

# **Introduction to the UNIX command line**

Getting stuff done like it's 1971

# Overview

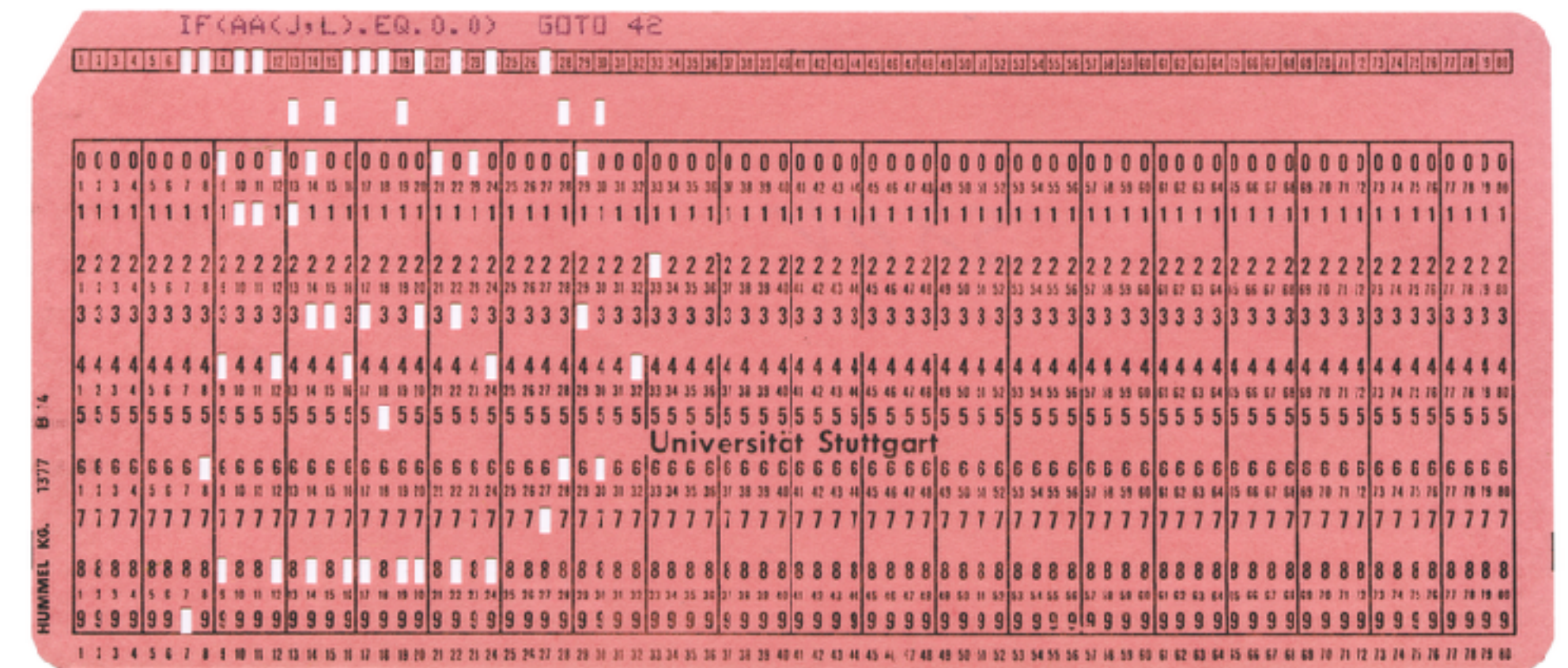
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- Why a command line?
- Command Line Basics
- Read the manual stupid!
- Connecting to other computers
- Messing around

# **Why a command line?**

# Why a command line?

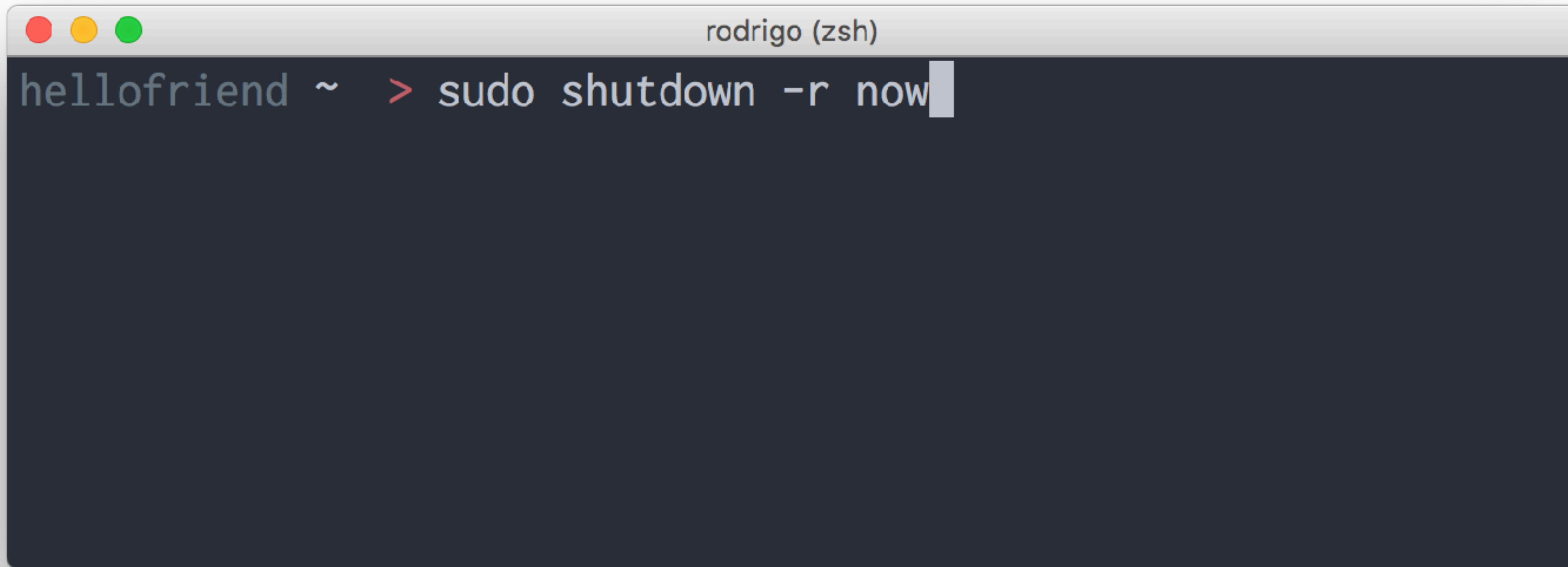
- The command line was the first “User Interface” that allowed us to interact directly with a computer using the keyboard.
- Before that we had to use something called a “Punch Card”.
- This was all before we had Graphical User Interfaces
- It's also known under the acronym: **CLI** (Command Line Interface)



PUNCH CARD

# Tell the computer what to do!

The **CLI** allows us to type in commands, the computer in turn will execute those once we hit enter.

