

1. ls

```
tonytsai@tonytsai-VirtualBox: ~/Downloads/課程大綱及ch00-ch06/ch02
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch02$ ls
all  callgrind.out.20038  hello  makefile  pointer.c  table.c
a.out  gmon.out             hello.c  pointer  table
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch02$ ls -a
.  ..  all  callgrind.out.20038  hello  makefile  pointer.c  table.c
.  .  a.out  gmon.out             hello.c  pointer  table  .vscode
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch02$ ls -l
total 116
-rw-r--r-- 1 tonytsai tonytsai 0 16 15:50 all
-rwxrwxr-x 1 tonytsai tonytsai 10568 16 16:26 a.out
-rw----- 1 tonytsai tonytsai 48679 16 15:11 callgrind.out.20038
-rw-rw-r-- 1 tonytsai tonytsai 501 16 15:51 gmon.out
-rwxrwxr-x 1 tonytsai tonytsai 8600 16 15:50 hello
-rw-r--r-- 1 tonytsai tonytsai 76 25 2016 hello.c
-rw-r--r-- 1 tonytsai tonytsai 215 16 15:50 makefile
-rwxrwxr-x 1 tonytsai tonytsai 11680 16 15:50 pointer
-rw-r--r-- 1 tonytsai tonytsai 172 25 2016 pointer.c
-rwxrwxr-x 1 tonytsai tonytsai 9352 16 15:50 table
-rw-r--r-- 1 tonytsai tonytsai 766 16 17:23 table.c
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch02$ ls -al
total 128
drwxr-xr-x 3 tonytsai tonytsai 4096 16 16:26 .
drwxrwxr-x 8 tonytsai tonytsai 4096 17 19:48 ..
-rw-r--r-- 1 tonytsai tonytsai 0 16 15:50 all
-rwxrwxr-x 1 tonytsai tonytsai 10568 16 16:26 a.out
-rw----- 1 tonytsai tonytsai 48679 16 15:11 callgrind.out.20038
-rw-rw-r-- 1 tonytsai tonytsai 501 16 15:51 gmon.out
-rwxrwxr-x 1 tonytsai tonytsai 8600 16 15:50 hello
-rw-r--r-- 1 tonytsai tonytsai 76 25 2016 hello.c
-rw-r--r-- 1 tonytsai tonytsai 215 16 15:50 makefile
-rwxrwxr-x 1 tonytsai tonytsai 11680 16 15:50 pointer
-rw-r--r-- 1 tonytsai tonytsai 172 25 2016 pointer.c
-rwxrwxr-x 1 tonytsai tonytsai 9352 16 15:50 table
-rw-r--r-- 1 tonytsai tonytsai 766 16 17:23 table.c
drwxr-xr-x 2 tonytsai tonytsai 4096 16 16:17 .vscode
```

ls 指令可以查看當前目錄下的檔案有哪些

若是只有 ls 是察看非隱藏檔，後面加上 -a 可以查看到隱藏檔

而 -l 及 -al 則可看到更多檔案的資訊，像是屬性、檔案大小、建檔日期等等
而其中 -al 可顯示出隱藏檔的資訊。

2. man

```
tonytsai@tonytsai-VirtualBox: ~/Downloads/課程大綱及ch00-ch06/ch02
LS(1) User Commands LS(1)
NAME
ls - list directory contents
SYNOPSIS
ls [OPTION]... [FILE]...
DESCRIPTION
List information about the FILES (the current directory by default). Sort
entries alphabetically if none of -cftuvSUX nor --sort is specified.
Mandatory arguments to long options are mandatory for short options too.
-a, --all
do not ignore entries starting with .
-A, --almost-all
do not list implied . and ..
--author
with -l, print the author of each file
-b, --escape
print C-style escapes for nongraphic characters
--block-size=SIZE
scale sizes by SIZE before printing them; e.g., '--block-size=M' prints
sizes in units of 1,048,576 bytes; see SIZE format below
-B, --ignore-backups
do not list implied entries ending with ~
-c with -lt: sort by, and show, ctime (time of last modification of file sta-
Manual page ls(1) line 1 (press h for help or q to quit)
```

