

南京邮电大学

实验报告

(2024 / 2025 学年 第 一 学期)

课程名称	Linux 编程				
实验名称	实验一 Linux 基本命令操作				
实验时间	2024	年	10	月	14 日
指导单位	计算机学院				
指导教师	王磊				

学生姓名	顾茂阳	学号	B21111530
学院(系)	计算机学院	专 业	计算机科学与技术

实 验 报 告

实验名称	实验一 Linux 基本命令操作			指导教师	王磊
实验类型	验证	实验学时	2	实验时间	2024.10.14
<p>一、实验目的及实验要求</p> <p>实验目的</p> <p>通过实验熟悉 Linux 操作系统环境，掌握 Linux 基本命令的使用。</p> <p>实验要求</p> <ol style="list-style-type: none">1、掌握 Linux 文件权限管理；2、掌握基本的文件和目录操作；3、Linux 用户管理；4、文件压缩和归档					
<p>二、实验环境(实验设备)</p> <p>硬件：微型计算机</p> <p>软件：Windows + VMWare + Ubuntu</p>					
<p>三、实验原理及内容</p> <p>(1) 目录操作</p> <p>依次输入以下命令：</p> <pre>\$pwd \$cd ~ \$mkdir B21111530 \$cd B21111530 \$mkdir 顾茂阳 \$ls \$rmdir 顾茂阳 \$ls</pre> <p>运行结果：</p>					

```

gumaoyang@gumaoyang-virtual-machine:~$ pwd
/home/gumaoyang
gumaoyang@gumaoyang-virtual-machine:~$ cd ~
gumaoyang@gumaoyang-virtual-machine:~$ mkdir B21111530
gumaoyang@gumaoyang-virtual-machine:~$ cd B21111530
gumaoyang@gumaoyang-virtual-machine:~/B21111530$ mkdir 顾茂阳
gumaoyang@gumaoyang-virtual-machine:~/B21111530$ ls
顾茂阳
gumaoyang@gumaoyang-virtual-machine:~/B21111530$ rmdir 顾茂阳
gumaoyang@gumaoyang-virtual-machine:~/B21111530$ ls
gumaoyang@gumaoyang-virtual-machine:~/B21111530$

```

图 1 目录操作运行结果

(2) 文件操作

依次输入以下命令：

```

$cd ~
$touch 顾茂阳.txt
$ls
$echo "hello world" > 顾茂阳.txt
$cat 顾茂阳.txt
$cp 顾茂阳.txt 顾茂阳 2.txt
$mv 顾茂阳.txt B21111530.txt
$ls

```

运行结果：

```

gumaoyang@gumaoyang-virtual-machine:~/B21111530$ cd ~
gumaoyang@gumaoyang-virtual-machine:~$ touch 顾茂阳.txt
gumaoyang@gumaoyang-virtual-machine:~$ ls
B21111530      caozuotest2_2      Desktop      Music      test2_1.sh
B21111530 顾茂阳 lab1.doc      caozuotest2_2.c  documents  Pictures   test2_2.sh
B21111530 顾茂阳 lab3.docx   caozuotest2_3    Documents  Public     test2_3.sh
B21111530 顾茂阳 lab4.docx   caozuotest2_3.c  Downloads  Python-3.9.19 test2_4.sh
B21111530 顾茂阳 lab5.docx   datalab-handout  jf03       shmfile    test2_5.sh
caozuotest2_1  datalab-handout.tar lab1         snap       Videos    顾茂阳.txt
caozuotest2_1.c datalab-handout.tar.1 lab2        Templates
gumaoyang@gumaoyang-virtual-machine:~$ echo "hello word">顾茂阳.txt
gumaoyang@gumaoyang-virtual-machine:~$ cat 顾茂阳.txt
hello word
gumaoyang@gumaoyang-virtual-machine:~$ cp 顾茂阳.txt 顾茂阳2.txt
gumaoyang@gumaoyang-virtual-machine:~$ mv 顾茂阳.txt B21111530.txt
gumaoyang@gumaoyang-virtual-machine:~$ ls
B21111530      caozuotest2_2      documents    Public      test2_4.sh
B21111530.txt  caozuotest2_2.c    Documents    Python-3.9.19 test2_5.sh
B21111530 顾茂阳 lab1.doc      caozuotest2_3    Downloads  shmfile    Videos
B21111530 顾茂阳 lab3.docx   caozuotest2_3.c  jf03       snap       顾茂阳2.txt
B21111530 顾茂阳 lab4.docx   datalab-handout  lab1       Templates
B21111530 顾茂阳 lab5.docx   datalab-handout.tar.1 lab2       test2_1.sh
caozuotest2_1  datalab-handout.tar.1 Music      test2_2.sh
caozuotest2_1.c Desktop          Pictures    test2_3.sh
gumaoyang@gumaoyang-virtual-machine:~$ █

