

## Assignment 5

Great! Happy to see your improvement. Pls keep on

1.

First, I change my directory to ~ by using command `cd ~`.

1.1

use man to learn

```
LN(1)                                     User Commands                                     LN(1)

NAME
    ln - make links between files

SYNOPSIS
    ln [OPTION]... [-T] TARGET LINK_NAME
    ln [OPTION]... TARGET
    ln [OPTION]... TARGET... DIRECTORY
    ln [OPTION]... -t DIRECTORY TARGET...

DESCRIPTION
    In the 1st form, create a link to TARGET with the name LINK_NAME. In the 2nd form, create a link to TARGET in the current directory. In the 3rd and 4th forms, create links to each TARGET in DIRECTORY. Create hard links by default, symbolic links with --symbolic. By default, each destination (name of new link) should not already exist. When creating hard links, each TARGET must exist. Symbolic links can hold arbitrary text; if later resolved, a relative link is interpreted in relation to its parent directory.

    Mandatory arguments to long options are mandatory for short options too.

    --backup[=CONTROL]
        make a backup of each existing destination file

    -b
        like --backup but does not accept an argument

    -d, -F, --directory
        allow the superuser to attempt to hard link directories (note: will probably fail due to system restrictions, even for the superuser)
```

The result

```
[ese-zhangych@login02 ~]$ ln -s data_demo/ data_demo_link
[ese-zhangych@login02 ~]$ ll
total 2
drwxr-xr-x 2 ese-zhangych ese-ouycc 4096 Dec  8 15:09 data_demo
lrwxrwxrwx 1 ese-zhangych ese-ouycc  10 Dec  8 15:08 data_demo_link -> data_demo/
drwxr-xr-x 2 ese-zhangych ese-ouycc 4096 Nov  2 18:48 exam
drwxr-xr-x 2 ese-zhangych ese-ouycc 4096 Nov 24 20:19 TEST
[ese-zhangych@login02 ~]$
```

## 1.2

use man to learn

```
ECHO(1)                                User Commands                                ECHO(1)

NAME
    echo - display a line of text

SYNOPSIS
    echo [SHORT-OPTION]... [STRING]...
    echo LONG-OPTION

DESCRIPTION
    Echo the STRING(s) to standard output.

    -n      do not output the trailing newline
    -e      enable interpretation of backslash escapes
    -E      disable interpretation of backslash escapes (default)
    --help  display this help and exit
    --version
            output version information and exit

    If -e is in effect, the following sequences are recognized:

    \\      backslash
    \a      alert (BEL)
```

The result

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

## 1.3

use man to learn

```
TOUCH(1)                                User Commands                                TOUCH(1)

NAME
    touch - change file timestamps

SYNOPSIS
    touch [OPTION]... FILE...

DESCRIPTION
    Update the access and modification times of each FILE to the current time.

    A FILE argument that does not exist is created empty, unless -c or -h is supplied.

    A FILE argument string of - is handled specially and causes touch to change the times of the file associated
    with standard output.

    Mandatory arguments to long options are mandatory for short options too.

    -a      change only the access time
    -c, --no-create
            do not create any files
    -d, --date=STRING
            parse STRING and use it instead of current time
    -f      (ignored)
    -h, --no-dereference
```

The result

```
[ese-zhangych@login02 ~]$ touch test.pdb
[ese-zhangych@login02 ~]$ ls
data_demo  data_demo_link  exam  TEST  test.pdb
[ese-zhangych@login02 ~]$
```