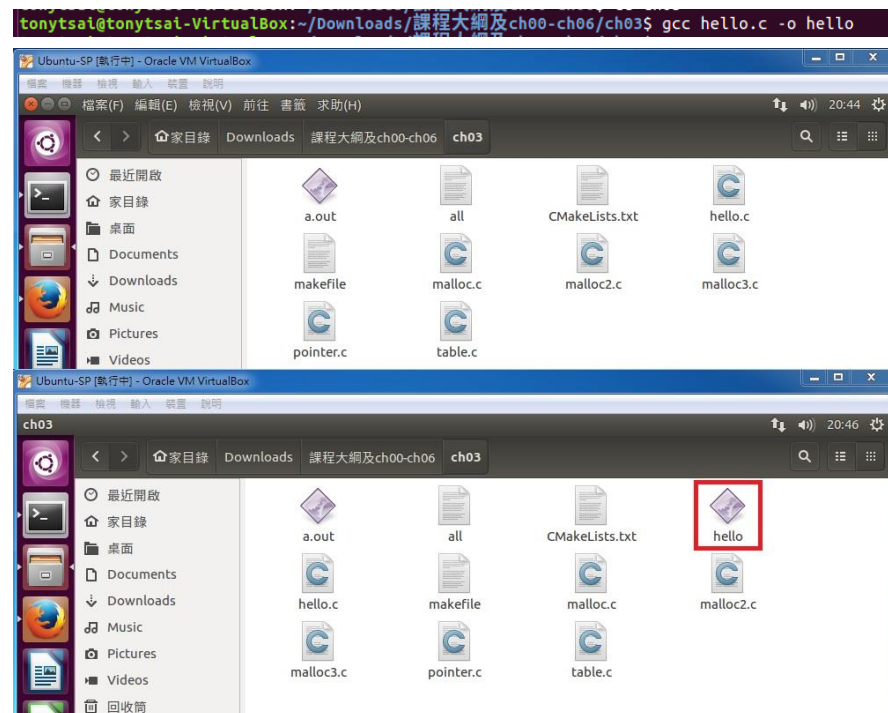
man 的功能是用來查詢，若是我要查詢 ls 指令，就在命令列中輸入 man ls
即可看到上圖的結果。

3. apt-get

```
tonytsai@tonytsai-VirtualBox: ~  
tonytsai@tonytsai-VirtualBox:~$ sudo apt-get install vim  
[sudo] password for tonytsai:  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
vim is already the newest version (2:7.4.1689-3ubuntu1.2).  
The following packages were automatically installed and are no longer required:  
  libappindicator1 libindicator7 python-cairo python-gobject-2 python-gpgme python-gtk2  
Use 'sudo apt autoremove' to remove them.  
0 upgraded, 0 newly installed, 0 to remove and 30 not upgraded.  
tonytsai@tonytsai-VirtualBox:~$ sudo apt-get upgrade  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Calculating upgrade... Done  
The following packages were automatically installed and are no longer required:  
  libappindicator1 libindicator7 python-cairo python-gobject-2 python-gpgme python-gtk2  
Use 'sudo apt autoremove' to remove them.  
The following packages will be upgraded:  
  appmenu-qt5 desktop-file-utils gir1.2-appindicator3-0.1 gir1.2-gtk-3.0 gnome-software  
  gnome-software-common grub-common grub-pc grub-pc-bin grub2-common init  
  init-system-helpers libappindicator3-1 libexiv2-14 libgail-3-0 libgtk-3-0 libgtk-3-bin  
  libgtk-3-common libnm-glib-vpn1 libnm-glib4 libnm-util2 libnm0 nano network-manager  
  resolvconf snap-confine snapd sni-qt ubuntu-core-launcher ubuntu-software  
30 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.  
Need to get 21.1 MB of archives.  
After this operation, 2774 kB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://tw.archive.ubuntu.com/ubuntu xenial-updates/main amd64 init-system-helpers all  
  1.29ubuntu4 [32.3 kB]  
Get:2 http://tw.archive.ubuntu.com/ubuntu xenial-updates/main amd64 init amd64 1.29ubuntu4  
  [4624 B]  
Get:3 http://tw.archive.ubuntu.com/ubuntu xenial-updates/main amd64 grub-pc amd64 2.02-beta  
  2-36ubuntu3.8 [197 kB]  
Get:4 http://tw.archive.ubuntu.com/ubuntu xenial-updates/main amd64 grub2-common amd64 2.02
```

apt-get 指令通常是跟安裝、更新、移除等功能相關，上圖就舉了 2 個例子，第 1 個指令是安裝 vim，而第 2 個指令則是檢查是否有更新。

4. gcc



gcc 是編譯的指令，拿上課教材當例子，首先輸入上圖的指令，能編譯 hello.c 然後做出一個名叫 hello 的執行檔，下圖就是執行前跟後的差別，多出一個 hello 的執行檔。

