

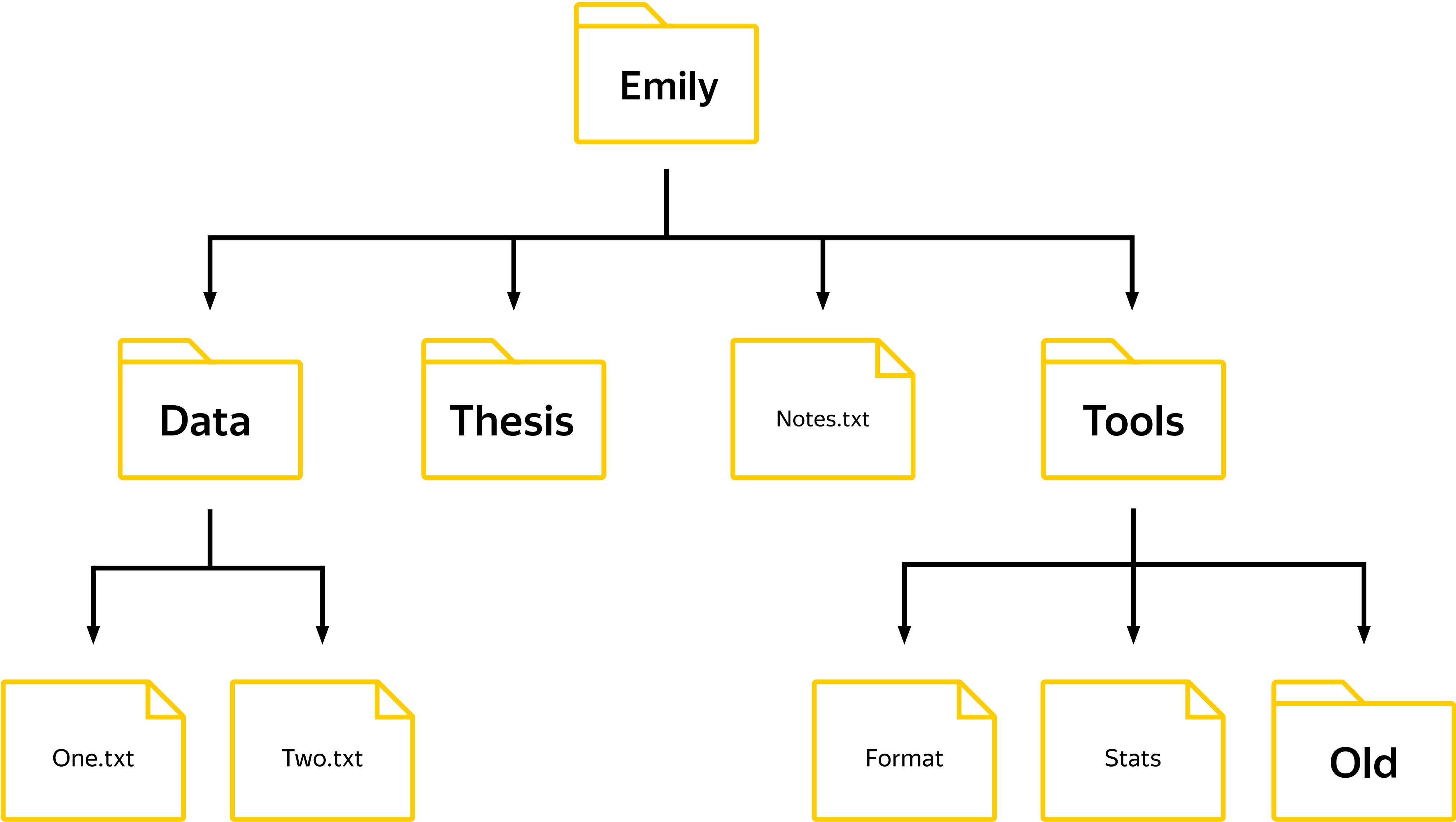
**Y**andex

# Unix/Linux Command Line

File system exploration

How is data stored at the laptop?

