

Lecture 17 - Some Helpful Utilities

DSE 511

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2022-10-25

Announcements

- New homework
- Questions?

Major Utilities

Printing / File Inspection

- echo
- head and tail
- cat
- less

File Info

- wc
- du and df
- locate
- which
- find

Editors

- nano
- vim

Diffing Files

- cmp
- diff
- md5sum

Calculators

- R and Python
- bc

Content

- Printing and File Inspection
- File Info
- Editors
- Diffing Files
- Calculators

Printing and File Inspection

Printing / File Inspection

- `echo` - print a string
- `head` and `tail` - see first/last "few" lines of a file
- `cat` - print a file to stdout
- `less` - interactively view a file

echo

```
echo hello world
```

```
## hello world
```

```
echo a b c
```

```
## a b c
```

```
echo "d e f"
```

```
## d e f
```

```
echo \"g h i\"
```

```
## "g h i"
```

echo

```
echo $LANG
```

```
## en_US.UTF-8
```

```
x=1  
echo $x
```

```
## 1
```

```
echo "a\nb"
```

```
## a\nb
```

```
echo -e "a\nb"
```

```
## a
```

```
## b
```


head and tail

```
echo -e "a\nb\nc\nd\ne" > /tmp/x.txt
```

```
head -n1 /tmp/x.txt
```

```
## a
```

```
head -n3 /tmp/x.txt
```

```
## a
```

```
## b
```

```
## c
```

```
tail -n1 /tmp/x.txt
```

```
## e
```

```
tail -n3 /tmp/x.txt
```

```
## c
```

```
## d
```

```
## e
```

head and tail

```
echo -e "a\nb\nc\nd\ne" > /tmp/x.txt
```

```
cat /tmp/x.txt
```

```
## a
## b
## c
## d
## e
```

```
cat -n /tmp/x.txt
```

```
##      1      a
##      2      b
##      3      c
##      4      d
##      5      e
```

less

- We've seen this in class
- How does it work?
- `less some_file`
- Search with `/` e.g. `/my_search_string<enter>`
- Exit with `q`

File Info

File Info

- `wc` - char/word/line counting
- `du` and `df` - "disk usage" and "disk free"
- `locate` - find files by name
- `which` - locate a *command*
- `find` - a better `locate`

```
echo -e "a\nb\nc\nd\ne" > /tmp/x.txt
```

```
wc /tmp/x.txt
```

```
## 5 5 10 /tmp/x.txt
```

```
wc -l /tmp/x.txt
```

```
## 5 /tmp/x.txt
```

du and df

```
echo -e "a\nb\nc\nd\ne" > /tmp/x.txt
```

```
du /tmp/x.txt
```

```
## 4      /tmp/x.txt
```

```
du -h /tmp/x.txt
```

```
## 4.0K   /tmp/x.txt
```

du and df

```
echo -e "a\nb\nc\nd\ne" > /tmp/x.txt
```

```
df | head -n 4
```

## Filesystem	1K-blocks	Used	Available	Use%	Mounted on
## tmpfs	6578712	1976	6576736	1%	/run
## /dev/sda2	114276516	46959856	61465524	44%	/
## tmpfs	32893560	840128	32053432	3%	/dev/shm

```
df /tmp
```

## Filesystem	1K-blocks	Used	Available	Use%	Mounted on
## /dev/sda2	114276516	46959856	61465524	44%	/

locate

```
locate Rscript | grep ^/usr/lib
```

```
## /usr/lib/R/bin/Rscript
```

```
locate libR.so | grep ^/usr/lib
```

```
## /usr/lib/libR.so
```

```
## /usr/lib/R/lib/libR.so
```

which

```
which Rscript
```

```
## /usr/bin/Rscript
```

```
which python
```

```
## /usr/bin/python
```

find

```
cd /tmp && mkdir -p /tmp/example && cd example  
touch x.txt  
touch y.txt  
touch a && chmod +x a
```

```
find /tmp/example -name *.txt
```

```
## /tmp/example/x.txt  
## /tmp/example/y.txt
```

```
find /tmp/example -name x.*
```

```
## /tmp/example/x.txt
```

```
find /tmp/example -executable
```

```
## /tmp/example  
## /tmp/example/a
```

Editors

Editors

- nano
- vim
- And the rest...

- `nano some_file.txt`
- How to use it? Read the bar at the bottom!
- `ctrl+x` - exit
- `ctrl+o` - save file
- `ctrl+r` - open file
- etc.

- A "modal" editor
- Difficult to learn, but very powerful
- Not for everyone
- You aren't "bad" for not liking it

- `vim some_file.txt`
- `i` to enter "insert" mode
- `Esc` or `ctrl+c` to exit current mode
- `:w` to save
- `:q` to quit

Diffing Files

Diffing Files

- `cmp` - concisely compare files
- `diff` - verbosely compare files
- `md5sum` - check if two files are identical

Setup

```
cd /tmp && mkdir -p /tmp/example2 && cd example2  
echo "a\nb" > x.txt  
echo -e "a\nb" > y.txt
```

cmp

```
cd /tmp/example2/  
cmp x.txt x.txt
```

```
cd /tmp/example2  
cmp x.txt y.txt
```

```
## x.txt y.txt differ: byte 2, line 1
```

```
cd /tmp/example2/  
diff x.txt x.txt
```

```
cd /tmp/example2  
diff x.txt y.txt
```

```
## 1c1,2  
## < a\nb  
## ---  
## > a  
## > b
```

md5sum

```
cd /tmp/example2  
md5sum x.txt y.txt
```

```
## ae2af30d93d6dbd7f6f62c775c038c60  x.txt  
## dd8c6a395b5dd36c56d23275028f526c  y.txt
```

Calculators

Calculators

- R and Python
- bc - "basic calculator"

R and Python

```
Rscript -e "cat(1+1, '\n')"
```

```
## 2
```

```
python -c "print(1+1)"
```

```
## 2
```

```
python -c "import math; print(math.pow(10, 20))"
```

```
## 1e+20
```

```
echo "1+1" | bc
```

```
## 2
```

```
echo "10^20" | bc
```

```
## 100000000000000000000
```

```
echo "1/3" | bc
```

```
## 0
```

```
echo "scale=17; 1/3" | bc
```

```
## .33333333333333333
```

```
echo 'ibase=10; obase=2; 12345' | bc
```

```
## 110000000111001
```

```
echo 'ibase=F; obase=2; 12345' | bc
```

```
## 1110001100000011
```



```
echo 'ibase=8; obase=12; 31' | bc
```

```
## 25
```



Wrapup

Wrapup

- Lots of utilities...
- We'll be using these *a lot* as we build on the shell.
- Get very comfortable with `echo`, pipes, redirection...
- 🎃 Oct 31 = Dec 25 🎄

Questions?

