

## Assignment 05

Good job!

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# 1. More Linux Commands

In this exercise, we will learn a few more Linux commands. For each command, please use `man` to learn what it does and how to use it correctly. First, change your directory to `~`.

**1.1 [2 points]** Make a link called `data_demo_link` to `data_demo` folder using `ln`.

代码及运行结果如下图:

```
[ese-caozh@login01 data_demo]$ ln -s data_demo_link
[ese-caozh@login01 data_demo]$ ls
creatures  data_demo_link  my_file_new  notes  solar.pdf  writing
data      molecules      north-pacific-gyre  pizza.cfg  test
```

**1.2 [2 points]** Print your home directory using `echo`.

代码及运行结果如下图:

```
[ese-caozh@login01 ~]$ pwd
/work/ese-caozh
[ese-caozh@login01 ~]$ echo /work/ese-caozh
/work/ese-caozh
```

**1.3 [2 points]** Go to `data_demo/molecules/`, make an empty file `test.pdb` with `touch`.

代码及运行结果如下图:

```
[ese-caozh@login01 ~]$ cd data_demo/molecules
[ese-caozh@login01 molecules]$ touch test.pdb
[ese-caozh@login01 molecules]$ ls
cubane.pdb  ethane.pdb  methane.pdb  octane.pdb  pentane.pdb  propane.pdb  test.pdb
```

**1.4 [3 points]** Find how many files in `data_demo/data/elements/` using `find`.

代码及运行结果如下图:

```
[ese-caozh@login01 elements]$ cd
[ese-caozh@login01 ~]$ cd data_demo/data/elements
[ese-caozh@login01 elements]$ find -type f | wc -l
103
```

**1.5 [2 points]** Compare `data_demo/data/pdb/ethane.pdb` and `data_demo/data/pdb/ethanol.pdb` with `diff`.

代码及运行结果如下图：

```
[ese-caozh@login01 ~]$ cd data_demo/data/pdb
[ese-caozh@login01 pdb]$ diff ethane.pdb ethanol.pdb
1,11c1,12
< COMPND      ETHANE
< AUTHOR      DAVE WOODCOCK  95 12 18
< ATOM        1  C          1      -0.752  0.001  -0.141  1.00  0.00
< ATOM        2  C          1       0.752 -0.001   0.141  1.00  0.00
< ATOM        3  H          1     -1.158  0.991   0.070  1.00  0.00
< ATOM        4  H          1     -1.240 -0.737   0.496  1.00  0.00
< ATOM        5  H          1     -0.924 -0.249  -1.188  1.00  0.00
< ATOM        6  H          1      1.158 -0.991  -0.070  1.00  0.00
< ATOM        7  H          1      0.924  0.249   1.188  1.00  0.00
< ATOM        8  H          1      1.240  0.737  -0.496  1.00  0.00
< TER         9
---
> COMPND      ETHANOL
> AUTHOR      DAVE WOODCOCK  96 01 03
> ATOM        1  C          1     -0.426 -0.115  -0.147  1.00  0.00
> ATOM        2  O          1     -0.599  1.244  -0.481  1.00  0.00
> ATOM        3  H          1     -0.750 -0.738  -0.981  1.00  0.00
> ATOM        4  H          1     -1.022 -0.351   0.735  1.00  0.00
> ATOM        5  H          1     -1.642  1.434  -0.689  1.00  0.00
> ATOM        6  C          1      1.047 -0.383   0.147  1.00  0.00
> ATOM        7  H          1      1.370  0.240   0.981  1.00  0.00
> ATOM        8  H          1      1.642 -0.147  -0.735  1.00  0.00
> ATOM        9  H          1      1.180 -1.434   0.405  1.00  0.00
> TER        10
```

**1.6 [3 points]** Count how many `But she` string appears in `data_demo/writing/data/LittleWomen.txt` with `grep`.

代码及运行结果如下图：

```
[ese-caozh@login01 data]$ grep -c 'But she' LittleWomen.txt
15
```

**1.7 [2 points]** Check the total file size of the `data_demo/data/` folder using `du`.

代码及运行结果如下图：

```
[ese-caozh@login01 data]$ du -c
407    ./pdb
52     ./elements
1     ./animal-counts
719
719    total
```

**1.8 [3 points]** Copy the data\_demo/writing/ folder to

data\_demo/writing\_new/, compress data\_demo/writing\_new/ using zip, and decompress the .zip file with unzip.