A terminal window with a dark blue background and a light gray title bar. The title bar contains three colored window control buttons (red, yellow, green) on the left and the text 'rodrigo (zsh)' on the right. The terminal content shows the prompt 'hellofriend ~' followed by a red greater-than sign, the command 'sudo shutdown -r now', and a white cursor at the end of the command.

```
rodrigo (zsh)  
hellofriend ~ > sudo shutdown -r now
```

# Be precise in your speech.

The computer only recognizes specific commands, we have to be very exact in what we want to tell the computer to do otherwise it won't understand it.

```
mrmeeseeks ~ > "Please help me computer"  
zsh: command not found: Please help me computer  
mrmeeseeks ~ > █
```



# Why learn it?

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- The GUI might be more user friendly, but the command line is much more powerful if you know how to use it.
- It's much easier to automate certain tasks so that they can be re-used later on.
- Is the most common way to work with Servers to which you don't have physical access to.
- Some programs can only be run in the command line! Not all applications have a GUI.
- A lot of free commands for all sort of tasks.
- It makes you look cool! 😎

# Basics

---





# Print something on screen (echo)

SHELL

```
echo "Hello, from the command line"
```



```
mrmeeseeks ~ > echo "Hello, from the command line"  
Hello, from the command line
```

# When you are stuck

SHELL

echo "Hello, from the command line"

CTRL

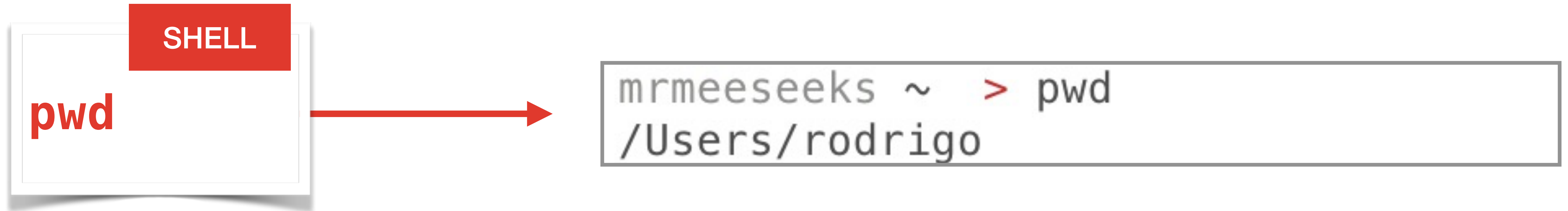
+

C

mrmeeseeks ~ > echo "Hello, from the command line  
dquote> sdfjhsfjksldlfjk█

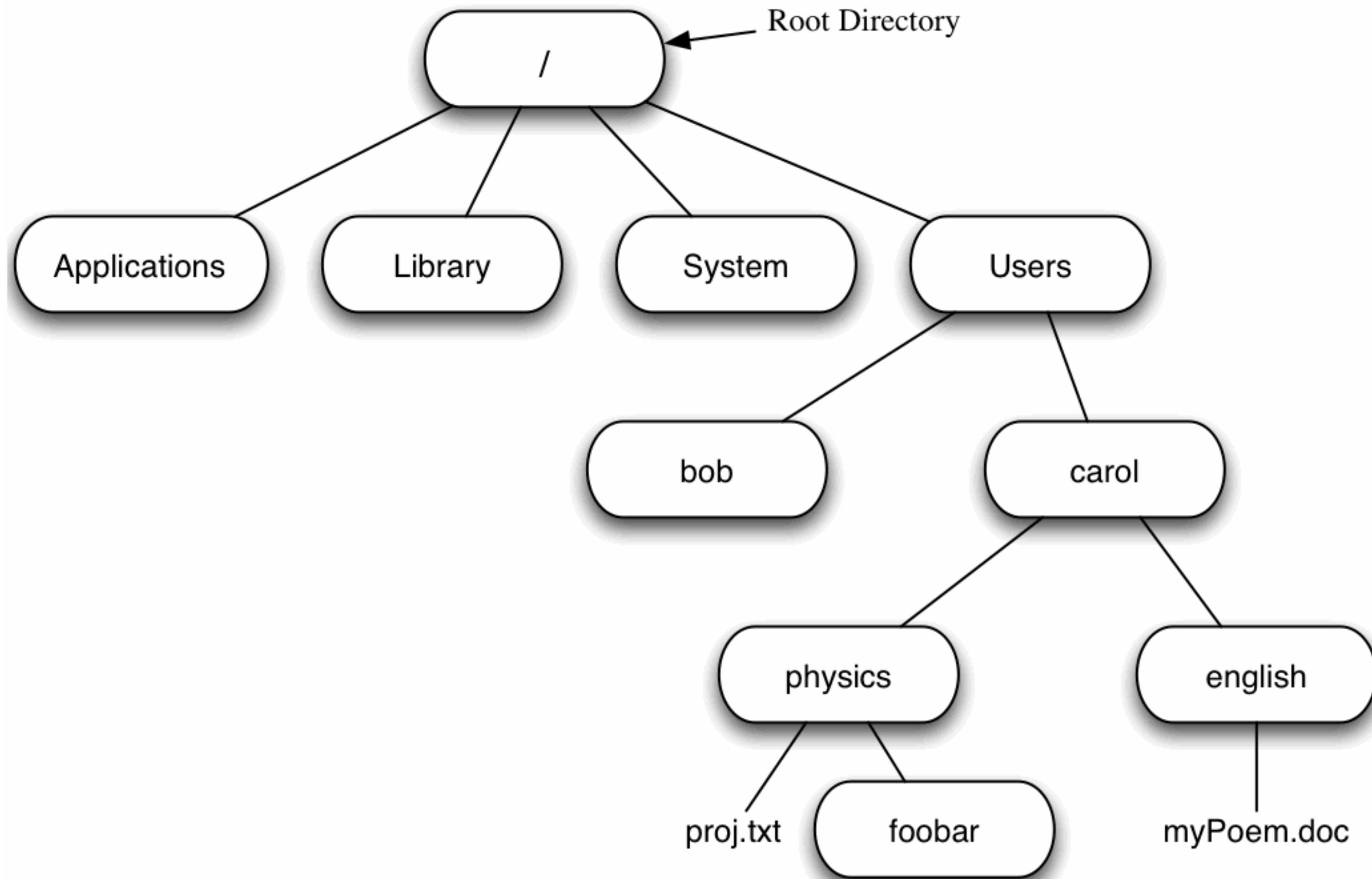
Press the combination **CTRL + C** when you are stuck to get out of trouble!

# Print the working directory (pwd)



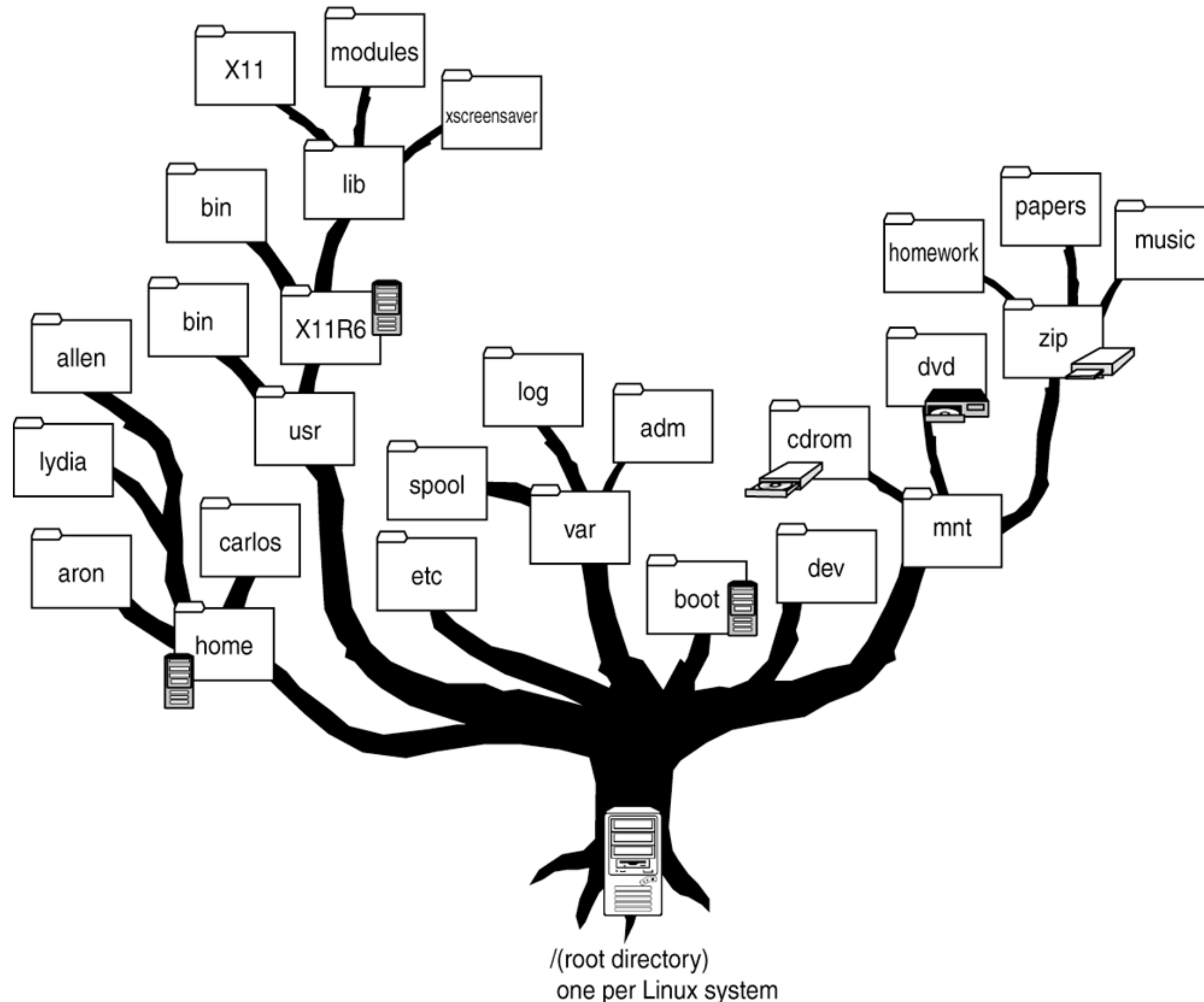
# The unix tree structure (macOS)

