1. Objective

Get familiar with the Linux operating system environment through experiments and master the use of basic Linux commands.

2. Requirement

- Master the permission management of Linux files
- Master basic file and directory operations
- Linux user management
- File compression and archiving

3. Experiment Step

(1) Directory Operation

Enter the following commands in sequence:

```
$pwd
$cd ~
$mkdir your_studentID
$cd your_studentID
$mkdir your_name
$ls
$rmdir your_name
$ls
```

Save a screenshot of the above command along with the corresponding results, you must have your student number and name.

```
jh@jh-virtual-machine:~$ pwd
/home/jh
jh@jh-virtual-machine:~$ cd ~
jh@jh-virtual-machine:~$ mkdir B22040619
mkdir: cannot create directory 'B22040619': File exists
jh@jh-virtual-machine:~$ mkdir B22040619
jh@jh-virtual-machine:~$ cd B22040619
jh@jh-virtual-machine:~/B22040619$ mkdir jiahang
jh@jh-virtual-machine:~/B22040619$ ls
jiahang
jh@jh-virtual-machine:~/B22040619$ rmdir jiahang
jh@jh-virtual-machine:~/B22040619$ ls
jh@jh-virtual-machine:~/B22040619$ █
```

Important d

(2) File operation

Enter the following commands in sequence:

```
$cd ~
$touch yourname.txt
$ls
$echo "hello world" > yourname.txt
$cat yourname.txt
$cp yourname.txt yourname2.txt
$mv yourname.txt yourstudentid.txt
$ls
```

Save a screenshot of the above command along with the corresponding results, you must have your student number and name.

```
jh@jh-virtual-machine:~$ ls
 B22040619                 datalab-handout        lab3           Public
 B22040619.111             datalab-handout.tar    linklab        snap
'B22040619贾航 lab2.doc'    Desktop                linklab.tar    Templates
 bomb405                   Documents              Music         'Untitled 1.doc'
 Rhythmbox        r        Downloads              Pictures       Videos
 bomb.asm                  jiahang.txt            printf.so
jh@jh-virtual-machine:~$ echo "hello world" > jiahang.txt
jh@jh-virtual-machine:~$ cat jiahang.txt
hello world
jh@jh-virtual-machine:~$ cp jiahang.txt jiahang2.txt
jh@jh-virtual-machine:~$ mv jiahng.txt B22040619.txt
mv: cannot stat 'jiahng.txt': No such file or directory
jh@jh-virtual-machine:~$ mv jihang.txt B22040619.txt
mv: cannot stat 'jihang.txt': No such file or directory
jh@jh-virtual-machine:~$ mv jiahang.txt B22040619.txt
jh@jh-virtual-machine:~$ ls
 B22040619                 bomb.asm               jiahang2.txt   printf.so
 B22040619.111             datalab-handout        lab3           Public
'B22040619贾航 lab2.doc'    datalab-handout.tar    linklab        snap
 B22040619.txt             Desktop                linklab.tar    Templates
 bomb405                   Documents              Music         'Untitled 1.doc'
 bomb405.tar               Downloads              Pictures       Videos
jh@jh-virtual-machine:~$
```

(3)User Management

Enter the following commands in sequence:

```
$whoami
$sudo su root
```

Enter the password of the current logged-in user, not the root password, and then enter:

```
#groupadd student
#whoami
#adduser yourstudentID
#usermod -g student yourstudentID
```

Follow the prompts to create the user and add the user to the student group.

Switch to the user.

```
#su yourstudentID
$cd ~
$touch yourname.txt
$ls -l
```

View the properties of the file, including the owner user and the group to which the owner user belongs.

```
jh@jh-virtual-machine:~$ whoami
jh
jh@jh-virtual-machine:~$ sudo su root
[sudo] password for jh:
root@jh-virtual-machine:/home/jh# groupadd student
root@jh-virtual-machine:/home/jh# whuami
Command 'whuami' not found, did you mean:
  command 'whoami' from deb coreutils (8.32-4.1ubuntu1)
Try: apt install <deb name>
 Ubuntu Software  -machine:/home/jh# whoami
root
root@jh-virtual-machine:/home/jh# adduser b22040619
Adding user `b22040619' ...
Adding new group `b22040619' (1002) ...
Adding new user `b22040619' (1001) with group `b22040619' ...
Creating home directory `/home/b22040619' ...
Copying files from `/etc/skel' ...
New password:
BAD PASSWORD: The password fails the dictionary check - it is too sim
Retype new password:
passwd: password updated successfully
Changing the user information for b22040619
Enter the new value, or press ENTER for the default
        Full Name []: jiahang
        Room Number []: 617
        Work Phone []: 13973411822
        Home Phone []: 111111
        Other []: 0
```

(4) Permission management

Enter the following commands in sequence:

```
$ touch demo
$ chmod 777 demo
$ chmod  a-x demo        # result is rw-rw-rw-
$ chmod  go-w demo       # result is rw-r--r--
$ chmod  g+w demo        # result is rw-rw-r--
$ chmod  a=   demo        # result is ---------
$ chmod  +t demo         # result is --------T
$ chmod  u+s demo        # result is --S-----T
$ chmod  u+rx demo       # result is r-s-----T
$ chmod  g+rws demo      # result is r-srwS--T
```

