

### basic bash commands

- pwd : print working directory
- cd /path/to/dir : change directory
- ls /dir/to/list : list directory content (default is .)
  - l : display the content on one column
  - l : display the content with long listing format
  - a : display the content of the directory (including hidden files)
  - R : Display the content of the directory and the content of subdirectories
- mv /path/to/file /path/where/to/move : move or rename a file or a directory
- cp /path/to/file /path/where/to/copy : copy a file
  - r : copy recursively (used to copy directory)
- rm /path/to/file : remove a file
  - r : remove recursively (used to remove directories)
  - f : force remove
- mkdir /path/dirName : create an empty directory
- rmdir /path/to/dir : remove a directory (works only if the directory is empty)

### bash redirections

- command > file : redirect stdout to file. (creates the file if it doesn't exist and overwrite it if it does exist)
- command >> file : redirect stdout to file. (creates the file if it doesn't exist and append to the end if it does exist)
- command 2> file : redirect stderr to file (creates the file if it doesn't exist and overwrite it if it does exist)
- command 2>> file : redirect stdout to file. (creates the file if it doesn't exist and append to the end if it does exist)

### bash redirections (cont)

- command &> file : redirect stdout and stderr to file (creates the file if it doesn't exist and overwrite it if it does exist)
- command &>> file : redirect stdout and stderr to file. (creates the file if it doesn't exist and append to the end if it does exist)
- command < file : redirect stdin to file.
- command1 | command 2 : uses the output of command1 as the input of command2

### file globbing regex

- \ : escape character. It deletes the significance of a special character
- ? : Any character, once.
- \* : Any character, 0, 1 or many time.
- [...] : Any character that is in the class. ex: [abc], [a-z], [0-9]
- [^...]: Any character that is not in the class. ex: [^abc], [^a-z], [^0-9]
- {s1, s2, sN} : match s1 or s2 or sN

### control structure (if)

```
if <expression>; then
    [st ate ments]
elif <ex pre ssi on>; then
    [st ate ments]
else
    [st ate ments]
fi
```

### control structure (while)

```
while <expression>; do
    [st ate ments]
done
```

### control structure (for)

```
for var in <expression>; do
    echo $var
    [st ate ments]
done
```

### control structure (case)

```
# patterns are file globbing
regex
case <ex pre ssi on> in
    pat tern1)
        [st ate ments]
        ;;
    pat tern2)
        [st ate ments]
        ;;
    *)
        [st ate ments]
        ;;
esac
```

### function definition

```
function functionName {
    [st ate ments]
    [return X]
}
```

### conditional expressions

- && : logical and operator
- || : logical or operator
- [[ string ]] : return 0 if string is not empty
- [[ -z string ]] : return 0 if the string is empty
- [[ string1 == string2 ]] : return 0 if the string are equivalent
- [[ string1 != string2 ]] : return 0 if the string are not equivalent
- [[ string =~ pattern ]] : return 0 if the string matches the pattern (extended regex)
- [[ -e file ]] : return 0 if the file exists



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### conditional expressions (cont)

- `[[ -d file ]]` : return 0 if file is a directory
- `[[ -f file ]]` : return 0 if file is a file
- `[[ -x file ]]` : return 0 if file is executable
- `[[ $n1 -eq $n2 ]]` : return 0 if  $n1 == n2$
- `[[ $n1 -lt $n2 ]]` : return 0 if  $n1 < n2$
- `[[ $n1 -gt $n2 ]]` : return 0 if  $n1 > n2$
- `[[ $n1 -ge $n2 ]]` : return 0 if  $n1 \geq n2$
- `[[ $n1 -le $n2 ]]` : return 0 if  $n1 \leq n2$
- `[[ $n1 -ne $n2 ]]` : return 0 if  $n1 \neq n2$

### more basic bash commands

- `passwd` : change your password
- `history` : consult the history of your command
- `jobs` : list of your pending processes
- `cat file1 file2 ...` : concatenate files and print to stdout
- `more / less file1 file2 ...` : display a file page by page on stdout
- `tail / head number` : display the "number" first or last line of a file on stdout
- `touch file1 file2 ...` : change the modification date of the files
- `chmod` : change the privileges of a file / directory
- `echo "text"` : display a line of text to stdout
- `sort file1 file2 ...` : sort the file (combine files if many are specified) and print the result to stdout (files aren't impacted)
  - r : sort in reverse order
  - n : numerical sort
  - u : delete duplicated lines
- `wc file1 file2 ...` : print to stdout the number of characters, words and lines of files
  - l : number of lines only
  - w : number of words only
  - c : number of characters only

### more basic bash commands (cont)

- `diff file1 file2` : compare file1 and file 2 for differences
  - i : ignore the character case
  - B : ignore empty lines
  - w : ignore whitespaces
  - c : add context to the output (good for readability)
- `which commandName` : print the path of a command
- `pushd / popd /path/to/dir` : change directory using the directory stack
- `dirs` : print the directory stack
- `find /path/to/dir -name pattern` : find every files and directory that have a name that matches "pattern" in the directory specified and its subdirectories
- `man commandName` : Display the manual for command commandName
- `sudo command` : run the command as superuser
- `command1 | xargs -i command2` : uses the output of the command1 as the input of the command2. output will be accessible via `{}` in command2

