Shell, basics

- Level: Novice
- By Julien Barbier
- Weight: 1
- Your score will be updated as you progress.

Resources

Read or watch:

- What Is "The Shell"?
- Navigation
- Looking Around
- A Guided Tour
- Manipulating Files
- Working With Commands
- Reading Man pages
- Keyboard shortcuts for Bash
- LTS
- Shebang

man or help:

- `cd`
- `ls`
- `pwd`
- `less`
- `file`
- `ln`
- `cp`

- `mv`
- `rm`
- `mkdir`
- `type`
- `which`
- `help`
- `man`

Learning Objectives

At the end of this project, you are expected to be able to explain to anyone, **without the help of Google**:

General

- What does RTFM mean?
- What is a Shebang

What is the Shell

- What is the shell
- What is the difference between a terminal and a shell
- What is the shell prompt
- How to use the history (the basics)

Navigation

- What do the commands or built-ins `cd`, `pwd`, `ls` do
- How to navigate the filesystem
- What are the . and .. directories
- What is the working directory, how to print it and how to change it
- What is the root directory
- What is the home directory, and how to go there
- What is the difference between the root directory and the home directory of the user root
- What are the characteristics of hidden files and how to list them
- What does the command `cd -` do

Looking Around

- What do the commands `ls`, `less`, `file` do
- How do you use options and arguments with commands
- Understand the ls long format and how to display it
- A Guided Tour
- What does the `ln` command do
- What do you find in the most common/important directories
- What is a symbolic link

- What is a hard link
- What is the difference between a hard link and a symbolic link

Manipulating Files

- What do the commands `cp`, `mv`, `rm`, `mkdir` do
- What are wildcards and how do they work
- How to use wildcards

Working with Commands

- What do `type`, `which`, `help`, `man` commands do
- What are the different kinds of commands
- What is an alias
- When do you use the command help instead of man

Reading Man Pages

- How to read a man page
- What are man page sections
- What are the section numbers for User commands, System calls and Library functions

Keyboard Shortcuts for Bash

- Common shortcuts for Bash

LTS

- What does `LTS` mean?

Requirements

General

- Allowed editors: `vi`, `vim`, `emacs`
- All your scripts will be tested on Ubuntu 20.04 LTS
- All your scripts should be exactly two lines long (`$ wc -l file` should print 2)
- All your files should end with a new line (why?)
- The first line of all your files should be exactly `#!/bin/bash`
- A `README.md` file at the root of the repo, containing a description of the repository
- A `README.md` file, at the root of the folder of *this* project, describing what each script is doing
- You are not allowed to use backticks, `&&`, `||` or `;`

- All your scripts must be executable. To make your file executable, use the `chmod` command: `chmod u+x file`. Later, we'll learn more about how to utilize this command.

More Info

Example of line count and first line

```
julien@ubuntu:/tmp$ wc -l 12-file_type
2 12-file_type
julien@ubuntu:/tmp$ head -n 1 12-file_type
#!/bin/bash
julien@ubuntu:/tmp$
```

In order to test your scripts, you will need to use this command: `chmod u+x file`. We will see later what does `chmod` mean and do, but you can have a look at `man chmod` if you are curious.

Example

```
julien@ubuntu:/tmp$ ls
12-file_type
lll
julien@ubuntu:/tmp$ ls -la lll
-rw-rw-r-- 1 julien julien 15 Sep 19 21:05 lll
julien@ubuntu:/tmp$ cat lll
#!/bin/bash
ls
julien@ubuntu:/tmp$ ls -l lll
-rw-rw-r-- 1 julien julien 15 Sep 19 21:05 lll
julien@ubuntu:/tmp$ chmod u+x lll # you do not have to understand this yet
julien@ubuntu:/tmp$ ls -l lll
-rwxrw-r-- 1 julien julien 15 Sep 19 21:05 lll
julien@ubuntu:/tmp$ ./lll
12-file_type
lll
julien@ubuntu:/tmp$
```

Quiz questions
Great! You've completed the quiz successfully! Keep going! (Show quiz)

Tasks

0. Where am I?
`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Write a script that prints the absolute path name of the current working directory.

