## APPLIED OPERATING SYSTEM LABORATORY









# BASIC INTERNAL AND EXTERNAL DOS COMMANDS









## **OBJECTIVES**

#### Upon completion of this module, the student will be able to:

- Understand the history and concepts of DOS
- Perform file/directory creation and manipulation using DOS commands









## **MS-DOS OPERATING SYSTEM**

- MS-DOS means Microsoft Disk Operating System.
- It is a single-user, single-task, non-graphical command line operating system derived from 86-DOS that was created for IBM compatible computers.

#### Functions:

- Oversee the operation of the system
- Can executing programs
- Controlling I/O devices,
- Handling errors
- Provides user interface.













## **MS-DOS OPERATING SYSTEM**

#### **Advantages:**

- Lightweight
- Boots faster
- Supports system administration/management

#### **Disadvantages:**

- Lack of flexibility
- Limited ability to meet the needs of programmers and experienced users









## **HISTORY**

- Microsoft discovered an innovative operating system, called 86-DOS, designed by Tim Patterson of Seattle Computer Products.
- Microsoft bought it, renamed it MS-DOS, and made it available to IBM.
- IBM chose MS-DOS in August 1981, called it PC-DOS, and proclaimed it the standard for their line of PCs.









## **HISTORY**

- MS-DOS became standard operating system for most 16-bit personal computers
- Each version of MS-DOS is a standard version Later versions are compatible with earlier versions
- Early versions of Windows (versions 1.0 through 3.1) were merely GUIs that ran on top of the MS-DOS operating system
- Although MS-DOS is no longer widely used, many Windows OSs offer a DOS emulator









## **EVOLUTION OF MS-DOS**

Version No.	Release Date	Features
1.0	1981	CP/M compatible; supported only 1 directory
1.1	1982	Allowed double-sided 5% inch disks
2.0	1983	Eliminated some defects in Version 4
3.0	1984	Increased memory requirement to 36K, supported PC/AT
3.1	1984	First release to support networking
3.2	1986	Supported token ring and 3½ inch disks
3.3	1987	Supported the IBM PS/2 computer
4.0	1988	Supported hard disks larger than 32 MB
5.0	1991	Better use of extended memory
6.0	1993	Better use of conventional memory
6.22	1994	Provided users with capabilities previously available only as third-party applications







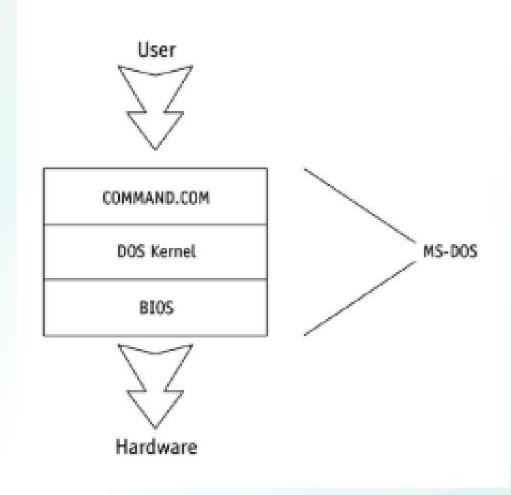
- Designed to accommodate single novice user in singleprocess environment
- Standard I/O support includes keyboard, monitor, printer, and secondary storage unit
- User commands are based on English words or phrases, interpreted by command processor











The three layers of MS-DOS









#### BIOS (Basic Input / Output System):

- Interfaces directly with various I/O devices
- It contains device drivers for:
  - Console display and keyboard (CON)
  - Line printer (PRN)
  - Auxiliary device (AUX)
  - Date and time (CLOCK)
  - Boot disk device (block device)

- Installable drivers are accommodated by device driver entries in the CONFIG.SYS file.
- Driver examples are:
  - MOUSE.SYS (mouse driver)
  - 386EMM.SYS (memory) management)
  - CLOCK.SYS (software clock)









#### **DOS Kernel:**

The DOS Kernel performs the following functions:

- File and record management
- Memory management
- Character device input/output
- Spawning other programs
- Access to real-time clock
- The DOS kernel components are contained in the MSDOS.SYS system file.
- Programs communicate with the kernel via software interrupts.