5. chmod

```
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch03$ ls -l testchmod
-rw-rw-r-- 1 tonytsai tonytsai 0  三  17 20:55 testchmod
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch03$ chmod 770 testchmod
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch03$ ls -l testchmod
-rwxrwx--- 1 tonytsai tonytsai 0  三  17 20:55 testchmod
tonytsai@tonytsai-VirtualBox:~/Downloads/課程大綱及ch00-ch06/ch03$
```

chmod 是用來更改權限的指令，基本權限有 9 個，分別是 owner、group 及 others 的 3 個權限(read、write、execute)，而其中 r=4 w=2 x=1，因此 owner、group 及 others 三者都會有一個加總的數字，ex: rwx=4+2+1=7，因此在 chmod 指令中需要用此總和來設定權限。在目錄中有一個 testchmod 的檔案，本來的權限是 rw-rw-r-- 表示 owner 及 group 能 read、write，而 others 只能 read，此時將若要让 owner group 有 3 個權限而 others 沒有權限，就要輸入“chmod 770 檔案名稱”即可。

6. chown

```
tonytsai@tonytsai-VirtualBox: ~
total 48
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Desktop
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Documents
drwxr-xr-x 4 tonytsai tonytsai 4096 17 19:48 Downloads
-rw-r--r-- 1 tonytsai tonytsai 8980  7 23:45 examples.desktop
-rw-r--r-- 1 tonytsai tonytsai  76  25 2016 hello.c
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Music
drwxr-xr-x 2 tonytsai tonytsai 4096 17 19:51 Pictures
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Public
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Templates
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Videos
tonytsai@tonytsai-VirtualBox:~$ sudo chown root hello.c
tonytsai@tonytsai-VirtualBox:~$ ls -l
total 48
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Desktop
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Documents
drwxr-xr-x 4 tonytsai tonytsai 4096 17 19:48 Downloads
-rw-r--r-- 1 tonytsai tonytsai 8980  7 23:45 examples.desktop
-rw-r--r-- 1 root    tonytsai  76  25 2016 hello.c
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Music
drwxr-xr-x 2 tonytsai tonytsai 4096 17 19:51 Pictures
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Public
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Templates
drwxr-xr-x 2 tonytsai tonytsai 4096  8 00:08 Videos
tonytsai@tonytsai-VirtualBox:~$
```

chown 是用來改變檔案的 owner，上圖 hello.c 的 owner 從 tonytsai 變成了 root 了，其中若是在 chown 後加上 -R 則是將所選得目錄下的檔案一併更改。

7. chgrp

```
tonytsai@tonytsai-VirtualBox: ~  
total 48  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Desktop  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Documents  
drwxr-xr-x 4 tonytsai tonytsai 4096 17 19:48 Downloads  
-rw-r--r-- 1 tonytsai tonytsai 8980 7 23:45 examples.desktop  
-rw-r--r-- 1 tonytsai tonytsai 76 25 2016 hello.c  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Music  
drwxr-xr-x 2 tonytsai tonytsai 4096 17 19:51 Pictures  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Public  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Templates  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Videos  
tonytsai@tonytsai-VirtualBox:~$ sudo chgrp root hello.c  
tonytsai@tonytsai-VirtualBox:~$ ls -l  
total 48  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Desktop  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Documents  
drwxr-xr-x 4 tonytsai tonytsai 4096 17 19:48 Downloads  
-rw-r--r-- 1 tonytsai tonytsai 8980 7 23:45 examples.desktop  
-rw-r--r-- 1 tonytsai root 76 25 2016 hello.c  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Music  
drwxr-xr-x 2 tonytsai tonytsai 4096 17 19:51 Pictures  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Public  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Templates  
drwxr-xr-x 2 tonytsai tonytsai 4096 8 00:08 Videos  
tonytsai@tonytsai-VirtualBox:~$
```

chgrp 是用來改變檔案所屬的 group，上圖 hello.c 所屬的 group 變成了 root 了，同樣的，若是在 chgrp 後加上 -R 則是將所選得目錄下的檔案一併更改。

