模块的设计和对应功能如下:

Is命令

1. handle_ls模块更具-a,-R,-d 或无指定参数来决定有哪些文件以及文件夹需要被展示,例如 -a就需要添加 "." 和 ".."。

```
def handle_ls(path,command):
    notOriginList = True
    for i in command:
        if(len(command)==1):
            break
        if i == '-a':
            list = ['.','..'] + os.listdir(path)
            notOriginList = False
            break
        elif i == '-R':
            command.remove('-R')
            list = []
            getAllFilesRecursive(path, list, command)
            notOriginList = False
            break
        elif i == '-d':
            list = ['.']
            notOriginList = False
            break
    if notOriginList == True:
        list = os.listdir(path)
    ans = []
    for i in list:
        # 遍历list, 获取每个文件的各种属性
        ans.append( each_ls(path,i))
    printFormatted(ans)
```

2. 对于每个文件或文件夹,根据参数获取其对应的信息 使用python的os库,使用其中的os.lstat()方法获取所需要的各类信息

```
def each_ls(path,i):
    path = os.path.join(path,i)
    fileStats = os.lstat(path)
    ret =[]
# flag在最初更具输入的命令确定,具体见源码
    global flag_i
```

```
global flag_l
if flag_i == True:
    ret = ret + [str(fileStats.st_ino)]
if flag_l == True:
    ret = ret + [
        filemode(fileStats.st_mode),
        str(fileStats.st_nlink),
        getpwuid(fileStats.st_uid).pw_name,
        getgrgid(fileStats.st_gid).gr_name,
        str(fileStats.st_size),
        formatted_time(fileStats.st_mtime),
    ]
ret = ret + [i]
return ret
```

3. 对于获取的信息格式化

例如格式化时间使用如下方法

```
def formatted_time(st_mtime):
    dt = datetime.datetime.fromtimestamp(st_mtime)
    return dt.strftime('%b %d %H:%M')
```

wc命令

1. 使用python中的open, 关键代码如下

```
for filename in filenames:
        chars = 0
        words = 0
        lines = 0
        try:
            with open(os.path.join(os.getcwd(),filename)) as fh:
                for line in fh:
                    lines += 1
                    words += len(line.split())
                    chars += len(line)
            results.append([
                str(lines),
                str(words),
                str(chars),
                str(filename)
            ]
            )
        except Exception as err:
            print(err)
```

运行截图

运行环境 ubuntu 20.04, python版本3.8.10

Is

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls
bye.c
dir1
hello.cpp
ls.py
```

ls -l

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls -l
                                                 Apr 07 11:56
                 1
                                         120
                                                                 bye.c
-rwxrwxrwx
                         zyz
drwxrwxrwx
                 1
                                         4096
                                                 Apr 07 11:17
                                                                 dir1
                         zyz
                                 zyz
                                                                 hello.cpp
                 1
                                         108
                                                 Apr 07 11:57
-rwxrwxrwx
                         zyz
                                 zyz
                 1
                                         4078
                                                 Apr 07 20:30
-rwxrwxrwx
                                                                 ls.py
                         zyz
                                 zyz
```

ls -a

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls -a
.
.
bye.c
dir1
hello.cpp
ls.py
```

Is-R

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls -R
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业:
bye.c
dir1
hello.cpp
ls.py
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业/dir1:
dir1_java.java
dir2
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业/dir1/dir2:
index.html
```