#### **COMMAND.COM**

- DOS command processor (shell/command interpreter)
- Sends prompts to user
- Accepts commands that are typed in
- Executes commands including both internal and external commands, and issues appropriate responses.









## **USER INTERFACE**

- MS-DOS uses command-driven interface
- Users type in commands at system prompt
- Default prompt is drive indicator and > character
- A prompt may also be a text representation of where the user is currently.
- Default prompt can be changed using PROMPT command or simply type the drive letter followed by a colon (:) symbol
- Type C: will go to the C: drive. Similarly A: and D: etc.

```
Select Command Prompt — 

C:\>E:\>
```







## BASIC DOS COMMANDS

- User commands include some or all of following elements in this order: – command, source-file, destination-file, switches
- Switches are optional and give specific details about how command is to be carried out
  - Begin with slash (i.e., /P /V /F)
- DOS commands are not case sensitive

```
E:\>copy file1.txt CANVAS
1 file(s) copied.

E:\>
```







#### DOS EXTERNAL & INTERNAL COMMANDS

- The internal commands reside in COMMAND.COM, which loads into memory when the computer system is started; these commands do not reside on disk.
- The external commands are files that do reside on disk and are not included in command.com. have an extension of .COM, .EXE, or .BAT.
- Both command types are executed from the MS-DOS prompt.









## **COMMON DOS INTERNAL COMMANDS**

- CD
- CLS
- COPY
- DATE
- DEL(ERASE)
- DIR
- ECHO
- EXIT
- MKDIR(MD)

- MOVE
- PROMPT
- RENAME(REN)
- RMDIR(RD)
- TIME
- TYPE
- VER
- VOL









## **COMMON DOS EXTERNAL COMMANDS**

- ATTRIB
- DEBUG
- DEFRAG
- DISKCOPY
- EDIT
- FDISK
- FORMAT

- HELP
- PING
- PRINT
- SCANDISK
- SHUTDOWN
- XCOPY



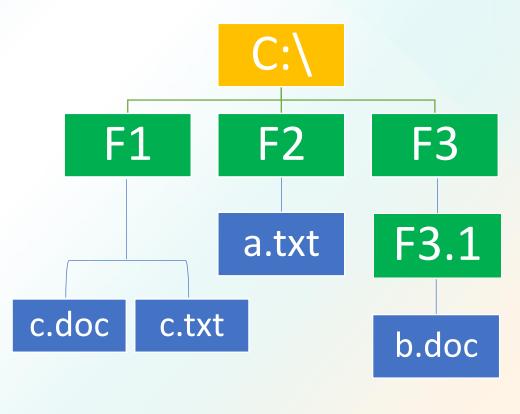






## **DIRECTORY STRUCTURE**

- The directory structure in DOS is just like the one in Windows.
- The drive C represents the root directory written as C:\
- nested directories are called Subdirectories.
- Everything looks exactly like a tree except the roots are at the top
- The directory that hosts subdirectories is called Parent directory.











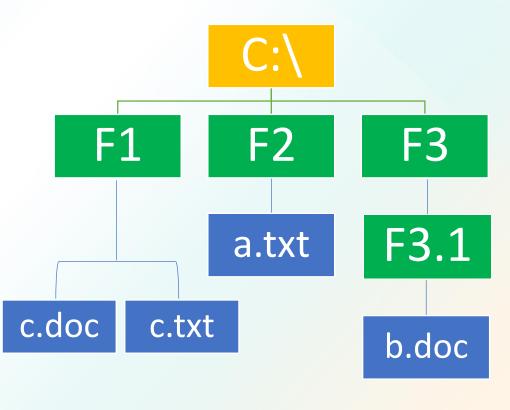
## **ABSOLUTE AND RELATIVE PATH**

Absolute or full path is a unique location of a file or directory from the root directory.