代码及运行结果如下图:

```
[ese-caozh@login01 data_demo]$ ls
creatures  data_demo_link  my_file_new  notes  solar.pdf  writing
data       molecules      north-pacific-gyre  pizza.cfg  test       writing_new
[ese-caozh@login01 data_demo]$ cd writing_new
[ese-caozh@login01 writing_new]$ ls
data  haiku.txt  thesis  tools
[ese-caozh@login01 writing_new]$ zip -r writing_new.zip ./
adding: data/ (stored 0%)
adding: data/one.txt (deflated 53%)
adding: data/LittleWomen.txt (deflated 61%)
adding: data/two.txt (deflated 59%)
adding: haiku.txt (deflated 29%)
adding: thesis/ (stored 0%)
adding: thesis/empty-draft.md (stored 0%)
adding: tools/ (stored 0%)
adding: tools/stats (stored 0%)
adding: tools/old/ (stored 0%)
adding: tools/old/oldtool (stored 0%)
adding: tools/format (deflated 13%)
[ese-caozh@login01 writing_new]$ ls
data  haiku.txt  thesis  tools  writing_new.zip
[ese-caozh@login01 writing_new]$ mv writing_new.zip ..
[ese-caozh@login01 writing_new]$ cd ..
[ese-caozh@login01 data_demo]$ ls
creatures  molecules      notes  test  writing_new.zip
data       my_file_new    pizza.cfg  writing
data_demo_link  north-pacific-gyre  solar.pdf  writing_new
[ese-caozh@login01 data_demo]$ rm writing_new
[ese-caozh@login01 data_demo]$ ls
creatures  data_demo_link  my_file_new  notes  solar.pdf  writing
data       molecules      north-pacific-gyre  pizza.cfg  test       writing_new.zip
[ese-caozh@login01 data_demo]$ unzip writing_new.zip
Archive:  writing_new.zip
  inflating: data/one.txt
  inflating: data/LittleWomen.txt
  inflating: data/two.txt
  inflating: haiku.txt
   creating: thesis/
 extracting: thesis/empty-draft.md
   creating: tools/
 extracting: tools/stats
   creating: tools/old/
 extracting: tools/old/oldtool
  inflating: tools/format
[ese-caozh@login01 data_demo]$ ls
creatures  haiku.txt  north-pacific-gyre  solar.pdf  tools
data       molecules  notes              test       writing
data_demo_link  my_file_new  pizza.cfg          thesis     writing_new.zip
[ese-caozh@login01 data_demo]$
```

**1.9 [3 points]** Change the file permissions flags on `writing_new` to `drwxr-x---` using `chmod`.

代码及运行结果如下图：

```
[ese-caozh@login01 data_demo]$ ls -al
total 133
drwxr-xr-x 8 ese-caozh ese-ouycc 4096 Nov 25 19:08 .
drwx----- 6 ese-caozh ese-ouycc 4096 Nov 25 19:06 ..
drwxr-xr-x 2 ese-caozh ese-ouycc 4096 Nov 25 19:06 creatures
drwxr-xr-x 5 ese-caozh ese-ouycc 4096 Nov 25 19:06 data
drwxr-xr-x 2 ese-caozh ese-ouycc 4096 Nov 25 19:06 molecules
drwxr-xr-x 3 ese-caozh ese-ouycc 4096 Nov 25 19:06 north-pacific-gyre
-rwxr-xr-x 1 ese-caozh ese-ouycc 76 Nov 25 19:06 notes
-rwxr-xr-x 1 ese-caozh ese-ouycc 32 Nov 25 19:06 pizza.cfg
-rwxr-xr-x 1 ese-caozh ese-ouycc 21583 Nov 25 19:06 solar.pdf
drwxr-xr-x 5 ese-caozh ese-ouycc 4096 Nov 25 19:06 writing
drwxr-xr-x 5 ese-caozh ese-ouycc 4096 Nov 25 19:08 writing_new
[ese-caozh@login01 data_demo]$ chmod o--- writing_new
[ese-caozh@login01 data_demo]$ ls -al
total 133
drwxr-xr-x 8 ese-caozh ese-ouycc 4096 Nov 25 19:08 .
drwx----- 6 ese-caozh ese-ouycc 4096 Nov 25 19:06 ..
drwxr-xr-x 2 ese-caozh ese-ouycc 4096 Nov 25 19:06 creatures
drwxr-xr-x 5 ese-caozh ese-ouycc 4096 Nov 25 19:06 data
drwxr-xr-x 2 ese-caozh ese-ouycc 4096 Nov 25 19:06 molecules
drwxr-xr-x 3 ese-caozh ese-ouycc 4096 Nov 25 19:06 north-pacific-gyre
-rwxr-xr-x 1 ese-caozh ese-ouycc 76 Nov 25 19:06 notes
-rwxr-xr-x 1 ese-caozh ese-ouycc 32 Nov 25 19:06 pizza.cfg
-rwxr-xr-x 1 ese-caozh ese-ouycc 21583 Nov 25 19:06 solar.pdf
drwxr-xr-x 5 ese-caozh ese-ouycc 4096 Nov 25 19:06 writing
drwxr-x--- 5 ese-caozh ese-ouycc 4096 Nov 25 19:08 writing_new
```