# File System



# File System Functions

- › Store data
- › Control data
- › Retrieve data

# File System

- › Store data into the named files
- › Hierarchy of files
- › Structure and logic rules used to manage files

How to explore the file system?

# File Manager

- › GNOME's Nautilus file manager
- › Windows Explorer
- › Finder



# BASH

- › command interpreter
- › programming language
- › command processor that typically runs in a text window, where the user types commands that cause
- › actions
- › can also read and execute commands from a file, called a script

# File System Exploration Commands

- › ls
- › cd
- › pwd
- › du
- › df

# ls

- › Lists the contents of a directory

**ls [OPTION]... [FILE]...**

# ls

```
yandex — bash

emily-osx-2:~ emily$ ls
Applications      Workspace
Desktop           anaconda
Documents         ichwill
Downloads         mxnet
Dropbox           rbuid
Library           recommendations-updater
Movies            seaborn-data
Music             spark-1.6.3-bin-hadoop2.6
MyJabberFiles     trunk
Pictures          xgboost
Public            yandex-build
Samsung           yt
VirtualBox VMs
emily-osx-2:~ emily$ █
```



# ls -l

```
yandex — bash

emily-osx-2:~ emily$ ls -l
total 0
drwx-----  4 emily  593637566   136  21 апр 12:44 Applications
drwx-----+ 46 emily  593637566  1564  10 июл 20:53 Desktop
drwx-----+ 229 emily  593637566  7786   8 июл 18:10 Documents
drwx-----+ 1586 emily  593637566 53924  10 июл 14:12 Downloads
drwx-----@  16 emily  593637566   544  11 ноя  2015 Dropbox
drwx-----@  59 emily  593637566  2006  19 апр  2016 Library
drwx-----+   3 emily  593637566   102  18 ноя  2013 Movies
drwx-----+   4 emily  593637566   136  14 сен  2014 Music
drwxr--r--   3 emily  593637566   102  11 май  2016 MyJabberFiles
drwx-----+  15 emily  593637566   510   7 дек  2016 Pictures
drwxr-xr-x+   4 emily  593637566   136  18 ноя  2013 Public
drwxr-xr-x   3 emily  593637566   102   6 сен  2014 Samsung
drwxr-xr-x   4 emily  593637566   136   6 мар 16:51 VirtualBox VMs
drwxr-xr-x   2 emily  593637566    68   5 дек  2013 Workspace
drwxr-xr-x  23 emily  593637566   782  19 ноя  2016 anaconda
drwxr-xr-x  16 emily  593637566   544  20 ноя  2013 ichwill
drwxr-xr-x  39 emily  593637566  1326   1 май  2016 mxnet
drwxr-xr-x   8 emily  593637566   272  21 ноя  2013 rbuild
drwxr-xr-x  15 emily  593637566   510  10 июл 20:48 recommendations-updater
drwxr-xr-x   3 emily  593637566   102   5 мар  2016 seaborn-data
drwxr-xr-x@  17 emily  593637566   578   3 ноя  2016 spark-1.6.3-bin-hadoop2.6
drwxr-xr-x   5 emily  593637566   170   5 дек  2013 trunk
drwxr-xr-x  29 emily  593637566   986  16 мар  2016 xgboost
drwxr-xr-x  15 emily  593637566   510  20 ноя  2013 yandex-build
drwxr-xr-x   7 emily  593637566   238  23 сен  2014 yt
emily-osx-2:~ emily$
```