ls -i

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls -i
10414574138325129 bye.c
9570149208194401 dir1
32369622321753306 hello.cpp
66991044457146544 ls.py
```

/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls -d .

Is 参数组合

ls -l -i

/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 ls -l -i							
10414574138325129	-rwxrwxrwx	1	zyz	zyz	120	Apr 07 11:56	bye . c
9570149208194401	drwxrwxrwx	1	zyz	zyz	4096	Apr 07 11:17	dir1
32369622321753306	-rwxrwxrwx	1	zyz	zyz	108	Apr 07 11:57	hello.cpp
66991044457146544	-rwxrwxrwx	1	zyz	zyz	3675	Apr 07 20:48	ls.py

Is -R -I -i

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业
                                                                                                            bye.c
dir1
                                                                                        Apr 07 11:56
Apr 07 11:17
Apr 07 11:57
10414574138325129
                              -rwxrwxrwx
                                                                     zyz
                                                                               120
9570149208194401
                              drwxrwxrwx
                                                                     zyz
                                                                               4096
                                                           zyz
32369622321753306
                                                                                                            hello.cpp
                              -rwxrwxrwx
                                                           zyz
                                                                     zyz
                                                                               108
                                                                                        Apr 07 20:48
66991044457146544
                              -rwxrwxrwx
                                                                     zyz
                                                                               3675
                                                                                                            ls.py
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业/dir1:
30399297484781856
2814749767363145
                                                                                        Apr 07 11:57
Apr 07 11:18
                              -rwxrwxrwx
                                                                                                            dir1_java.java
                              drwxrwxrwx
                                                                               4096
                                                                                                            dir2
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业/dir1/dir2
9288674231650506
                             -rwxrwxrwx
                                                                     zyz
                                                                               274
                                                                                        Apr 07 11:18
                                                                                                            index.html
```

ls -R -l -i -a

```
t/c/Users/zhuyize/Desktop/linux_第
/mnt/c/Users/zhuyize/Desktop/Linux_第三次作业:
54606145481895183 drwxrwxrwx 1
                                                                                                    Apr 07 20:09
Apr 07 19:59
Apr 07 11:56
                                                                                         4096
                                                                   zyz
                                                                              zyz
6192449487736612
10414574138325129
                                  drwxrwxrwx
                                                                   zyz
                                                                              zyz
zyz
                                                                                         4096
                                   -rwxrwxrwx
                                                                                         120
                                                                                                                          bye.c
                                                                   zyz
9570149208194401
                                                                              zyz
                                                                                         4096
                                                                                                    Apr 07 11:17
                                                                                                                          dir1
                                  drwxrwxrwx
                                                                   zyz
                                                                                                    Apr 07 11:57
Apr 07 20:48
32369622321753306
                                  -rwxrwxrwx
                                                                                         108
                                                                                                                          hello.cpp
                                                                   zyz
                                                                              zyz
66991044457146544
                                  -rwxrwxrwx
                                                                              zyz
                                                                                         3675
                                                                                                                          ls.py
                                                                   zyz
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业/dir1:
9570149208194401 drwxrwxrwx 1 zvz
                                                                                                   Apr 07 11:17
Apr 07 20:09
Apr 07 11:57
Apr 07 11:18
                                                                   zyz
                                                                              zyz
                                                                                         4096
54606145481895183
                                                                                         4096
                                  drwxrwxrwx
                                                                   zyz
                                                                              zyz
                                                                                                                          dir1_java.java
30399297484781856
                                                                                         121
                                                                   zyz
                                                                              zyz
                                   -rwxrwxrwx
2814749767363145
2814749767363145 drwxrwxrwx 1 zyz
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业/dir1/dir2
                                                                                         4096
                                                                              zyz
                                                                                                    Apr 07 11:18
Apr 07 11:17
Apr 07 11:18
2814749767363145
                                  drwxrwxrwx
                                                                              zyz
                                                                                         4096
                                                                   zyz
9570149208194401
9288674231650506
                                  drwxrwxrwx
                                                                                         4096
                                                                                                                          index.html
                                  -rwxrwxrwx
                                                                              zyz
                                                                                         274
```

wc命令,支持后跟多个文件

wc bye.c

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 wc bye.c
7 13 98 bye.c
```

wc bye.c ls.py

```
/mnt/c/Users/zhuyize/Desktop/linux_第三次作业 wc bye.c ls.py
7 13 98 bye.c
143 321 3553 ls.py
```