

Operating Systems

- An operating system, or OS, is a software program that enables the computer hardware to communicate and operate with the computer software. Without a computer operating system, a computer would be useless.

OS Types

- As computers have progressed and developed so have the types of operating systems. Below is a basic list of the different types of operating systems and a few examples of operating systems that fall into each of the categories. Many computer operating systems will fall into more than one of the below categories.
 - **GUI** - Short for **Graphical User Interface**, a GUI Operating System contains graphics and icons and is commonly navigated by using a computer mouse. Intuitive, however hardware demanding. A GUI uses windows, icons, and menus to carry out commands such as opening files, deleting files, moving files, etc. and although many GUI Operating Systems are operated by using a mouse, the keyboard can also be used by using keyboard shortcuts or arrow keys.
Unlike a command line operating system like Unix or MS-DOS, GUI operating systems are much easier for end-users to learn and use because commands do not need to be known or memorized. Because of their ease of use, GUI Operating Systems have become the dominant operating system used by end-users today.

Windows Structure and Management in GUI

Goals

- Desktop description
- How to copy, move, rename, delete, and restore files and folders
- How to create folders
- How to add/change/delete users
- How to use essential tools: disk error checking, system error checking, power settings, time and language

Linux/MacOS/UNIX

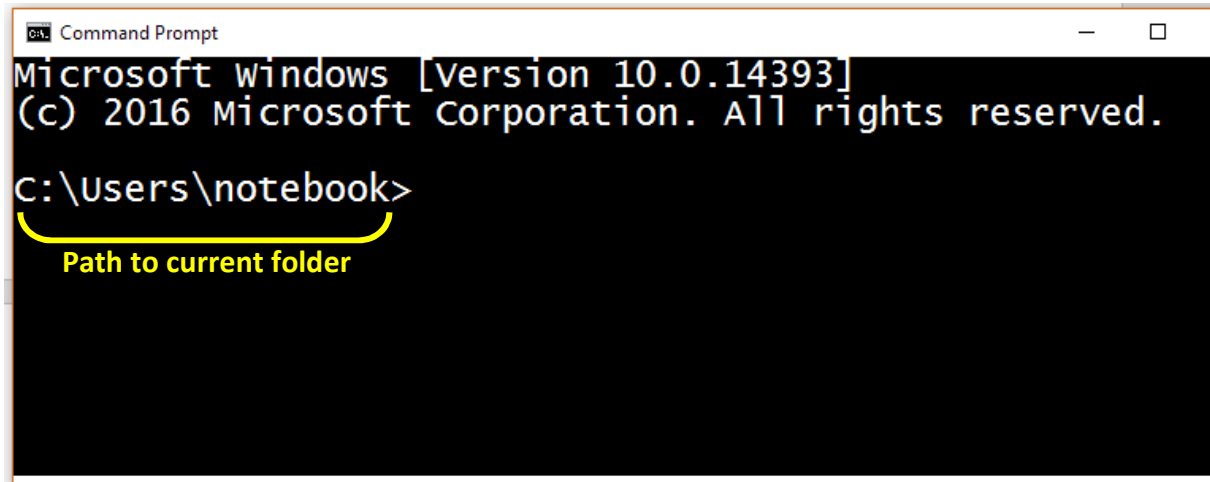
LEARN ENOUGH TO BE DANGEROUS: <https://www.learnenough.com/command-line-tutorial>

A perfect tip by Ivana Mišová.