**1.10 [3 points]** Print the last 10 commands you made using `history`.

代码及运行结果如下图：

```
[ese-caozh@login01 ~]$ history 10
177  chmod o- rx writing_new
178  chmod o-  writing_new
179  ls -al
180  chmod o=-- writing_new
181  ls -al
182  hitory tail10
183  history -d 10
184  cd
185  hitory 10
186  history 10
```

## 2. BASH for Loop

The general syntax of a BASH loop goes like:

```
for thing in list_of_things
do
    operation_using $thing
done
```

**[5 points]** Write a shell script to print file size (in bytes) of each \*.pdb file in data\_demo/data/pdb/, line by line.

代码及运行结果如下图:

```
[ese-caozh@login01 ~]$ cat > pdb.sh
for file in data_demo/data/pdb/*.pdb
do
du -b $file
done
^C
[ese-caozh@login01 ~]$ sh pdb.sh
1516 data_demo/data/pdb/aldrin.pdb
306 data_demo/data/pdb/ammonia.pdb
1444 data_demo/data/pdb/ascorbic-acid.pdb
1030 data_demo/data/pdb/benzaldehyde.pdb
1830 data_demo/data/pdb/camphene.pdb
5049 data_demo/data/pdb/cholesterol.pdb
1090 data_demo/data/pdb/cinnamaldehyde.pdb
1694 data_demo/data/pdb/citronellal.pdb
2452 data_demo/data/pdb/codeine.pdb
1158 data_demo/data/pdb/cubane.pdb
895 data_demo/data/pdb/cyclobutane.pdb
1384 data_demo/data/pdb/cyclohexanol.pdb
695 data_demo/data/pdb/cyclopropane.pdb
622 data_demo/data/pdb/ethane.pdb
690 data_demo/data/pdb/ethanol.pdb
2396 data_demo/data/pdb/ethylcyclohexane.pdb
765 data_demo/data/pdb/glycol.pdb
4209 data_demo/data/pdb/heme.pdb
1064 data_demo/data/pdb/lactic-acid.pdb
2562 data_demo/data/pdb/lactose.pdb
11193 data_demo/data/pdb/lanoxin.pdb
3395 data_demo/data/pdb/lsd.pdb
2562 data_demo/data/pdb/maltose.pdb
2164 data_demo/data/pdb/menthol.pdb
422 data_demo/data/pdb/methane.pdb
490 data_demo/data/pdb/methanol.pdb
1869 data_demo/data/pdb/mint.pdb
2288 data_demo/data/pdb/morphine.pdb
2123 data_demo/data/pdb/mustard.pdb
1680 data_demo/data/pdb/nerol.pdb
2729 data_demo/data/pdb/norethindrone.pdb
1828 data_demo/data/pdb/octane.pdb
1226 data_demo/data/pdb/pentane.pdb
2287 data_demo/data/pdb/piperine.pdb
825 data_demo/data/pdb/propane.pdb
1256 data_demo/data/pdb/pyridoxal.pdb
3303 data_demo/data/pdb/quinine.pdb
2675 data_demo/data/pdb/strychnine.pdb
1159 data_demo/data/pdb/styrene.pdb
2562 data_demo/data/pdb/sucrose.pdb
2787 data_demo/data/pdb/testosterone.pdb
2196 data_demo/data/pdb/thiamine.pdb
1508 data_demo/data/pdb/tnt.pdb
2395 data_demo/data/pdb/tuberin.pdb
2103 data_demo/data/pdb/tyrian-purple.pdb
1361 data_demo/data/pdb/vanillin.pdb
423 data_demo/data/pdb/vinyl-chloride.pdb
2894 data_demo/data/pdb/vitamin-a.pdb
```