Example:

```
$ ./0-current_working_directory
/0x00-shell_basics
$
```

Repo:

- GitHub repository: shell
- Directory: basics
- File: 0-current_working_directory

Review your work Get a sandbox QA Review
6/6 pts
1. What's in there?
`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Display the contents list of your current directory.

Example:

```
$ ./1-listit
Applications    Documents    Dropbox Movies Pictures
Desktop Downloads    Library Music Public
$
```

Repo:

- GitHub repository: shell
- Directory: basics
- File: 1-listit

Review your work Get a sandbox QA Review
5/5 pts
2. There is no place like home
`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Write a script that changes the working directory to the user's home directory.

- You are not allowed to use any shell variables

```
julien@ubuntu:/tmp$ pwd
```

```
/tmp

julien@ubuntu:/tmp$ echo $HOME

/home/julien

julien@ubuntu:/tmp$ source ./2-bring_me_home

julien@ubuntu:~$ pwd

/home/julien

julien@ubuntu:~$
```

Repo:

- GitHub repository: shell
- Directory: basics
- File: 2-bring_me_home

Review your work Get a sandbox QA Review

5/5 pts
3. The long format
mandatory

Score: 100.00% (*Checks completed: 100.00%*)

Display current directory contents in a long format

Example:

```
$ ./3-listfiles
total 32
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:19 0-current_working_directory
-rwxr-xr-x@ 1 sylvain staff 19 Jan 25 00:23 1-listit
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:29 2-bring_me_home
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:39 3-listfiles
$
```

Repo:

- GitHub repository: shell
- Directory: basics
- File: 3-listfiles

Review your work Get a sandbox QA Review

5/5 pts
4. Hidden files
mandatory

Score: 100.00% (*Checks completed: 100.00%*)

Display current directory contents, including hidden files (starting with **.**). Use the long format.

Example:

```
$ ./4-listmorefiles
total 32
drwxr-xr-x@ 6 sylvain staff 204 Jan 25 00:29 .
drwxr-xr-x@ 43 sylvain staff 1462 Jan 25 00:19 ..
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:19 0-current_working_directory
-rwxr-xr-x@ 1 sylvain staff 19 Jan 25 00:23 1-listit
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:29 2-bring_me_home
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:39 3-listfiles
-rwxr-xr-x@ 1 sylvain staff 18 Jan 25 00:41 4-listmorefiles
$
```

Repo:

- GitHub repository: shell
- Directory: basics
- File: 4-listmorefiles

Review your work Get a sandbox QA Review
5/5 pts
5. I love numbers
mandatory

Score: 100.00% (*Checks completed: 100.00%*)
Display current directory contents.

- Long format
- with user and group IDs displayed numerically
- And hidden files (starting with .)

Example:

```
$ ./5-listfilesdigitonly
total 32
drwxr-xr-x@ 6 501 20 204 Jan 25 00:29 .
drwxr-xr-x@ 43 501 20 1462 Jan 25 00:19 ..
-rwxr-xr-x@ 1 501 20 18 Jan 25 00:19 0-current_working_directory
-rwxr-xr-x@ 1 501 20 18 Jan 25 00:23 1-listfiles
-rwxr-xr-x@ 1 501 20 19 Jan 25 00:29 2-bring_me_home
-rwxr-xr-x@ 1 501 20 20 Jan 25 00:39 3-listfiles
-rwxr-xr-x@ 1 501 20 18 Jan 25 00:41 4-listmorefiles
-rwxr-xr-x@ 1 501 20 18 Jan 25 00:43 5-listfilesdigitonly
```

```
$
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `5-listfilesdigitonly`

Review your work Get a sandbox QA Review
5/5 pts
6. Welcome
mandatory

Score: 100.00% (*Checks completed: 100.00%*)
Create a script that creates a directory named `my_first_directory` in the `/tmp/` directory.

Example:

```
$ ./6-firstdirectory
$ file /tmp/my_first_directory/
/tmp/my_first_directory/: directory
$
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `6-firstdirectory`

Review your work Get a sandbox QA Review
4/4 pts
7. Betty in my first directory
mandatory

Score: 100.00% (*Checks completed: 100.00%*)
Move the file `betty` from `/tmp/` to `/tmp/my_first_directory`.