After entering each line, run ls -l demo to view the result.

```
jh@jh-virtual-machine:~$ touch demo
jh@jh-virtual-machine:~$ chmod 777 demo
jh@jh-virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00 B22040619
drwxrwxr-x 2 jh jh    4096  5月 15 15:32 B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02 B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55 bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18 bomb405.tar
                  jh       0  5月 14 19:53 bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024 datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024 datalab-handout.tar
-rwxrwxrwx 1 jh jh       0 10月 14 10:12 demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54 Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07 Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03 jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57 lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07 linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22 linklab.tar
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Music
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Pictures
-rw-rw-r-- 1 jh jh   32304  5月 27 13:32 printf.so
```

Ubuntu Software

```
jh@jh-virtual-machine:~$ chmod a-x demo
jh@jh-virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00 B22040619
Rhythmbox 2 jh jh    4096  5月 15 15:32 B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02 B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55 bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18 bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53 bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024 datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024 datalab-handout.tar
-rw-rw-rw- 1 jh jh       0 10月 14 10:12 demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54 Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07 Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03 jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57 lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07 linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22 linklab.tar
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Music
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Pictures
-rw-rw-r-- 1 jh jh   32304  5月 27 13:32 printf.so
```

```
jh@jh-virtual-machine:~$ chmod go-w demo
jh@jh-virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00 B22040619
Rhythmbox 2 jh jh    4096  5月 15 15:32 B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02 B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55 bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18 bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53 bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024 datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024 datalab-handout.tar
-rw-r--r-- 1 jh jh       0 10月 14 10:12 demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54 Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07 Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03 jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57 lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07 linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22 linklab.tar
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Music
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Pictures
-rw-rw-r-- 1 jh jh   32304  5月 27 13:32 printf.so
```

###(5) Other management

Create folder "others" in the main directory of the user, go to the folder, and create two files with the name of any file. Then run the following commands in sequence.

```
$tar -czvf backup.tar.gz others
$ls -l
$tar  -xzvf  backup.tar.gz
$ls -l
```

Observe changes in the process.
Create a textfile file and make it as follows:

```
no, I study in njupt.
this line ends with 00
this line ends with .00
I am 25 years old.
He is 15. It is 16.00
wy is the short of my name.
```

Search for all lines beginning with the character "n" in the file textfile

```
$ grep  '^n'  textfile
```

Search the textfile for all lines ending in ".00"

```
$ grep  '\.00$'  textfile
```

Search for all lines in the textfile that contain the number 5, followed by the character ".", followed by any character

```
$ grep  '5\..'  textfile
```

Search for all lines starting with the characters "w" and "y" in the file textfile

```
$ grep '^[wy]'textfile
```

```
jh@jh-virtual-machine:~$ chmod g+w demo
jh@jh-virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00 B22040619
                2 jh jh    4096  5月 15 15:32 B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02 B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55 bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18 bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53 bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024 datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024 datalab-handout.tar
-rw-rw-r-- 1 jh jh       0 10月 14 10:12 demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54 Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07 Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03 jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57 lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07 linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22 linklab.tar
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Music
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Pictures
-rw-rw-r-- 1 jh jh   32304  5月 27 13:32 printf.so
```

```
jh@jh-virtual-machine:~$ chmod a=    demo
jh@jh-virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh     4096 10月 14 10:00  B22040619
drwxrwxr-x 2 jh jh     4096  5月 15 15:32  B22040619.111
-rw-rw-r-- 1 jh jh   267264  5月 15 15:27  'B22040619贾航 lab2.d
                     12 10月 14 10:02  B22040619.txt
           jh        4096  5月 14 19:55  bomb405
-rw-rw-r-- 1 jh jh    40960  5月 14 12:18  bomb405.tar
-rw-rw-r-- 1 jh jh        0  5月 14 19:53  bomb.asm
drwxrwxr-x 2 jh jh     4096  4月  2  2024  datalab-handout
-rw-rw-r-- 1 jh jh  1341440  4月  1  2024  datalab-handout.tar
---------- 1 jh jh        0 10月 14 10:12  demo
drwxr-xr-x 2 jh jh     4096  5月 15 21:54  Desktop
drwxr-xr-x 2 jh jh     4096  2月 28  2024  Documents
drwxr-xr-x 2 jh jh     4096  6月  8 12:07  Downloads
-rw-rw-r-- 1 jh jh       12 10月 14 10:03  jiahang2.txt
drwxrwxr-x 2 jh jh     4096  5月 28 20:57  lab3
drwxrwxr-x 2 jh jh     4096  6月  8 12:07  linklab
-rw-rw-r-- 1 jh jh     1704  6月  8 09:22  linklab.tar
drwxr-xr-x 2 jh jh     4096  2月 28  2024  Music
drwxr-xr-x 2 jh jh     4096  2月 28  2024  Pictures
-rw-rw-r-- 1 jh jh    32304  5月 27 13:32  printf.so
```

