

# MS DOS / Windows XP Commands

## DOS Batch Language Scripting

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### Chapter 2: MS DOS / Windows XP Commands

## Objectives

You will learn:

- PIPES and FILTERS.
- FILTER commands.
- Redirecting output to a file.
- Input redirection.
- Pipe operator - (|).
- Find command.
- Sort command.
- Command redirection operators.
- Handles.
- Redirecting command input (<) and command output (>).

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## DOS Batch Language Scripting

### Objectives

You will learn:

- Appending files.
- Redirecting to the bit bucket.
- path command.
- xcopy command.
- call command.
- set command.
- Integer arithmetic.
- Prompting for user input.
- Conditional execution.
- ATTRIB command.

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### PIPES and FILTERS

- The DIR command outputs the contents of the disk to the screen.
  - This output is usually not in alphabetical order.
- PIPES
  - The DIR | SORT combination can be used to output the directory in sorted order.
    - PIPE (|)
      - PIPE means directing the output of one DOS command into another DOS command.
      - The character used to indicate pipe is "SHIFT \|" which is displayed on the screen as a split vertical line.
- FILTERS
  - A FILTER is a DOS command which processes information from another DOS command and outputs the information.
    - SORT and MORE are FILTERS.
  - FILTERS are used with PIPES.
    - > Redirects output to a file or device.
    - < Directs file input into a command.

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### **FILTER**

- **A FILTER is used in conjunction with the command redirection pipe character (|).**
  - **A command FILTER is a command within a command that reads the command's input, transforms the input, and then writes the output.**
  - **FILTER commands help in sorting, viewing, and selecting parts of a command output.**

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### **FILTER Commands**

- **more**
  - Displays the contents of a file or the output of a command in one command prompt window at a time.
- **find**
  - Searches through files and command output for the characters that have been specified.
- **sort**
  - Alphabetizes files and command output.

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### Redirecting Output to a File

- Redirection is used for redirecting the output from a DOS command on the screen to a file or printer.
  - Examples:
    - Redirect the output to a file named DIRFILE .  
C> DIR|SORT >DIRFILE  
C> TYPE DIRFILE
    - Sort the Clients file and store the output in the file CLIENTS.SRT .  
C> SORT <CLIENTS >CLIENTS.SRT  
C> TYPE CLIENTS.SRT

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### Input Redirection

- **STDOUT** can be redirected with > to send output elsewhere, such as to a file.
- **STDIN** also can be redirected in order that input be read from elsewhere.
  - The input **redirection** operator < is used for reading input.
- Certain commands, such as the **find** command, can be used for both input and output redirection on the same command line.
  - The **find** command can be used for searching text from the keyboard.
  - However, it can also be used for explicitly setting **STDIN** to **CON** .
    - Example:  
find "echo" <con >note

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### Pipe Operator

- In addition to simple input and output redirection, the pipe operator | can be used for joining the STDOUT (output side) of one command to the STDIN (input side) of another.
- The TYPE command will send its output to STDOUT.
  - This is normally the console.
    - Example:

```
type stuff.txt
```

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### Pipe Operator

- Instead of using **find** to search the file, the output of the TYPE command can be connected to the input of **find** with a **pipe**.
  - Example:

```
type big.bat | find "echo"
```

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### Find Command

- The find command searches files for the string or text that has been specified.
  - Cmd.exe displays every line that matches the string or text that has been specified in the Command Prompt window.
- The find command can be used as either a filter command or a standard Windows XP command.
  - In order to use find as a filter command, a less than sign (<) and the string or text on which the search is to be performed must be used.
  - By default, find searches are case-sensitive.
    - Example:

```
find "Dave" < trade.txt
```

      - This command finds occurrences of the string "Dave" in the file Trade.txt.
- In order to save the output of the find command rather than display it in the Command Prompt window, type a greater than sign (>) and the name of the file where the output is to be stored.
  - Example:

```
find "Dave" < trade.txt > nwtrade.txt
```

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### Sort Command

- The sort command alphabetizes a text file or the output of a command.
  - Example:

```
sort < list.txt
```

    - The sort command sorts the lines of the List.txt file into an alphabetical list and displays the results without changing the file.
- In order to save the output of the sort command rather than display it, type a greater than sign (>) and a file name.
  - Example:

```
sort < list.txt > alphlist.txt
```
- In order to sort the output of a command, type the command, type a pipe (|), and then type sort (that is, *command* | sort).
  - Example:

```
find "Jones" maillst.txt | sort
```

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### Command

## Redirection Operators

- Redirection operators can be used for redirecting command input and output streams from the default locations to different locations.
  - The input or output stream location is referred to as a handle.

