Explore your computer

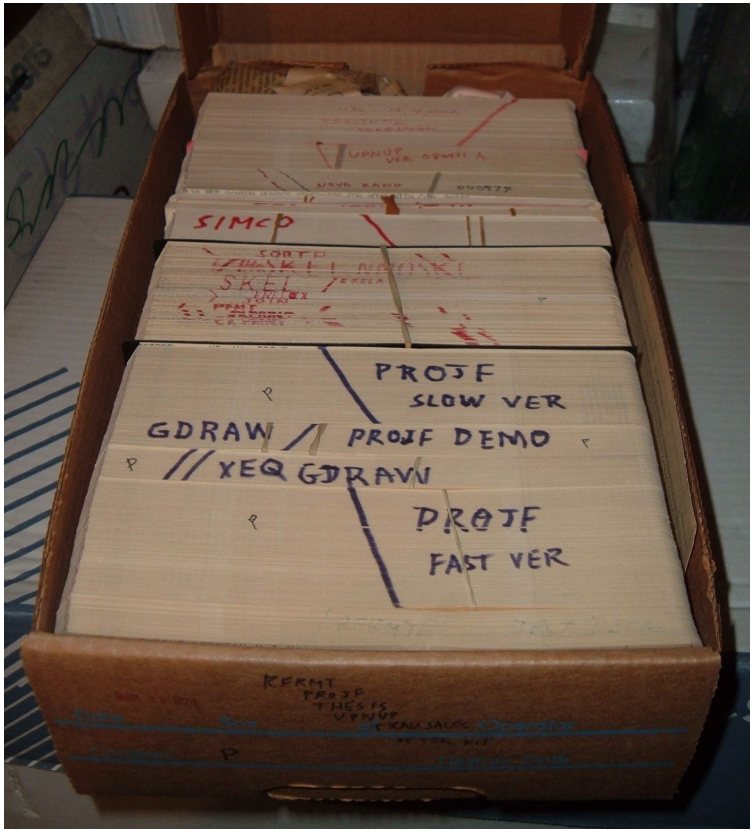
Helena Bermúdez Sabel

Goals

- **Learn the different types of files**
- Browse the file system
- Create/delete/move folders and files from the command line

File types

- A possible classification:
  - **executable files**: they contain programs
  - **data files**: they contain different types of information: text, image, audio, video.
- Another taxonomy:
  - **text files**: data is stored using electronic text (characters). They are human-readable.
  - **binary files**: data is stored in binary format. They are computer-readable but not human-readable.



Punched card decks by Arnold Reinhold

Formats

- The file extension can be used as a hint to the format
- The format tells us the specific software we need to read it and/or manipulate it (e.g. data files) or run it (i.e. executable files)

Character encoding

- Any “text” is created from **characters**.
- Characters that are needed for a specific purpose are grouped into a **character set**.
- To refer to a character in an unambiguous way, each character is associated to a **code point** (a number).
- Characters are stored in the computers as one of more **bytes**.
- A **character encoding** is a set of mappings between the bytes and the character set.

Which character encoding?

UTF-8

⚠️ Your machine might be using a different encoding by default (eg. Windows-1252 or CP-1252)

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The terminal

- Also known as console, command-line interface
- It processes commands to a computer program in the form of lines of text
- To open the terminal:
  - Linux: press **`CTRL + ALT + T`**
  - Windows: press **`Windows + X`**; select **`Windows PowerShell`** or open the start menu and type “Powershell”
  - Mac: in the Finder, open **`/Applications/Utilities`** (or use Launchpad and type “Terminal”)

Command

It is a request the user sends to the OS for it to execute it. Elements:

1. Name of a executable program (e.g. **`curl`**)
2. A set of options whose name is preceded by one or two hyphens (e.g. **`-f`** or **`--help`**)
3. A set of arguments to define the file(s) or the data that must be used

Command example

```
curl
https://digital.library.upenn.edu/women/sultana/dream/dream.
html
```

File/directory naming conventions

⚠️ **Do not use whitespaces (and avoid special characters as well)**

Paths

A path specifies a unique location in a file system. It points to a location by following the directory tree hierarchy, thus it looks like a slash-separated list of directory names followed by either a directory name or a file name. Eg.:

- macOS: `/Users/username/Desktop`
- Linux: `/home/username/Desktop`
- Windows: `C:\Users\username\Desktop`

Types of path

- **relative**: path in relation to the current location
- **absolute**: path in relation to the disk root

Path representation (conventions)

- root directory
  - UNIX: `/`
  - Windows: `\` (relative to current working directory root) or `drive_letter:\`
- directory separator
  - UNIX: `/`
  - Windows: `\`
- Current directory: `.`
- Parent directory: `..`