A:\> copy C:\F2\a.txt

Relative path starts from some given working directory, avoiding the need to provide the full absolute path.

C:\del F2\a.txt









- If you want to see all the files in a folder in Windows you would open the Windows Explorer, in the command line you would use the dir command.
- Allows you to see the available files and directories/folders in a directory and their respective details

```
Command Prompt
C:\>dir
Volume in drive C has no label.
Volume Serial Number is D017-0657
Directory of C:\
22/07/2019 10:51 AM
                        <DIR>
                                       C++ Programs
28/09/2019 03:06 PM
                        <DIR>
                                       Dev-Cpp
06/09/2018 09:04 AM
                        <DIR>
                                       ExamView
21/07/2018 10:07 PM
                        <DIR>
                                       Intel
12/04/2020 09:17 AM
                        <DIR>
                                      ipad backup
19/05/2020 05:39 PM
                        <DIR>
                                      PerfLogs
30/06/2020 12:16 PM
                        <DIR>
                                       Program Files
13/06/2020 02:39 AM
                        <DIR>
                                       Program Files (x86)
05/04/2020 06:05 PM
                        <DIR>
                                       Users
18/07/2020 05:35 PM
                        <DIR>
                                      Windows
              0 File(s)
                                      0 bytes
             10 Dir(s) 87,579,484,160 bytes free
C:\>
```







#### dir /w

Lists multiple file names on every line, producing "wide" output, which displays file names at once. However, other information such as file size is omitted. The /w means Wide List format.

#### dir/s

Recursively lists the files in the directory that you are in and all sub directories after that directory,







#### dir/p

If the directory has a lot of files and you cannot read all the files as they scroll by, you can use this command and it will display all files one page at a time. The /p means Pause after each screen of data.

#### dir /s /w /p

This would list all the files and directories in the current directory and the sub directories after that, in wide format and one page at a time.

#### dir /on

List the files in alphabetical order by the names of the files.









#### DOS WILDCARD CHARACTERS

The asterisk (\*) and question mark (?) are used as wildcard characters, as they are in MS-DOS and Windows. The asterisk matches any sequence of characters, whereas the question mark matches any single character.

#### dir \*.exe

Lists any executable file or any file with a .exe extension filename.

#### dir ?.txt

Lists any text file with single character filename.