Example:

```
$ ./7-movethatfile
$ ls /tmp/my_first_directory/
betty
$
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `7-movethatfile`

5/5 pts

8. Bye bye Betty

`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Delete the file `betty`.

- The file `betty` is in `/tmp/my_first_directory`

Example:

```
$ ./8-firstdelete
$ ls /tmp/my_first_directory/
$
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `8-firstdelete`

5/5 pts

9. Bye bye My first directory

`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Delete the directory `my_first_directory` that is in the `/tmp` directory.

Example:

```
$ ./9-firstdirdeletion
$ file /tmp/my_first_directory
/tmp/my_first_directory: cannot open `/tmp/my_first_directory' (No such fil
e or directory)
$
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `9-firstdirdeletion`

5/5 pts

10. Back to the future

`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Write a script that changes the working directory to the previous one.

```
julien@ubuntu:/tmp$ pwd

/tmp

julien@ubuntu:/tmp$ cd /var

julien@ubuntu:/var$ pwd

/var

julien@ubuntu:/var$ source ./10-back

/tmp

julien@ubuntu:/tmp$ pwd

/tmp
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `10-back`

Review your work Get a sandbox QA Review
5/5 pts
11. Lists
`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Write a script that lists all files (even ones with names beginning with a period character, which are normally hidden) in the current directory and the parent of the working directory and the `/boot` directory (in this order), in long format.

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `11-lists`

Review your work Get a sandbox QA Review
5/5 pts
12. File type
`mandatory`

Score: 100.00% (*Checks completed: 100.00%*)

Write a script that prints the type of the file named `iamafile`. The file `iamafile` will be in the `/tmp` directory when we will run your script.

Example

```
ubuntu@ip-172-31-63-244:~$ ./12-file_type
```

```
/tmp/iamafile: ELF 64-bit LSB  executable, x86-64, version 1 (SYSV), dynami
cally linked (uses shared libs), for GNU/Linux 2.6.24, BuildID[sha1]=bd39c0
7194a778ccc066fc963ca152bdfaa3f971, stripped
```

Note that depending on the file, the output of your script will be different.

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `12-file_type`

Review your work Get a sandbox QA Review
5/5 pts
13. We are symbols, and inhabit symbols
mandatory

Score: 100.00% (*Checks completed: 100.00%*)
Create a symbolic link to `/bin/ls`, named `__ls__`. The symbolic link should be created in the current working directory.

```
ubuntu@ip-172-31-63-244:/tmp/sym$ ls -la

total 144

drwxrwxr-x  2 ubuntu ubuntu    4096 Sep 20 03:24 .

drwxrwxrwt 12 root    root    139264 Sep 20 03:24 ..

ubuntu@ip-172-31-63-244:/tmp/sym$./13-symbolic_link

ubuntu@ip-172-31-63-244:/tmp/sym$ ls -la

total 144

drwxrwxr-x  2 ubuntu ubuntu    4096 Sep 20 03:24 .

drwxrwxrwt 12 root    root    139264 Sep 20 03:24 ..

lrwxrwxrwx  1 ubuntu ubuntu       7 Sep 20 03:24 __ls__ -> /bin/ls
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `13-symbolic_link`

Review your work Get a sandbox QA Review
5/5 pts
14. Copy HTML files
mandatory

Score: 100.00% (*Checks completed: 100.00%*)
Create a script that copies all the HTML files from the current working directory to the parent of the working directory, but only copy files that did not exist in the parent of the working directory or were newer than the versions in the parent of the working directory.

You can consider that all HTML files have the extension `.html`

Repo:

- GitHub repository: shell
- Directory: basics
- File: 14-copy_html

Review your work Get a sandbox QA Review
5/5 pts
15. Let's move
mandatory

Score: 100.00% (*Checks completed: 100.00%*)

Create a script that moves all files beginning with an uppercase letter to the directory /tmp/u.

You can assume that the directory /tmp/u will exist when we will run your script