#### 1.4

Use man to learn

```
WC(1)                                     User Commands                                     WC(1)

NAME
    wc - print newline, word, and byte counts for each file

SYNOPSIS
    wc [OPTION]... [FILE]...
    wc [OPTION]... --files0-from=F

DESCRIPTION
    Print newline, word, and byte counts for each FILE, and a total line if more than one FILE is specified. A
    word is a non-zero-length sequence of characters delimited by white space.

    With no FILE, or when FILE is -, read standard input.

    The options below may be used to select which counts are printed, always in the following order: newline,
    word, character, byte, maximum line length.

    -c, --bytes
        print the byte counts

    -m, --chars
        print the character counts

    -l, --lines
        print the newline counts

    --files0-from=F
        read input from the files specified by NUL-terminated names in file F; If F is - then read names from
```

```
FIND(1)                                   General Commands Manual                                   FIND(1)

NAME
    find - search for files in a directory hierarchy

SYNOPSIS
    find [-H] [-L] [-P] [-D debugopts] [-Olevel] [starting-point...] [expression]

DESCRIPTION
    This manual page documents the GNU version of find. GNU find searches the directory tree rooted at each given
    starting-point by evaluating the given expression from left to right, according to the rules of precedence
    (see section OPERATORS), until the outcome is known (the left hand side is false for and operations, true for
    or), at which point find moves on to the next file name. If no starting-point is specified, '.' is assumed.

    If you are using find in an environment where security is important (for example if you are using it to search
    directories that are writable by other users), you should read the 'Security Considerations' chapter of the
    findutils documentation, which is called Finding Files and comes with findutils. That document also includes
    a lot more detail and discussion than this manual page, so you may find it a more useful source of informa-
    tion.

OPTIONS
    The -H, -L and -P options control the treatment of symbolic links. Command-line arguments following these are
    taken to be names of files or directories to be examined, up to the first argument that begins with '-', or
    the argument '(' or '!'. That argument and any following arguments are taken to be the expression describing
    what is to be searched for. If no paths are given, the current directory is used. If no expression is given,
    the expression -print is used (but you should probably consider using -print0 instead, anyway).

    This manual page talks about 'options' within the expression list. These options control the behaviour of
    find but are specified immediately after the last path name. The five 'real' options -H, -L, -P, -D and -O
```

## The result

```
[ese-zhangych@login02 ~]$  
[ese-zhangych@login02 ~]$ find /work/ese-zhangych/data_demo/data/elements/ -type f | wc -l  
103  
[ese-zhangych@login02 ~]$
```

## 1.5

### Use man to learn

```
GNU(1)                                User Commands                                GNU(1)  
  
NAME  
    GNU diff - compare files line by line  
  
SYNOPSIS  
    diff [OPTION]... FILES  
  
DESCRIPTION  
    Compare FILES line by line.  
  
    Mandatory arguments to long options are mandatory for short options too.  
  
    --normal  
        output a normal diff (the default)  
  
    -q, --brief  
        report only when files differ  
  
    -s, --report-identical-files  
        report when two files are the same  
  
    -c, -C NUM, --context[=NUM]  
        output NUM (default 3) lines of copied context  
  
    -u, -U NUM, --unified[=NUM]  
        output NUM (default 3) lines of unified context  
  
    -e, --ed
```

## The result

```
[ese-zhangych@login02 ~]$ diff data_demo/data/pdb/ethane.pdb data_demo/data/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  
[ese-zhangych@login02 ~]$
```

## 1.6

### Use man to learn

```
GREP(1)                                User Commands                                GREP(1)

NAME
    grep, egrep, fgrep, rgrep - print lines that match patterns

SYNOPSIS
    grep [OPTION...] PATTERNS [FILE...]
    grep [OPTION...] -e PATTERNS ... [FILE...]
    grep [OPTION...] -f PATTERN_FILE ... [FILE...]

DESCRIPTION
    grep searches for PATTERNS in each FILE. PATTERNS is one or more patterns separated by newline characters, and grep prints each line that matches a pattern. Typically PATTERNS should be quoted when grep is used in a shell command.

    A FILE of "-" stands for standard input. If no FILE is given, recursive searches examine the working directory, and nonrecursive searches read standard input.

    In addition, the variant programs egrep, fgrep and rgrep are the same as grep -E, grep -F, and grep -r, respectively. These variants are deprecated, but are provided for backward compatibility.

OPTIONS
    Generic Program Information
        --help Output a usage message and exit.

        -V, --version
            Output the version number of grep and exit.

    Pattern Syntax
```