---



# The unix tree structure (Linux)

---



# Change the working directory (cd)

SHELL

**cd ..**

mrmeeseeks /Users > pwd  
/Users

SHELL

**cd Inbox/Scans**

mrmeeseeks ~/Inbox/Scans > pwd  
/Users/rodrigo/Inbox/Scans



# List Files (ls)

SHELL

ls

```
zsh
mrmeeseeks ~ > ls
Applications      Inbox             Public
Desktop           Library          Screenshots
Documents         Movies           Torrents
Downloads         Music            code
Google Drive File Stream Pictures
```

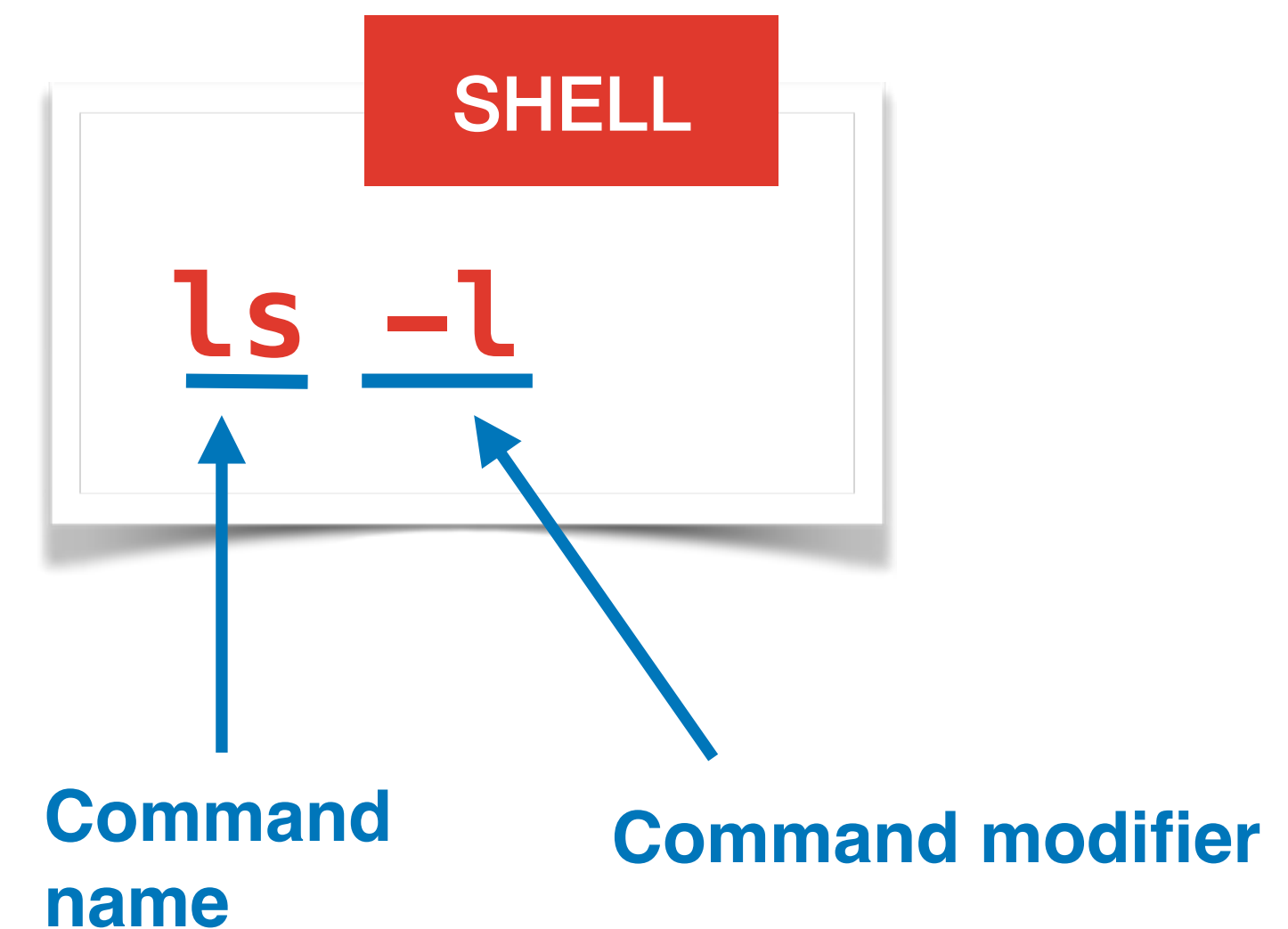
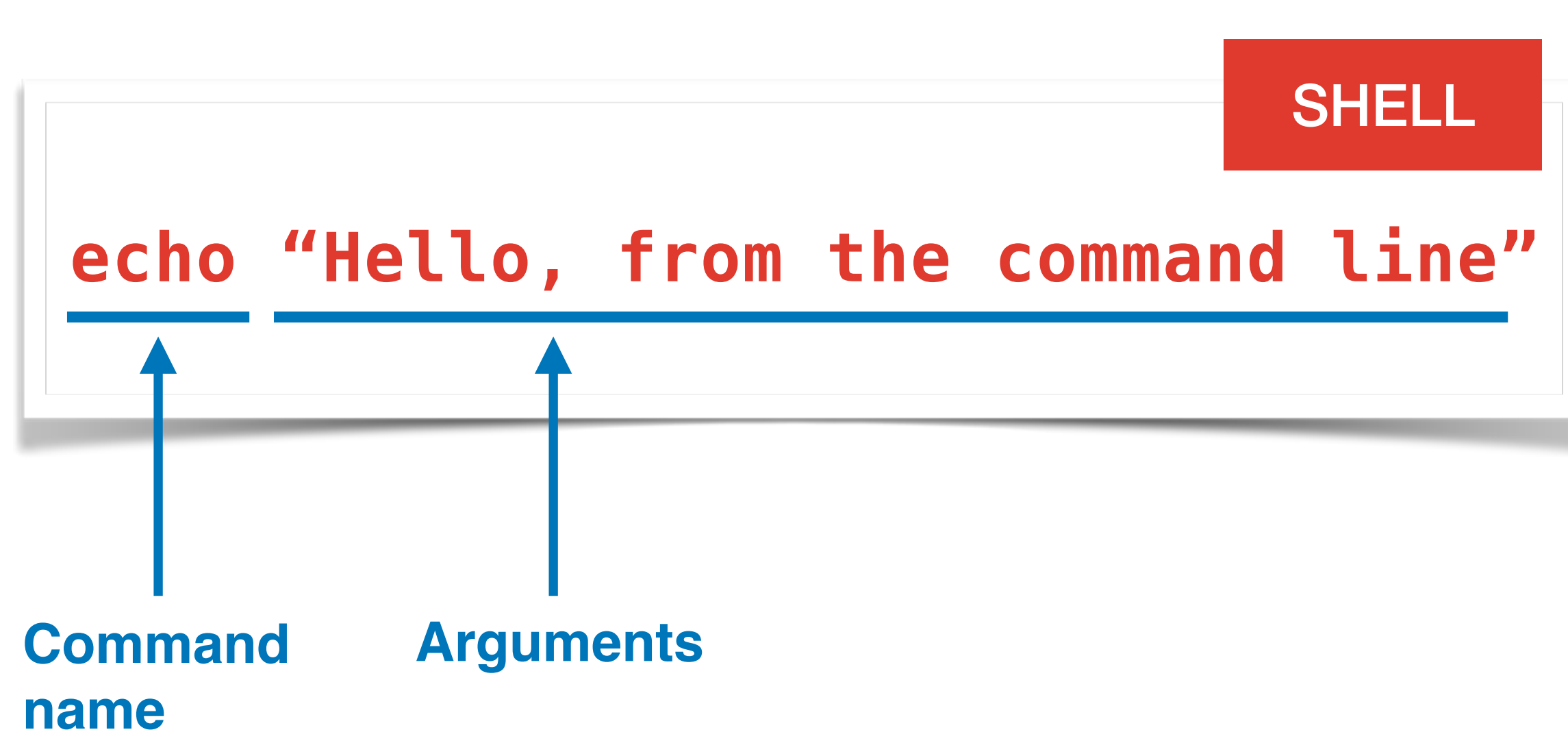
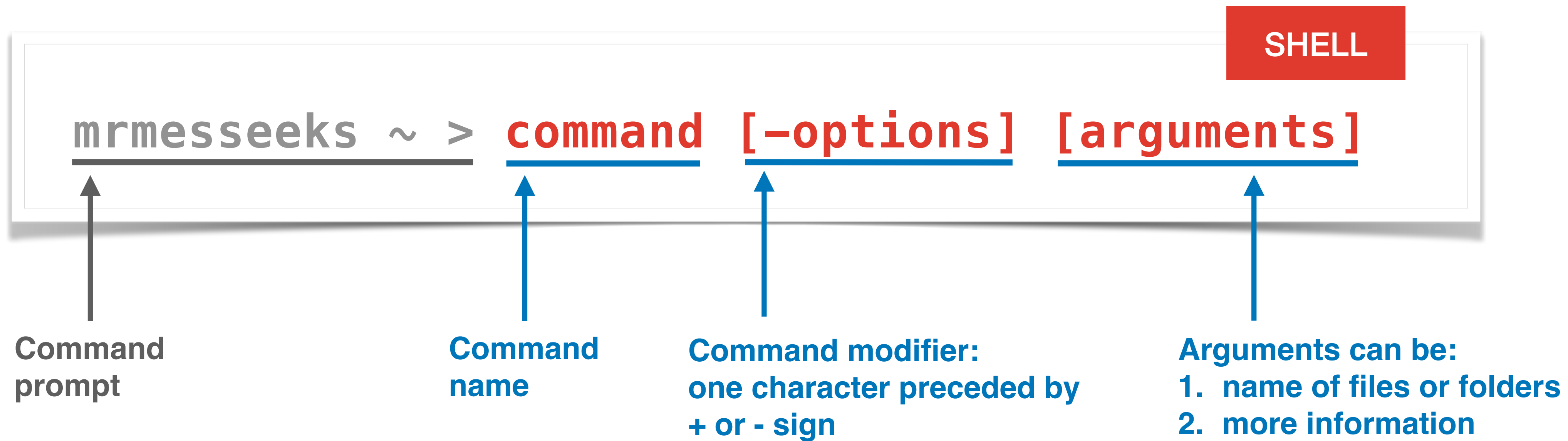
SHELL