LibreOffice Writer

```
jh@jh-virtual-machine:~$ chmod u+s demo
jh@jh-virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00  B22040619
drwxrwxr-x 2 jh jh    4096  5月 15 15:32  B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02  B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55  bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18  bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53  bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2  2024  datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1  2024  datalab-handout.tar
---S-----T 1 jh jh       0 10月 14 10:12  demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54  Desktop
drwxr-xr-x 2 jh jh    4096  2月 28  2024  Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07  Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03  jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57  lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07  linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22  linklab.tar
drwxr-xr-x 2 jh jh    4096  2月 28  2024  Music
drwxr-xr-x 2 jh jh    4096  2月 28  2024  Pictures
```

```
jh@jh-virtual-machine:~$ chmod u+rx demo
     virtual-machine:~$ ls -l
Files
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00  B22040619
drwxrwxr-x 2 jh jh    4096  5月 15 15:32  B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02  B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55  bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18  bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53  bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024   datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024   datalab-handout.tar
-r-s-----T 1 jh jh       0 10月 14 10:12  demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54  Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024   Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07  Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03  jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57  lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07  linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22  linklab.tar
```

```
jh@jh-virtual-machine:~$ chmod +t demo
 Files  virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00 B22040619
drwxrwxr-x 2 jh jh    4096  5月 15 15:32 B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02 B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55 bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18 bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53 bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024 datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024 datalab-handout.tar
---------T 1 jh jh       0 10月 14 10:12 demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54 Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07 Downloads
-rw-rw-r-- 1 jh jh      12 10月 14 10:03 jiahang2.txt
drwxrwxr-x 2 jh jh    4096  5月 28 20:57 lab3
drwxrwxr-x 2 jh jh    4096  6月  8 12:07 linklab
-rw-rw-r-- 1 jh jh    1704  6月  8 09:22 linklab.tar
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Music
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Pictures
```

```
jh@jh-virtual-machine:~$ chmod g+rws demo
 Files  virtual-machine:~$ ls -l
total 1956
drwxrwxr-x 2 jh jh    4096 10月 14 10:00 B22040619
drwxrwxr-x 2 jh jh    4096  5月 15 15:32 B22040619.111
-rw-rw-r-- 1 jh jh  267264  5月 15 15:27 'B22040619贾航 lab2.doc'
-rw-rw-r-- 1 jh jh      12 10月 14 10:02 B22040619.txt
drwxrwxr-x 2 jh jh    4096  5月 14 19:55 bomb405
-rw-rw-r-- 1 jh jh   40960  5月 14 12:18 bomb405.tar
-rw-rw-r-- 1 jh jh       0  5月 14 19:53 bomb.asm
drwxrwxr-x 2 jh jh    4096  4月  2 2024 datalab-handout
-rw-rw-r-- 1 jh jh 1341440  4月  1 2024 datalab-handout.tar
-r-srwS--T 1 jh jh       0 10月 14 10:12 demo
drwxr-xr-x 2 jh jh    4096  5月 15 21:54 Desktop
drwxr-xr-x 2 jh jh    4096  2月 28 2024 Documents
drwxr-xr-x 2 jh jh    4096  6月  8 12:07 Downloads
```

```
jh@jh-virtual-machine:~/other$ grep '^n' 11.txt
no, I study in njupt.
jh@jh-virtual-machine:~/other$ grep '\.00' 11.txt
.00
He is 15.It is 16.00
jh@jh-virtual-machine:~/other$ grep '5\..' 11.txt
He is 15.It is 16.00
jh@jh-virtual-machine:~/other$ grep '^[jh]' 11.txt
jh is the short of my name.
jh@jh-virtual-machine:~/other$
```

```
jh@jh-virtual-machine:~/other$ touch 11.txt
jh@jh-virtual-machine:~/other$ touch 22.txt
jh@jh-virtual-machine:~/other$ tar -czvf backup.tar.gz others
tar: others: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
jh@jh-virtual-machine:~/other$ tar -czvf backup.tar.gz 11.txt
11.txt
jh@jh-virtual-machine:~/other$ ls -l
total 4
-rw-rw-r-- 1 jh jh   0 10月 14 10:24 11.txt
-rw-rw-r-- 1 jh jh   0 10月 14 10:24 22.txt
-rw-rw-r-- 1 jh jh 109 10月 14 10:25 backup.tar.gz
jh@jh-virtual-machine:~/other$ tar  -xzvf backup.tar.gz
11.txt
jh@jh-virtual-machine:~/other$ ls -l
total 4
-rw-rw-r-- 1 jh jh   0 10月 14 10:24 11.txt
-rw-rw-r-- 1 jh jh   0 10月 14 10:24 22.txt
-rw-rw-r-- 1 jh jh 109 10月 14 10:25 backup.tar.gz
jh@jh-virtual-machine:~/other$
```