#### **HELP COMMAND**

#### **HELP (HELP DIR)**

Displays DOS Help. For help on an individual command, type HELP then the command for which you want more information.

```
Command Prompt
C:\>help
For more information on a specific command, type HELP command-name
              Displays or modifies file extension associations.
ATTRIB
              Displays or changes file attributes.
BREAK
              Sets or clears extended CTRL+C checking.
              Sets properties in boot database to control boot loading.
BCDEDIT
CACLS
              Displays or modifies access control lists (ACLs) of files.
CALL
              Calls one batch program from another.
              Displays the name of or changes the current directory.
CHCP
              Displays or sets the active code page number.
CHDIR
              Displays the name of or changes the current directory.
CHKDSK
              Checks a disk and displays a status report.
CHKNTFS
              Displays or modifies the checking of disk at boot time.
CLS
              Clears the screen.
CMD
              Starts a new instance of the Windows command interpreter.
COLOR
              Sets the default console foreground and background colors.
              Compares the contents of two files or sets of files.
              Displays or alters the compression of files on NTFS partitions.
COMPACT
              Converts FAT volumes to NTFS. You cannot convert the
CONVERT
              current drive.
              Copies one or more files to another location.
COPY
DATE
              Displays or sets the date.
              Deletes one or more files.
              Displays a list of files and subdirectories in a directory.
              Displays or configures Disk Partition properties.
DOSKEY
              Edits command lines, recalls Windows commands, and
              creates macros.
```

```
Command Prompt - help dir
:\>help dir
Displays a list of files and subdirectories in a directory.
DIR [drive:][path][filename] [/A[[:]attributes]] [/B] [/C] [/D] [/L] [/N]
 [/O[[:]sortorder]] [/P] [/Q] [/R] [/S] [/T[[:]timefield]] [/W] [/X] [/4]
 [drive:][path][filename]
             Specifies drive, directory, and/or files to list.
             Displays files with specified attributes.
 attributes D Directories
                                           R Read-only files
              H Hidden files
                                           A Files ready for archiving
              S System files
                                          I Not content indexed files
              L Reparse Points
                                           O Offline files
              - Prefix meaning not
             Uses bare format (no heading information or summary).
             Display the thousand separator in file sizes. This is the
             default. Use /-C to disable display of separator.
             Same as wide but files are list sorted by column.
             Uses lowercase.
             New long list format where filenames are on the far right.
             List by files in sorted order.
 sortorder
             N By name (alphabetic) S By size (smallest first)
              E By extension (alphabetic) D By date/time (oldest first)
              G Group directories first - Prefix to reverse order
             Pauses after each screenful of information.
 /Q
/R
             Display the owner of the file.
             Display alternate data streams of the file.
             Displays files in specified directory and all subdirectories.
```









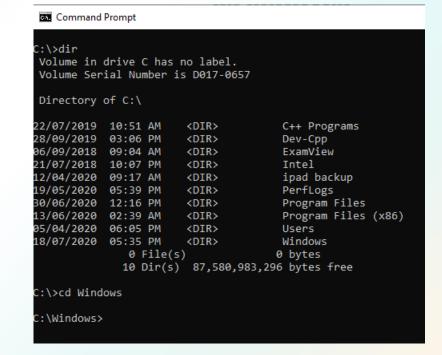
## CD COMMAND

#### CD < DIRECTORY NAME>

Change directory. When you change directory, the prompt changes, showing the path of the directory you are currently in.

Note, directory is the term used by DOS for what Windows calls a folder.

To change to another path, type the full path with slashes.





C:\>cd Windows\Temp

C:\Windows\Temp>









## CD COMMAND

CD...

Moves you one level up to the directory tree

#### CD\

Takes you to the top of the directory tree.

```
C:\>dir
Volume in drive C has no label.
Volume Serial Number is D017-0657
Directory of C:\
                                       C++ Programs
22/07/2019 10:51 AM
                        <DIR>
28/09/2019 03:06 PM
                        <DIR>
                                       Dev-Cpp
                        <DIR>
06/09/2018 09:04 AM
                                       ExamView
                        <DIR>
                                       Intel
21/07/2018 10:07 PM
                                      ipad backup
12/04/2020 09:17 AM
                        <DIR>
19/05/2020 05:39 PM
                        <DIR>
                                      PerfLogs
30/06/2020 12:16 PM
                        <DIR>
                                      Program Files
                                      Program Files (x86)
13/06/2020 02:39 AM
                        <DIR>
05/04/2020 06:05 PM
                        <DIR>
                                       Users
18/07/2020 05:35 PM
                        <DIR>
                                      Windows
              0 File(s)
                                      0 bytes
             10 Dir(s) 87,578,959,872 bytes free
C:\>cd Windows
C:\Windows>cd Temp
C:\Windows\Temp>cd..
C:\Windows>
```

Command Prompt

C:\Windows\Temp>cd\

C:\>









## MD (MKDIR) COMMAND

#### MD (MD <NEWDIR>)

Make directory. Creates a new directory below the current one.

