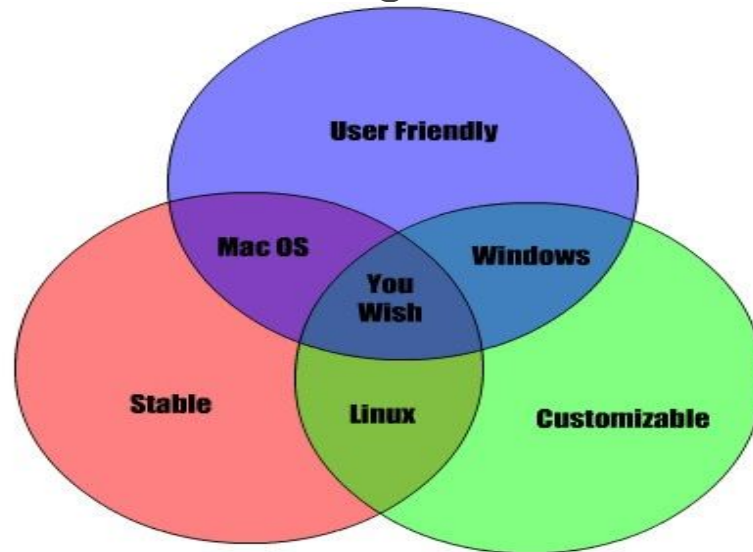


CLI 101

Petr Svarny, 2020

UNIX versus Windows

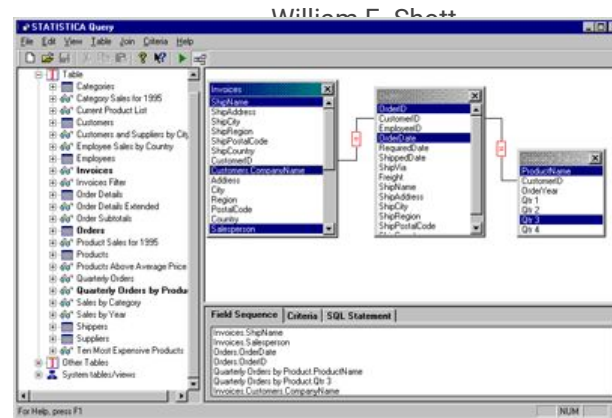
- UNIX is family of operating systems
- Created in Bell Labs in 1969
- In UNIX, users are encouraged to extend and improve the system



Command Line Interface vs Graphical User Interface

“Graphical user interfaces make easy tasks easy, while command line interfaces make difficult tasks possible”

```
ja@muj-VirtualBox: ~  
ja@muj-VirtualBox:~$ ls -l  
total 44  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Desktop  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Documents  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Downloads  
-rw-r--r-- 1 ja ja 8980 kv6 26 21:52 examples.desktop  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Music  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Pictures  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Public  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Templates  
drwxr-xr-x 2 ja ja 4096 kv6 26 21:57 Videos  
ja@muj-VirtualBox:~$ history  
1 cat /proc/cpuinfo  
2 python  
3 sudo apt-get install python3  
4 python3  
5 sudo apt-get install samtools  
6 sudo apt-get install vcftools  
7 vcftools  
8 samtools  
9 ls -la  
10 clear  
11 ls -l  
12 history  
ja@muj-VirtualBox:~$
```



Command Line Interface (CLI)

- User is communicating with computer by typing commands into command line
- CLI requires user to learn 'vocabulary' in the beginning, but to the proficient users it offers higher efficiency
- **CLI is more as programming - you need to know what you want to do and build a solution**



American English QWERTY keyboard layout



Find and memorize the location of:

\$ { } [] < > ~ / :

First command

```
$ whoami  
username
```

What could it mean?

man whoami

```
WHOAMI(1) User Commands WHOAMI(1)
NAME
  whoami - print effective userid
SYNOPSIS
  whoami [OPTION]...
DESCRIPTION
  Print the user name associated with the current effective user ID. Same as id
  -un.
  --help display this help and exit
  --version
        output version information and exit
AUTHOR
  Written by Richard Mlynarik.
REPORTING BUGS
  GNU coreutils online help: <http://www.gnu.org/software/coreutils/>
  Report whoami translation bugs to <http://translationproject.org/team/>
COPYRIGHT
  Copyright © 2016 Free Software Foundation, Inc. License GPLv3+: GNU GPL version
  3 or later <http://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it. There is NO
  WARRANTY, to the extent permitted by law.
SEE ALSO
  Full documentation at: <http://www.gnu.org/software/coreutils/whoami>
  or available locally via: info '(coreutils) whoami invocation'
Manual page whoami(1) line 1 (press h for help or q to quit)
```

