirm your decision. Click End Task again. Under normal circumstances this process will shut down the problematic application and the computer will be restored to its previous running state. It will also give you the option to shut the computer down if you choose to do so.
4. Sometimes, however, clicking on a particular task and trying to end it will not always do the trick. The only option left is to press Ctrl+Alt+Del again, which will cause the computer to restart. Any unsaved work will be lost in this instance, so make sure you save often to avoid redoing work.

There are a number of things you can do to prevent and avoid freezes and crashes.

- Only open the applications you will be using-extra applications take up more memory and can cause freeze-ups.
- When you sit down at the computer, check to see that no applications were left running by the previous user. These running applications will often be minimized at the bottom of the screen.
- If you are using an application that requires a lot of memory, such as PowerPoint or PhotoShop, do not attempt to open other programs, as a freeze-up may occur when memory fills up.

Internet Access

To access the Internet from a computer, you need to open a web browser. A web browser is a program such as Firefox or Internet Explorer that allows you to surf the net. Computers here at BGSU normally have both web browsers, and you may use either on a PC. Web browsers function similar to most other applications, so they are opened and closed in the same general manner as regular applications. If you are interested in acquiring the latest version of Firefox or Internet Explorer, download them free of charge at Download.com, or check out the CD Rom at the Library Circulation Desk. There are basically three ways to access the Internet from a PC.

1. Double-click the web browser icon on the desktop.
2. Click Start Menu > Programs > Internet, and then click on the web browser of your choice.
3. Click the web browser shortcut on the task bar located at the bottom of the screen.

Common Applications

Each computer here at BGSU is preloaded with various applications that you may use during your stay. Although each computer contains different software, most of them contain the same basic applications that you will use frequently. We list some of the most widely used applications here.

Microsoft Word - Use to type a paper. Microsoft Word is a word processing application that allows you to format your text as well as add graphics, tables and charts. Found in Start menu > Programs > Microsoft Word. Netscape or Internet Explorer - Use to access the Internet. Found in Start menu > Programs > Internet Explorer (firefox).

Windows Media Player - Use to listen to a CD. This program allows you to listen to your favorite CDs while you work. It includes programming features and volume controls. You will need to bring your headphones to listen while you work in the BGSU computer

labs. Found in Start menu > Programs > Accessories > Entertainment > Windows Media Player.

Calculator - Use to do math on the computer. The Windows Calculator can be used by pointing and clicking the calculator on the screen, or by typing in the numbers on the keyboard. Found in Start Menu > Programs > Accessories > Calculator.

Windows Keyboard Shortcuts

Keyboard shortcuts are key commands that allow you to accomplish various tasks. Instead of using your mouse to go through menus and sub-menus, you can use keyboard shortcuts to do common tasks like saving, copying, or pasting. Most people find using key shortcuts to be a faster and easier way to type. Listed below are some of the most common keyboard shortcuts in alphabetical order.

Close	CTRL+W
Copy	CTRL+C
Cut	CTRL+X
Delete	DEL
Exit	ESC
Find	CTRL+F3
Help	F1
Minimize Window	Windows Key*+M
Move to Recycling	CTRL+DEL
New Folder/Document	CTRL+N
Open	CTRL+O
Open Start Menu	Windows Key*
Paste	CTRL+V
Page Up/Down	Page Up/Down Keys
Print	CTRL+P
Print Screen	ALT+Print Screen Key
Quit	ALT+F4
Reboot/Restart	CTRL+ALT+DEL
Save	CTRL+S
Select All	CTRL+A
Undo	CTRL+Z

The Right-Click Menu

When you right-click your mouse, a small menu will appear. This is the right-click menu, and it contains a list of the common tasks for whatever program you're currently using. If you use the right-click menu you can leave your cursor in roughly the same spot, which makes resuming your task easier.

Each program's right-click menu will be unique and look slightly different from others, but most follow the same general format. As an example, the following picture is what a menu would look like if you right-clicked on the desktop.



Arrows along the right side of the menu signal that there is a sub-menu for that particular item. These sub-menus contain even more shortcuts that are grouped together in a category.