(The command can also be written as MKDIR)

```
Command Prompt
```

```
D:\>md folder
D:\>dir
Volume in drive D has no label.
Volume Serial Number is DAAF-BAC8
Directory of D:\
23/07/2020 07:47 PM
                        <DIR>
                                       IT0035 - MILES
23/07/2020 07:48 PM
                        <DIR>
                                       Α
                                       В
23/07/2020 07:48 PM
                        <DIR>
23/07/2020 07:48 PM
                        <DIR>
                                       folder
23/07/2020 07:48 PM
                        <DIR>
              0 File(s)
                                      0 bytes
              5 Dir(s) 29,364,404,224 bytes free
```

```
Command Prompt
D:\>mkdir A B C
D:\>dir
Volume in drive D has no label.
Volume Serial Number is DAAF-BAC8
Directory of D:\
23/07/2020 07:47 PM
                       <DIR>
                                      IT0035 - MILES
                       <DIR>
23/07/2020 07:48 PM
23/07/2020 07:48 PM
                       <DIR>
                                      В
23/07/2020 07:48 PM
                       <DIR>
              0 File(s)
                                     0 bytes
              4 Dir(s) 29,364,420,608 bytes free
```

Command Prompt

```
D:\>md "My Folder"
D:\>dir
Volume in drive D has no label.
Volume Serial Number is DAAF-BAC8
Directory of D:\
23/07/2020 07:47 PM
                        <DIR>
                                      IT0035 - MILES
23/07/2020 07:48 PM
                        <DIR>
23/07/2020 07:48 PM
                        <DIR>
                                      В
23/07/2020 07:48 PM
                        <DIR>
                                       folder
23/07/2020 07:48 PM
                        <DIR>
23/07/2020 07:50 PM
                        <DIR>
                                      My Folder
                                      0 bytes
              0 File(s)
              6 Dir(s) 29,364,387,840 bytes free
```







## **COPY CON COMMAND**

#### **COPY CON <FILENAME>**

Allows the creation of a file through the command line.

To use this command, type copy confollowed by the name of the file you want to create.

Then type the content of the file.

Press CTRL+Z to SAVE the file.

```
e:\>COPY CON FILE.TXT
HELLO
^Z
1 file(s) copied.
e:\>
```







## **COPY COMMAND**

#### COPY

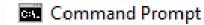
Can be used both to copy files from disk to disk or to create a second copy of a file on a single disk.

#### C:\copy FILE1.TXT A:

Copies the file **FILE1.TXT** from the C drive to the A drive and gives it the same name.

#### C:\copy A:\file1.txt B:\folder\file2.txt

Creates a copy of **FILE1.TXT** from drive A on drive B, putting it in the **FOLDER** subdirectory and renaming it **FILE2.TXT**.



e:\>copy file1.txt file2.txt 1 file(s) copied.

```
e:\>copy file1.txt FOLDER
1 file(s) copied.
e:\>
```

```
Command Prompt
```









## **XCOPY COMMAND**

#### **XCOPY**

command with additional features; It has the capability of moving files, directories, and even whole drives from one location to another. It can replicate the source directory structure as is.

D:\XCOPY FOLDER1 D:\USER\FOLDER1

```
Command Prompt
e:\>xcopy F2 FOLDER\F2
Does FOLDER\F2 specify a file name
or directory name on the target
(F = file, D = directory)? D
F2\a.txt
 File(s) copied
e:\>DIR FOLDER
Volume in drive E has no label.
Volume Serial Number is A20F-8CA5
Directory of e:\FOLDER
23/07/2020 01:50 PM
                        <DIR>
23/07/2020 01:50 PM
                        <DIR>
23/07/2020 01:50 PM
                       <DIR>
                                       F2
                                   15 file1.txt
23/07/2020 11:53 AM
              1 File(s)
                                    15 bytes
```

3 Dir(s) 10,117,885,952 bytes free









## **DEL COMMAND**

#### **DEL (ERASE)**

Delete one or more files in the current directory. Can be used with the '\*' and the '?' wildcards.

