

# Intro to Unix (Linux) shell

Asya Shklyar  
June 2021

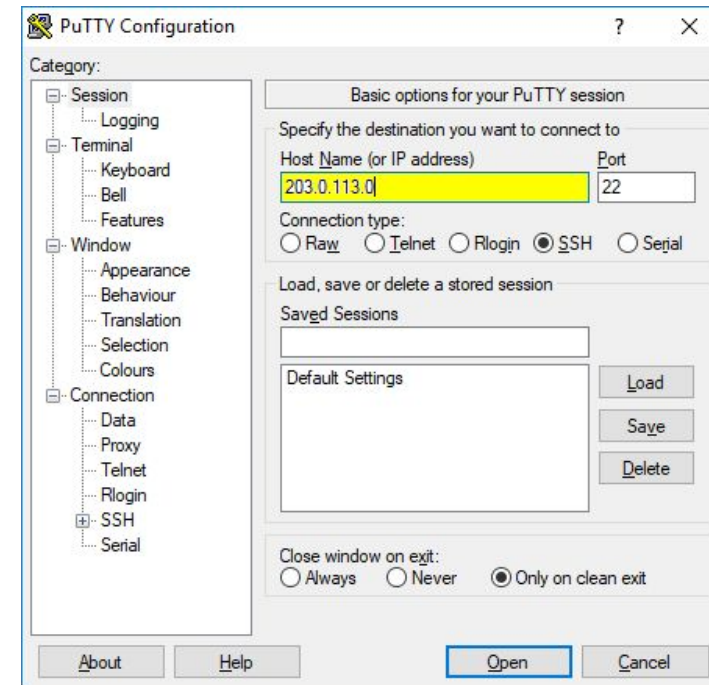


**USC**

Advanced Research Computing  
Enabling scientific breakthroughs at scale

# How do I login to the HPC environment?

Terminal on Mac (built-in, in Applications, Utilities) or putty/ssh on Windows



<https://www.putty.org/> or <https://docs.microsoft.com/en-us/windows/wsl/install-win10>

# How do I login to the HPC environment?

---

Install Duo app on your phone

ssh [yourusername@discovery.usc.edu](https://yourusername@discovery.usc.edu)

confirm push notification and you are in!

```
asyashklyar@CAL-MBP-shklyar ~ % ssh shklyar@discovery.usc.edu
Duo two-factor login for shklyar
```

Enter a passcode or select one of the following options:

1. Duo Push to XXX-XXX-5230
2. Phone call to XXX-XXX-5230
3. SMS passcodes to XXX-XXX-5230

Passcode or option (1-3): █

```
Success. Logging you in...
Last login: Tue Jun  1 13:45:14 2021 from 10.21.37.1
```

```
-----
Welcome to the Center for Advanced Research Computing (CARC)
at the University of Southern California (USC)
-----
```

```
CARC website : https://carc.usc.edu
User portal   : https://hpcaccount.usc.edu/
User support  : https://carc.usc.edu/user-support
User guides   : https://carc.usc.edu/user-information/user-guides
```

```
** Unauthorized use/access is prohibited **
```

```
If you log on to this computer system, you acknowledge your awareness of and
concurrency with the USC CARC Acceptable Use Policy. USC will prosecute
violators to the full extent of the law.
```