ls -l

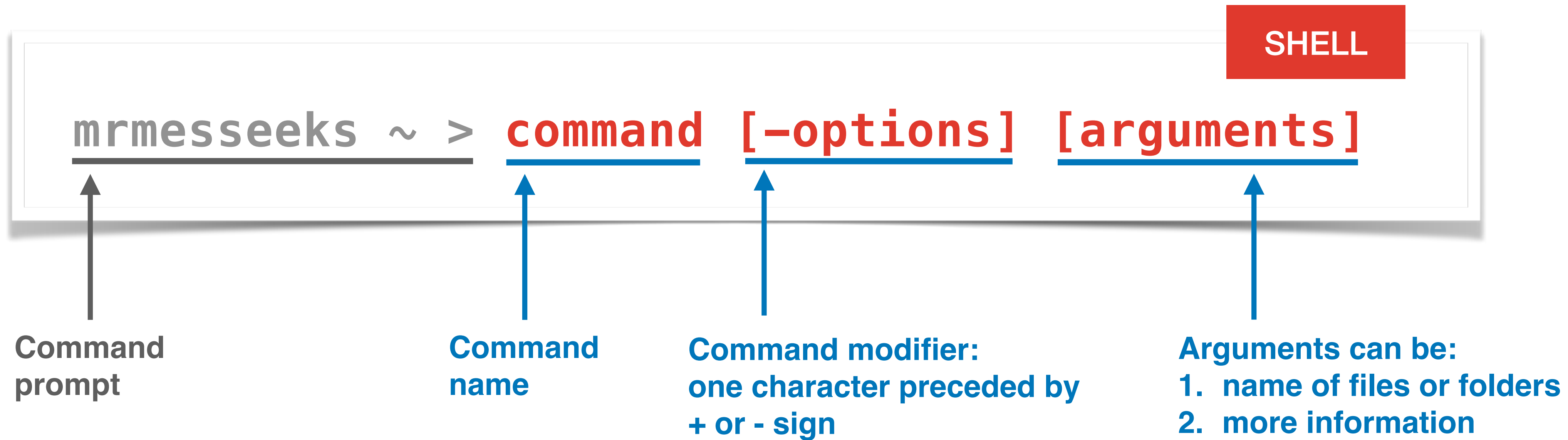
```
zsh
mrmeeseeks ~ > ls -l
total 0
drwx----- 7 rodrigo staff 224 Dec 22 14:03 Applications
drwx-----+ 5 rodrigo staff 160 Jan 31 12:05 Desktop
drwx-----+ 5 rodrigo staff 160 Jan 12 13:38 Documents
drwx-----+ 25 rodrigo staff 800 Jan 31 14:21 Downloads
lrwxr-xr-x  1 rodrigo staff  20 Jan 26 16:27 Google Drive File Stream -> /Volumes/GoogleDrive
drwxr-xr-x 12 rodrigo staff 384 Jan 12 15:29 Inbox
drwx-----@ 85 rodrigo staff 2720 Jan 25 17:56 Library
drwx-----+ 4 rodrigo staff 128 Sep 25 14:14 Movies
drwx-----+ 5 rodrigo staff 160 Oct 30 2016 Music
drwx-----+ 8 rodrigo staff 256 Jan 29 18:35 Pictures
drwxr-xr-x+  6 rodrigo staff 192 Apr 26 2017 Public
drwxr-xr-x  99 rodrigo staff 3168 Jan 31 16:50 Screenshots
drwxr-xr-x  15 rodrigo staff 480 Jan 31 16:18 Torrents
drwxr-xr-x 130 rodrigo staff 4160 Jan 30 15:32 code
mrmeeseeks ~ >
```



# Structure of a command



# Structure of a command



- **UNIX is case sensitive**
- There is always a **SPACE** between command, options and arguments.
- There is **NO SPACE** between the plus or minus sign and option letter
- The command prompt can look different on every computer and **DOES NOT** have to be typed in.