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## Redirection Operators

Operator	Description
>	Writes the command output to a file or a device, such as a printer, instead of the Command Prompt window.
<	Reads the command input from a file, instead of reading input from the keyboard.
>>	Appends the command output to the end of a file without deleting the information that is already in the file.
>&	Writes the output from one handle to the input of another handle.
<&	Reads the input from one handle and writes it to the output of another handle.
	Reads the output from one command and writes it to the input of another command. It is also known as a pipe.

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### Available Handles

Handle	Numeric handle	Description
STDIN	0	Keyboard input.
STDOUT	1	Output to the Command Prompt window.
STDERR	2	Error output to the Command Prompt window.
UNDEFINED	3-9	These handles are defined individually by the application and are specific to each tool.

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### Duplicating Handles

- **The & redirection operator duplicates output or input from one specified handle to another specified handle.**
  - **Example:**
    - `dir>c:\file.txt 2>&1`
    - **This command will send dir output to File.txt and send the error output to File.txt.**

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### Redirecting Command Input (<)

- The < operator can be used for redirecting command input from the keyboard to a file or device.
- Example:
  - sort<file.txt
  - This sort command receives command input from the File.txt.
    - The contents of File.txt appear in the Command Prompt window as an alphabetized list.

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### Redirecting Command Output (>)

- Most commands send output to the Command Prompt window.
  - Even commands that send output to a drive or printer display messages and prompts in the Command Prompt window.
- In order to redirect command output from the Command Prompt window to a file or device, use the > operator.
  - This operator can be used with most commands.
  - Example:
    - dir>dirlist.txt
    - This command will redirect dir output to Dirlist.txt:
      - If Dirlist.txt does not exist, Cmd.exe creates it.
      - If Dirlist.txt exists, Cmd.exe replaces the information in the file with the output from the dir command.

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### Append Files

- The >> redirection operator can be used for appending output.
  - In order to add the output from a command to the end of a file without losing any of the information already in the file, use two consecutive greater than signs – (>>).
  - Example:
    - `dir>>dirlist.txt`
      - This command appends the directory list produced by the dir command to the Dirlist.txt file.

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### Redirecting to the Bit Bucket

- NUL
  - `ECHO Message>NUL`
    - This command will suppress the message.

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### Pipe Operator (|)

- The pipe operator (|) takes the output of one command and directs it into the input of another command.
  - By default, output is STDOUT and input is STDIN.
  - Example:  
`dir | sort`
    - This command sorts a directory.
      - Both commands start simultaneously, but then the sort command pauses until it receives the dir command's output.
      - The sort command uses the dir command's output as its input, and then sends its output to handle 1, which is STDOUT.

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### Combining Commands

- Custom commands can be created by combining filter commands with other commands and file names.
  - Example:  
`dir /b | find "LOG" > loglist.txt`
    - This command stores the names of files that contain the string "LOG":
      - The dir command's output is sent through the find filter command.
      - File names that contain the string "LOG" are stored as a list of file names.
        - » Example:
        - » NetshConfig.log, Logdat.svd, and Mylog.bat in the Loglist.txt file.

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### Filter and Pipes Example

1. Output the directory in sort order:  
**DIR|SORT**
2. Output a directory in reverse sorted order:  
**DIR|SORT/R**
3. The /P and /W options cannot be used with the DIR|SORT command.
  - In order to get the output to pause after each screen type:  
**DIR|SORT|MORE**
4. Perform a Sort by time:  
**DIR|SORT/+13**
  - The above command tells DOS to sort by the 13<sup>th</sup> character in the filename/extension.

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### path Command

- When Windows XP is asked to execute an external command, unless a path is specified, it only looks in the current directory for the command file
  - The path command allows access files that are not in the current directory.
  - The path command instructs Windows XP to look in the "PATH DIRECTORY", as well as the current directory, for a particular command for the rest of the computer session.
  - If a path has been specified, Windows XP can find and execute programs contained in the path directories, regardless as to the current location on disk.