#### **DEL** \*.\*

Deletes ALL files in the current directory, USE WITH CAUTION as it will erase all your files.









## **DEL COMMAND**

**DEL \*.JPG** 

will delete all files with the extension JPG.

**DEL MY\*.\*** 

will delete all files beginning with MY and with any extension

DEL MY??.\*

will delete files that are 4 characters long and begin with MY and with any extension







## **MOVE COMMAND**

#### MOVE

The MOVE command moves one or more files from one directory to another, whether the directories are on the same drive or not.

To move a file or files, you specify the **filename** and **location** of the file or files you want to **move** followed by the destination.

```
Command Prompt
e:\F2>dir
 Volume in drive E has no label.
 Volume Serial Number is A20F-8CA5
 Directory of e:\F2
23/07/2020 03:14 PM
                        <DIR>
23/07/2020 03:14 PM
                        <DIR>
23/07/2020 01:30 PM
                                     4 a.txt
23/07/2020 03:14 PM
                        <DIR>
               1 File(s)
                                      4 bytes
              3 Dir(s) 10,117,885,952 bytes free
e:\F2>move a.txt F3
       1 file(s) moved.
e:\F2>dir
 Volume in drive E has no label.
 Volume Serial Number is A20F-8CA5
Directory of e:\F2
23/07/2020 03:14 PM
                        <DIR>
23/07/2020 03:14 PM
                        <DIR>
23/07/2020 03:14 PM
                        <DIR>
                                       F3
               0 File(s)
                                      0 bytes
               3 Dir(s) 10,117,885,952 bytes free
e:\F2>
```









#### RD COMMAND

Command Prompt

RD < DIRECTORYNAME >
Removes a subdirectory of the current directory that is EMPTY. (The command can also be written as RMDIR)

RD/S < DIRECTORYNAME > Removes a subdirectory of the current directory that is NOT EMPTY.

```
Volume in drive E has no label.
Volume Serial Number is A20F-8CA5
Directory of e:\F2
          02:23 PM
                      <DIR>
          01:30 PM
                                  4 a.txt
                                    SAMPLE
23/07/2020 02:23 PM
             1 File(s)
                                   4 bytes
             4 Dir(s) 10,117,885,952 bytes free
                                                Command Prompt
::\F2>RD SAMPLE2
:\F2>DIR
                                                e:\F2>DIR SAMPLE
Volume in drive E has no label.
                                                Volume in drive E has no label.
Volume Serial Number is A20F-8CA5
                                                Volume Serial Number is A20F-8CA5
Directory of e:\F2
                                                Directory of e:\F2\SAMPLE
23/07/2020 02:24 PM
                      <DIR>
                      <DIR>
          02:24 PM
                                                23/07/2020 02:23 PM
                                  4 a.txt
                                                23/07/2020 02:23 PM
                                                                         <DIR>
                                    SAMPLE
23/07/2020 02:23 PM
                                                23/07/2020 01:30 PM
                                                                                       4 a.txt
             1 File(s)
                                   4 bytes
                                                               1 File(s)
                                                                                        4 bytes
             3 Dir(s) 10,117,885,952 bytes free
                                                               2 Dir(s) 10,117,885,952 bytes free
                                                e:\F2>RD SAMPLE
                                                 he directory is not empty.
                                                e:\F2>RD/S SAMPLE
                                                SAMPLE, Are you sure (Y/N)? Y
                                                e:\F2>DIR
                                                Volume in drive E has no label.
                                                Volume Serial Number is A20F-8CA5
                                                Directory of e:\F2
                                                23/07/2020 02:32 PM
                                                                         <DIR>
                                                23/07/2020 02:32 PM
                                                23/07/2020 01:30 PM
                                                                                       4 a.txt
                                                               1 File(s)
                                                               2 Dir(s) 10,117,885,952 bytes free
```







## RENAME AND TYPE COMMANDS

RENAME <OLDNAME.EXT> <NEWNAME.EXT>
It is used to rename a filename.
You must use the full file name including the extension filename.