# Create a new directory (mkdir)

SHELL

```
mkdir test
```

```
mrmeeseeks ~/Desktop > ls  
test
```

# Create a new empty file (touch)

SHELL

```
touch homepage.html
```

```
mrmeeseeks ~/Desktop > ls  
homepage.html
```

# Make a copy (cp)

SHELL

```
cp homepage.html copy.html
```

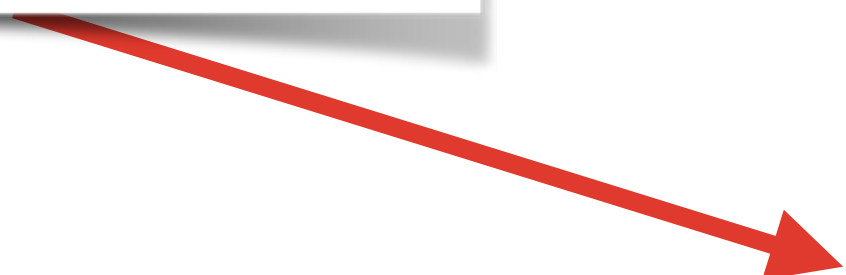


```
mrmeeseeks ~/Desktop > ls  
copy.html      homepage.html
```

# Delete a file (rm)

SHELL

```
rm homepage.html
```



```
mrmeeseeks ~/Desktop > ls  
copy.html
```



**ATTENTION:** The **rm** command DOES NOT put the file into the trash. It deletes it immediately from the disk.

# Other commands

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Command	Example	Description
clear	clear	Clears the screen
exit	exit	Closes the current terminal session
cat	cat homepage.html	Prints the content of a file out on screen
mv	mv homepage.html index.html	Rename the file homepage.html to index.html. This can also be used to move files between directories.
curl	curl -o master21.html https://master21.academy	Download the HTML from master21 and save it locally as master21.html
wc	wc poem.txt	Count the number of words in a Textfile.
say	say "I like the smells of flowers"	Make your computer speak (macOS only)!
ping	ping twitter.com	Check if a webserver is online. (Press ctrl + c to cancel)



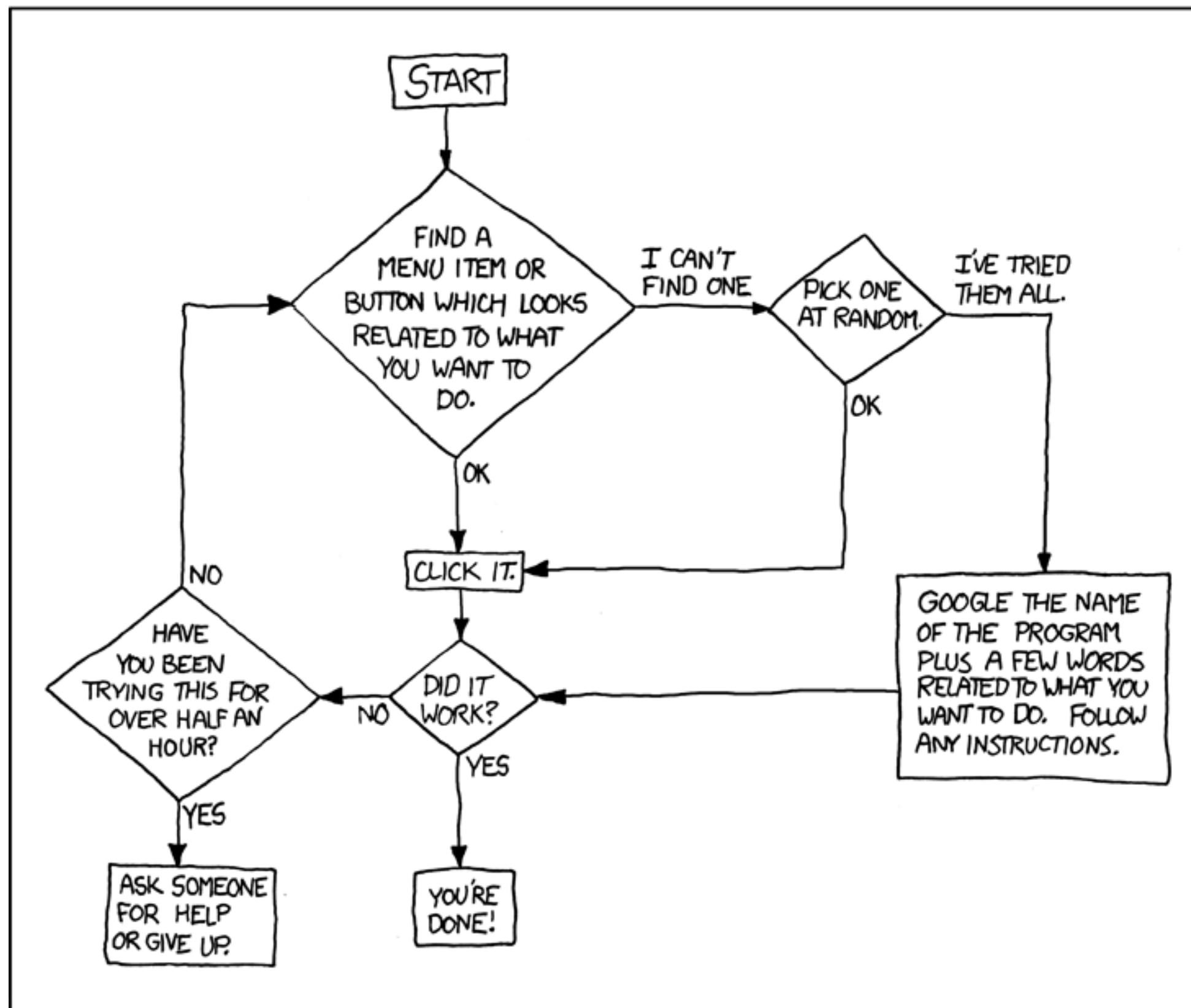
# **Basics - Demo** 🧐



# Number 1 Skill

DEAR VARIOUS PARENTS, GRANDPARENTS, CO-WORKERS,  
AND OTHER "NOT COMPUTER PEOPLE."

WE DON'T MAGICALLY KNOW HOW TO DO EVERYTHING IN EVERY  
PROGRAM. WHEN WE HELP YOU, WE'RE USUALLY JUST DOING THIS:



PLEASE PRINT THIS FLOWCHART OUT AND TAPE IT NEAR YOUR SCREEN.  
CONGRATULATIONS; YOU'RE NOW THE LOCAL COMPUTER EXPERT!