```

图 2 文件操作运行结果

(3) 用户管理

依次输入以下命令：

```
$whoami
```

```
$sudo su root
```

输入当前登录用户的密码，而不是 root 密码，然后输入：

```
#groupadd student
```

```
#whoami
```

```
#adduser B21111530
```

```
#usermod -g student B21111530
```

按照提示创建用户并将用户添加到学生组

切换到用户

运行结果：

```
gumaoyang@gumaoyang-virtual-machine:~$ whoami
gumaoyang
gumaoyang@gumaoyang-virtual-machine:~$ sudo su root
[sudo] password for gumaoyang:
root@gumaoyang-virtual-machine:/home/gumaoyang# groupadd student
root@gumaoyang-virtual-machine:/home/gumaoyang# whoami
root
```

```
root@gumaoyang-virtual-machine:/home/gumaoyang# adduser b21111530
Adding user `b21111530' ...
Adding new group `b21111530' (1002) ...
Adding new user `b21111530' (1001) with group `b21111530' ...
Creating home directory `/home/b21111530' ...
Copying files from `/etc/skel' ...
```

```
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for b21111530
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n]
```

```
root@gumaoyang-virtual-machine:/home/gumaoyang# usermod -g student b21111530
root@gumaoyang-virtual-machine:/home/gumaoyang#
```

图 3 用户管理运行结果

查看文件属性，包括所属用户和所属组

```
#su b21111530
```

```
$cd ~
```

```
$touch 顾茂阳.txt
```

```
$ls -l
```

运行结果:

```
root@gumaoyang-virtual-machine:/home/gumaoyang# su b21111530
b21111530@gumaoyang-virtual-machine:/home/gumaoyang$ cd~

b21111530@gumaoyang-virtual-machine:~$ touch 顾茂阳.txt
b21111530@gumaoyang-virtual-machine:~$ ls -l
total 0
-rw-r--r-- 1 b21111530 student 0 12月  9 10:44 顾茂阳.txt
```

图 4 查看文件属性运行结果

(4) 权限管理

依次输入以下命令:

输入每行后, 运行 `ls -l demo` 查看结果。

```
$ 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
```

运行结果:

```
b21111530@gumaoyang-virtual-machine:~$ touch demo
b21111530@gumaoyang-virtual-machine:~$ chmod 777 demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-rwxrwxrwx 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod a-x demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-rw-rw-rw- 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod go-w demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-rw-r--r-- 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod g+w demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-rw-rw-r-- 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod a= demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
----- 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod +t demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-----T 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod u+s demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
--S-----T 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod u+rx demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-r-s-----T 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$ chmod g+rws demo
b21111530@gumaoyang-virtual-machine:~$ ls -l demo
-r-srwS--T 1 b21111530 student 0 12月  9 10:49 demo
b21111530@gumaoyang-virtual-machine:~$
```

图 5 权限管理运行结果

(5) 其他管理

在用户的主目录下创建文件夹“others”，进入该文件夹，创建两个文件，文件名任意。然后依次执行以下命令。

```
$tar -czvf backup.tar.gz others
```

```
$ls -l
```

```
$tar -xzvf backup.tar.gz
```

```
$ls -l
```

运行结果：

```
b21111530@gumaoyang-virtual-machine:~$ mkdir others
b21111530@gumaoyang-virtual-machine:~$ cd others
b21111530@gumaoyang-virtual-machine:~/others$ touch 1530_1.txt
b21111530@gumaoyang-virtual-machine:~/others$ touch 1530_2.txt
```