### grep (simple regex)

- `grep "pattern" file1 file2 ...` : print the lines that matched the pattern
  - v : print lines that didn't match the pattern
  - i : ignore the character case
  - l : print the name of the files that have at least one match
  - o : print only the piece of line that matched the pattern
  - E : uses the extended regex
  - q : quiet. returns 0 in  `$?`  if at least one line has been matched. 1 if no line matched

### variables

- `VAR=VARVALUE` : create a variable VAR. the variable can be accessed like so: `$VAR` or `${VAR}`
- `VAR="$VAR2"` : \$VAR will contains the value of \$VAR2
- `VAR='VAR2'` : \$VAR will contains \$VAR2
- `VAR=$(command)` : \$VAR will contains the output of the command
- `(( VAR = $VAR + 1 ))` : the double parentheses must be used when doing arithmetics
- `${VAR#pattern}` : return a substring of VAR where the smallest string (starting from the beginning) matching "pattern" will be cut
- `${VAR##pattern}` : return a substring of VAR where the longest string (starting from the beginning) matching "pattern" will be cut
- `${VAR%pattern}` : return a substring of VAR where the smallest string (starting from the end) matching "pattern" will be cut
- `${VAR%%pattern}` : return a substring of VAR where the longest string (starting from the end) matching "pattern" will be cut
- `$?`  : the exit status of the last command / function executed. usually 0 when everything went right.
- `$#`  : the number of args passed to the script / function
- `$0`  : the name of the script
- `$n`  : the nth argument passed to the script / function
- `$@`  : the list of all the argument passed to the script / function
- Arrays
  - `myArray=(value1 value2 value3)`: declare an array
  - `declare -a myArray=(value1 value2 value3)`: declare an array



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### variables (cont)

`${myArray[index]}` : access an element (index starts at 0)

`myArray[index]=` : add or modify the element at index

`${#myArray[*]}` : return the length of the array

`${myArray[*]}`: all the elements of the array

### simple regex

`\` : escape character. It deletes the significance of a special character

`.` : joker. It represents any characters

`*` : 0, 1 or many repetition of the last character / sequence of character

`^` : The beginning of the line

`$` : The end of the line

`[...]` : Any character that is in the class. ex: `[abc]`, `[a-z]`, `[0-9]`

`[^...]`: Any character that is not in the class. ex: `[^abc]`, `[^a-z]`, `[^0-9]`

`\(...\)` : Capture the pattern. The pattern can then be accessed with `\1`, `\2` ... `\n` depending on the number of capture in the regex

`\{n\}` : n repetitions of the last character / sequence of character

`\{n,\}` : At least n repetitions of the last character / sequence of character

`\{n, m\}` : Between n and m repetitions of the last character / sequence of character

### extended regex

`\` : escape character. It deletes the significance of a special character

`.` : joker. It represents any characters

`*` : 0, 1 or many repetition of the last character / sequence of character

`+` : 1 or more repetition of the last character / sequence of character

### extended regex (cont)

`?` : The last character / sequence of character can appear or not

`^` : The beginning of the line

`$` : The end of the line

`[...]` : Any character that is in the class. ex: `[abc]`, `[a-z]`, `[0-9]`

`[^...]`: Any character that is not in the class. ex: `[^abc]`, `[^a-z]`, `[^0-9]`

`s1|s2` : Either s1 or s2 but not both

`(...)` : change the priority

`{n}` : n repetitions of the last character / sequence of character

`{n,}` : At least n repetitions of the last character / sequence of character

`{n, m}` : Between n and m repetitions of the last character / sequence of character

### sed (simple regex)

`sed 'sed script' file` : execute the script on every line of "file"

`s/pattern/newString/gI` : Substitute the piece of the line that matches "pattern" by "newString". g (optional): global, I (optional): ignore case

`/pattern/d` : delete the line if "pattern" is matched

`/pattern/p` : print the line if "pattern" is matched

`/pattern1/,/pattern2/` : print every lines between the first line that matches "pattern1" to the first line that matches "pattern2"

`-i.ext` : Modifications done "in-place". A backup file will be created with .ext extension (it is optional)

`-n` : print only the lines that matched the pattern

### awk (extended regex)

`awk -F c 'awk script' file1 file2 ...` (where "c" is the delimiter)

typical awk script: `'BEGIN {statements} /pattern/ {script statements} END {statements}'`

`BEGIN {}` : Will be executed once at the start

`END {}` : Will be executed once at the end

`/pattern/` : only lines that matched the pattern will be processed

`/pattern1/,/pattern2/` : every line from the first line that matches pattern1 to the first line that matches pattern2 will be processed

`{script statements}` : core of the script

`printf`: C-style formatter (man printf)

`$n` : the nth field of the line

`$0` : the entire line

`NR` : the record number

`NF` : the number of fields in the record

`FS`: The field separator (the delimiter)



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