# Cheating encouraged

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## Linux Bash Shell Cheat Sheet

### Basic Commands

#### Basic Terminal Shortcuts

CTRL L = Clear the terminal  
CTRL D = Logout  
SHIFT Page Up/Down = Go up/down the terminal  
CTRL A = Cursor to start of line  
CTRL E = Cursor the end of line  
CTRL U = Delete left of the cursor  
CTRL K = Delete right of the cursor  
CTRL W = Delete word on the left  
CTRL Y = Paste (after CTRL U,K or W)  
TAB = auto completion of file or command  
CTRL R = reverse search history  
!! = repeat last command  
CTRL Z = stops the current command (resume with fg in foreground or bg in background)

#### Basic Terminal Navigation

ls -a = list all files and folders  
ls <folderName> = list files in folder  
ls -lh = Detailed list, Human readable  
ls -l \*.jpg = list jpeg files only  
ls -lh <fileName> = Result for file only  
  
cd <folderName> = change directory  
    if folder name has spaces use " "  
cd / = go to root  
cd .. = go up one folder, tip: ../../..  
  
du -h: Disk usage of folders, human readable  
du -ah: " " " files & folders, Human readable  
du -sh: only show disc usage of folders  
  
pwd = print working directory  
  
man <command> = shows manual (RTFM)

#### Basic file manipulation

cat <fileName> = show content of file  
                    (less, more)  
head = from the top  
      -n <#oflines> <fileName>  
  
tail = from the bottom  
      -n <#oflines> <fileName>  
  
mkdir = create new folder  
mkdir myStuff ..  
mkdir myStuff/pictures/ ..  
  
cp image.jpg newimage.jpg = copy and rename a file  
cp image.jpg <folderName>/ = copy to folder  
cp image.jpg folder/sameImageNewName.jpg  
cp -R stuff otherStuff = copy and rename a folder  
cp \*.txt stuff/ = copy all of \*<file type> to folder  
  
mv file.txt Documents/ = move file to a folder  
mv <folderName> <folderName2> = move folder in folder  
mv filename.txt filename2.txt = rename file  
mv <fileName> stuff/newfileName  
mv <folderName>/ .. = move folder up in hierarchy  
  
rm <fileName> .. = delete file (s)  
rm -i <fileName> .. = ask for confirmation each file  
rm -f <fileName> = force deletion of a file  
rm -r <foldername>/ = delete folder  
  
touch <fileName> = create or update a file  
  
ln file1 file2 = physical link  
ln -s file1 file2 = symbolic link

# **Basics - Your turn**



# **Read the Manual**





# Read the Manual

SHELL

`man ls`

- Use the Arrow keys to scroll up and down.
- Press **Q** to exit the Manual.

```
less
LS(1) BSD General Commands Manual LS(1)
NAME
  ls -- list directory contents
SYNOPSIS
  ls [-ABCFGHLOPRSTUW@abcdeghijklmnopqrstuwx1] [file ...]
DESCRIPTION
  For each operand that names a file of a type other than directory, ls
  displays its name as well as any requested, associated information.
  For each operand that names a file of type directory, ls displays the
  names of files contained within that directory, as well as any
  requested, associated information.

  If no operands are given, the contents of the current directory are
  displayed. If more than one operand is given, non-directory operands
  are displayed first; directory and non-directory operands are sorted
  separately and in lexicographical order.

  The following options are available:

  -@      Display extended attribute keys and sizes in long (-l) out-
          put.

  -1      (The numeric digit ``one''.) Force output to be one entry
          per line. This is the default when output is not to a termi-
          nal.
```

# Apropos Manual

SHELL

**apropos speech**

```
zsh
mrmeeseeks ~ > apropos speech
SpeechDataInstaller(8) - Manages downloading of speech-related assets
SpeechSynthesisServer(8) - Implements speaking hotkey and time announcements text-to-speech features
com.apple.speech.speechsynthesisd(8) - Centralized text-to-speech process for generating speech output
say(1) - Convert text to audible speech
mrmeeseeks ~ > █
```

SHELL

**man say**

```
less
SAY(1) Speech Synthesis Manager SAY(1)

NAME
    say - Convert text to audible speech

SYNOPSIS
    say [-v voice] [-r rate] [-o outfile [audio format options]] | -n name:port | -a device]
    [-f file | string ...]

DESCRIPTION
    This tool uses the Speech Synthesis manager to convert input text to audible
    speech and either play it through the sound output device chosen in System
    Preferences or save it to an AIFF file.

OPTIONS
    string
        Specify the text to speak on the command line. This can consist of multiple
        arguments, which are considered to be separated by spaces.

:█
```