图 6 创建文件夹 others

```
b21111530@gumaoyang-virtual-machine:~$ mkdir others
b21111530@gumaoyang-virtual-machine:~$ cd others
b21111530@gumaoyang-virtual-machine:~/others$ touch 1530_1.txt
b21111530@gumaoyang-virtual-machine:~/others$ touch 1530_2.txt
b21111530@gumaoyang-virtual-machine:~/others$ cd ~
b21111530@gumaoyang-virtual-machine:~$ tar -czvf backup.tar.gz others
others/
others/1530_1.txt
others/1530_2.txt
b21111530@gumaoyang-virtual-machine:~$ ls -l
total 8
-rw-r--r-- 1 b21111530 student 166 12月 9 11:11 backup.tar.gz
-r-srws--T 1 b21111530 student 0 12月 9 10:49 demo
drwxr-xr-x 2 b21111530 student 4096 12月 9 11:10 others
-rw-r--r-- 1 b21111530 student 0 12月 9 10:44 顾茂阳.txt
b21111530@gumaoyang-virtual-machine:~$ cd others
b21111530@gumaoyang-virtual-machine:~/others$ ls
1530_1.txt 1530_2.txt
b21111530@gumaoyang-virtual-machine:~/others$ cd ~
b21111530@gumaoyang-virtual-machine:~$ tar -xzvf backup.tar.gz
others/
others/1530_1.txt
others/1530_2.txt
b21111530@gumaoyang-virtual-machine:~$ ls -l
total 8
-rw-r--r-- 1 b21111530 student 166 12月 9 11:11 backup.tar.gz
-r-srws--T 1 b21111530 student 0 12月 9 10:49 demo
drwxr-xr-x 2 b21111530 student 4096 12月 9 11:10 others
-rw-r--r-- 1 b21111530 student 0 12月 9 10:44 顾茂阳.txt
```

图 7 压缩文件夹

观察过程中的变化：

从结果来看，解压时提取的内容与原始压缩内容相同：others 目录及其中的文件（如 1530_1.txt 和 1530_2.txt）。因此，看起来这两个操作没有区别，但实际上是在执行压缩和解压的不同步骤。

创建一个 textfile 文件，如下所示：

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.

1、在文件 textfile 中搜索所有以字符“n”开头的行：

```
$ grep '^n' textfile.txt
```

运行结果：

```
gumaoyang@gumaoyang-virtual-machine:~$ grep '^n' textfile.txt  
no, I study in njupt.
```

图 8 搜索所有以字符“n”开头的行

2、搜索所有以“.00”结尾的行：

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

运行结果：

```
gumaoyang@gumaoyang-virtual-machine:~$ grep '\.00$' textfile.txt  
this line ends with .00  
He is 15. It is 16.00
```

图 9 搜索所有以“.00”结尾的行

3、在文本文件中搜索包含数字 5，后面跟着字符“.”，后面跟着任意字符的所有行：

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

运行结果：

```
gumaoyang@gumaoyang-virtual-machine:~$ grep '5\.' textfile.txt  
He is 15. It is 16.00
```

图 10 在文本文件中搜索包含数字 5，后面跟着字符“.”，后面跟着任意字符的所有行

4、在文件 textfile 中搜索所有以“w”和“y”开头的行：

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

运行结果：

```
gumaoyang@gumaoyang-virtual-machine:~$ grep '^[wy]' textfile.txt  
wy is the short of my name.
```

图 11 在文件 textfile 中搜索所有以“w”和“y”开头的行

四、实验小结（包括问题和解决方法、心得体会、意见与建议等）

在这次 Linux 实验过程中，我经历了多个常用命令的实际操作，解决了一些常见的问题，以下是我总结的几个重要心得：

1、命令格式和参数使用

命令格式非常重要：Linux 是区分大小写的，命令参数通常需要精确输入；

正确理解命令的每个选项：在使用 tar 命令时，选项如 -c、-z、-v 和 -f 代表不同的操作，如创建归档、压缩、显示详细信息和指定文件名。了解这些选项的作用，能帮助我们更好地掌握命令。

2、文件和目录操作

目录的删除问题：使用 rmdir 删除目录时，必须确保目录为空。如果目录不为空，系统会报错。因此，使用 rm -r 或 rm -rf 进行删除时，需要特别小心，确保删除的是不再需要的文件或目录。

通过这次实验，我不仅学习了如何使用常见的 Linux 命令进行文件和目录的管理、压缩与解压，还提高了排查问题和解决问题的能力。在实际操作中，我更加熟悉了 Linux 系统的基本操作，尤其是文件管理、用户管理和压缩解压等常用任务。同时也深刻认识到，Linux 系统的强大与灵活性来自于其强大的命令行操作，而每个命令和选项的理解与使用对于系统管理来说至关重要。

通过这次实验，我相信自己能够在未来的工作和学习中更加得心应手地运用 Linux 系统进行日常管理和维护。