

# 系統程式設計

## Lab4 File Attributes

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### I. How do you modify fig4\_22.c?

Error message

```
buttercup@buttercup-virtual-machine:~/sp/HW4/Lab4_example$ make
gcc fig4_22.c error.c path_alloc.c -o fig4_22
bash createFile.sh
./fig4_22 -rwt /tmp/buttercup/esllab20140411.cn
Can't read directory /tmp/buttercup/fileMx7Qrt/Test2/: Permission denied
Can't read directory /tmp/buttercup/fileMx7Qrt/Test1/: Permission denied
regular files = 53, 80.30 %
directories = 5, 7.58 %
block special = 0, 0.00 %
char special = 0, 0.00 %
FIFOs = 5, 7.58 %
symbolic links = 3, 4.55 %
sockets = 0, 0.00 %
```

```
buttercup@buttercup-virtual-machine:~/sp/HW4/Lab4_example$ make
bash createFile.sh
./fig4_22 `cat /tmp/buttercup/esllab20140411.sp`
regular files = 53, 80.30 %
directories = 5, 7.58 %
block special = 0, 0.00 %
char special = 0, 0.00 %
FIFOs = 5, 7.58 %
symbolic links = 3, 4.55 %
sockets = 0, 0.00 %
```

因權限不合所以使用 `chmod()`，改變權限

Chmod

# include <sys/stat.h>

int chmod (const char \*pathname, mode\_t mode)

--> `chmod(fullpath, S_IRWXU | S_IRWXG | S_IRWXO);`

註:

`static char *fullpath; /* contains full pathname for every file */`  
`fullpath = path_alloc(&len);`

### II. The count of the various types of files?

```
regular files = 53, 80.30 %
directories = 5, 7.58 %
block special = 0, 0.00 %
char special = 0, 0.00 %
FIFOs = 5, 7.58 %
symbolic links = 3, 4.55 %
sockets = 0, 0.00 %
valid = 2
invalid = 1
Total size= 20573
```

### III. The count of total files size?

**Total size = 20573(如 II 上截圖)**

Use `st_size` in `stat` struct specifies size of file in bytes

```
#include <sys/types.h>
```

```
off_t total_size;
```

```
total_size += statbuf.st_size;
```

一開始，很疑惑 `directory` 的大小應該要是 16 或 512 的倍數，為甚麼投影片上的卻是 20567，後來想想其實還會加上 `#bytes(filename)` for links，所以才會造成此結果，而這個 link 是包含完整路徑的黨名，因此每個人測出來也會不同。

### IV. (Bonus) The count of valid and invalid link?

**Valid link = 2(如 II 上截圖)**

**Invalid link = 1(如 II 上截圖)**

想法:

`readlink()` 會將參數 `path` 的符號連接內容存到 `buf` 所指的內存空間，失敗返回 -1  
`access()`，test for existence of file-->F\_OK，成功返回 0 (valid++)，失敗返回 -1 (invalid++)

```
access(const char *pathname, int mode);
```

```
readlink(const char *restrict pathname, char *restrict buf, rsize_t bufsize);
```

```
char buf[1024];
```

```
if(readlink(fullpath, buf, 1024) != -1)
{
    if(access(buf,F_OK) == 0)
        valid++;
    else
        invalid++;
}
```