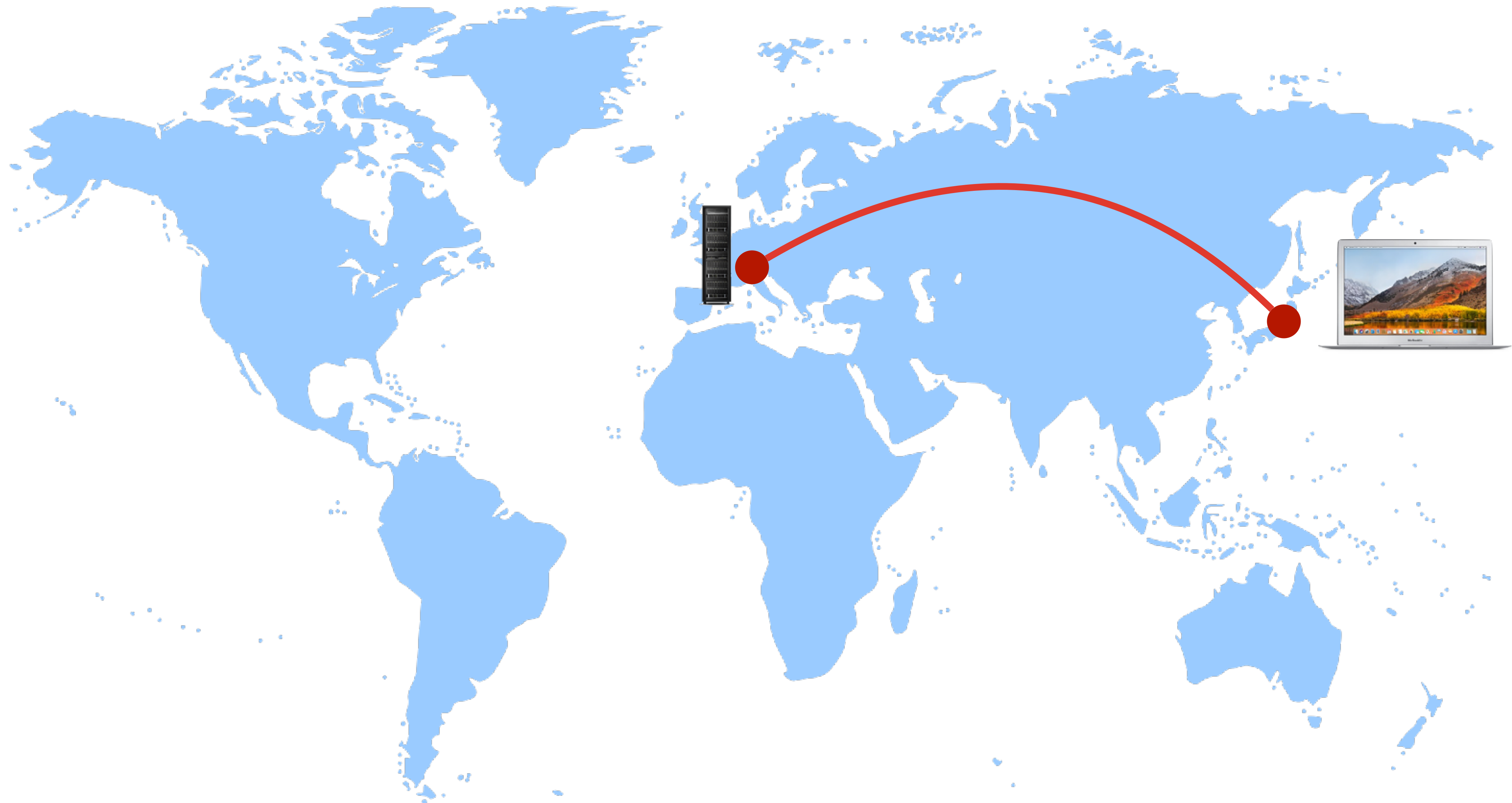


**Read the Manual - Demo 🧐**

**Read the Manual - Your turn** 

# **Connecting to other Computers**

# Around the world in 200 milliseconds

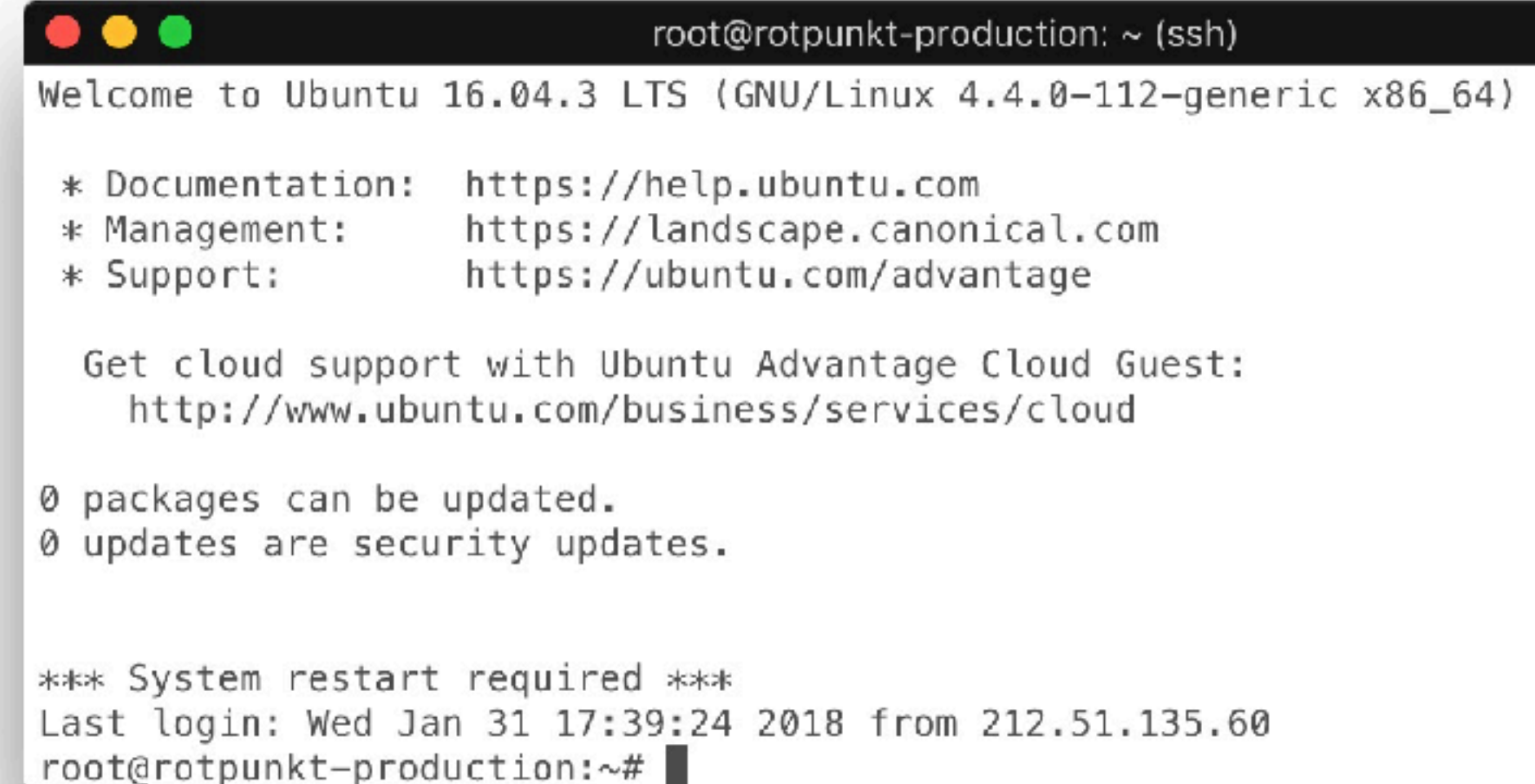


# Introducing the Secure Socket Shell (SSH)

SSH is a **network protocol** that provides us with a **secure way to access a remote computer**. SSH is widely used by network administrators for managing systems and applications remotely, allowing them to log in to another computer over a network, execute commands and move files from one computer to another. No GUI required!

SHELL

```
ssh username@rotpunktverlag.ch
```

A terminal window titled 'root@rotpunkt-production: ~ (ssh)' showing the output of an SSH login to a remote Ubuntu server. The terminal displays the Ubuntu welcome message, system information, and links to documentation, management, and support. It also shows that no packages can be updated and no security updates are available. A system restart is required, and the last login time and IP address are displayed.

```
root@rotpunkt-production: ~ (ssh)
Welcome to Ubuntu 16.04.3 LTS (GNU/Linux 4.4.0-112-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

0 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Wed Jan 31 17:39:24 2018 from 212.51.135.60
root@rotpunkt-production:~#
```