To exit the right-click menu, left-click on any part of the screen that isn't the menu.

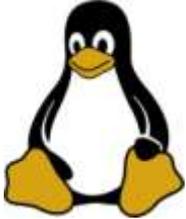
Windows Explorer

If you are familiar with Internet Explorer, you know that it helps you find web pages and information on the Internet. There is another kind of explorer on your computer: Windows Explorer. The basic idea behind Windows Explorer is very similar to Internet Explorer. The program lets you look through all of the files and folders on your computer. You can even open, copy, cut, and paste your files from inside Windows Explorer.

UNIT-5

Linux Operating System

What Is Linux?



Linux is an operating system's kernel. You might have heard of UNIX. Well, Linux is a UNIX clone. But it was actually created by Linus Torvalds from Scratch. Linux is free and open-source, that means that you can simply change anything in Linux and redistribute it in your own name! There are several Linux Distributions, commonly called “distros”.

- Ubuntu Linux
- Red Hat Enterprise Linux
- Linux Mint
- Debian
- Fedora

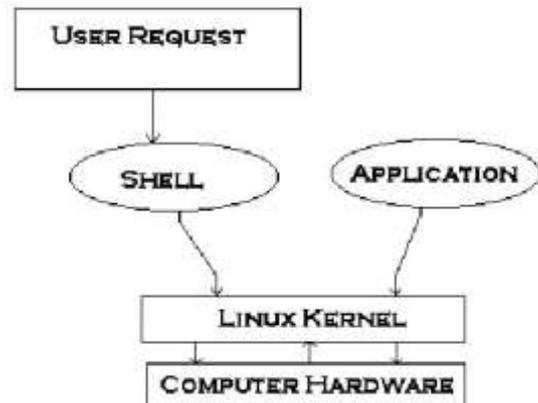
Linux is Mainly used in servers. About 90% of the internet is powered by Linux servers. This is because Linux is fast, secure, and free! The main problem of using Windows servers are their cost. This is solved by using Linux servers. The OS that runs in about 80% of the smartphones in the world, Android, is also made from the Linux kernel. Most of the viruses in the world run on Windows, but not on Linux!

The goal of this article is to help introduce new users to the basics of Linux. After reading this article you will have an understanding of how the Linux system is structured, where files and directories are located making it easier for you to navigate around, giving you a better idea of how your systems works. We'll then move on to some basic Linux navigation, copy, showing your files and directories, etc.

Whether you're new to Linux or are looking into getting some type of certificate, you'll need to have some basic knowledge of the Shell, the Kernel, the Terminal, and FHS, among others. There's actually quite a bit of other things you'll need to know, but let's start with the basics.

The Kernel

The Kernel is what controls everything on a system; think of it as the heart of Linux. It performs tasks that create and maintain the Linux environment. The Kernel receives instructions from the shell and engages the appropriate hardware (processors, memory, disks, enforces security, etc.). It is a bridge between applications and the actual data processing done at the hardware level.



The Shell

The shell is the interface between you and Linux. We issue commands through the command line interface which is interpreted and passed on to the kernel for processing. When we log onto the computer the shell will automatically start. It will then monitor the terminal for any commands.

This is the Terminal (command line interface).

There are a number of shells you can use, each differing slightly. Most Linux distros use Bourne-Again shell(bash) but support various others: Korn Shell, Bourne shell, C shell, etc. For all intensive purposes you can just stick with bash but I will show you how to change this if you want to. As you advance you can use shells to create scripts to automate tasks, making your daily routine all the more easier.

Filesystem Hierarchy Standard

Next important aspect is the FHS. Everything in Linux is either a file or a directory. The Filesystem Hierarchy Standard (FHS) is the way that these files and directories are structured. More importantly though is how they are structured. Looks intimidating at first glance but

when you realize that there is a method to this madness, you will find it's so much simpler because everything is organized in the proper place and you can find where you want go much easier.



/ - The root directory. This is where your directory structure starts. Everything is housed under the root directory.