```
ubuntu@ip-172-31-63-244:/tmp/sym$ ls -la
total 148
drwxrwxr-x  3 ubuntu ubuntu    4096 Sep 20 03:33 .
drwxrwxrwt 12 root   root    139264 Sep 20 03:26 ..
-rw-rw-r--  1 ubuntu ubuntu       0 Sep 20 03:32 My_file
lrwxrwxrwx  1 ubuntu ubuntu       7 Sep 20 03:24 __ls__ -> /bin/ls
-rw-rw-r--  1 ubuntu ubuntu       0 Sep 20 03:32 Elif_ym
-rw-rw-r--  1 ubuntu ubuntu       0 Sep 20 03:32 random_file
ubuntu@ip-172-31-63-244:/tmp/sym$ ls -la /tmp/u
total 8
drwxrwxr-x 2 ubuntu ubuntu 4096 Sep 20 03:33 .
drwxrwxr-x 3 ubuntu ubuntu 4096 Sep 20 03:33 ..
ubuntu@ip-172-31-63-244:/tmp/sym$ ./15-lets_move
ubuntu@ip-172-31-63-244:/tmp/sym$ ls -la
total 148
drwxrwxr-x  3 ubuntu ubuntu    4096 Sep 20 03:33 .
drwxrwxrwt 12 root   root    139264 Sep 20 03:26 ..
lrwxrwxrwx  1 ubuntu ubuntu       7 Sep 20 03:24 __ls__ -> /bin/ls
-rw-rw-r--  1 ubuntu ubuntu       0 Sep 20 03:32 random_file
ubuntu@ip-172-31-63-244:/tmp/sym$ ls -la /tmp/u
total 8
drwxrwxr-x 2 ubuntu ubuntu 4096 Sep 20 03:33 .
drwxrwxr-x 3 ubuntu ubuntu 4096 Sep 20 03:33 ..
-rw-rw-r-- 1 ubuntu ubuntu    0 Sep 20 03:32 My_file
-rw-rw-r-- 1 ubuntu ubuntu    0 Sep 20 03:32 Elif_ym
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `15-lets_move`

Review your work Get a sandbox QA Review

5/5 pts
16. Clean Emacs
mandatory

Score: 100.00% (*Checks completed: 100.00%*)

Create a script that deletes all files in the current working directory that end with the character `~`.

```
ubuntu@ip-172-31-63-244:/tmp/sym$ ls
main.c  main.c~  Makefile~
ubuntu@ip-172-31-63-244:/tmp/sym$ ./16-clean_emacs
ubuntu@ip-172-31-63-244:/tmp/emacs$ ls
main.c
ubuntu@ip-172-31-63-244:/tmp/emacs$
```

Repo:

- GitHub repository: `shell`
- Directory: `basics`
- File: `16-clean_emacs`

Review your work Get a sandbox QA Review

5/5 pts
17. Tree
mandatory

Score: 100.00% (*Checks completed: 100.00%*)

Create a script that creates the directories `welcome/`, `welcome/to/` and `welcome/to/school` in the current directory.