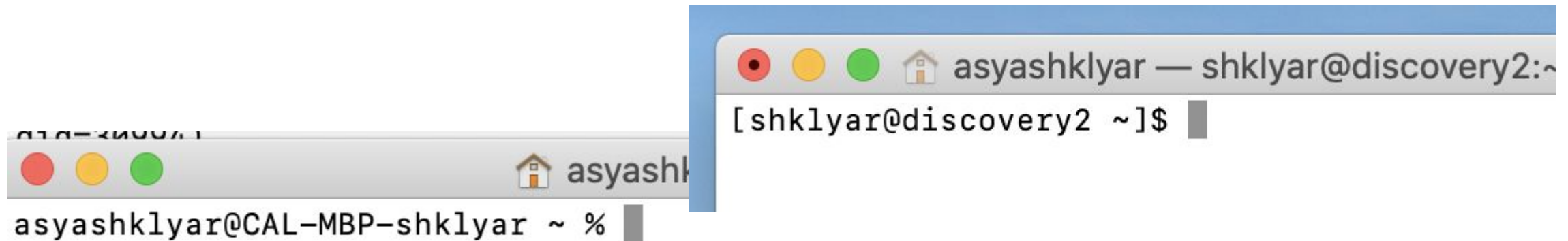
```
-----
[shklyar@discovery2 ~]$ █
```



# How do I know if I am still on my computer or on a remote node?

---

Pay attention to your username and the computer name in the prompt



# More information about Discovery and other CARC resources

---

<https://carc.usc.edu/>

<https://carc.usc.edu/services/hpc>

## User Support

---



### Ticket Submission

Send a message to the CARC team with your specific issue.



### CARC User Portal

Request and manage resources and allocations for your projects.



### User Forum

A question and answer community for CARC-specific topics.



### Frequently Asked Questions

Your common questions about CARC services and systems.



### User Guides

Comprehensive how-to guides for CARC resources and services.



### IT Services Help

USC NetID management, password reset, Duo two-factor authentication, and more ITS help topics.



# How do I know where my files are?

ls (list) or ls -lah (for more details)

```
[[shklyar@discovery2 ~]$ ls
```

```
~
```

```
module_avail_before_sarus_install
```

```
ondemand
```

```
[[shklyar@discovery2 ~]$
```

PonyLinux

ponysay

r-base\_latest.sif

sarus

script.sh

spack\_List.txt

test\_python.py

ubuntu\_latest.sif

```
[[shklyar@discovery2 ~]$ ls -lah
```

```
total 91K
```

```
-rw-rw----  1 shklyar shklyar   56 May 28 19:10 ~
drwxr-x--- 14 shklyar shklyar   24 Jun  3 09:25 .
drwxr-xr-x 2967 root    root    2.9K Jun  7 07:00 ..
-rw-----  1 shklyar shklyar  5.8K Jun  7 13:04 .bash_history
-rw-r----- 1 shklyar shklyar  193 Apr 16 01:03 .bash_profile
-rw-r----- 1 shklyar shklyar  485 May 28 16:51 .bashrc
drwxrwx---  3 shklyar shklyar    1 Apr 21 12:51 .cache
drwx----- 4 shklyar shklyar    2 Apr 21 12:51 .config
-rw-----  1 shklyar shklyar    0 May 27 17:33 .lessht
drwx----- 3 shklyar shklyar    1 May  5 14:49 .local
-rw-rw----  1 shklyar shklyar  18K May 26 14:23 module_avail_before_sarus_install
drwxr-xr-x  3 shklyar shklyar    1 Apr 27 13:59 ondemand
drwxr----- 3 shklyar shklyar    1 Apr 15 13:26 .pki
drwxr-xr-x 10 shklyar shklyar   24 Jun  2 14:26 PonyLinux
drwxr-xr-x 15 shklyar shklyar   23 Jun  2 14:30 ponysay
-rwxrwx---  1 shklyar shklyar 294M May  5 14:52 r-base_latest.sif
drwxrwxr-x  3 shklyar shklyar    2 May 25 09:59 sarus
-rwxrwx---  1 shklyar shklyar  179 May 28 19:20 script.sh
drwx----- 3 shklyar shklyar    1 May  5 14:48 .singularity
drwxrwxr-x  3 shklyar shklyar    2 May 24 18:44 .spack
-rw-rw-r--  1 shklyar shklyar  53K May 24 15:57 spack_List.txt
drwx----- 2 shklyar shklyar    6 May 27 16:06 .ssh
-rw-rw----  1 shklyar shklyar   23 May 28 19:21 test_python.py
-rwxrwx---  1 shklyar shklyar  27M May  5 14:48 ubuntu_latest.sif
drwxr-xr-x  2 shklyar shklyar    1 Jun  3 09:25 .vim
-rw-----  1 shklyar shklyar  4.7K Jun  3 09:25 .viminfo
```