TYPE <FILENAME>
Displays the contents
of a text file.

```
Command Prompt
e:\F2>DIR
Volume in drive E has no label.
 Volume Serial Number is A20F-8CA5
Directory of e:\F2
                       <DIR>
23/07/2020 01:30 PM
23/07/2020 01:30 PM
                        <DIR>
23/07/2020 01:30 PM
                                     4 a.txt
              1 File(s)
                                      4 bytes
              2 Dir(s) 10,117,885,952 bytes free
e:\F2>TYPE A.TXT
e:\F2>
```

```
Command Prompt
e:\FOLDER>DIR
Volume in drive E has no label.
Volume Serial Number is A20F-8CA5
Directory of e:\FOLDER
23/07/2020 01:50 PM
                       <DIR>
                       <DIR>
3/07/2020 01:50 PM
                                      F2
23/07/2020 01:50 PM
                       <DIR>
23/07/2020 11:53 AM
                                    15 file1.txt
              1 File(s)
                                    15 bytes
              3 Dir(s) 10,117,885,952 bytes free
e:\FOLDER>REN file1.txt A.TXT
e:\FOLDER>DTR
Volume in drive E has no label.
Volume Serial Number is A20F-8CA5
Directory of e:\FOLDER
23/07/2020 01:55 PM
                       <DIR>
3/07/2020 01:55 PM
                       <DIR>
23/07/2020 11:53 AM
                                    15 A.TXT
23/07/2020 01:50 PM
                                      F2
                                    15 bytes
              3 Dir(s) 10,117,885,952 bytes free
e:\FOLDER>
```







## ATTRIB AND CLS COMMANDS

#### **ATTRIB**

Sets or displays the file/directory attributes such as R=read-only, A=archive, S=system, and H=hidden.

Change file attributes. '+' adds an attribute, '-' removes it.

## **CLS**Clear the screen

```
e:\F2>ATTRIB
                         E:\F2\a.txt
e:\F2>ATTRIB +r +s +h a.txt
e:\F2>attrib
   SHR
                     E:\F2\a.txt
e:\F2>ATTRIB +r -<mark>s -h</mark> a.txt
e:\F2>attrib
                         E:\F2\a.txt
```







#### FIND COMMAND

FIND <"STRING"> <FILENAME>

Finds and reports the location of a specific string of text characters in one or more files.

#### **Options:**

- /V Displays all lines not containing the specified string.
- /C Displays only the count of the number of lines that contained a match in each of the files.
- /I Ignores the case of letters in the string search.
- /N Displays the found line preceded by the relative line number.

```
e:\F2\F3>TYPE a.txt
hi
e:\F2\F3>FIND "HI" A.TXT
----- A.TXT
e:\F2\F3>FIND "hi" A.TXT
hi
e:\F2\F3>
```

```
e:\F2\F3>FIND/I "HI" A.TXT
----- A.TXT
hi
e:\F2\F3>
```







## REDIRECTOR COMMAND

#### Redirector (>)

Redirects all output of a DOS command to a single file.

It is used to combined contents of a two or more files and redirect it to another file

```
Command Prompt
e:\F2\F3>type a.txt b.text
a.txt
b.text
hello
e:\F2\F3>type a.txt b.text > c.txt
a.txt
b.text
e:\F2\F3>type c.txt
hello
e:\F2\F3>
```









## REDIRECTOR COMMAND

Redirector (>>)
APPEND into a file

```
Command Prompt
e:\F2\F3>type d.txt
goodbye
e:\F2\F3>type d.txt >> c.txt
e:\F2\F3>type c.txt
hello
goodbye
e:\F2\F3>
```







## REFERENCES

- Tomsho, G. (2019). Guide to Operating Systems, Cengage Learning.
- McHoes, A., Flynn, I. (2018), Understanding Operating Systems, 8th Edition