# ls -lh

```
yandex — bash

emily-osx-2:~ emily$ ls -lh
total 0
drwx-----  4 emily  593637566  136B 21 апр 12:44 Applications
drwx-----+ 47 emily  593637566  1,6K 10 июл 20:54 Desktop
drwx-----+ 229 emily  593637566  7,6K  8 июл 18:10 Documents
drwx-----+ 1586 emily  593637566   53K 10 июл 14:12 Downloads
drwx-----@ 16 emily  593637566  544B 11 ноя  2015 Dropbox
drwx-----@ 59 emily  593637566  2,0K 19 апр  2016 Library
drwx-----+  3 emily  593637566  102B 18 ноя  2013 Movies
drwx-----+  4 emily  593637566  136B 14 сен  2014 Music
drwxr--r--  3 emily  593637566  102B 11 май  2016 MyJabberFiles
drwx-----+ 15 emily  593637566  510B  7 дек  2016 Pictures
drwxr-xr-x+  4 emily  593637566  136B 18 ноя  2013 Public
drwxr-xr-x  3 emily  593637566  102B  6 сен  2014 Samsung
drwxr-xr-x  4 emily  593637566  136B  6 мар 16:51 VirtualBox VMs
drwxr-xr-x  2 emily  593637566   68B  5 дек  2013 Workspace
drwxr-xr-x 23 emily  593637566  782B 19 ноя  2016 anaconda
drwxr-xr-x 16 emily  593637566  544B 20 ноя  2013 ichwill
drwxr-xr-x 39 emily  593637566  1,3K  1 май  2016 mxnet
drwxr-xr-x  8 emily  593637566  272B 21 ноя  2013 rbuild
drwxr-xr-x 15 emily  593637566  510B 10 июл 20:48 recommendations-updater
drwxr-xr-x  3 emily  593637566  102B  5 мар  2016 seaborn-data
drwxr-xr-x@ 17 emily  593637566  578B  3 ноя  2016 spark-1.6.3-bin-hadoop2.6
drwxr-xr-x  5 emily  593637566  170B  5 дек  2013 trunk
drwxr-xr-x 29 emily  593637566  986B 16 мар  2016 xgboost
drwxr-xr-x 15 emily  593637566  510B 20 ноя  2013 yandex-build
drwxr-xr-x  7 emily  593637566  238B 23 сен  2014 yt
emily-osx-2:~ emily$ $
```



# ls -lSh

```
yandex — bash

emily-osx-2:~ emily$ ls -lSh
total 0
drwx-----+ 1586 emily 593637566    53K 10 июл 14:12 Downloads
drwx-----+  229 emily 593637566   7,6K  8 июл 18:10 Documents
drwx-----@   59 emily 593637566   2,0K 19 апр  2016 Library
drwx-----+   48 emily 593637566   1,6K 10 июл 20:54 Desktop
drwxr-xr-x    39 emily 593637566   1,3K  1 май  2016 mxnet
drwxr-xr-x    29 emily 593637566  986B 16 мар  2016 xgboost
drwxr-xr-x    23 emily 593637566  782B 19 ноя  2016 anaconda
drwxr-xr-x@   17 emily 593637566  578B  3 ноя  2016 spark-1.6.3-bin-hadoop2.6
drwx-----@   16 emily 593637566  544B 11 ноя  2015 Dropbox
drwxr-xr-x    16 emily 593637566  544B 20 ноя  2013 ichwill
drwx-----+   15 emily 593637566  510B  7 дек  2016 Pictures
drwxr-xr-x    15 emily 593637566  510B 10 июл 20:48 recommendations-updater
drwxr-xr-x    15 emily 593637566  510B 20 ноя  2013 yandex-build
drwxr-xr-x     8 emily 593637566  272B 21 ноя  2013 rbuild
drwxr-xr-x     7 emily 593637566  238B 23 сен  2014 yt
drwxr-xr-x     5 emily 593637566  170B  5 дек  2013 trunk
drwx-----    4 emily 593637566  136B 21 апр 12:44 Applications
drwx-----+    4 emily 593637566  136B 14 сен  2014 Music
drwxr-xr-x+    4 emily 593637566  136B 18 ноя  2013 Public
drwxr-xr-x    4 emily 593637566  136B  6 мар 16:51 VirtualBox VMs
drwx-----+    3 emily 593637566  102B 18 ноя  2013 Movies
drwxr--r--    3 emily 593637566  102B 11 май  2016 MyJabberFiles
drwxr-xr-x    3 emily 593637566  102B  6 сен  2014 Samsung
drwxr-xr-x    3 emily 593637566  102B  5 мар  2016 seaborn-data
drwxr-xr-x    2 emily 593637566   68B  5 дек  2013 Workspace
emily-osx-2:~ emily$
```