CLI Essentials – Windows

Start

Start button → cmd → Enter



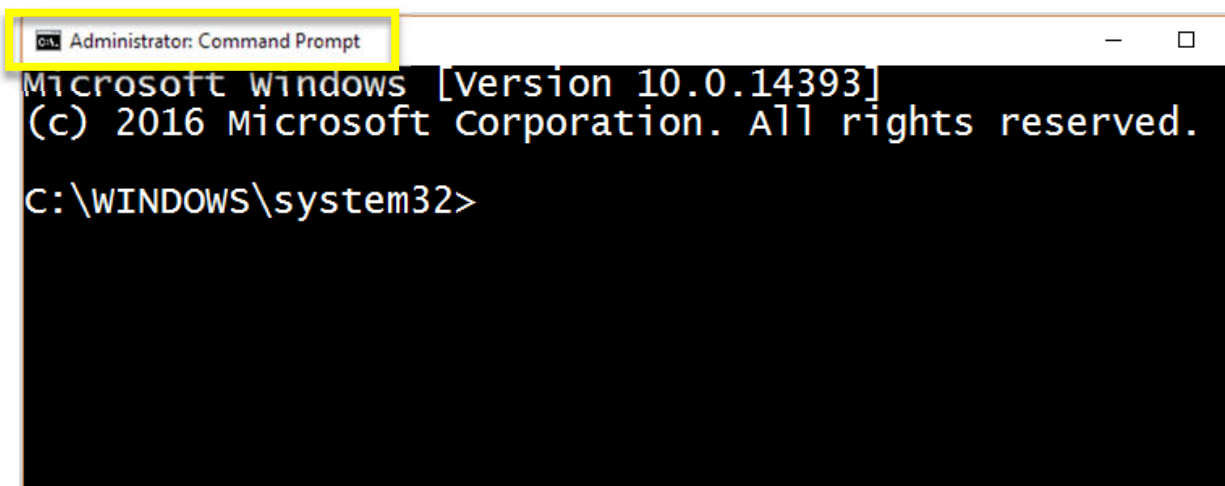
A screenshot of a standard Windows Command Prompt window. The title bar reads "Command Prompt". The text inside shows the Microsoft Windows version (10.0.14393) and copyright information (© 2016 Microsoft Corporation). The current directory is "C:\Users\notebook>". A yellow bracket underlines the path "C:\Users\notebook" with the label "Path to current folder" written below it.

Any command issued over the command prompt must be executed by pressing Enter (it is not enough to type it & wait 😊).

The sample above is command prompt started with privileges of a standard user. There are moments, when administrator privileges are needed – to get cmd with admin rights:

Start button → cmd → right click → Run as Administrator, or

Start button → cmd → Ctrl + Shift + Enter



A screenshot of an Administrator Command Prompt window. The title bar reads "Administrator: Command Prompt". The text inside shows the Microsoft Windows version (10.0.14393) and copyright information (© 2016 Microsoft Corporation). The current directory is "C:\WINDOWS\system32>".

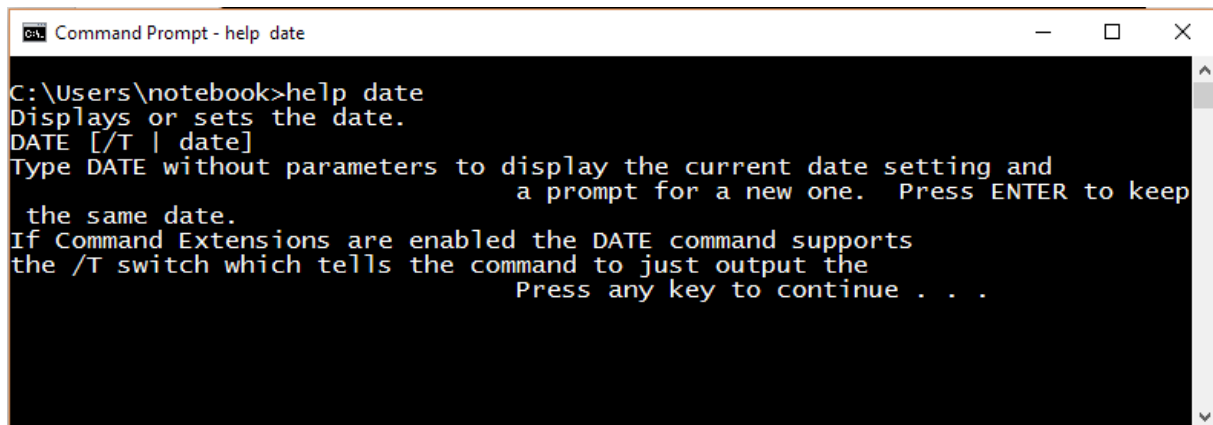
Getting Help

help

It show the list of available commands.