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### xcopy Command

- The xcopy command copies files and directories, including subdirectories.

**xcopy** *Source* [*Destination*]

**[/w] [/p] [/c] [/v] [/q]**

**[/f] [/l] [/g] [/d[:mm-dd-yyyy]]**

**[/u] [/i] [/s] [/e] [/t] [/k] [/r] [/h]**

**[{/a|/m}] [/n] [/o] [/x]**

**[/exclude:file1[+[file2]][+[file3]] [{/y|/y}] [/z]**

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### xcopy Command

- *Source*
  - Required.
  - Specifies the location and names of the files to be copied.
  - This parameter must include either a drive or a path.
- *Destination*
  - Specifies the destination of the files to be copied.
  - This parameter can include a drive letter and colon, a directory name, a file name, or a combination of the above.

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## DOS Batch Language Scripting

### xcopy Command - Options

- **/w**
  - Displays the following message and waits for a response before starting to copy files.
  - Press any key to begin copying file(s)
- **/p**
  - Prompts for confirming whether each destination file should be created.
- **/v**
  - Verifies each file as it is written to the destination file.
  - This serves to ensure that the destination files are identical to the source files.
- **/q**
  - Suppresses the display of xcopy messages.
- **/f**
  - Displays source and destination file names while copying.
- **/l**
  - Displays a list of files that are to be copied.
- **/d[:mm-dd-yyyy]**
  - Copies source files changed on or after the specified date only.
  - If a *mm-dd-yyyy* value is not specified, **xcopy** copies all *Source* files that are newer than existing *Destination* files.
  - This command-line option provides the capability to update files that have changed.

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### xcopy Command - Options

- **/u**
  - Copies files from *Source* that exist on *Destination* only.
- **/s**
  - Copies directories and subdirectories, unless they are empty.
  - If */s* is omitted, xcopy works within a single directory.
- **/e**
  - Copies all subdirectories, even if they are empty.
  - Use */e* with the */s* and */t* command-line options.
- **/t**
  - Copies the subdirectory structure only, not the files.
  - In order to copy empty directories, the */e* command-line option must be included.
- **/k**
  - Copies files and retains the read-only attribute on destination files if present on the source files.
  - By default, xcopy removes the read-only attribute.
- **/r**
  - Copies read-only files.
- **/h**
  - Copies files with hidden and system file attributes.
  - By default, xcopy does not copy hidden or system files.
- **/a**
  - Copies only source files that have their archive file attributes set.
  - */a* does not modify the archive file attribute of the source file.

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### xcopy Command

- Appending files
  - In order to append files, specify a single file for destination and the multiple files for source.
    - Multiple files are specific by using wildcards or file1+file2+file3 format.
- Default value for *Destination*
  - If *Destination* is omitted, the **xcopy** command copies the files to the current directory.

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### xcopy Command - Exit Codes

Code	Description
0	Files were copied without error.
1	No files were found to copy.
2	The user pressed CTRL+C to terminate.
4	Initialization error occurred. There is not enough memory or disk space, or an invalid drive name or invalid syntax on the command line has been entered.
5	Disk write error occurred.

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### call Command

- The call command calls one batch program from another without stopping the parent batch program.
  - The **call** command accepts labels as the target of the call.
  - The **call** has no effect at the command-line when used outside of a script or batch file.

```
call [[Drive:][Path] FileName [BatchParameters]] [:label [arguments]]
```

- **[Drive:][Path] FileName**
  - Specifies the location and name of the batch program to be called.
  - The *FileName* parameter must have a .bat or .cmd extension.
- **BatchParameters**
  - Specifies any command-line information required by the batch program, including command-line options, file names, batch parameters (%0 through %9), or variables.
- **:label**
  - Specifies the label to which the batch program control is to jump.
- **arguments**
  - Specifies any command-line information that is passed to the new instance of the batch program that begins at *:label*, including command-line options, file names, batch parameters (that is, %1 through %9), or variables.

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### call Command

- Batch parameters can contain any information which can be passed to a batch program, including command-line options, file names, batch parameters (%0 through %9), and variables.
- Do not use pipes and redirection symbols with the call command.
  - A batch program can be created which calls itself; however, an exit condition must be provided.
  - Otherwise, the parent and child batch programs may loop endlessly.

