1. At this assignment, I would like to report with screenshots. I got help mostly at the websites (https://swcarpentry.github.io/shell-novice/), and (https://www.runoob.com/linux/linux-command-manual.html), or just tried by myself.

1.1. 'ln -s' means soft link, and the first one argument is the target folder, and the second is name of the link.

```
[ese-hejl@login02 ~]$ ls
data_demo  exam
[ese-hejl@login02 ~]$ ln -s data_demo/ data_demo_link
[ese-hejl@login02 ~]$ ls
data_demo  data_demo_link  exam
```

1.2. A '~' means home directory.

```
[ese-hejl@login02 ~]$ echo ~
/work/ese-hejl
```

1.3. 'touch filename' means creating a file with the filename.

```
[ese-hejl@login02 ~]$ cd data_demo/molecules/
[ese-hejl@login02 molecules]$ ls
cubane.pdb  ethane.pdb  methane.pdb  octane.pdb  pentane.pdb  propane.pdb
[ese-hejl@login02 molecules]$ touch test.pdb
[ese-hejl@login02 molecules]$ ls
cubane.pdb  methane.pdb  pentane.pdb  test.pdb
ethane.pdb  octane.pdb   propane.pdb
```

1.4. 'find . -type f' returns a list of all of the files in different rows, so we can use 'wc -l' to count the rows number which equals to files number.

```
[ese-hejl@login02 ~]$ cd data_demo/data/elements/
[ese-hejl@login02 elements]$ ls
Ac.xml  Bk.xml  Cs.xml  Ga.xml  Kr.xml  Nb.xml  Pd.xml  Rn.xml  Tb.xml  Yb.xml
Ag.xml  Br.xml  Cu.xml  Gd.xml  K.xml   Nd.xml  Pm.xml  Ru.xml  Tc.xml  Y.xml
Al.xml  B.xml   C.xml   Ge.xml  La.xml  Ne.xml  Po.xml  Sb.xml  Te.xml  Zn.xml
Am.xml  Ca.xml  Dy.xml  He.xml  Li.xml  Ni.xml  Pr.xml  Sc.xml  Th.xml  Zr.xml
Ar.xml  Cd.xml  Er.xml  Hf.xml  Lr.xml  No.xml  Pt.xml  Se.xml  Ti.xml
As.xml  Ce.xml  Es.xml  Hg.xml  Lu.xml  Np.xml  Pu.xml  Si.xml  Tl.xml
At.xml  Cf.xml  Eu.xml  Ho.xml  Md.xml  N.xml   P.xml   Sm.xml  Tm.xml
Au.xml  Cl.xml  Fe.xml  H.xml   Mg.xml  Os.xml  Ra.xml  Sn.xml  U.xml
Ba.xml  Cm.xml  Fm.xml  In.xml  Mn.xml  O.xml   Rb.xml  Sr.xml  V.xml
Be.xml  Co.xml  Fr.xml  Ir.xml  Mo.xml  Pa.xml  Re.xml  S.xml   W.xml
Bi.xml  Cr.xml  F.xml   I.xml   Na.xml  Pb.xml  Rh.xml  Ta.xml  Xe.xml
[ese-hejl@login02 elements]$ find . -type f | wc -l
103
```

1.5. 'diff file1 file2' means comparing file1 and file2.

```
[ese-hejl@login02 ~]$ cd data_demo/data/pdb/
[ese-hejl@login02 pdb]$ ls
aldrin.pdb          cyclopropane.pdb      methanol.pdb       strychnine.pdb
ammonia.pdb         ethane.pdb            mint.pdb           styrene.pdb
ascorbic-acid.pdb   ethanol.pdb           morphine.pdb       sucrose.pdb
benzaldehyde.pdb    ethylcyclohexane.pdb  mustard.pdb        testosterone.pdb
camphene.pdb        glycol.pdb            nerol.pdb          thiamine.pdb
cholesterol.pdb     heme.pdb              norethindrone.pdb  tnt.pdb
cinnamaldehyde.pdb  lactic-acid.pdb       octane.pdb         tuberin.pdb
citronellal.pdb     lactose.pdb           pentane.pdb        tyrian-purple.pdb
codeine.pdb         lanoxin.pdb           piperine.pdb       vanillin.pdb
count.sh            lsd.pdb               print.sh           vinyl-chloride.pdb
cubane.pdb          maltose.pdb           propane.pdb        vitamin-a.pdb
cyclobutane.pdb     menthol.pdb           pyridoxal.pdb
cyclohexanol.pdb    methane.pdb           quinine.pdb
[ese-hejl@login02 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              1
---
> 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
```

1.6. ‘grep str file’ means searching for str in the file, and ‘-c’ means returning the counts of all of the results.

```
[ese-hejl@login02 data]$ grep -c 'But she' LittleWomen.txt
15
```

1.7. ‘du’ returns the size of the working folder, and my working folder is data_demo/data/.

```
[ese-hejl@login02 data]$ du
1281    .
```

1.8. ‘cp -r folder newfolder’ means copying folder to newfolder. ‘zip -q -r file.zip’ means compressing all of the files in the working folder with a name ‘file.zip’.

```
[ese-hejl@login02 ~]$ cp -r data_demo/writing/ data_demo/writing_new
[ese-hejl@login02 ~]$ cd data_demo/writing
[ese-hejl@login02 writing]$ ls
data  haiku.txt  thesis  tools
[ese-hejl@login02 writing]$ cd ../writing_new/
[ese-hejl@login02 writing_new]$ ls
data  haiku.txt  thesis  tools
```

```
[ese-hejl@login02 writing_new]$ zip -q -r writing_new.zip *
[ese-hejl@login02 writing_new]$ ls
data  haiku.txt  thesis  tools  writing_new.zip
```