help <command>

It shows details about the command.



```
C:\Users\notebook>help date
Displays or sets the date.
DATE [/T | date]
Type DATE without parameters to display the current date setting and
a prompt for a new one. Press ENTER to keep
the same date.
If Command Extensions are enabled the DATE command supports
the /T switch which tells the command to just output the
Press any key to continue . . .
```

Repeating Recent Commands

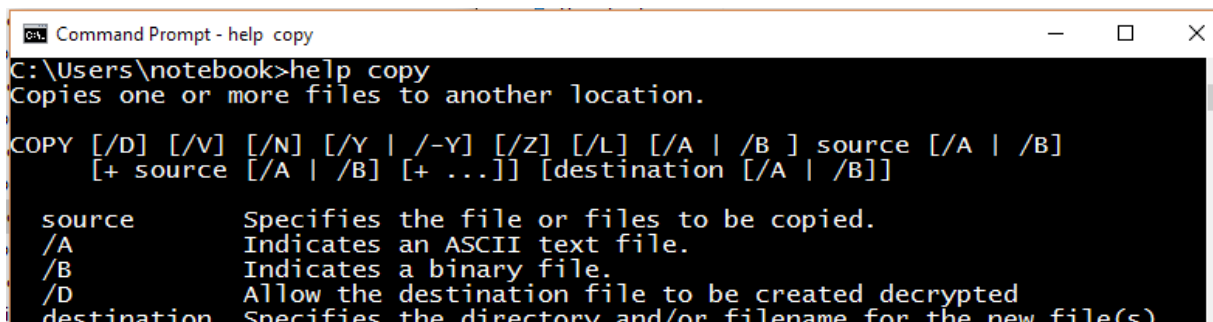
Pushing *Arrow Up* on the keyboard traverses over the recent commands.

Stopping Unwanted Command

Usually → push *Ctrl + C*

Parameters

Almost all commands use **parameters**, i.e. additional text, which specifies the required action. Some of the parameters are optional – those are indicated by square brackets in the help; mandatory parameters are stated without the square brackets.



```
C:\Users\notebook>help copy
Copies one or more files to another location.
COPY [/D] [/V] [/N] [/Y | /-Y] [/Z] [/L] [/A | /B ] source [/A | /B]
[+ source [/A | /B] [+ ...]] [destination [/A | /B]]

source      Specifies the file or files to be copied.
/A          Indicates an ASCII text file.
/B          Indicates a binary file.
/D          Allow the destination file to be created decrypted
destination Specifies the directory and/or filename for the new file(s)
```

In the example above is information about the *copy* command. It has one mandatory parameter – source; everything else is optional.

There are also parameters, which start with slash (symbol */*) – those are so called switches.

Case Sensitivity

Windows is not case sensitive – it is valid to type *copy*, *Copy* or *COpy* – all are valid forms of the copy command.