/bin – Essential user command binaries used for general operations: Copy, show directory, etc. (ls, cp, and cat – we'll get to these commands soon)

/boot – Static files of the boot loader. Files here are necessary for a Linux system to start (Kernel & GTUB information)

/dev – Where the device files are located

/etc – Configuration files for all programs. Things like an apache web server, users & groups on your system, or printer configuration. Think of this as a control panel for Windows users. We will edit these text files later (These files should remain static and text based).

/home – Home directories for all the users to store personal files (i.e. /home/roman) – Windows equivalent of Documents & Settings.

/lib – Essential shared libraries and kernel modules

/media – Mount point for removable media

/mnt – Temporary mounted file systems

/opt - Add on application software packages – (i.e. Program files for windows users)

/sbin - Essential system binaries

/tmp – Programs write their temporary files here.

/usr – Multi-user utilities & Applications. It contains application source codes, documentation, & config files they use. It's the largest directory on the system.

/var – Variable data on a system. Data that will change as the system is running (Log files, backups, cache, etc.)

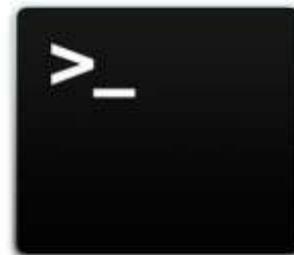
/root – Home directory for root

/proc – Virtual directory containing process information (system memory, hardware configuration, devices mounted, etc.)

The directories that I would be most concerned starting off are /etc, /home, /dev, /mnt. As your skills progress you'll venture off into other areas, but I started out in /etc 95 percent of the time. There are directories that extend, but we'll get those later.

Linux Shell or “Terminal”

So, basically, a shell is a program that receives commands from the user and gives it to the OS to process, and it shows the output. Linux's shell is its main part. Its distros come in GUI (graphical user interface), but basically, Linux has a CLI (command line interface). In this tutorial, we are going to cover the basic commands that we use in the shell of Linux.



To open the terminal, press Ctrl+Alt+T in Ubuntu, or press Alt+F2, type in gnome-terminal, and press enter. In Raspberry Pi, type in lxterminal. There is also a GUI way of taking it, but this is better!

Linux Commands

Basic Commands

1. **pwd** — When you first open the terminal, you are in the home directory of your user. To know which directory you are in, you can use the “**pwd**” command. It gives us the absolute path, which means the path that starts from the root. The root is the base of the Linux file system. It is denoted by a forward slash (/). The user directory is usually something like “/home/username”.

```
nayso@Alok-Aspire:~$ pwd
/home/nayso
```

2. ls — Use the **ls** command to know what files are in the directory you are in. You can see all the hidden files by using the command **ls -a**.

```
nayso@Alok-Aspire:~$ ls
Desktop          itsuserguide.desktop  reset-settings        VCD_Copy
Documents        Music                  School_Resources     Videos
Downloads        Pictures                Students_Works_10
examples.desktop Public                  Templates
updatesProject  Oqis Projects         TuxPaint-Pictures
```

3. cd — Use the **cd** command to go to a directory. For example, if you are in the home folder, and you want to go to the downloads folder, then you can type in **cd Downloads**. Remember, this command is case sensitive, and you have to type in the name of the folder exactly as it is. But there is a problem with these commands. Imagine you have a folder named **Raspberry Pi**. In this case, when you type in **cd Raspberry Pi**, the shell will take the second argument of the command as a different one, so you will get an error saying that the directory does not exist. Here, you can use a backward slash. That is, you can use **cd Raspberry\ Pi** in this case. Spaces are denoted like this: If you just type **cd** and press enter, it takes you to the home directory. To go back from a folder to the folder before that, you can type **cd ..**. The two dots represent back.

```
nayso@Alok-Aspire:~$ cd Downloads
nayso@Alok-Aspire:~/Downloads$ cd
nayso@Alok-Aspire:~$ cd Raspberry\ Pi
nayso@Alok-Aspire:~/Raspberry Pi$ cd ..
nayso@Alok-Aspire:~$
```