# manual pages aka man pages

---

# A great text-based tutorial (for later):

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

## Schedule

	Setup	Download files required for the lesson
00:00	1. <a href="#">Introducing the Shell</a>	What is a command shell and why would I use one?
00:05	2. <a href="#">Navigating Files and Directories</a>	How can I move around on my computer? How can I see what files and directories I have? How can I specify the location of a file or directory on my computer?
00:45	3. <a href="#">Working With Files and Directories</a>	How can I create, copy, and delete files and directories? How can I edit files?
01:35	4. <a href="#">Pipes and Filters</a>	How can I combine existing commands to do new things?
02:10	5. <a href="#">Loops</a>	How can I perform the same actions on many different files?
03:00	6. <a href="#">Shell Scripts</a>	How can I save and re-use commands?
03:45	7. <a href="#">Finding Things</a>	How can I find files? How can I find things in files?
04:30	Finish	

The actual schedule may vary slightly depending on the topics and exercises chosen by the instructor.

Licensed under [CC-BY 4.0 2018–2021](#) by [The Carpentries](#)  
Licensed under [CC-BY 4.0 2016–2018](#) by [Software Carpentry](#)  
[Foundation](#)

[Edit on GitHub](#) / [Contributing](#) / [Source](#) / [Cite](#) / [Contact](#)

Using [The Carpentries style](#) version 9.5.3.



Advanced Research Computing  
Enabling scientific breakthroughs at scale



# Where am I?

---

pwd

```
[[shklyar@discovery2 ~]$ pwd  
/home1/shklyar  
[[shklyar@discovery2 ~]$ █
```

# Other disks and file systems

“df -h” and “mount”... and “du -ksh”... and “less” and “grep” and “/”

Filesystem	Size	Used	Avail	Use%	Mounted on
devtmpfs	126G	0	126G	0%	/dev
tmpfs	126G	1.2M	126G	1%	/dev/shm
tmpfs	126G	3.3G	123G	3%	/run
tmpfs	126G	0	126G	0%	/sys/fs/cgroup
/dev/sda4	3.9G	652M	3.0G	18%	/
/dev/sda5	7.8G	2.9G	4.5G	40%	/usr
/dev/sda2	486M	27M	431M	6%	/boot
/dev/sda7	176G	1.1G	166G	1%	/var
/dev/sda6	32G	101M	30G	1%	/tmp
apps:/spack	1.7T	382G	1.4T	23%	/spack
beegfs_nodev	483T	49T	434T	11%	/home1
beegfs_nodev	7.6P	2.7P	4.9P	36%	/project
beegfs_nodev	709T	557T	152T	79%	/scratch2
beegfs_nodev	806T	647T	159T	81%	/scratch
tmpfs	26G	0	26G	0%	/run/user/352098
tmpfs	26G	0	26G	0%	/run/user/327602
tmpfs	26G	0	26G	0%	/run/user/268648
tmpfs	26G	0	26G	0%	/run/user/172734
tmpfs	26G	0	26G	0%	/run/user/351147
tmpfs	26G	0	26G	0%	/run/user/356650
tmpfs	26G	0	26G	0%	/run/user/600305
tmpfs	26G	0	26G	0%	/run/user/329077

```
/dev/sda2 on /boot type ext4 (rw,relatime,data=ordered)
/dev/sda7 on /var type ext4 (rw,relatime,data=ordered)
/dev/sda6 on /tmp type ext4 (rw,relatime,data=ordered)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
apps:/spack on /spack type nfs4 (ro,relatime,vers=4.1,rsz=1048576,wsz=1048576,namlen=
255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=10.125.0.197,local_lock=none,ad
dr=10.125.0.88)
beegfs_nodev on /home1 type beegfs (rw,relatime,cfgFile=/etc/beegfs/beegfs-client-home1.c
onf,_netdev)
beegfs_nodev on /project type beegfs (rw,relatime,cfgFile=/etc/beegfs/beegfs-client-proje
ct.conf,_netdev)
beegfs_nodev on /scratch2 type beegfs (rw,relatime,cfgFile=/etc/beegfs/beegfs-client-scrat
ch2.conf,_netdev)
beegfs_nodev on /scratch type beegfs (rw,relatime,cfgFile=/etc/beegfs/beegfs-client-scrat
ch.conf,_netdev)
```