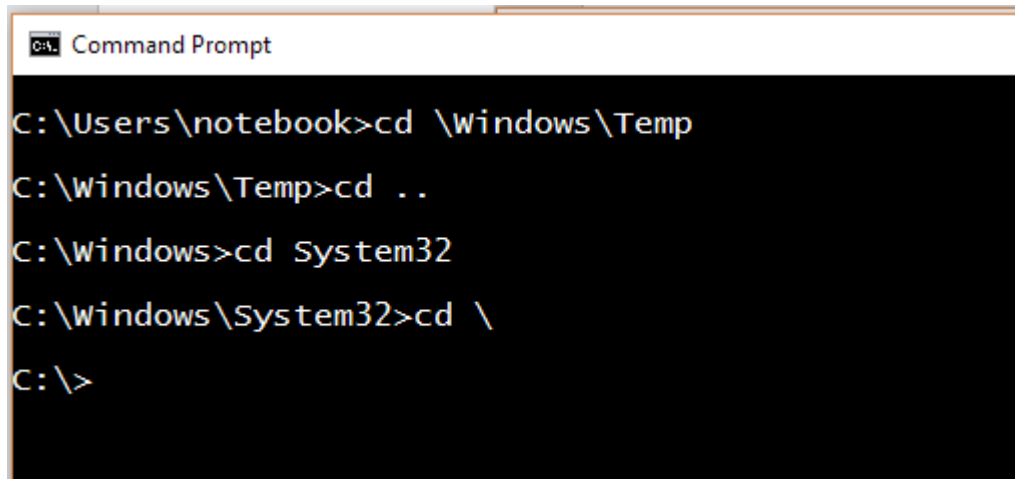
Commands

cls clear screen

cd, chdir change the current folder (in the command prompt terminology **directory**) to the one specified as its parameter.

Without any parameter it displays path to the current directory.

Examples:



```
Command Prompt
C:\Users\notebook>cd \Windows\Temp
C:\Windows\Temp>cd ..
C:\Windows>cd System32
C:\Windows\System32>cd \
C:\>
```

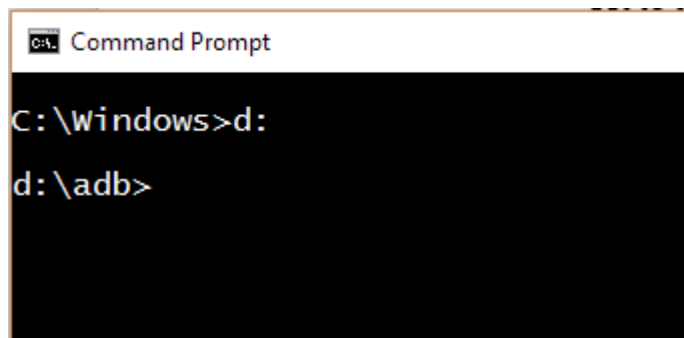
There 4 typical uses of *cd*:

1. *cd \Windows\Temp* – it changes the current directory using the **absolute path** – an absolute path defines exact order of folders **from the beginning of the file system (the first slash** represents the beginning of the file system – **root folder**; remaining slashes are just separators of folder names). In this case it means “starting in the root folder, go to Windows, then to Temp folder”.
2. *cd ..* – in this case is used a special parameter *..*, which means “the parent folder” or “the folder above”. For the folder *C:\Windows\Temp* the parent is *C:\Windows* – and that is the new current folder. It is possible to move over multiple parent folders, e.g.: *cd ..\..* goes 2 folders above.
3. *cd System32* – **relative path** example – a relative path defines how to get **to the destination from the current folder**, not the root one.
4. *cd * - its meaning is “go to the root folder” of the current drive.

Tips:

- to finish the names of folders use **Tab** key on the keyboard; just type the first letter or two, then press Tab - you should get the folder name; if Tab is pressed one more time, you'll get to another folder with the same letters at the beginning etc.

- to change the current drive type its name *without cd*:



```
Command Prompt
C:\Windows>d:
d:\adb>
```

dir displays the content of the current folder

Useful parameters:

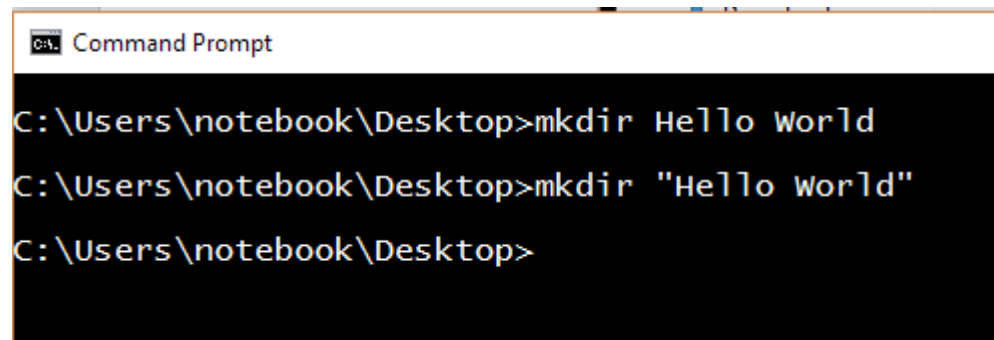
dir /s → recursively goes over all subdirectories of the displayed folder