### The result

```
[ese-zhangyich@login02 ~]$ grep -o 'But she' data_demo/writing/data/LittleWomen.txt | wc -l
15
[ese-zhangyich@login02 ~]$
```

## 1.7

### Use man to learn

```
DU(1)                                User Commands                                DU(1)

NAME
    du - estimate file space usage

SYNOPSIS
    du [OPTION]... [FILE]...
    du [OPTION]... --files0-from=F

DESCRIPTION
    Summarize disk usage of the set of FILES, recursively for directories.

    Mandatory arguments to long options are mandatory for short options too.

    -0, --null
        end each output line with NUL, not newline

    -a, --all
        write counts for all files, not just directories

    --apparent-size
        print apparent sizes, rather than disk usage; although the apparent size is usually smaller, it may be larger due to holes in ('sparse') files, internal fragmentation, indirect blocks, and the like

    -B, --block-size=SIZE
        scale sizes by SIZE before printing them; e.g., '-BM' prints sizes in units of 1,048,576 bytes; see SIZE format below

    -b, --bytes
```

## The result

```
[ese-zhangych@login02 ~]$ du -h -c data_demo/data/
409K    data_demo/data/pdb
52K     data_demo/data/elements
1.0K    data_demo/data/animal-counts
721K    data_demo/data/
721K    total
[ese-zhangych@login02 ~]$
```

## 1.8

## Use man to learn

```
CP(1)                                     User Commands                                     CP(1)

NAME
    cp - copy files and directories

SYNOPSIS
    cp [OPTION]... [-T] SOURCE DEST
    cp [OPTION]... SOURCE... DIRECTORY
    cp [OPTION]... -t DIRECTORY SOURCE...

DESCRIPTION
    Copy SOURCE to DEST, or multiple SOURCE(s) to DIRECTORY.

    Mandatory arguments to long options are mandatory for short options too.

    -a, --archive
        same as -dR --preserve=all

    --attributes-only
        don't copy the file data, just the attributes

    --backup[=CONTROL]
        make a backup of each existing destination file

    -b
        like --backup but does not accept an argument

    --copy=contents
        copy contents of special files when recursive
```

```
ZIP(1)                                     General Commands Manual                                     ZIP(1)

NAME
    zip - package and compress (archive) files

SYNOPSIS
    zip [-aABcdDeEfFghjklLmoqrRSTuvVwXyz!@$] [--longoption ...] [-b path] [-n suffixes] [-t date] [-tt date]
    [zipfile [file ...]] [-xi list]

    zipcloak (see separate man page)

    zipnote (see separate man page)

    zipsplit (see separate man page)

    Note: Command line processing in zip has been changed to support long options and handle all options and arguments more consistently. Some old command lines that depend on command line inconsistencies may no longer work.

DESCRIPTION
    zip is a compression and file packaging utility for Unix, VMS, MSDOS, OS/2, Windows 9x/NT/XP, Minix, Atari, Macintosh, Amiga, and Acorn RISC OS. It is analogous to a combination of the Unix commands tar(1) and compress(1) and is compatible with PKZIP (Phil Katz's ZIP for MSDOS systems).

    A companion program (unzip(1)) unpacks zip archives. The zip and unzip(1) programs can work with archives produced by PKZIP (supporting most PKZIP features up to PKZIP version 4.6), and PKZIP and PKUNZIP can work with archives produced by zip (with some exceptions, notably streamed archives, but recent changes in the zip file standard may facilitate better compatibility). zip version 3.0 is compatible with PKZIP 2.04 and also supports the Zip64 extensions of PKZIP 4.5 which allow archives as well as files to exceed the previous 2 GB
```