# How do I go to another directory?

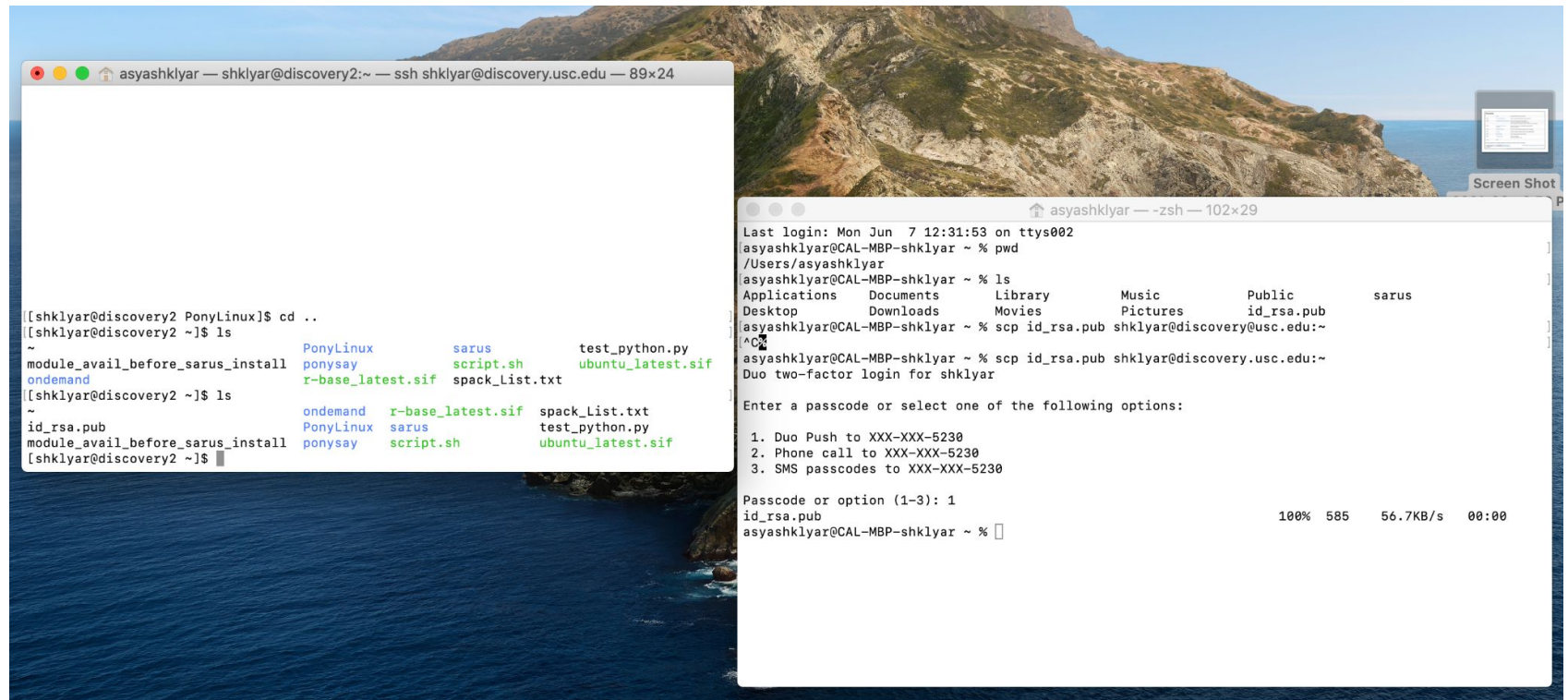
---

cd yourdirectory

```
[shklyar@discovery2 ~]$ cd PonyLinux/
[shklyar@discovery2 PonyLinux]$ ls
CHANGES          installation_instructions.md  ponyicon.png  runQuiz.sh      Section_Three_dev  Utilities.sh
Credits           JetstreamFont.png          Ponylinux.sh  runTutorial.sh  Section_Two
Developer_utilities LICENSE                    ponysay       Section_One     splash.txt
Images           minibash.sh                README.md     Section_Three   starbucks.txt
```