Hello, world

```
$ echo Hello, world  
Hello, world
```

echo "text" will print text to the screen

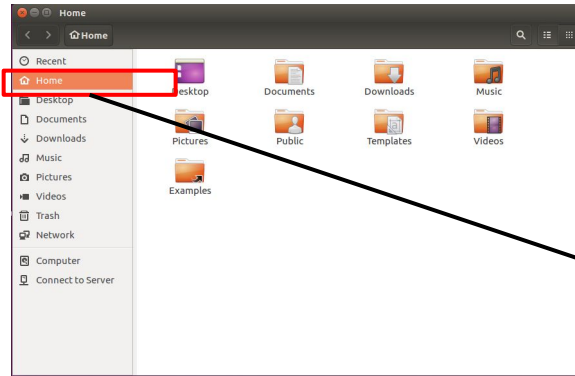
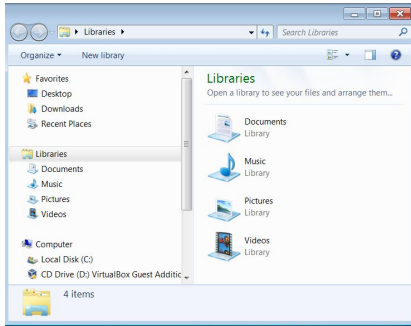
What shell is used?

```
$ echo $SHELL  
/bin/bash
```



How to know where we are?

- File system - the way in which files are named and where they are placed logically for storage and retrieval
- File system gathers files and directories (which itself can contain files and subdirectories)



me@my-computer: ~ \$

```
me@MacAir:~$
```

- User name
- Computer name
- Current directory
- Prompt
- Example:
 - me@my-VirtualBox:~/Documents\$
 - anna@anna:/media/anna/anna/Projects/rubicon\$

Root directory (root)

- First or top-most directory in a hierarchy
 - All other directories in the same file system are root's subdirectories
 - UNIX: root directory is one for all media
 - Symbol: /
- Windows: each partition has its root directory
 - Symbol: e.g. **C:**

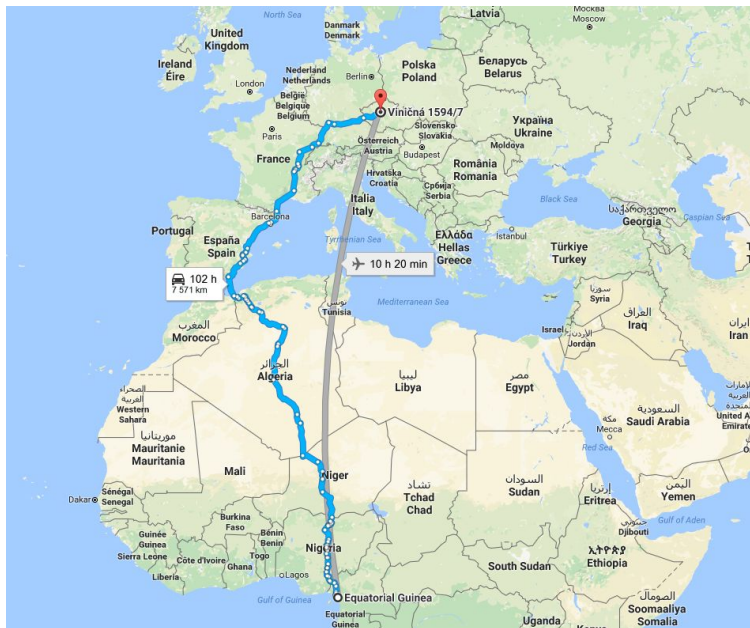


Home directory (home)

- Contains home directory of all users except for root
- Home directory of each user is /home/user_name or ~
- Examples
 - /home/me (Ubuntu)
 - /Users/anna (Mac OS)
 - /c/Users/anna (Windows - GitBash)



Absolute versus relative path



- ↑ Head east
15 m
- ↻ Turn right toward Náměstí Míru
8 m
- ↶ Turn left toward Náměstí Míru
81 m
- ↶ Turn left toward Náměstí Míru
21 m
- ↻ Turn right toward Náměstí Míru
29 m
- ↶ Slight right toward Náměstí Míru
50 m
- ↶ Turn left onto Náměstí Míru
11 m
- ↻ Turn right onto Slezská
99 m
- ↶ Turn left onto Blanická
300 m
- ↻ Turn right onto Polská
Destination will be on the right
110 m