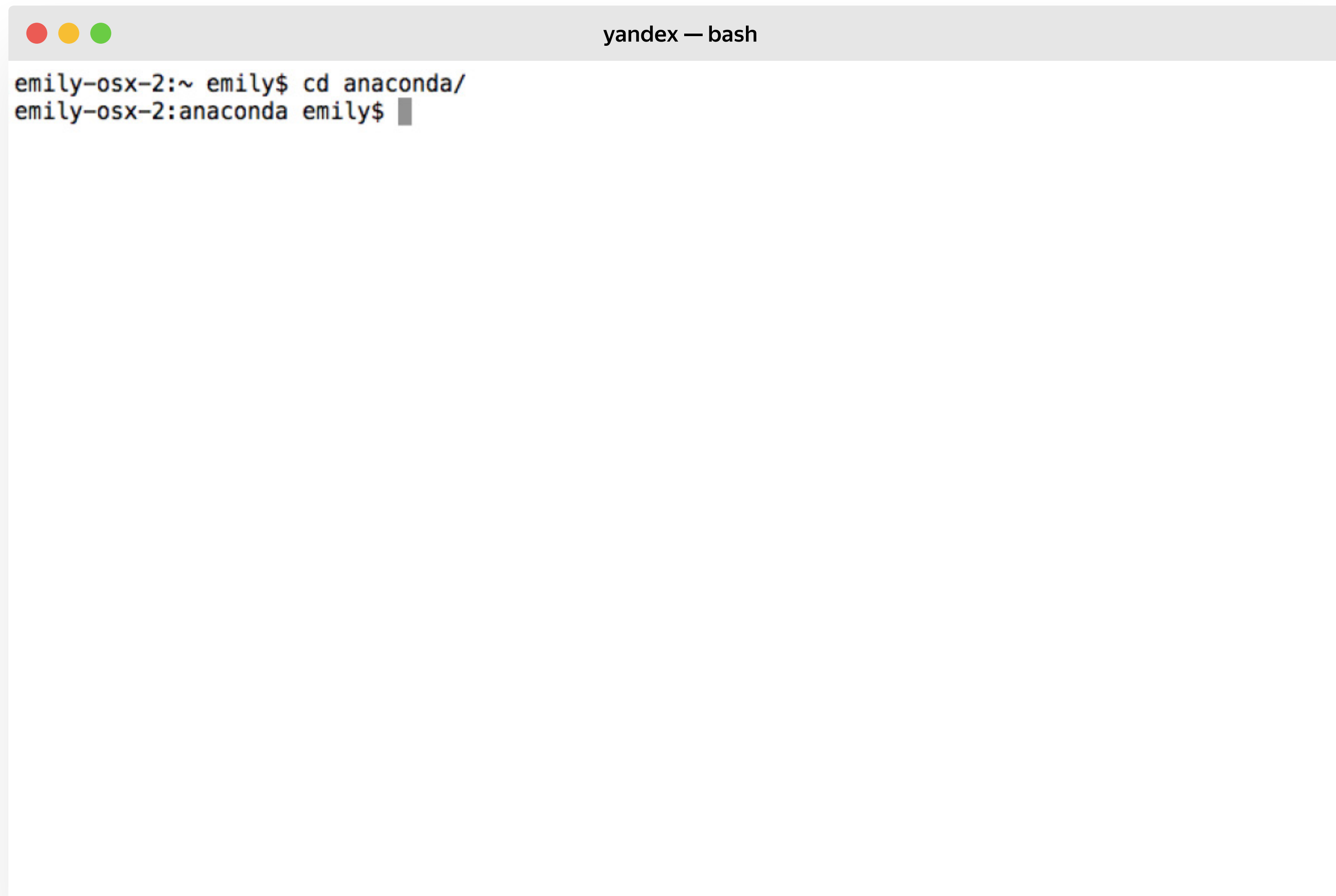
# cd

- › change directory

**cd [-L|-P] directory**



# cd



```

yandex — bash
emily-osx-2:~ emily$ cd anaconda/
emily-osx-2:anaconda emily$
```

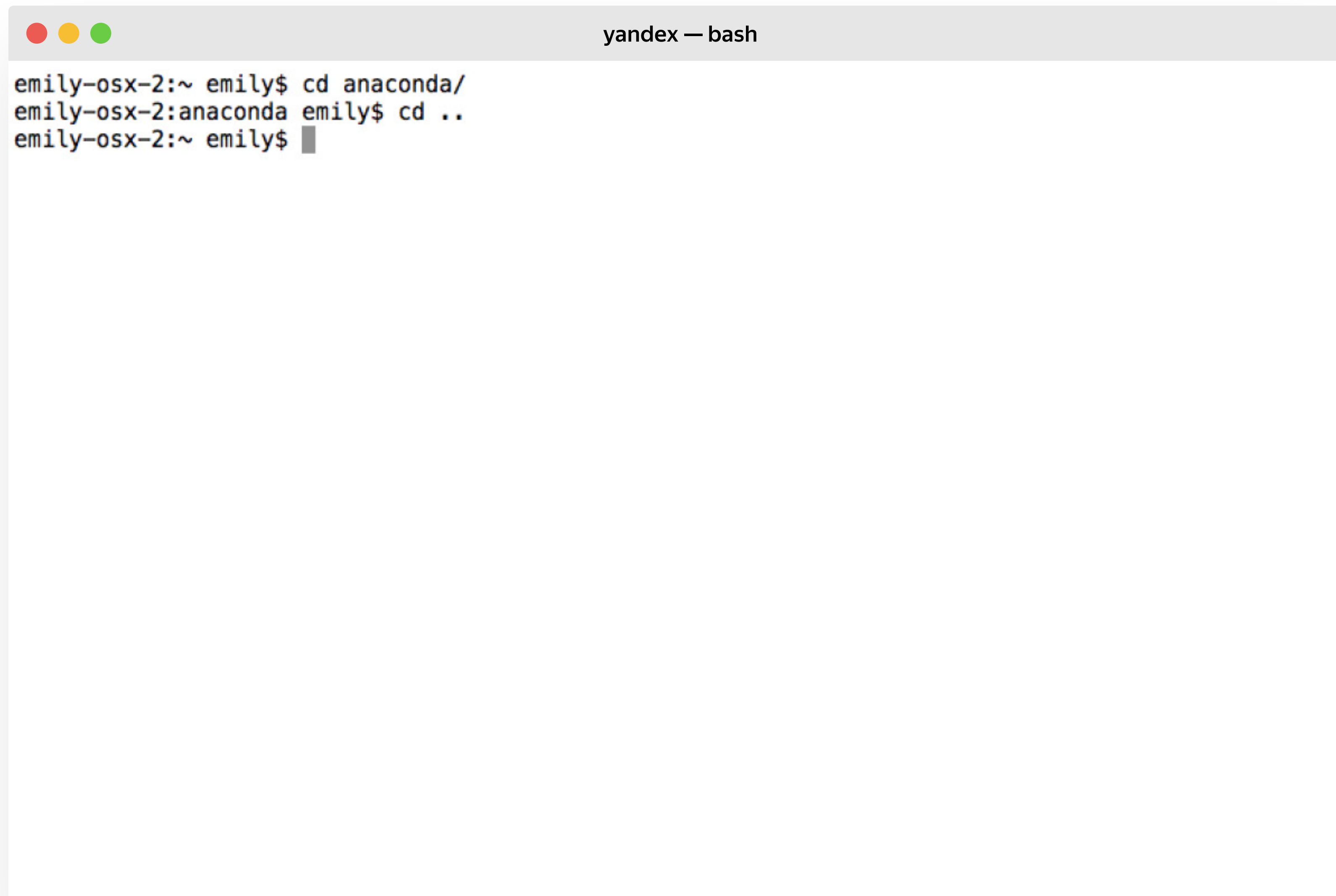
A terminal window titled "yandex — bash" with standard macOS window controls (red, yellow, green buttons). The terminal shows a user named "emily" at a host named "emily-osx-2". The user enters the command "cd anaconda/" and the prompt changes to "emily-osx-2:anaconda emily\$".