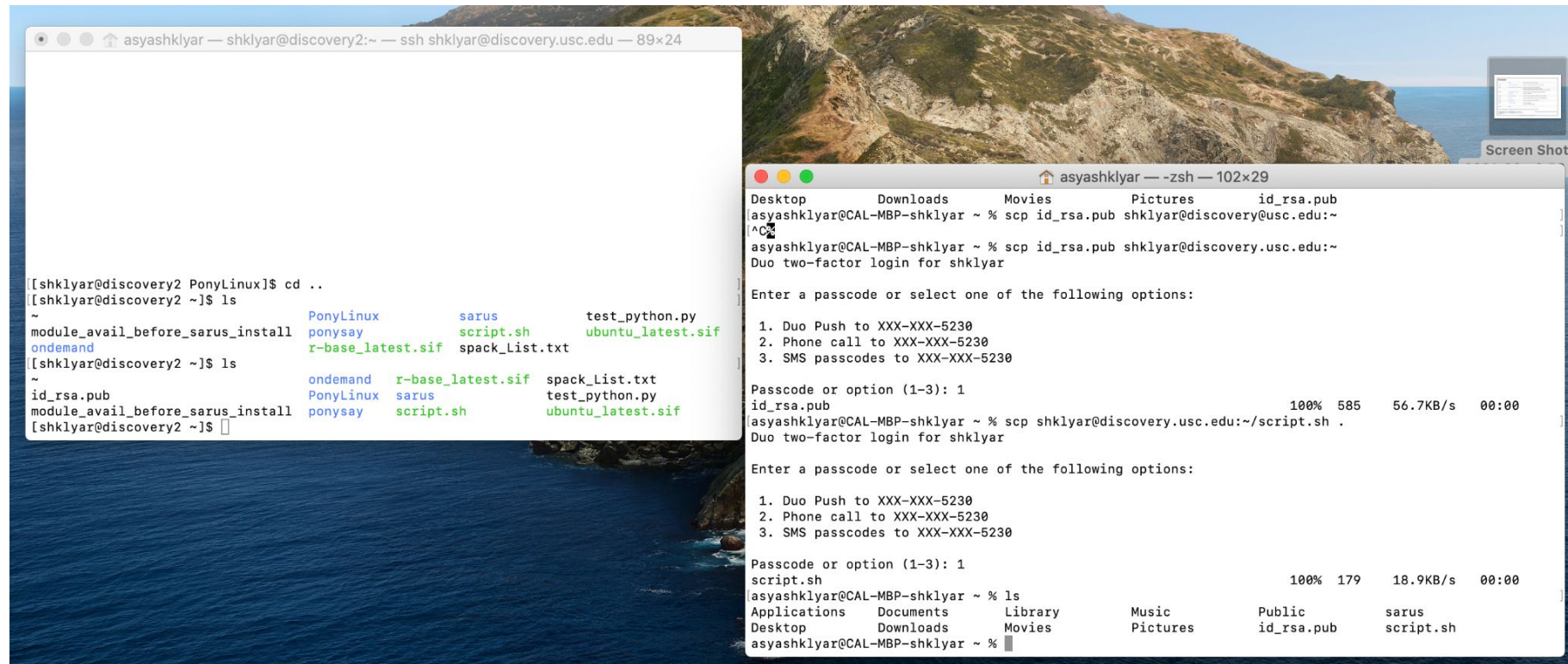
# How do I copy a file to the node?

`scp yourfile yourusername@discovery.usc.edu:~`



# How do I get my data out?

scp [yourusername@discovery.usc.edu](mailto:yourusername@discovery.usc.edu):~/yourfile .