4. mkdir & rmdir — Use the **mkdir** command when you need to create a folder or a directory. For example, if you want to make a directory called **DIY**, then you can type **mkdir DIY**. Remember, as told before, if you want to create a directory named **DIY Hacking**, then you can type **mkdir DIY\ Hacking**. Use **rmdir** to delete a directory. But **rmdir** can only be used to delete an empty directory. To delete a directory containing files, use **rm**.

```
nayso@Alok-Aspire:~/Desktop$ ls
nayso@Alok-Aspire:~/Desktop$ mkdir DIY
nayso@Alok-Aspire:~/Desktop$ ls
DIY
nayso@Alok-Aspire:~/Desktop$ rmdir DIY
nayso@Alok-Aspire:~/Desktop$ ls
nayso@Alok-Aspire:~/Desktop$
```

5. rm — Use the **rm** command to delete files and directories. But **rm** cannot simply delete a directory. Use **rm -r** to delete a directory. In this case, it deletes both the folder and the files in it.

```
nayso@Alok-Aspire:~/Desktop$ ls
newer.py  New Folder
nayso@Alok-Aspire:~/Desktop$ rm newer.py
nayso@Alok-Aspire:~/Desktop$ ls
New Folder
nayso@Alok-Aspire:~/Desktop$ rm -r New\ Folder
nayso@Alok-Aspire:~/Desktop$ ls
nayso@Alok-Aspire:~/Desktop$
```

6. touch — The **touch** command is used to create a file. It can be anything, from an empty txt file to an empty zip file. For example, **touch new.txt**.

```
nayso@Alok-Aspire:~/Desktop$ ls
nayso@Alok-Aspire:~/Desktop$ touch new.txt
nayso@Alok-Aspire:~/Desktop$ ls
new.txt
```

7. man & --help — To know more about a command and how to use it, use the **man** command. It shows the manual pages of the command. For example, **man cd** shows the manual pages of the **cd** command. Typing in the command name and the argument helps it show which ways the command can be used (e.g., **cd -help**).

```
TOUCH(1) User Commands TOUCH(1)
NAME
touch - change file timestamps

SYNOPSIS
touch [OPTION]... FILE...

DESCRIPTION
Update the access and modification times of each FILE to the current
time.

A FILE argument that does not exist is created empty, unless -c or -h
is supplied.

A FILE argument string of - is handled specially and causes touch to
change the times of the file associated with standard output.

Mandatory arguments to long options are mandatory for short options
too.

-b change only the access time

Manual page touch(1) line 1 (press h for help or q to quit)
```

8. cp — Use the **cp** command to copy files through the command line. It takes two arguments: The first is the location of the file to be copied, the second is where to copy.

```
nayso@Alok-Aspire:~/Desktop$ ls /home/nayso/Music/
nayso@Alok-Aspire:~/Desktop$ cp new.txt /home/nayso/Music/
nayso@Alok-Aspire:~/Desktop$ ls /home/nayso/Music/
new.txt
```

9. mv — Use the **mv** command to move files through the command line. We can also use the **mv** command to rename a file. For example, if we want to rename the file “**text**” to “**new**”, we can use “**mv text new**”. It takes the two arguments, just like the **cp** command.

```
nayso@Alok-Aspire:~/Desktop$ ls
new.txt
nayso@Alok-Aspire:~/Desktop$ mv new.txt newer.txt
nayso@Alok-Aspire:~/Desktop$ ls
newer.txt
```

10. locate — The **locate** command is used to locate a file in a Linux system, just like the search command in Windows. This command is useful when you don't know where a file is saved or the actual name of the file. Using the **-i** argument with the command helps to ignore the case (it doesn't matter if it is uppercase or lowercase). So, if you want a file that has the word “hello”, it gives the list of all the files in your Linux system containing the word “hello” when you type in “**locate -i hello**”. If you remember two words, you can separate them using an asterisk (*). For example, to locate a file containing the words “hello” and “this”, you can use the command “**locate -i *hello*this**”.

```
nayso@Alok-Aspire:~$ locate newer.txt
/home/nayso/Desktop/newer.txt
nayso@Alok-Aspire:~$ locate *DIY*Hacking*
/home/nayso/DIY Hacking
```

Intermediate Commands

1. echo — The “**echo**” command helps us move some data, usually text into a file. For example, if you want to create a new text file or add to an already made text file, you just need to type in, “**echo hello, my name is alok >> new.txt**”. You do not need to separate the spaces by using the backward slash here, because we put in two triangular brackets when we finish what we need to write.