# cd /

```
yandex — bash

emily-osx-2:~ emily$ cd anaconda/bin/
emily-osx-2:bin emily$ cd /
emily-osx-2:/ emily$ ls
Applications      home
Library           installer.failurerequests
Network           net
System            opt
Users             private
Volumes           sbin
bin               tmp
cores             usr
dev               var
etc
emily-osx-2:/ emily$
```

# cd ..



```

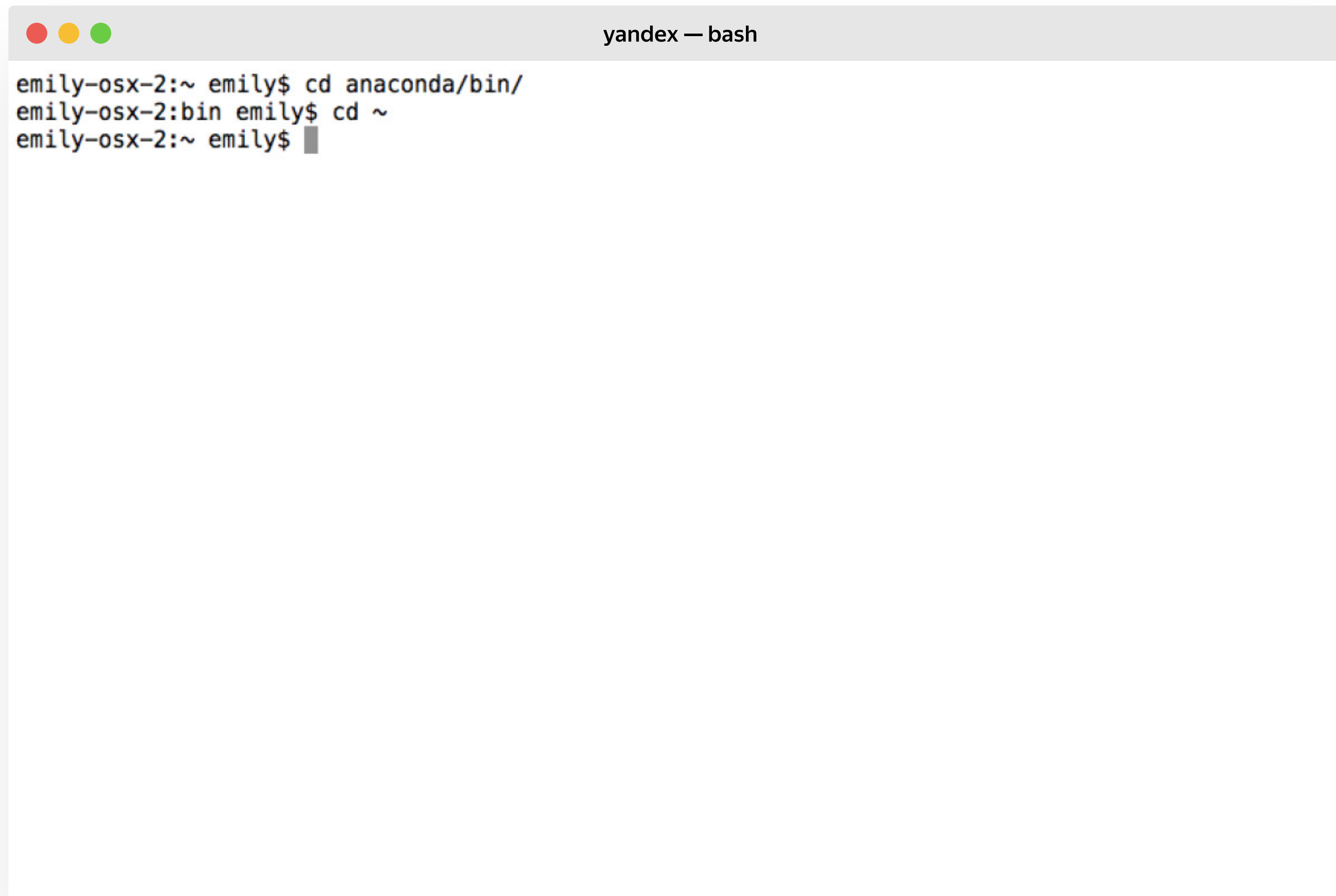
yandex — bash

emily-osx-2:~ emily$ cd anaconda/
emily-osx-2:anaconda emily$ cd ..
emily-osx-2:~ emily$ █

```

A terminal window titled "yandex — bash" with three colored window control buttons (red, yellow, green) in the top-left corner. The terminal shows a sequence of commands: "cd anaconda/" which changes the directory to "anaconda", followed by "cd .." which returns to the home directory "~". The prompt changes from "emily-osx-2:~ emily\$" to "emily-osx-2:anaconda emily\$" and back to "emily-osx-2:~ emily\$". A grey cursor block is visible at the end of the final prompt.