UNZIP(1)	General Commands Manual	UNZIP(1)
NAME	unzip - list, test and extract compressed files in a ZIP archive	
SYNOPSIS	unzip [-Z] [-cflptTuvz[abjnoqscDKLMUVWx\$/:^]] file[.zip] [file(s) ...] [-x xfile(s) ...] [-d exdir]	
DESCRIPTION	<p><code>unzip</code> will list, test, or extract files from a ZIP archive, commonly found on MS-DOS systems. The default behavior (with no options) is to extract into the current directory (and subdirectories below it) all files from the specified ZIP archive. A companion program, <code>zip(1)</code>, creates ZIP archives; both programs are compatible with archives created by PKWARE's <code>PKZIP</code> and <code>PKUNZIP</code> for MS-DOS, but in many cases the program options or default behaviors differ.</p>	
ARGUMENTS	<p><code>file[.zip]</code></p> <p>Path of the ZIP archive(s). If the file specification is a wildcard, each matching file is processed in an order determined by the operating system (or file system). Only the filename can be a wildcard; the path itself cannot. Wildcard expressions are similar to those supported in commonly used Unix shells (<code>sh</code>, <code>ksh</code>, <code>csh</code>) and may contain:</p> <ul style="list-style-type: none"> <li>* matches a sequence of 0 or more characters</li> <li>? matches exactly 1 character</li> <li>[...] matches any single character found inside the brackets; ranges are specified by a beginning character, a hyphen, and an ending character. If an exclamation point or a caret ('!' or '^') follows the left bracket, then the range of characters within the brackets is complemented (that</li> </ul>	

## The result

```
[ese-zhangych@login02 ~]$ cp -r data_demo/writing/ data_demo/writing_new/
[ese-zhangych@login02 ~]$ zip -r wn.zip data_demo/writing_new/*
adding: data_demo/writing_new/data/ (stored 0%)
adding: data_demo/writing_new/data/one.txt (deflated 53%)
adding: data_demo/writing_new/data/LittleWomen.txt (deflated 61%)
adding: data_demo/writing_new/data/two.txt (deflated 59%)
adding: data_demo/writing_new/haiku.txt (deflated 29%)
adding: data_demo/writing_new/thesis/ (stored 0%)
adding: data_demo/writing_new/thesis/empty-draft.md (stored 0%)
adding: data_demo/writing_new/tools/ (stored 0%)
adding: data_demo/writing_new/tools/stats (stored 0%)
adding: data_demo/writing_new/tools/old/ (stored 0%)
adding: data_demo/writing_new/tools/old/oldtool (stored 0%)
adding: data_demo/writing_new/tools/format (deflated 13%)
[ese-zhangych@login02 ~]$ unzip wn.zip -d test/
Archive: wn.zip
  creating: test/data_demo/writing_new/data/
  inflating: test/data_demo/writing_new/data/one.txt
  inflating: test/data_demo/writing_new/data/LittleWomen.txt
  inflating: test/data_demo/writing_new/data/two.txt
  inflating: test/data_demo/writing_new/haiku.txt
  creating: test/data_demo/writing_new/thesis/
  extracting: test/data_demo/writing_new/thesis/empty-draft.md
  creating: test/data_demo/writing_new/tools/
  extracting: test/data_demo/writing_new/tools/stats
  creating: test/data_demo/writing_new/tools/old/
  extracting: test/data_demo/writing_new/tools/old/oldtool
  inflating: test/data_demo/writing_new/tools/format
[ese-zhangych@login02 ~]$
```