‘unzip file.zip’ means decompressing the file.zip. At this time because of the same names of the files, I renamed some of them, and files with ‘_d’ are decompressed files. Other I didn’t rename.

```
[ese-hejl@login02 writing_new]$ unzip writing_new.zip
```

```
[ese-hejl@login02 writing_new]$ ls
data    empty-draft_d.md  haiku.txt          one_d.txt  tools      writing_new.zip
data_e  haiku_d.txt       LittleWomen_d.txt  thesis     two_d.txt
```

1.9. ‘chmod 750 directory’ means changing the permissions flags of directory to 750, and 750 corresponds with ‘drwxr-x---‘.

```
[ese-hejl@login02 data_demo]$ ll
total 133
drwxr-xr-x 2 ese-hejl ese-ouycc  4096 Nov 24 19:21 creatures
drwxr-xr-x 5 ese-hejl ese-ouycc  4096 Nov 24 19:21 data
drwxr-xr-x 2 ese-hejl ese-ouycc  4096 Dec  2 15:20 molecules
-rw-r--r-- 1 ese-hejl ese-ouycc    22 Nov 24 19:55 my_file_new
drwxr-xr-x 3 ese-hejl ese-ouycc  4096 Nov 24 19:21 north-pacific-gyre
-rwxr-xr-x 1 ese-hejl ese-ouycc    69 Nov 24 19:21 notes
-rwxr-xr-x 1 ese-hejl ese-ouycc    32 Nov 24 19:21 pizza.cfg
-rwxr-xr-x 1 ese-hejl ese-ouycc 21583 Nov 24 19:21 solar.pdf
drwxr-xr-x 2 ese-hejl ese-ouycc  4096 Nov 24 19:57 test
drwxr-xr-x 5 ese-hejl ese-ouycc  4096 Nov 24 19:21 writing
drwxr-xr-x 5 ese-hejl ese-ouycc  4096 Dec  2 16:09 writing_new
[ese-hejl@login02 data_demo]$ chmod 750 writing_new/
[ese-hejl@login02 data_demo]$ ll
total 133
drwxr-xr-x 2 ese-hejl ese-ouycc  4096 Nov 24 19:21 creatures
drwxr-xr-x 5 ese-hejl ese-ouycc  4096 Nov 24 19:21 data
drwxr-xr-x 2 ese-hejl ese-ouycc  4096 Dec  2 15:20 molecules
-rw-r--r-- 1 ese-hejl ese-ouycc    22 Nov 24 19:55 my_file_new
drwxr-xr-x 3 ese-hejl ese-ouycc  4096 Nov 24 19:21 north-pacific-gyre
-rwxr-xr-x 1 ese-hejl ese-ouycc    69 Nov 24 19:21 notes
-rwxr-xr-x 1 ese-hejl ese-ouycc    32 Nov 24 19:21 pizza.cfg
-rwxr-xr-x 1 ese-hejl ese-ouycc 21583 Nov 24 19:21 solar.pdf
drwxr-xr-x 2 ese-hejl ese-ouycc  4096 Nov 24 19:57 test
drwxr-xr-x 5 ese-hejl ese-ouycc  4096 Nov 24 19:21 writing
drwxr-x--- 5 ese-hejl ese-ouycc  4096 Dec  2 16:09 writing_new
```

1.10. ‘history 10’ returns the last 10 commands I made.

```
[ese-hejl@login02 data_demo]$ history 10
  340  rm data_e
  341  ls
  342  ll
  343  cd ..
  344  ll
  345  chmod 750 writing_new/
  346  ll
  347  history
  348  history | tail 10
  349  history 10
```

2. I writed a for loop at demo.sh. ‘du -b $f’ returns all of the sizes of files with ‘.pdb’ in this

folder in bytes. ‘-b’ means sizes in bytes at this case. And it would print line by line.

```
  GNU nano 2.3.1                File: demo.sh

for f in *.pdb
do
        du -b $f
done
```

And I changed the permissions flags.

```
[ese-hejl@login02 pdb]$ chmod 750 demo.sh
```

Then I ran it.

```
[ese-hejl@login02 pdb]$ ./demo.sh
1516    aldrin.pdb
306     ammonia.pdb
1444    ascorbic-acid.pdb
1030    benzaldehyde.pdb
1830    camphene.pdb
5049    cholesterol.pdb
1090    cinnamaldehyde.pdb
1694    citronellal.pdb
2452    codeine.pdb
1158    cubane.pdb
895     cyclobutane.pdb
1384    cyclohexanol.pdb
695     cyclopropane.pdb
622     ethane.pdb
690     ethanol.pdb
2396    ethylcyclohexane.pdb
765     glycol.pdb
4209    heme.pdb
1064    lactic-acid.pdb
2562    lactose.pdb
11193   lanoxin.pdb
3395    lsd.pdb
2562    maltose.pdb
2164    menthol.pdb
422     methane.pdb
490     methanol.pdb
1869    mint.pdb
2288    morphine.pdb
2123    mustard.pdb
1680    nerol.pdb
2729    norethindrone.pdb
1828    octane.pdb
1226    pentane.pdb
2287    piperine.pdb
825     propane.pdb
1256    pyridoxal.pdb
3303    quinine.pdb
2675    strychnine.pdb
1159    styrene.pdb
2562    sucrose.pdb
```

```
2787    testosterone.pdb
2196    thiamine.pdb
1508    tnt.pdb
2395    tuberin.pdb
2103    tyrian-purple.pdb
1361    vanillin.pdb
423     vinyl-chloride.pdb
2894    vitamin-a.pdb
```