# cd ~

A terminal window titled "yandex — bash" with three colored window control buttons (red, yellow, green) in the top-left corner. The terminal displays a sequence of commands and directory changes: the user starts in the home directory (~), navigates to the anaconda/bin directory, and then returns to the home directory (~).

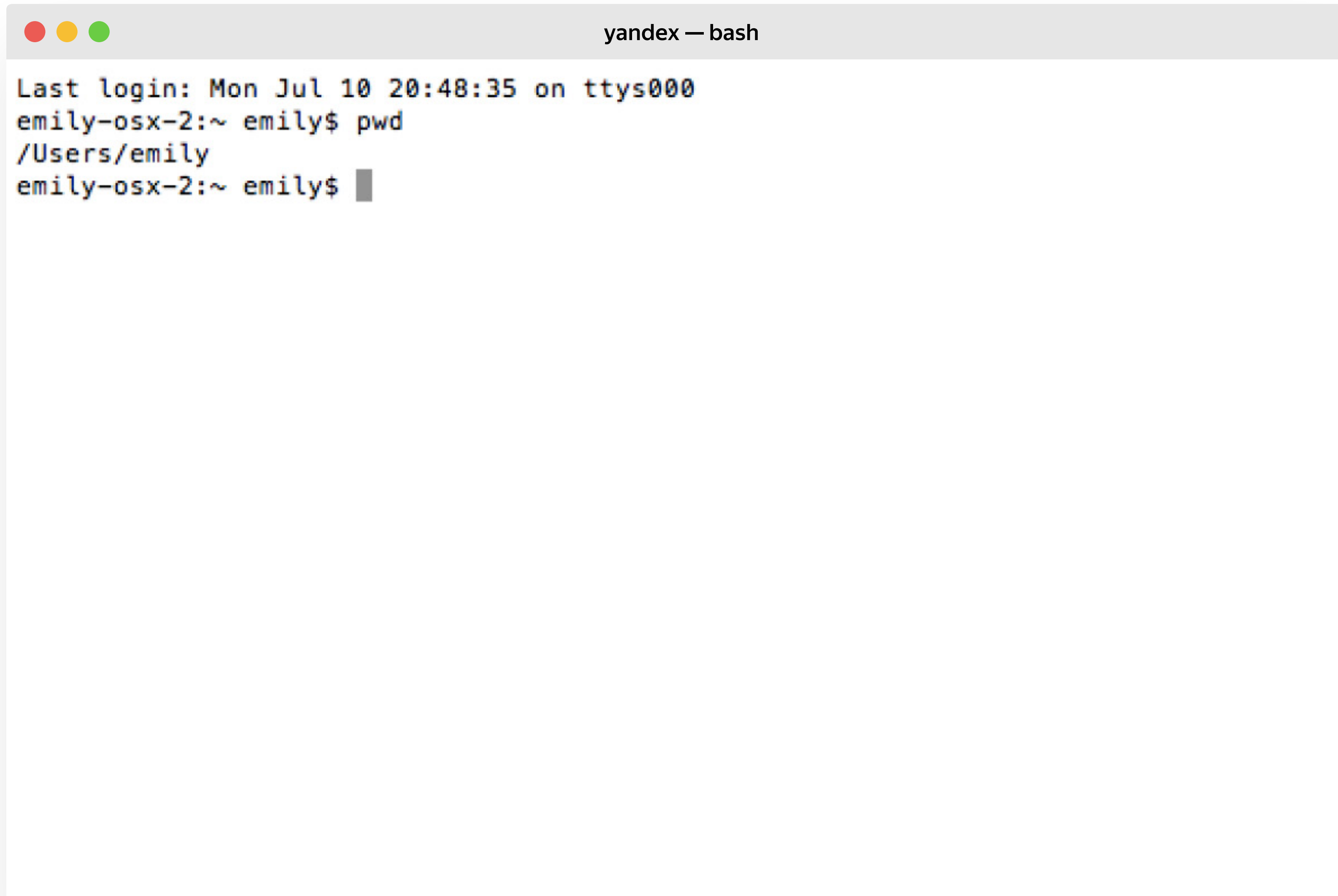
```
yandex — bash
emily-osx-2:~ emily$ cd anaconda/bin/
emily-osx-2:bin emily$ cd ~
emily-osx-2:~ emily$
```