8. mv

```
tonytsai@tonytsai-VirtualBox:~$ cd Downloads  
tonytsai@tonytsai-VirtualBox:~/Downloads$ ls  
testfile testmv 課程大綱及ch00-ch06  
tonytsai@tonytsai-VirtualBox:~/Downloads$ cd  
tonytsai@tonytsai-VirtualBox:~$ mv Downloads/testfile Downloads/testmv  
tonytsai@tonytsai-VirtualBox:~$ cd Downloads/testmv  
tonytsai@tonytsai-VirtualBox:~/Downloads/testmv$ ls  
testfile  
tonytsai@tonytsai-VirtualBox:~/Downloads/testmv$ mv testfile testfile2  
tonytsai@tonytsai-VirtualBox:~/Downloads/testmv$ ls  
testfile2  
tonytsai@tonytsai-VirtualBox:~/Downloads/testmv$
```

mv 可以用來改變檔案的位置，也可以用來改變檔名。

9. ln

```
tonytsai@tonytsai-VirtualBox:~/Downloads$ ln hello.c lnfile  
tonytsai@tonytsai-VirtualBox:~/Downloads$ ln -s hello.c lnfile2  
tonytsai@tonytsai-VirtualBox:~/Downloads$ ls -l  
total 12  
-rw-r--r-- 3 tonytsai tonytsai 139 2 2016 hello.c  
-rw-r--r-- 3 tonytsai tonytsai 139 2 2016 lnfile  
lrwxrwxrwx 1 tonytsai tonytsai 7 17 22:55 lnfile2 -> hello.c  
drwxrwxr-x 8 tonytsai tonytsai 4096 17 20:25 課程大綱及ch00-ch06
```

ln 可以用來連結檔案，其中分為軟連結與硬連結 2 種，硬連結是以副本方式存在，因此檔案大小與原檔一致，而軟連結則是以路徑方式存在，在語法上，軟連結需要加上 -s，而 2 者相同之處則是原檔及連結檔都是同步改變的。

10. mount

```
tonytsai@tonytsai-VirtualBox:~$ ls -l Downloads/mon
total 0
tonytsai@tonytsai-VirtualBox:~$ sudo mount -t auto /dev/sdb1 Downloads/mon
tonytsai@tonytsai-VirtualBox:~$ ls -l Downloads/mon
total 4
-rw-r--r-- 1 tonytsai tonytsai 0  17 23:45 11
-rw-r--r-- 1 tonytsai tonytsai 76 26 2016 hello.c
tonytsai@tonytsai-VirtualBox:~$ sudo umount Downloads/mon
tonytsai@tonytsai-VirtualBox:~$ ls -l Downloads/mon
total 0
tonytsai@tonytsai-VirtualBox:~$
```

mount 指令就是掛載，上圖將 usb 掛載到自訂的一個資料夾 mon 中，之後 umount 卸載後，mon 中的東西就清空了。

11. tar

```
tonytsai@tonytsai-VirtualBox:~/Downloads$ tar -jcv -f hello.tar hello.c
hello.c
tonytsai@tonytsai-VirtualBox:~/Downloads$ ls -l
total 16
-rw-r--r-- 3 tonytsai tonytsai 139 == 2 2016 hello.c
-rw-rw-r-- 1 tonytsai tonytsai 242 === 18 00:05 hello.tar
drwxrwxr-x 2 tonytsai tonytsai 4096 === 17 23:47 mon
drwxrwxr-x 8 tonytsai tonytsai 4096 === 17 23:28 課程大綱及ch00-ch06
tonytsai@tonytsai-VirtualBox:~/Downloads$ tar -jxv -f hello.tar -C ./testtar/
hello.c
tonytsai@tonytsai-VirtualBox:~/Downloads$ ls -l ./testtar
total 4
-rw-r--r-- 1 tonytsai tonytsai 139 == 2 2016 hello.c
tonytsai@tonytsai-VirtualBox:~/Downloads$
```

tar 可以執行壓縮及解壓縮等功能，還能指定解壓縮的目錄。

12. vim

```
tonytsai@tonytsai-VirtualBox:~/Downloads$ vim hello.c
```

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

int main() {
    printf("pid = %d\n", getpid());
    printf("hello\n");
    while(1);
}

~
~
~
~
~
~
~
~
~
~
~
~
```

1,1 All

Vim 為 vi 的進階版本，可以用來編輯程式，還能使用顏色來增加可讀性。上圖輸入 `vim hello.c` 後，就進入 `hello` 的程式內，按下 `i` 就能進行編輯修改，修改完後按下 `esc` 停止編輯，接著若要確定修改且離開 輸入 `:wq` 若不修改直接離開則輸入 `:q`。