

Shell tutorial

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A Shell is a program that enables user to interact with the operating system. There are a few common implementaion of a shell.

- bash
 - the most common shell
 - default in linux
 - used to be the default shell on macOS
- zsh
 - the default shell in macOS 10.15 Catalina
- powershell
 - primarily used in windows

We will focus on **bash** (and **zsh** is **bash** compatible).

There are a few program to launch the shell.

- linux
 - depends on the desktop environment, it could be gnome terminal, konsole etc..
- macOS
 - the default Terminal
 - iTerm2
- Windows
 - Powershell
 - Cmd (which runs DOS)
 - Cmder
- RStudio terminal
- Rmarkdown (for bash script)

Commands to cover

File navigation

- ls
 - A usful alias is
 - ```
alias ls='ls --color=auto -F'
```
- pwd
- cd

## File manipulation

- touch
- mkdir
- mv
- cp
- rm

## Utility

- echo
- cat
- which
- export

## SSH

The SSH protocol (also referred to as Secure Shell) is a method for secure remote login from one computer to another.

To use ssh, we need to install ssh.

- linux and macOS
  - you should have a the ssh program already
- Windows
  - if you have install git for windows, we should have git-bash and ssh installed.

## Login to your peloton account

```
ssh sta141c-NUMBER@peloton.cse.ucdavis.edu
```

Unfortunately, you will need to copy and paste password everytime you login. (I will teach you a way to do it in R without typing password each time).

## File editing over ssh

Editing a file over SSH is not an easy task.

- use a text editor in the system
- edit it locally and upload it to the server
  - either use `scp` functions
  - or a software, for example “Cyber Duck” for macOS and WinScp for Windows.

**scp function to copy files from to to server**

To copy a local file `file.txt` to remote `~/foo/file.txt`

```
scp file.txt sta141c-98@peloton.cse.ucdavis.edu:~/foo/
```

To copy a local directory to remote `~/foo/local_directory`

```
scp -r local_directory sta141c-98@peloton.cse.ucdavis.edu:~/foo/
```

To copy a local file `file.txt` from remote `~/foo/file.txt`

```
scp sta141c-98@peloton.cse.ucdavis.edu:~/foo/file.txt ./
```

To copy a directory from remote `~/foo/`

```
scp -r sta141c-98@peloton.cse.ucdavis.edu:~/foo/ ./
```

**The package `ssh` and `keyring`.**

```
library(keyring)
only need to do it once
key_set("PELTONPASSWORD")
```

```
library(ssh)
session <- ssh_connect(
 "sta141c-98@peloton.cse.ucdavis.edu",
 passwd = keyring::key_get("PELTONPASSWORD"))
session
```

```
session %>% ssh_exec_wait(
 "ls -A"
)
```

```
session %>% ssh_exec_wait("mkdir -p shell")
session %>% scp_upload("shell.Rmd", to = "shell/")
session %>% scp_download("shell/shell.Rmd", to = "foo/")
```

```
ssh_disconnect(session)
```

## Reference

- Episode 1 to 3 of <http://swcarpentry.github.io/shell-novice/>