# SSH - Demo 🧐



# Messing around 📖



# **Installing additional tools**

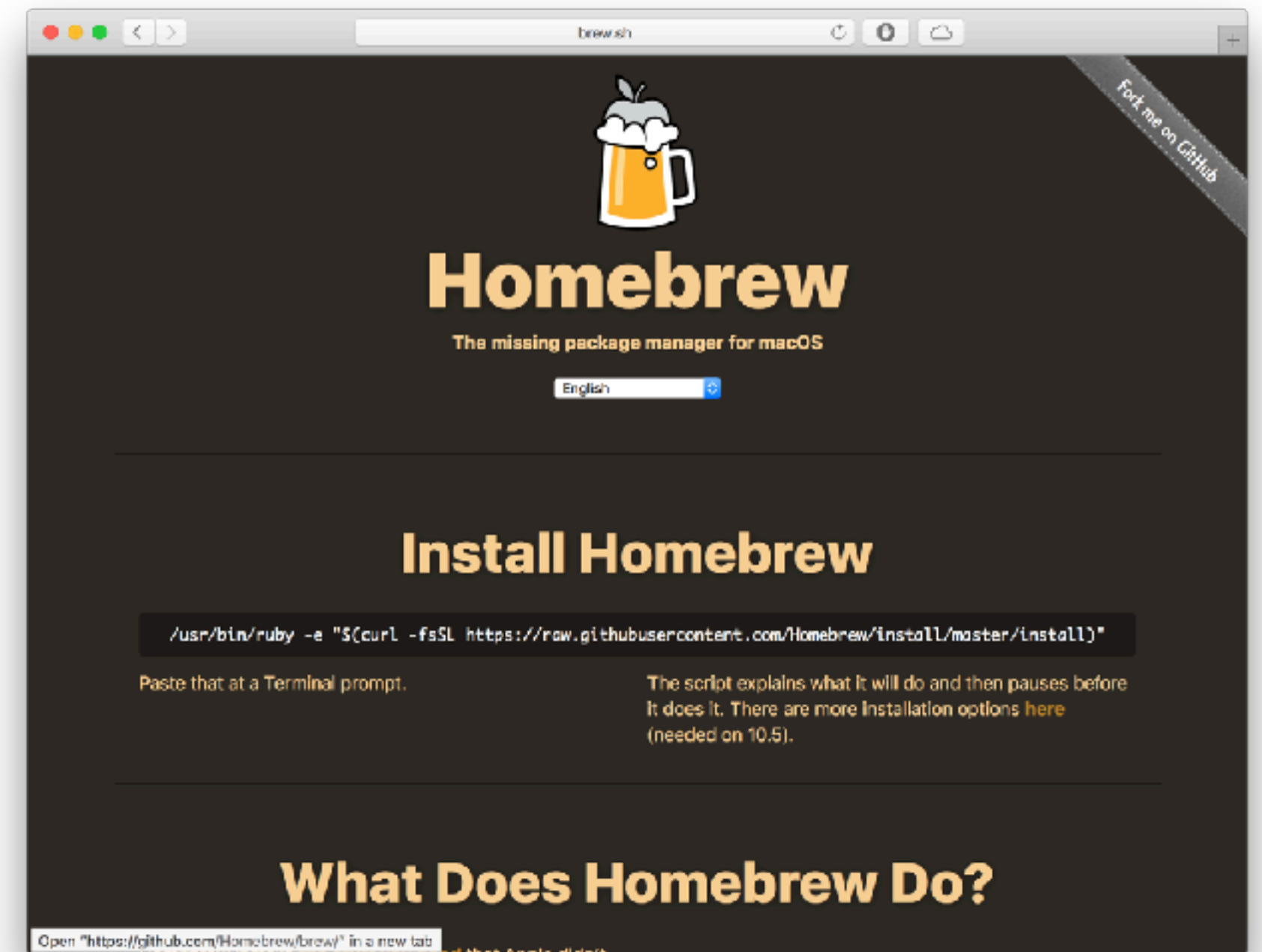
# Package Managers

- Allow easy installation of CLI tools.
- Take care of dependency management.
- **brew** command on macos
- **apt** command on ubuntu / windows

SHELL

```
brew info html2text
```

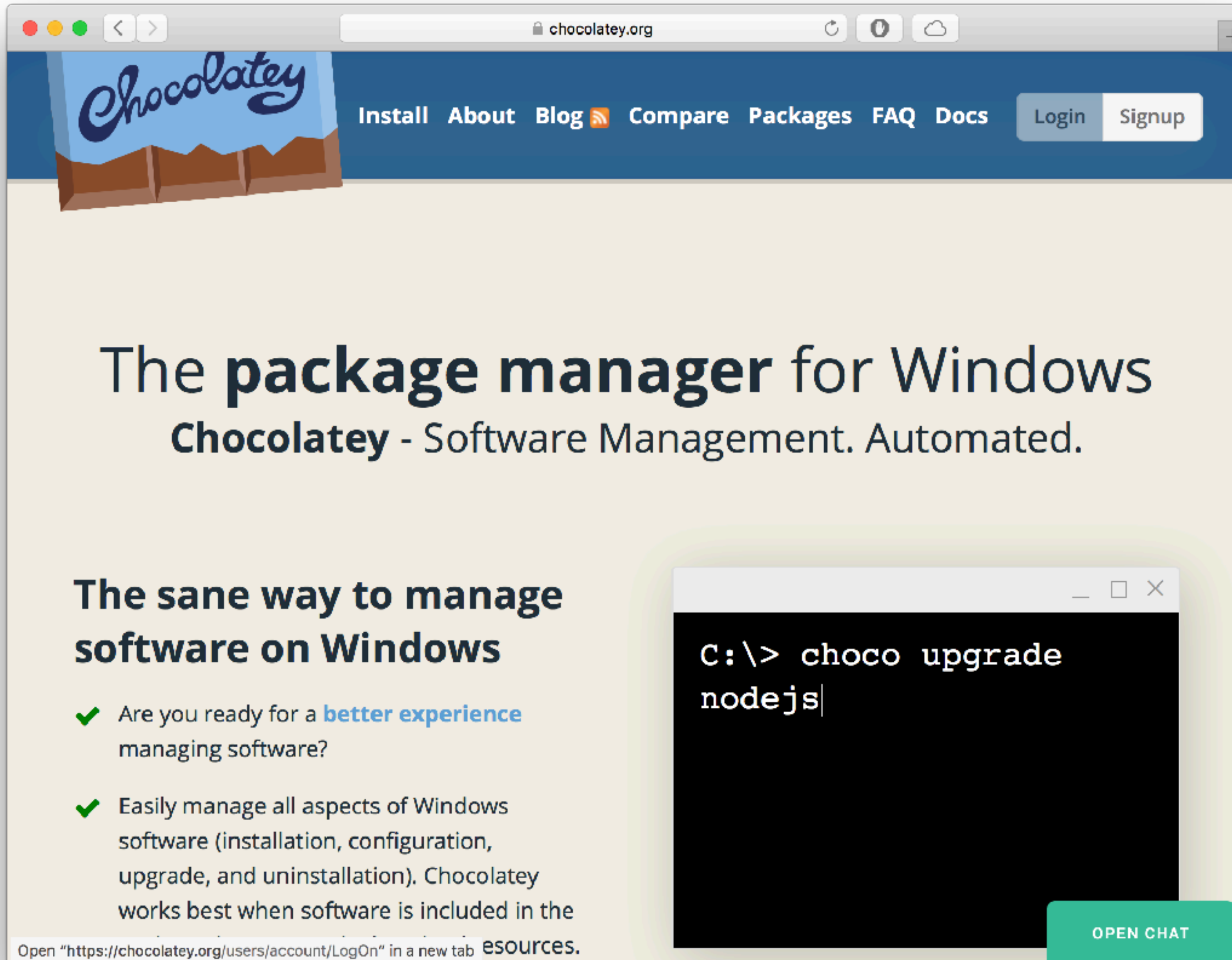
```
brew install html2text
```



<https://www.digitalocean.com/community/tutorials/how-to-manage-packages-in-ubuntu-and-debian-with-apt-get-apt-cache>

# Windows?

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The screenshot shows the Chocolatey website homepage. The browser's address bar displays 'chocolatey.org'. The website has a blue header with the 'Chocolatey' logo on the left and navigation links ('Install', 'About', 'Blog', 'Compare', 'Packages', 'FAQ', 'Docs') and 'Login'/'Signup' buttons on the right. The main content area has a light beige background. The headline reads 'The **package manager** for Windows' followed by 'Chocolatey - Software Management. Automated.' Below this, a section titled 'The sane way to manage software on Windows' lists two bullet points: 'Are you ready for a better experience managing software?' and 'Easily manage all aspects of Windows software (installation, configuration, upgrade, and uninstallation). Chocolatey works best when software is included in the'. To the right of this text is a terminal window showing the command 'C:\> choco upgrade nodejs|'. At the bottom left, there is a link to 'resources' with a note to open a specific URL in a new tab. At the bottom right, there is a green 'OPEN CHAT' button.

chocolatey.org

Chocolatey

Install About Blog Compare Packages FAQ Docs Login Signup

## The **package manager** for Windows

Chocolatey - Software Management. Automated.

### The sane way to manage software on Windows

- ✓ Are you ready for a **better experience** managing software?
- ✓ Easily manage all aspects of Windows software (installation, configuration, upgrade, and uninstallation). Chocolatey works best when software is included in the

```
C:\> choco upgrade nodejs|
```

Open "https://chocolatey.org/users/account/LogOn" in a new tab **resources**.

OPEN CHAT

# **Let's talk about pipes**



# Chaining commands together

---

```
rodrigo (zsh)
hellofriend ~ > curl https://en.wikipedia.org/wiki/Alan_Turing | html2text | grep died
```

```
rodrigo (zsh)
hellofriend ~ > curl -s https://en.wikipedia.org/wiki/Alan_Turing | html2text | grep died

castration) as an alternative to prison. Turing died in 1954, 16 days before
in 1927 without having studied even elementary calculus. In 1928, aged 16,
After Sherborne, Turing studied as an undergraduate from 1931 to 1934 at King's
studied cryptology and also built three of four stages of an electro-mechanical
On 8 June 1954, Turing's housekeeper found him dead. He had died the previous
hellofriend ~ >
```



# **Messing around - Demo** 🧐

# Books.

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