# **pwd**

- › Prints the whole pathname of the current directory

**pwd [OPTION]...**

# pwd



```
yandex — bash  
Last login: Mon Jul 10 20:48:35 on ttys000  
emily-osx-2:~ emily$ pwd  
/Users/emily  
emily-osx-2:~ emily$
```

# du

- › estimates and displays the disk space used by files

**du [OPTION]... [FILE]...**

# du

```
yandex — bash

emily-osx-2:Music emily$ du -h
0B    ./iTunes/Album Artwork/Cache
0B    ./iTunes/Album Artwork/Cloud
0B    ./iTunes/Album Artwork/Cloud Purchases
0B    ./iTunes/Album Artwork/Download
0B    ./iTunes/Album Artwork
0B    ./iTunes/iTunes Media/Automatically Add to iTunes.localized/.localized
0B    ./iTunes/iTunes Media/Automatically Add to iTunes.localized
40M   ./iTunes/iTunes Media/Music/Jim Dale/Harry Potter and the Sorcerer's Stone by J. K. Rowling Di
sc 1
40M   ./iTunes/iTunes Media/Music/Jim Dale
40M   ./iTunes/iTunes Media/Music
40M   ./iTunes/iTunes Media
8,0K  ./iTunes/Previous iTunes Libraries
40M   ./iTunes
40M   .
emily-osx-2:Music emily$
```



# df

- › reports the amount of available disk space being used by file systems

**df [OPTION]... [FILE]...**

# df

```
yandex — bash

emily-osx-2:~ emily$ df -h
Filesystem      Size  Used Avail Capacity  iused   ifree %iused  Mounted on
/dev/disk1     232Gi  177Gi   55Gi    77% 46578118 14367928   76%  /
devfs           182Ki   182Ki    0Bi   100%    628         0  100%  /dev
map -hosts       0Bi    0Bi    0Bi   100%      0         0  100%  /net
map auto_home    0Bi    0Bi    0Bi   100%      0         0  100%  /home
map -fstab       0Bi    0Bi    0Bi   100%      0         0  100%  /Network/Servers
emily-osx-2:~ emily$
```

# In-video question

- › How to print list of files in the current directory?
- › What command should we use to change directory?
- › How to print path to the current directory?

How to get help with bash?

# man

**man** is the interface used to view the system's reference manuals.

- › `man pwd`
- › To exit manual type “q”

# man pwd

```
yandex — bash

PWD(1)                                BSD General Commands Manual                                PWD(1)

NAME
    pwd -- return working directory name

SYNOPSIS
    pwd [-L | -P]

DESCRIPTION
    The pwd utility writes the absolute pathname of the current working directory to the standard output.

    Some shells may provide a builtin pwd command which is similar or identical to this utility. Consult the builtin(1) manual page.

    The options are as follows:

    -L      Display the logical current working directory.

    -P      Display the physical current working directory (all symbolic links resolved).

    If no options are specified, the -L option is assumed.

ENVIRONMENT
    Environment variables used by pwd:

    PWD     Logical current working directory.

EXIT STATUS
    The pwd utility exits 0 on success, and >0 if an error occurs.

:
```

# Outcome

- › File system
- › Bash
- › To explore FS we use:
  - › LS
  - › CD
  - › PWD
  - › DU
  - › DF
- › To get help we use:
- › MAN

**BigDATA**team