2. cat — Use the **cat** command to display the contents of a file. It is usually used to easily view programs.

```
nayso@Alok-Aspire:~/Desktop$ echo hello, my name is alok >> new.txt
nayso@Alok-Aspire:~/Desktop$ cat new.txt
hello, my name is alok
nayso@Alok-Aspire:~/Desktop$ echo this is another line >> new.txt
nayso@Alok-Aspire:~/Desktop$ cat new.txt
hello, my name is alok
this is another line
```

3. nano, vi, jed — **nano** and **vi** are already installed text editors in the Linux command line. The **nano** command is a good text editor that denotes keywords with color and can recognize most languages. And **vi** is simpler than **nano**. You can create a new file or modify a file using this editor. For example, if you need to make a new file named “**check.txt**”, you can create it by using the command “**nano check.txt**”. You can save your files after editing by using the sequence **Ctrl+X**, then **Y** (or **N** for no). In my experience, using **nano** for HTML editing doesn't seem as good, because of its color, so I recommend **jed** text editor. We will come to installing packages soon.



4. sudo — A widely used command in the Linux command line, **sudo** stands for “SuperUser Do”. So, if you want any command to be done with administrative or root privileges, you can use the **sudo** command. For example, if you want to edit a file like **viz. alsa-base.conf**, which needs root permissions, you can use the command – **sudo nano alsa-base.conf**. You can enter the root command line using the command “**sudo bash**”, then type in your user password. You can also use the command “**su**” to do this, but you need to set a root password before that. For that, you can use the command “**sudo passwd**”(not misspelled, it is **passwd**). Then type in the new root password.

```
nayso@Alok-Aspire:~/Desktop$ sudo passwd
[sudo] password for nayso:
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
nayso@Alok-Aspire:~/Desktop$ su
Password:
root@Alok-Aspire:/home/nayso/Desktop#
```

5. df — Use the **df** command to see the available disk space in each of the partitions in your system. You can just type in **df** in the command line and you can see each mounted partition and their used/available space in % and in KBs. If you want it shown in megabytes, you can use the command “**df -m**”.

```
root@Alok-Aspire:/home/nayso/Desktop# df -h
Filesystem      1M-blocks  Used Available Use% Mounted on
udev            940         1     940    1% /dev
tmpfs           191         2     189    1% /run
/dev/sda5       96398 23468    68013   26% /
none            1           0         1    0% /sys/fs/cgroup
none            5           0         5    0% /run/lock
none            951         1     950    1% /run/shm
none            100         1     100    1% /run/user
```

6. du — Use **du** to know the disk usage of a file in your system. If you want to know the disk usage for a particular folder or file in Linux, you can type in the command **du** and the name of the folder or file. For example, if you want to know the disk space used by the documents folder in Linux, you can use the command “**du Documents**”. You can also use the command “**ls -lah**” to view the file sizes of all the files in a folder.

```
nayso@Alok-Aspire:~$ du Documents
516  Documents/DIYHacking
548  Documents
```

7. tar — Use **tar** to work with tarballs (or files compressed in a tarball archive) in the Linux command line. It has a long list of uses. It can be used to compress and uncompress different types of tar archives like **.tar**, **.tar.gz**, **.tar.bz2**, etc. It works on the basis of the arguments given to it. For example, “**tar -cvf**” for creating a **.tar** archive, **-xvf** to untar a tar archive, **-tvf** to list the contents of the archive, etc. Since it is a wide topic,

8. zip, unzip — Use **zip** to compress files into a zip archive, and **unzip** to extract files from a zip archive.