dir /o → sorts the output alphabetically; *dir /o:s* sorts by size; *dir /o:d* sorts by date

dir /p → displays a page and then waits until a key is pressed

md, mkdir create a directory

If the new directory has to have a space in the name, use quotation marks around the name, otherwise it creates several folders:



```
Command Prompt
C:\Users\notebook\Desktop>mkdir Hello World
C:\Users\notebook\Desktop>mkdir "Hello World"
C:\Users\notebook\Desktop>
```

In the first case there are created 2 folders: *Hello* and *World*. In the next case 1 new folder *Hello World* is made.

rd, rmdir

erase a directory. If the directory contains other folders or files, it will not work, unless the parameter /s is used.

```
Command Prompt

C:\Users\notebook\Desktop>rmdir world
The directory is not empty.

C:\Users\notebook\Desktop>rmdir /s world
world, Are you sure (Y/N)? y

C:\Users\notebook\Desktop>
```

copy

it copies one or multiple files to another folder. It has one mandatory parameter – source.

Examples

```
Command Prompt

C:\Users\notebook\Desktop\Hello2>copy ..\Hello\*.pdf
..\Hello\1 - Python Intro.pdf
..\Hello\2 - Displaying Output.pdf
..\Hello\3 - Getting Input.pdf
..\Hello\4 - Python Basic Operators.pdf
4 file(s) copied.

C:\Users\notebook\Desktop\Hello2>
```

The example above uses minimal form of the copy – there is one parameter only: `..\Hello*.pdf`. What should be copied and where?

- `..\Hello\` - content of the folder Hello, which is in the parent folder of the current folder.
- `*.pdf` – all files with .pdf file extension
- Destination: in this case it was not defined – the current folder (`C:\Users\notebook\Desktop\Hello2`) will be the destination

```
Command Prompt

C:\Users\notebook\Desktop\Hello2>copy *.* d:\Docs\Documents
```

In this example above all files (`*.*`, could be also `*`) are copied to `D:\Docs\Documents`.

move

It moves files – its usage is very similar to **copy**.

del, erase

It deletes a file/couple of files.

```
C:\Users\notebook\Desktop\Hello2>del *.*  
C:\Users\notebook\Desktop\Hello2\*.*, Are you sure (Y/N)? y  
C:\Users\notebook\Desktop\Hello2>
```

The sample above erases all files in the current folder. The files must not be read-only (to erase read-only files use the switch **/F**).

Useful Utilities

<i>tasklist</i>	list of running processes
<i>taskkill</i>	kills a running process – the process can be identified by its name taskkill /IM chrome.exe or by its PID (identification number – the number can be obtained from the tasklist) taskkill /PID 1295
<i>chkdsk</i>	checks a drive for errors (e.g. <i>chkdsk d: </i>)
<i>sfc</i>	scans for errors in the operating system and tries to fix them – typical use is <i>sfc /scannow</i>
<i>shutdown</i>	schedules the system shutdown or reboot, e.g. <i>shutdown -r -f -t 360</i> → reboot (-r) the system after 360 seconds (-t 360) and force (-f) the end of all running processes <i>shutdown -s -f -t 1</i> → shutdown (-s) the system immediately (-t 1) and force (-f) the end of all running processes
<i>systeminfo</i>	information about the OS and hardware
<i>ipconfig, ping, pingpath, tracert, nslookup</i>	– useful network utilities
<i>time, date</i>	check or modify time or date
<i>shutdown</i>	shutdown or reboot the local computer or one accessible over the LAN

Redirection

command > file → it saves the output into file instead of displaying it on screen

Example: *tasklist > tasks.txt*

command < file → content of the input file is sent to command as its input

Example: *sort < tasks.txt*