The image shows two terminal windows. The left window is a terminal session on a remote host, showing the user navigating to the parent directory and listing files. The right window is a local terminal session on a Mac, showing the user running scp commands to transfer files from the remote host to the local machine. The first transfer is for 'id\_rsa.pub' and the second is for 'script.sh'. Both transfers show progress bars and completion status.

```
[[shklyar@discovery2 PonyLinux]$ cd ..
[[shklyar@discovery2 ~]$ ls
~
module_avail_before_sarus_install  PonyLinux      sarus          test_python.py
ondemand                          ponysay        script.sh      ubuntu_latest.sif
[[shklyar@discovery2 ~]$ ls
~
id_rsa.pub                         ondemand       r-base_latest.sif  spack_List.txt
module_avail_before_sarus_install  PonyLinux      sarus          test_python.py
[[shklyar@discovery2 ~]$

asyashklyar@CAL-MBP-shklyar ~ % scp id_rsa.pub shklyar@discovery.usc.edu:~
^C
asyashklyar@CAL-MBP-shklyar ~ % scp id_rsa.pub shklyar@discovery.usc.edu:~
Duo two-factor login for shklyar

Enter a passcode or select one of the following options:

1. Duo Push to XXX-XXX-5230
2. Phone call to XXX-XXX-5230
3. SMS passcodes to XXX-XXX-5230

Passcode or option (1-3): 1
id_rsa.pub                               100% 585    56.7KB/s   00:00
asyashklyar@CAL-MBP-shklyar ~ % scp shklyar@discovery.usc.edu:~/script.sh .
Duo two-factor login for shklyar

Enter a passcode or select one of the following options:

1. Duo Push to XXX-XXX-5230
2. Phone call to XXX-XXX-5230
3. SMS passcodes to XXX-XXX-5230

Passcode or option (1-3): 1
script.sh                                100% 179    18.9KB/s   00:00
asyashklyar@CAL-MBP-shklyar ~ % ls
Applications  Documents  Library      Music        Public      sarus
Desktop       Downloads  Movies       Pictures     id_rsa.pub  script.sh
asyashklyar@CAL-MBP-shklyar ~ %
```



# Practicum: Pony Linux - Introduction

---

## Welcome to PonyLinux!

---

PonyLinux is a very basic tutorial on using the **command line** in Unix operating systems, such as Ubuntu Linux.

Walk through a series of tutorial sections that will teach you different **commands**, what they do, and how to use them. The tutorials are interactive, with mini sessions to ensure you get more practice and engagement. Your task will be to take the knowledge you gained during the tutorials to find the Princess in the dungeon! So go on brave one, and be a hero while learning about Linux!



# Practicum: Pony Linux - Content

---

## SECTION ONE

Section one introduces the structure of things that are typed into the **command line**, and the concept that programs can be run using text. We delve into basic movement between folders and showing what is inside a folder. Understanding and setting permission to view, open, and change files and folders is covered, as well as how to read the contents of a file.

We go over the following **commands**:

```
cd  
ls  
pwd  
find  
chmod  
less
```



Section One wraps up with a challenge. Use the commands you learned during the tutorials to defeat a dungeon set up using files and folders right in the Linux environment. Your goal is to find the Princess in the dungeon with the knowledge you earned in the tutorial.

# Practicum: Pony Linux - Content

---

## SECTION TWO

We go over the following **commands**:

```
head  
tail  
wc  
cat  
less  
nano  
cp  
alias  
mv  
rm  
touch  
mkdir
```

The goals of section two will be to start getting into more bash commands that will introduce you to file handling in Linux - how to read, edit, generate, and remove files. Your goal is to use your new skills to navigate the dungeon, which is now a ruin and overrun with animals, to find the Princess's key.



# Practicum: Pony Linux - Let's do this!

---

Log in to Discovery

Load the module

Happy Learning!

# More learning!

---

<https://datacarpentry.org/lessons/>

## About The Carpentries Curricula

- [Data Carpentry: Ecology](#)
- [Data Carpentry: Genomics](#)
- [Data Carpentry: Geospatial](#)
- [Data Carpentry: Social Sciences](#)
- [Library Carpentry](#)
- [Software Carpentry \(All Workshops\)](#)
- [Software Carpentry \(Plotting and Programming in Python\)](#)
- [Software Carpentry \(Programming with Python\)](#)
- [Software Carpentry \(Programming with R\)](#)
- [Software Carpentry \(R for Reproducible Scientific Analysis\)](#)
- [Community Developed Lessons](#)