9. uname — Use **uname** to show the information about the system your Linux distro is running. Using the command

“**uname -a**” prints most of the information about the system. This prints the kernel release date, version, processor type, etc.

```
nayso@Alok-Aspire:~$ uname -a
Linux Alok-Aspire 4.4.0-22-generic
C 2016 i686 i686 i686 GNU/Linux
```

10. apt-get — Use **apt** to work with packages in the Linux command line. Use **apt-get** to install packages. This requires root privileges, so use the **sudo** command with it. For example, if you want to install the text editor **jed** (as I mentioned earlier), we can type in the command “**sudo apt-get install jed**”. Similarly, any packages can be installed like this. It is good to update your repository each time you try to install a new package. You can do that by typing “**sudo apt-get update**”. You can upgrade the system by typing “**sudo apt-get upgrade**”. We can also upgrade the distro by typing “**sudo apt-get dist-upgrade**”. The command “**apt-cache search**” is used to search for a package. If you want to search for one, you can type in “**apt-cache search jed**”(this doesn't require root).

```
nayso@Alok-Aspire:~$ sudo apt-get install jed
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  jed-common libslang2-modules sish
Suggested packages:
  gpm
The following NEW packages will be installed:
  jed jed-common libslang2-modules sish
0 upgraded, 4 newly installed, 0 to remove and 419 not upgr
Need to get 810 kB of archives.
After this operation, 2,992 kB of additional disk space will
Do you want to continue? [Y/n]
```

11. chmod — Use **chmod** to make a file executable and to change the permissions granted to it in Linux. Imagine you have a python code named **numbers.py** in your computer. You'll need to run “**python numbers.py**” every time you need to run it. Instead of that, when you make it executable, you'll just need to run “**numbers.py**” in the terminal to run the file. To make a file executable, you can use the command “**chmod +x numbers.py**” in this case. You can use “**chmod 755 numbers.py**” to give it root permissions or “**sudo chmod +x numbers.py**” for root executable..

```
nayso@Alok-Aspire:~/Desktop$ ls
numbers.py
nayso@Alok-Aspire:~/Desktop$ chmod +x numbers.py
nayso@Alok-Aspire:~/Desktop$ ls
numbers.py
```

12. hostname — Use **hostname** to know your name in your host or network. Basically, it displays your hostname and IP address. Just typing “**hostname**” gives the output. Typing in “**hostname -I**” gives you your IP address in your network.

```
nayso@Alok-Aspire:~/Desktop$ hostname
Alok-Aspire
nayso@Alok-Aspire:~/Desktop$ hostname -I
192.168.1.36
```

13. ping — Use **ping** to check your connection to a server. Wikipedia says, “**Ping** is a computer network administration software utility used to test the reachability of a host on an Internet Protocol (IP) network”. Simply, when you type in, for example, “**ping google.com**”, it checks if it can connect to the server and come back. It measures this round-trip time and gives you the details about it. The use of this command for simple users like us is to check your internet connection. If it pings the Google server (in this case), you can confirm that your internet connection is active!

```
nayso@Alok-Aspire:~/Desktop$ ping google.com
PING google.com (172.217.26.206) 56(84) bytes of data:
64 bytes from google.com (172.217.26.206): icmp_seq=1 ttl=56
64 bytes from google.com (172.217.26.206): icmp_seq=2 ttl=56
64 bytes from google.com (172.217.26.206): icmp_seq=3 ttl=56
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000
rtt min/avg/max/mdev = 47.959/49.388/51.299/1.417 ms
```

Tips and Tricks for Using Linux Command Line:

- You can use the **clear** command to clear the terminal if it gets filled up with too many commands.
- **TAB** can be used to fill up in terminal. For example, You just need to type “**cd Doc**” and then **TAB** and the terminal fills the rest up and makes it “**cd Documents**”.
- **Ctrl+C** can be used to stop any command in terminal safely. If it doesn't stop with that, then **Ctrl+Z** can be used to force stop it.

- You can exit from the terminal by using the **exit** command.
- You can power off or reboot the computer by using the command **sudo halt** and **sudo reboot**.