To change folder

- UNIX:
  - `cd directory_name`
- Windows:
  - `Set-Location directory_name`
  - `cd directory_name`
  - `chdir directory_name`

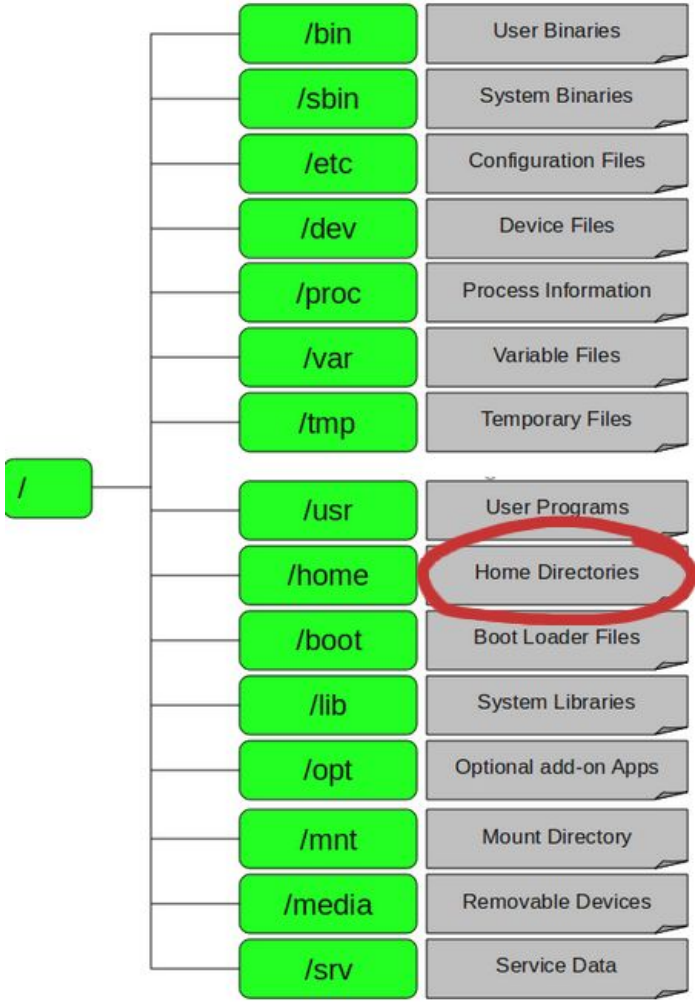
Navigation example

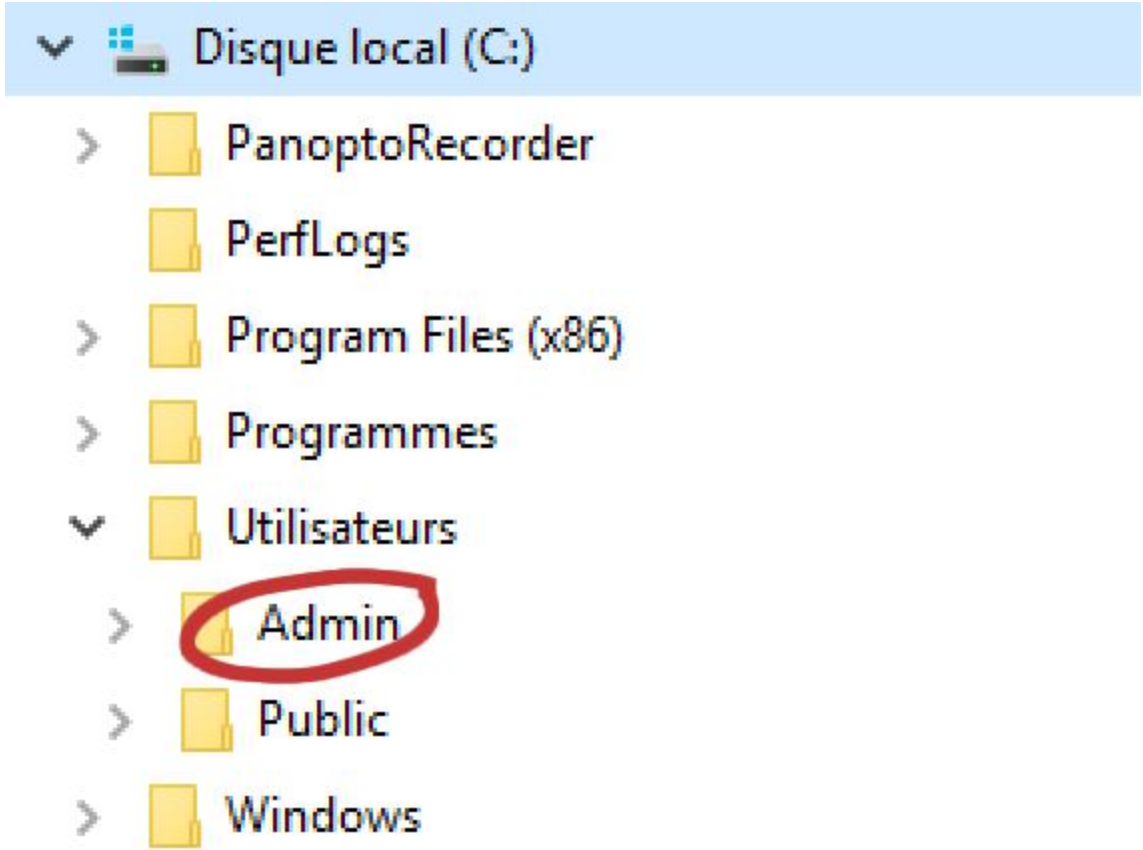
We are in “dossier3”