/home/me/Documents/

./Documents/

Tips for easier work with command line

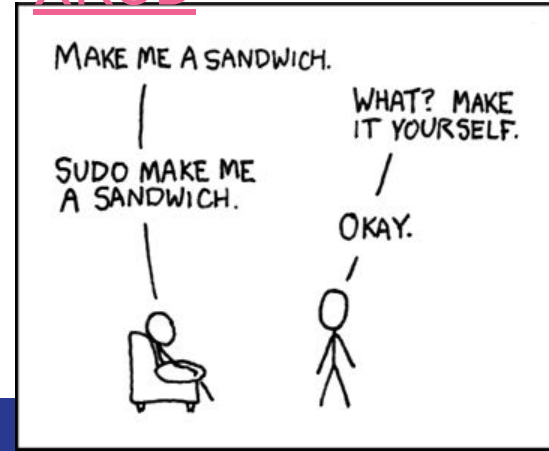
- `↑↓`- search in used commands
 - `Tab` - auto-complete commands
 - `history` - show last 500 commands
 - `Ctrl+r (^r)` - search in history
 - `clear` - clears the screen of commands
-
- Use [RegEx](#), i.e. regular expressions



sudo (super user do)

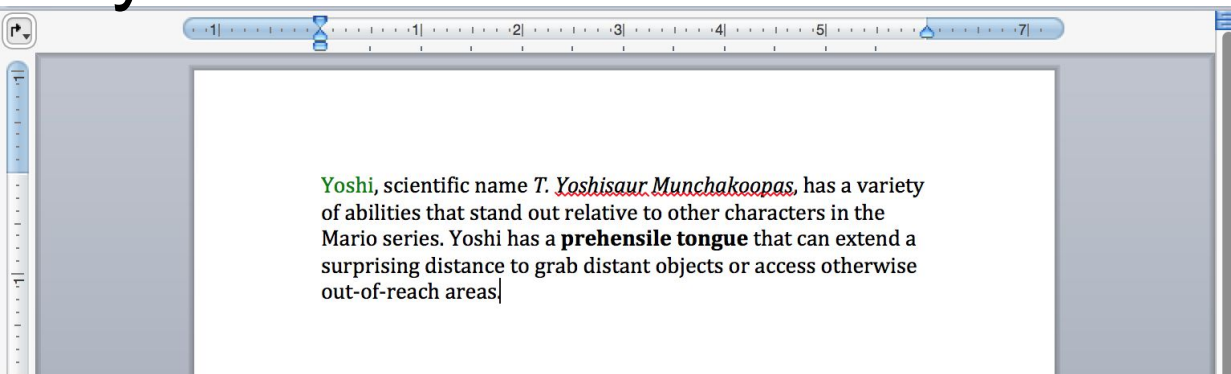
- Enables to run programs in administrator mode
- Requires user to be in 'sudoers' list
- User need to authenticate using password