## 1.9

### Use man to learn

```
CHMOD(1)                                User Commands                                CHMOD(1)

NAME
  chmod - change file mode bits

SYNOPSIS
  chmod [OPTION]... MODE[,MODE]... FILE...
  chmod [OPTION]... OCTAL-MODE FILE...
  chmod [OPTION]... --reference=RFILE FILE...

DESCRIPTION
  This manual page documents the GNU version of chmod.  chmod changes the file mode bits of each given file according to mode, which can be either a symbolic representation of changes to make, or an octal number representing the bit pattern for the new mode bits.

  The format of a symbolic mode is [ugoa...][[+=][perms...].], where perms is either zero or more letters from the set rwXst, or a single letter from the set ugo. Multiple symbolic modes can be given, separated by commas.

  A combination of the letters ugoa controls which users' access to the file will be changed: the user who owns it (u), other users in the file's group (g), other users not in the file's group (o), or all users (a). If none of these are given, the effect is as if (a) were given, but bits that are set in the umask are not affected.

  The operator + causes the selected file mode bits to be added to the existing file mode bits of each file; - causes them to be removed; and = causes them to be added and causes unmentioned bits to be removed except that a directory's unmentioned set user and group ID bits are not affected.

  The letters rwXst select file mode bits for the affected users: read (r), write (w), execute (or search for
```

### The result

```
[ese-zhangych@login02 ~]$ chmod 750 data_demo/writing_new/
[ese-zhangych@login02 ~]$ ll data_demo/
total 134
drwxr-x--- 2 ese-zhangych ese-ouycc 4096 Dec  8 15:15 creatures
drwxr-x--- 5 ese-zhangych ese-ouycc 4096 Dec  8 15:15 data
-rwxr-x--- 1 ese-zhangych ese-ouycc  637 Dec  8 15:15 log1
-rwxr-x--- 1 ese-zhangych ese-ouycc 1274 Dec  8 15:15 log2
drwxr-x--- 2 ese-zhangych ese-ouycc 4096 Dec  8 15:15 molecules
drwxr-x--- 3 ese-zhangych ese-ouycc 4096 Dec  8 15:15 north-pacific-gyre
-rwxr-x--- 1 ese-zhangych ese-ouycc   76 Dec  8 15:15 notes
-rwxr-x--- 1 ese-zhangych ese-ouycc   32 Dec  8 15:15 pizza.cfg
-rwxr-x--- 1 ese-zhangych ese-ouycc 21583 Dec  8 15:15 solar.pdf
-rwxr-x--- 1 ese-zhangych ese-ouycc   20 Dec  8 15:15 temp
drwxr-x--- 5 ese-zhangych ese-ouycc 4096 Dec  8 15:15 writing
drwxr-x--- 5 ese-zhangych ese-ouycc 4096 Dec  8 15:22 writing_new
[ese-zhangych@login02 ~]$
```



## Use man to learn

```
HISTORY(3)                                Library Functions Manual                                HISTORY(3)

NAME
    history - GNU History Library

COPYRIGHT
    The GNU History Library is Copyright (C) 1989-2020 by the Free Software Foundation, Inc.

DESCRIPTION
    Many programs read input from the user a line at a time. The GNU History library is able to keep track of those lines, associate arbitrary data with each line, and utilize information from previous lines in composing new ones.

HISTORY EXPANSION
    The history library supports a history expansion feature that is identical to the history expansion in bash. This section describes what syntax features are available.

    History expansions introduce words from the history list into the input stream, making it easy to repeat commands, insert the arguments to a previous command into the current input line, or fix errors in previous commands quickly.

    History expansion is usually performed immediately after a complete line is read. It takes place in two parts. The first is to determine which line from the history list to use during substitution. The second is to select portions of that line for inclusion into the current one. The line selected from the history is the event, and the portions of that line that are acted upon are words. Various modifiers are available to manipulate the selected words. The line is broken into words in the same fashion as bash does when reading input, so that several words that would otherwise be separated are considered one word when surrounded by quotes (see the description of history_tokenize() below). History expansions are introduced by the appearance of the history expansion character, which is ! by default. Only backslash (\) and single quotes can quote the history
```