- “my” absolute path: **`/arborescence/dossier1/dossier3`**
- to move to *dossier5* (relative path): **`cd dossier5`**
- to move to *dossier1* (relative path): **`cd ..`**
- to move to *dossier4* (relative path): **`cd ../dossier4`**
- to move to root: **`cd /`**

Directories

When we open the terminal, we are at the root of our personal folder


/
/bin
User Binaries
/sbin
System Binaries
/etc
Configuration Files
/dev
Device Files
/proc
Process Information
/var
Variable Files
/tmp
Temporary Files
/usr
User Programs
/home
Home Directories
/boot
Boot Loader Files
/lib
System Libraries
/opt
Optional add-on Apps
/mnt
Mount Directory
/media
Removable Devices
/srv
Service Data


Disque local (C:)
PanoptoRecorder
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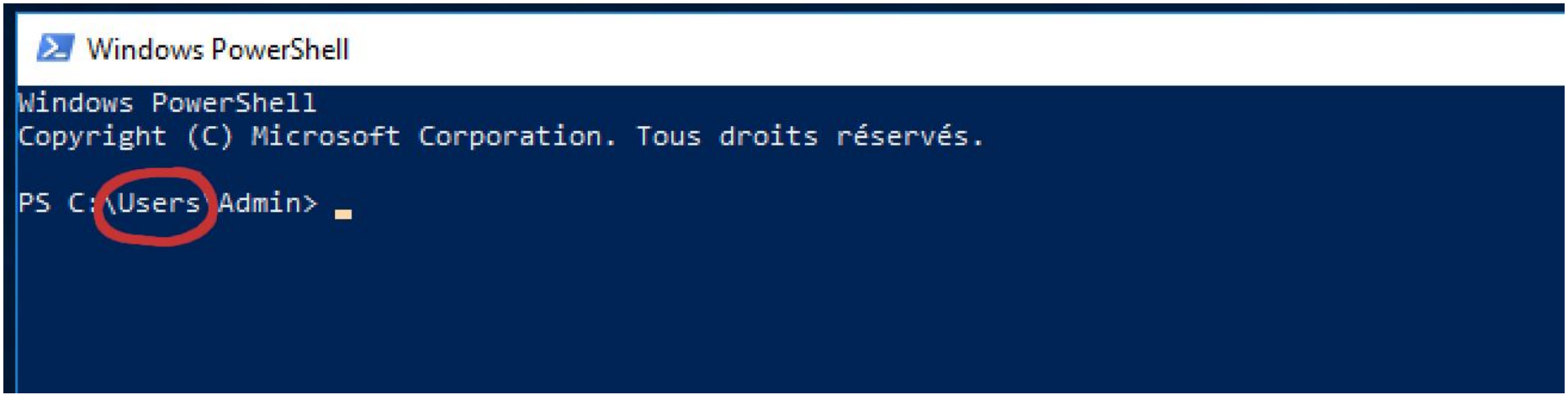
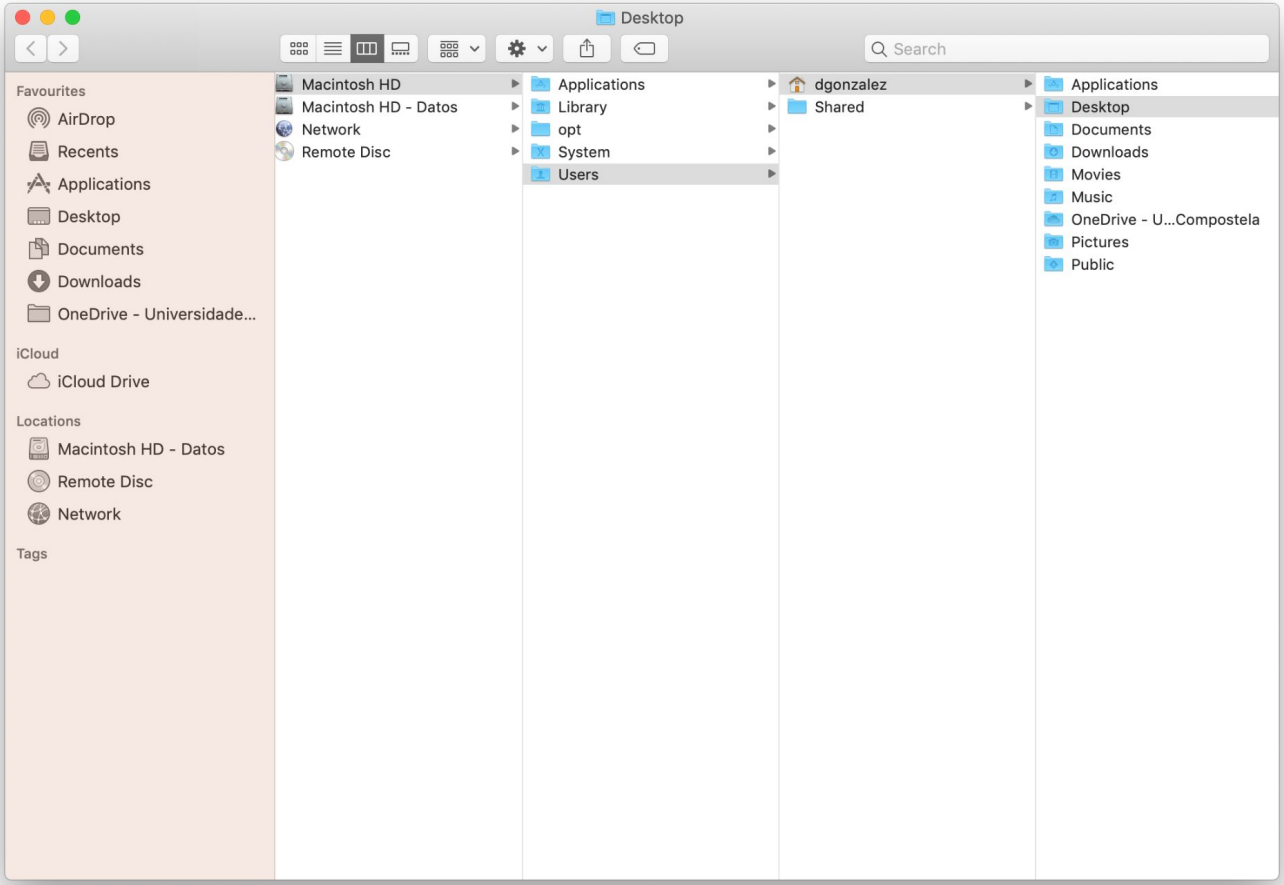
Program Files (x86)
Programmes
Utilisateurs
Admin
Public
Windows


Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. Tous droits réservés.
PS C:\Users\Admin>


Desktop
Search
Favourites
AirDrop
Recents
Applications
Desktop
Documents
Downloads
OneDrive - Universidade...
iCloud
iCloud Drive
Locations
Macintosh HD - Datos
Remote Disc
Network
Tags
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Shared
Applications
Desktop
Documents
Downloads
Movies
Music
OneDrive - U...Compostela
Pictures
Public

List the contents of a directory

- UNIX: `ls`
- Windows: `ls` or `dir`

Exercise

1. Open the terminal
2. List all files and directories
3. Go to your desktop

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Create a directory

- UNIX:
  - `mkdir directory_name`
- Windows:
  - `mkdir directory_name`
  - `New-Item directory_name`

Copy a file

```
cp file_name_source file_name_output
```

Move a file

```
mv file_name_source file_name_output
```

Delete a file

```
rm file_name
```

Delete a directory

```
rm -r directory_name
```

Exercise

Using the command line:

1. Open the terminal and go to your desktop or documents folder
2. Create the folder “my_data”
3. Create a new empty file with the command `touch name_of_my_new_file`
4. Delete this newly created file

To learn more

- OS: All
  - Milligan, Ian & Baker, James: “Introduction to the Bash Command Line”. The Programming Historian.
  - W3C: “Character encodings for beginners”.
  - Princeton University Library: “File naming and structure”. Research Data Management at Princeton.
- OS: Windows
  - Dawson, Ted: “Introduction to the Windows Command Line with PowerShell”. The Programming Historian.