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# MS DOS / Windows XP Commands

## DOS Batch Language Scripting

### set Command

- The set command displays, sets, or removes environment variables.
  - When used without parameters, **set** displays the current environment settings.

**set** *[[/a [expression]] [/p [variable=]] string*

- **/a**
  - Sets *string* to a numerical expression that is evaluated.
- **/p**
  - Sets the value of *variable* to a line of input.
- *variable*
  - Specifies the variable to be set or modified.
- *string*
  - Specifies the string to be associated with the specified variable.

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### set Information

- Environment variables are used for controlling the behavior of some batch files and programs and to control the way Windows XP and the MS-DOS subsystem appears and works.
  - When typing the set command alone, the current environment settings are displayed.
  - When specifying values for variable and string, the specified variable value is added to the environment and the string is associated with that variable.
    - If the variable already exists in the environment, the new string value replaces the old string value.
    - If only a variable is specified and there is an equal sign without a string for the set command, then the string value associated with the variable is cleared.

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## DOS Batch Language Scripting

### /a Switch

These are the operators supported for /a in descending order of precedence.

Operator	Operation performed
< >	Grouping
* / % + -	Arithmetic
<< >>	Logical shift
&	Bitwise AND
^	Bitwise exclusive OR
	Bitwise OR
= *= /= %= += -= &= ^=  = <<=>=>=	Assignment
,	Expression separator

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### /a Switch

- When using logical (&& ||) or modulus (%) operators, enclose the expression string in quotation marks.
  - Any non-numeric strings in the expression are considered environment variable names whose values are converted to numbers before being processed.
- If an environment variable name is specified that is not defined in the current environment, a value of zero is allotted.
  - This allows arithmetic to be performed with environment variable values without using the % to retrieve a value.

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## DOS Batch Language Scripting

### Integer Arithmetic

```
set /a x=20  
set /a y=3*x  
set /a y+=140  
set /a y/=2  
echo.y = %y%
```

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### Window Title and Color

```
SET title=Window Title  
TITLE %title%  
COLOR 1A
```

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### Prompt for User Input

```
@echo off
Set /P _dept=Please enter Department:
If "%_dept%"==" " goto :sub_error
If /i "%_dept%"=="finance" goto sub_finance
If /i "%_dept%"=="hr" goto sub_hr goto:eof
:sub_finance
echo You chose the finance dept
goto:eof
:sub_hr
echo You chose the hr dept
```

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### Conditional Execution

```
@ECHO OFF
echo.
echo.1:
echo. ...finding 'ERROR' in logfile.log
find "ERROR" logfile.log>NUL && (
    echo. yes, "ERROR" in logfile
)
echo.
echo.2:
echo. ...finding 'ERROR' in logfile.log
find "ERROR" logfile.log>NUL || (
    echo. no "ERROR" in logfile
)
echo.
echo.3:
set "v=old_value"
set /p "v= ...enter a value or just hit ENTER: " && (
    echo. The user entered a value, the variable v changed.
) || (
    echo. The user just hit Enter, the variable v remains unchanged.
)
echo. v is now: %v%
```

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## DOS Batch Language Scripting

### ATTRIB Command

- The ATTRIB command is used for displaying or changing file attributes.
- Syntax  
ATTRIB [ + *attribute* | - *attribute* ] [*pathname*] [/S]
  - + Turn an attribute ON
  - - Clear an attribute OFF
  - /S : Search the pathname including all subfolders.
  - *attributes*: R Read-only H Hidden A Archive S System
    - *extended attributes*:
      - E Encrypted
      - C Compressed (128:read-only)
      - I Not content-indexed
      - L Symbolic link/Junction (64:read-only)
      - N Normal (0: cannot be used for file selection)
      - O Offline
      - P Sparse file
      - T Temporary

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### ATTRIB Command

- The following command would clear the hidden and system attributes for the RECORD.TXT file:  
ATTRIB -S -H RECORD.TXT
- The attributes for a directory or folder can be changed.
  - In order to use ATTRIB with a directory, it will be necessary to explicitly specify the directory name.
  - Wildcards can not be used for working with directories.

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