## The result

```
[ese-zhangych@login02 ~]$
[ese-zhangych@login02 ~]$
[ese-zhangych@login02 ~]$
[ese-zhangych@login02 ~]$
[ese-zhangych@login02 ~]$ history | tail -10
 55 zip -r writting_new.zip data_demo/writing_new/*
 56 rm -rf writting_new.zip
 57 rm -rf data_demo/writing_new/
 58 mkdir test
 59 cp -r data_demo/writing/ data_demo/writing_new/
 60 zip -r wn.zip data_demo/writing_new/*
 61 unzip wn.zip -d test/
 62 chmod 750 data_demo/writing_new/
 63 ll data_demo/
 64 history | tail -10
[ese-zhangych@login02 ~]$
```

2

the shell script:

```
#!/bin/sh
for f in ~/data_demo/data/pdb/*.pdb; do
echo "$f"
done
```

~~~~~

"p2.sh" 4L, 65C

the result:

```
[ese-zhangych@login02 ~]$ bash p2.sh
/work/ese-zhangych/data_demo/data/pdb/aldrin.pdb
/work/ese-zhangych/data_demo/data/pdb/ammonia.pdb
/work/ese-zhangych/data_demo/data/pdb/ascorbic-acid.pdb
/work/ese-zhangych/data_demo/data/pdb/benzaldehyde.pdb
/work/ese-zhangych/data_demo/data/pdb/camphene.pdb
/work/ese-zhangych/data_demo/data/pdb/cholesterol.pdb
/work/ese-zhangych/data_demo/data/pdb/cinnamaldehyde.pdb
/work/ese-zhangych/data_demo/data/pdb/citronellal.pdb
/work/ese-zhangych/data_demo/data/pdb/codeine.pdb
/work/ese-zhangych/data_demo/data/pdb/cubane.pdb
/work/ese-zhangych/data_demo/data/pdb/cyclobutane.pdb
/work/ese-zhangych/data_demo/data/pdb/cyclohexanol.pdb
/work/ese-zhangych/data_demo/data/pdb/cyclopropane.pdb
/work/ese-zhangych/data_demo/data/pdb/ethane.pdb
/work/ese-zhangych/data_demo/data/pdb/ethanol.pdb
/work/ese-zhangych/data_demo/data/pdb/ethylcyclohexane.pdb
/work/ese-zhangych/data_demo/data/pdb/glycol.pdb
/work/ese-zhangych/data_demo/data/pdb/heme.pdb
/work/ese-zhangych/data_demo/data/pdb/lactic-acid.pdb
/work/ese-zhangych/data_demo/data/pdb/lactose.pdb
/work/ese-zhangych/data_demo/data/pdb/lanoxin.pdb
/work/ese-zhangych/data_demo/data/pdb/lsd.pdb
/work/ese-zhangych/data_demo/data/pdb/maltose.pdb
/work/ese-zhangych/data_demo/data/pdb/menthol.pdb
/work/ese-zhangych/data_demo/data/pdb/methane.pdb
/work/ese-zhangych/data_demo/data/pdb/methanol.pdb
/work/ese-zhangych/data_demo/data/pdb/mint.pdb
/work/ese-zhangych/data_demo/data/pdb/morphine.pdb
/work/ese-zhangych/data_demo/data/pdb/mustard.pdb
/work/ese-zhangych/data_demo/data/pdb/nerol.pdb
/work/ese-zhangych/data_demo/data/pdb/norethindrone.pdb
/work/ese-zhangych/data_demo/data/pdb/octane.pdb
/work/ese-zhangych/data_demo/data/pdb/pentane.pdb
/work/ese-zhangych/data_demo/data/pdb/piperine.pdb
/work/ese-zhangych/data_demo/data/pdb/propane.pdb
/work/ese-zhangych/data_demo/data/pdb/pyridoxal.pdb
/work/ese-zhangych/data_demo/data/pdb/quinine.pdb
/work/ese-zhangych/data_demo/data/pdb/strychnine.pdb
/work/ese-zhangych/data_demo/data/pdb/styrene.pdb
/work/ese-zhangych/data_demo/data/pdb/sucrose.pdb
```