XKCD

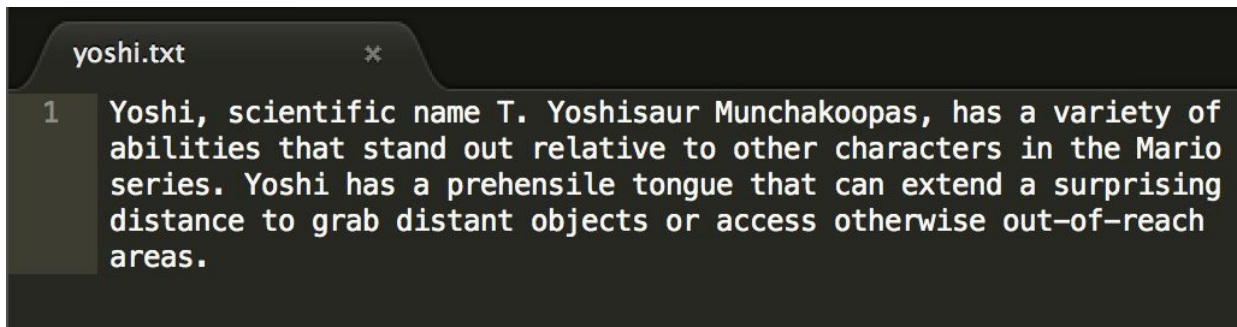


Rich versus plain text

yoshi.docx

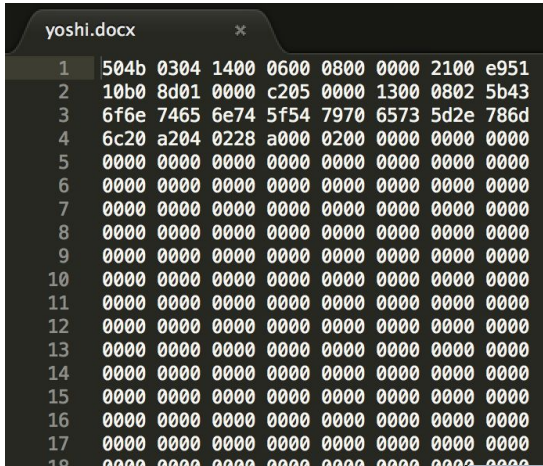


yoshi.txt



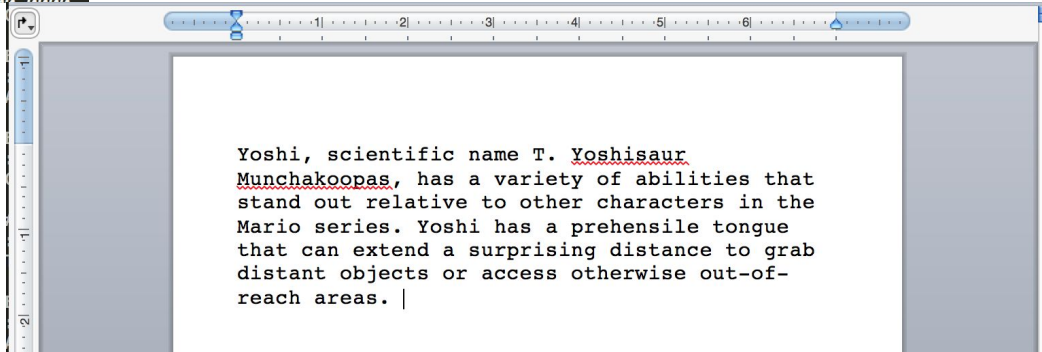
Rich *versus* plain text

yoshi.docx

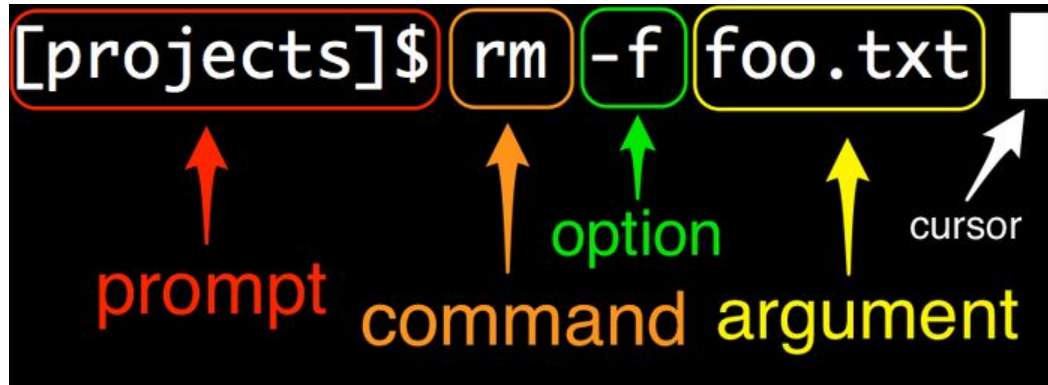


```
yoshi.docx
1 504b 0304 1400 0600 0800 0000 2100 e951
2 10b0 8d01 0000 c205 0000 1300 0802 5b43
3 6f6e 7465 6e74 5f54 7970 6573 5d2e 786d
4 6c20 a204 0228 a000 0200 0000 0000 0000
5 0000 0000 0000 0000 0000 0000 0000 0000
6 0000 0000 0000 0000 0000 0000 0000 0000
7 0000 0000 0000 0000 0000 0000 0000 0000
8 0000 0000 0000 0000 0000 0000 0000 0000
9 0000 0000 0000 0000 0000 0000 0000 0000
10 0000 0000 0000 0000 0000 0000 0000 0000
11 0000 0000 0000 0000 0000 0000 0000 0000
12 0000 0000 0000 0000 0000 0000 0000 0000
13 0000 0000 0000 0000 0000 0000 0000 0000
14 0000 0000 0000 0000 0000 0000 0000 0000
15 0000 0000 0000 0000 0000 0000 0000 0000
16 0000 0000 0000 0000 0000 0000 0000 0000
17 0000 0000 0000 0000 0000 0000 0000 0000
18 0000 0000 0000 0000 0000 0000 0000 0000
```

yoshi.txt



Anatomy of a UNIX command




[anatomy.png](#)

Software Carpentry - UNIX shell

<http://swcarpentry.github.io/shell-novice/>

1. Download [data-shell.zip](#)
2. Move the file to your Desktop
3. Extract file to your Desktop

Check out the basic commands on the next slides,
For the rest follow the Carpentry tutorial.



Main commands and options

ls -F LiSting all folders

ls --help a verbose ask for help

cd Changing Directory

pwd Print name of current Working Directory

cp /path/X /path/Y CoPy file X to file Y

man mkdir manual entry for Making Directory command

mv /path/X /path/Y MoVe file X to file Y (i.e. cut and paste)

rm X ReMove file X



Working through texts

cat displays the contents of its inputs

head displays the first 10 lines of its input

tail displays the last 10 lines of its input

sort sorts its inputs

wc counts lines, words, and characters in its inputs

command > file redirects a command's output to a file (overwrites!)

command >> file appends a command's output to a file

first | second is a pipeline: the output of the first command is used as the input to the second.