You are only allowed to use two spaces (and lines) in your script, not more.

```
julien@ubuntu:/tmp/h$ ls -l
total 4
-rwxrw-r-- 1 julien julien 44 Sep 20 12:09 17-tree
julien@ubuntu:/tmp/h$ wc -l 17-tree
2 17-tree
julien@ubuntu:/tmp/h$ head -1 17-tree
#!/bin/bash
```

```
julien@ubuntu:/tmp/h$ tr -cd ' ' < 17-tree | wc -c # you do not have to und
erstand this yet, but the result should be 2, 1 or 0

2

julien@ubuntu:/tmp/h$ ./17-tree

julien@ubuntu:/tmp/h$ ls

17-tree  welcome

julien@ubuntu:/tmp/h$ ls welcome/

to

julien@ubuntu:/tmp/h$ ls -l welcome/to

total 4

drwxrwxr-x 2 julien julien 4096 Sep 20 12:11 school

julien@ubuntu:/tmp/h$
```
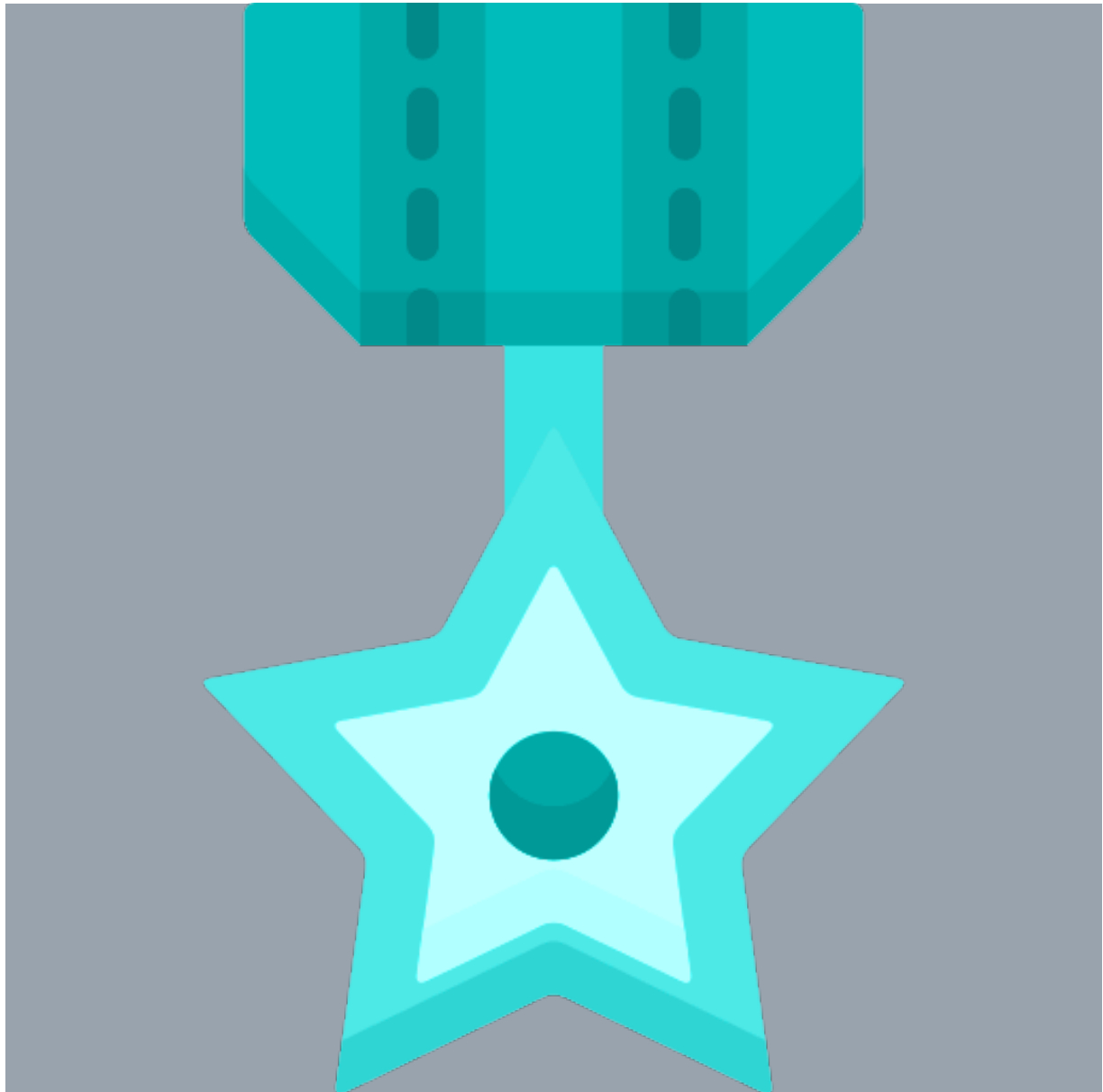
Repo:

- GitHub repository: shell
- Directory: basics
- File: 17-tree

Review your work Get a sandbox QA Review
5/5 pts
Score

100%
Score

Congratulations! You made it!

Next project: Shell, permissions

Open the next project