
Introduction to the Command Line

Jorge Pérez de Acha Chávez

The Command Line is one of the two fundamental ways to interact with a computer's operating system. The underlying logic is simple: the user enters text-based instructions (*commands*) to be performed by the operating system. The user uses a keyboard to type these commands on a screen or window—the command line interface (CLI)—and presses the enter (or return) key to indicate the command is ready to be executed. Most commands at this level are primarily concerned with manipulating files: create, delete, list, move, copy, etc.

For many years, the CLI was the main (and at times only) approach users had to, well, use a computer at all. Then came the invention of the mouse and pointer as well as the introduction of a graphical user interface (GUI) to computer systems, providing an intuitive and approachable way to interact with an operating system (i.e. they made using a computer *a lot* easier). Even though they might appear to be radically different, the CLI and GUI are in practice the same: both methods receive inputs from users in order to instruct the operating system to perform specific tasks or actions.

The choice of which interface to use is usually a matter of personal preference. Although learning how to use the command line may be both daunting and intimidating at first, it is an essential and powerful tool that allows users to know, and therefore manipulate, the inner guts of an operating system. If you do not care for such an intimate relationship with your computer, you can also just use the command line to easily automate time-consuming operations (e.g. renaming and moving 50+ files) via scripting or batch files.

Windows

To open the Command Line on Windows go to **Start**, type **cmd** and press Enter on your keyboard. This will open the Command Prompt.

Understanding the prompt

Usually, the Command Prompt opens in your user directory.

```
C:\Users\jorge>
```

A **directory**—aka a folder—is a location on your computer for storing files or other directories. Directories are usually organized following a hierarchical structure. The topmost directory is called the *root directory*. A directory that is below another directory is a *subdirectory*, while a directory above a subdirectory is called a *parent directory*.

The command prompt displays the current directory in which you are located. So when the command prompt displays `C:\Users\jorge>` it means that you are currently in a directory called `jorge`, which is a subdirectory of `Users`, which is a subdirectory of the *root directory*. In Windows, the root directory is a back slash (`\`).

Listing a directory

To view the files and directories contained in your current directory simply type `dir` and press Enter.

```
C:\Users\jorge>dir
```

The output will display something similar to the following.

Directory of C:\Users\jorge

```
08/20/2017  05:42 PM    <DIR>          .
08/20/2017  05:42 PM    <DIR>          ..
08/20/2017  05:40 PM                500  a file.txt
08/10/2017  05:56 PM           9,274,545  another file.docx
08/17/2017  01:26 AM    <DIR>          Contacts
08/17/2017  01:32 PM    <DIR>          Desktop
08/17/2017  01:48 AM    <DIR>          Documents
08/17/2017  01:43 AM    <DIR>          Downloads
08/17/2017  01:26 AM    <DIR>          Pictures
08/17/2017  01:26 AM    <DIR>          Saved Games
08/17/2017  01:26 AM    <DIR>          Videos
08/08/2017  08:17 PM           18,882,465  yet another file!.pdf
               3 File(s)          28,157,510 bytes
               9 Dir(s)  13,839,921,152 bytes free
```

The first two columns display the date and time of the last write to that file or directory. The third column specifies whether the entry is a directory or not. If an entry is a file, the following column will display the file's size in bytes. Finally, the last column displays the name of the directory or file. Notice the two directories named `.` and `..`, which have a special meaning. The `.` directory is actually the *current* directory (`jorge` in the example above), while the `..` directory stands for the *parent* (`Users` in the example).

Navigating through directories

To move to another directory use the `cd` command (short for change directory). The syntax is as follows

```
cd [PATH OF DIRECTORY]
```

Suppose you wish to move to your `Desktop` directory, then you would have to type

```
C:\Users\jorge>cd \Users\jorge\Desktop
```

and press enter. Notice how the prompt has changed from `C:\Users\jorge>` to `C:\Users\jorge\Desktop>` ! This means you are now located in your `Desktop` and no longer in `jorge`. If you now enter the `dir` command you would see all the files and directories contained in `Desktop`.

There is a shortcut that avoids having to write the entire path of a directory. If you wish to move to a subdirectory of the current directory, you can simply type `cd` followed by the name of the subdirectory. So in order to move to `Desktop` you could enter

```
C:\Users\jorge>cd Desktop
```

Remember the `..` name for the parent directory? That is the notation we use when wanting to move up to the parent directory. So let's say you now want to go back to `jorge`, simply type

```
C:\Users\jorge\Desktop>cd ..
```

and press Enter. Now the prompt has changed to `C:\Users\jorge>` again.

MacOS

Terminal is the CLI for MacOS. It is located in the Utilities folder within the Applications folder.

Understanding the prompt

Usually, Terminal opens in your user directory.

```
Jorges-Mac:~ jorgepda$
```

A **directory**—aka a folder—is a location on your computer for storing files or other directories. Directories are usually organized following a hierarchical structure. The topmost directory is called the *root directory*. A directory that is below another directory is a *subdirectory*, while a directory above a subdirectory is called a *parent directory*.

There are three main components in the command prompt. The first is the computer's name followed by a colon, then there is the current directory, and finally the current user. So when the command prompt displays `Jorges-Mac:~jorgepda` it means the computer's name is Jorges-Mac, that you are currently in the directory called `jorgepda` (indicated by `~` symbol) and the user is `jorgepda`.

To know the complete path of your current directory, type `pwd` (short for print working directory) and press Enter. The output will look something like this

```
Jorges-Mac:~ jorgepda$ pwd
/Users/jorgepda
```

In the previous example, we can see that `jorgepda` is a subdirectory of `Users`, which is a subdirectory of the *root directory*. In MacOS, the root directory is a slash (`/`).

Listing a directory

To view the files and directories contained in your current directory simply type `ls` and press Enter.

```
Jorges-Mac:~ jorgepda$ls
```

The output will display something similar to the following.

```
Applications
Desktop
Documents
Downloads
```

```
Library
Movies
Music
Pictures
Public
a file.txt
another file.docx
yet another file!.pdf
```

Navigating through directories

To move to another directory use the `cd` command (short for change directory). The syntax is as follows

```
cd [PATH OF DIRECTORY]
```

Suppose you wish to move to your `Desktop` directory, then you would have to type

```
Jorges-Mac:~ jorgepda$ cd /Users/jorgepda/Desktop
```

and press Enter. Notice how the prompt has changed from `Jorges-Mac:~ jorgepda` to `Jorges-Mac:Desktop jorgepda` ! This means you are now located in your `Desktop` and no longer in `jorgepda`. If you now enter the `ls` command you would see all the files and directories contained in `Desktop`.

There is a shortcut that avoids having to write the entire path of a directory. If you wish to move to a subdirectory of the current directory, you can simply type `cd` followed by the name of the subdirectory. So in order to move to `Desktop` you could enter

```
Jorges-Mac:~ jorgepda$ cd Desktop
```

When moving up to a parent directory `..` stands for the parent. So let's say you now want to go back to `jorgepda`, simply type

```
Jorges-Mac:Desktop jorgepda$ cd ..
```

and press Enter. Now the prompt has changed to `Jorges-Mac:~jorgepda` again.