系統程式 HW7
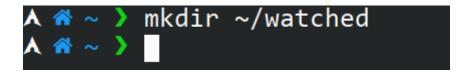
410410060 資工二 林柔均

1.先使用inotifywait熟悉inotify會產生哪些訊息

甲、先安裝工具『sudo apt install-y inotify-tools』（-y的意思是直接安裝了，不要問）

```
Λ 🏠 ~ ❯ yay inotify-tools                                          ⏰ 22:51:49
2 aur/inotify-tools-git 3.22.6.0.r6.g8367bdd-1 (+0 0.00)
    C library and a set of command-line programs for Linux providing a simple interface to ino
tify
1 community/inotify-tools 3.22.6.0-2 (162.5 KiB 882.1 KiB) (Installed)
    inotify-tools is a C library and a set of command-line programs for Linux providing a simp
le interface to inotify.
==> Packages to install (eg: 1 2 3, 1-3 or ^4)
==> 1
[sudo] password for rogewood:
warning: inotify-tools-3.22.6.0-2 is up to date -- reinstalling
resolving dependencies...
looking for conflicting packages...

Packages (1) inotify-tools-3.22.6.0-2

Total Installed Size:  0.86 MiB
Net Upgrade Size:      0.00 MiB

:: Proceed with installation? [Y/n]
(1/1) checking keys in keyring                     [###########################] 100%
(1/1) checking package integrity                   [###########################] 100%
```

乙、在自己的家目錄建立一個目錄『watched』mkdir ~/watched

```
Λ 🏠 ~ ❯ mkdir ~/watched
Λ 🏠 ~ ❯ 
```

丙、inotify可以監看目錄也可以監看檔案，這次我們監看目錄，指令為『inotifywait -m -r watched/』，其中『m』是monitor的縮寫，表示持續監看，-r代表遞回。

```
Λ 🏠 ~ ❯ inotifywait -m -r watched/
Setting up watches.  Beware: since -r was given, this may take a while!
Watches established.
```

丁、開啟另一個terminal，在watched目錄裡面建立檔案，例如使用『touch a』，建立目錄，例如使用『mkdir b-dir』，進入b-dir『cd b-dir』在b-dir內建立一個檔案『touch file_in_bdir』，看看inotifywait有哪些訊息


```
File  Edit  View  Bookmarks  Plugins  Settings  Help

  New Tab    Split View

∧ ⌂ ~ ❯ inotifywait -m -r watched/
Setting up watches.  Beware: since -r was g
Watches established.
watched/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ CREATE a
watched/ OPEN a
watched/ ATTRIB a
watched/ CLOSE_WRITE,CLOSE a
watched/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN a
watched/ CLOSE_NOWRITE,CLOSE a
watched/ CREATE,ISDIR b-dir
watched/ OPEN,ISDIR b-dir
watched/ ACCESS,ISDIR b-dir
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ ACCESS,ISDIR b-dir
watched/b-dir/ ACCESS,ISDIR
watched/ ACCESS,ISDIR b-dir
```

```
File  Edit  View  Bookmarks  Plugins  Settings  Help

  New Tab    Split View

∧ ⌂ ~ ❯ cd watched
∧ ▱ ~/watched ❯ touch a
∧ ▱ ~/watched ❯ mkdir b-dir
∧ ▱ ~/watched ❯ cd b-dir
∧ ▱ ~/watched/b-dir ❯ ouch file_in_bdir
zsh: command not found: ouch
∧ ▱ ~/watched/b-dir ❯ touch file_in_bdir
∧ ▱ ~/watched/b-dir ❯ █
```

```
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR
watched/ ACCESS,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/b-dir/ CREATE file_in_bdir
watched/b-dir/ OPEN file_in_bdir
watched/b-dir/ ATTRIB file_in_bdir
watched/b-dir/ CLOSE_WRITE,CLOSE file_in_bdir
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
```

戊、在b目錄底下執行vim，看看會出現什麼樣的訊息

```
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/b-dir/ OPEN file_in_bdir
watched/b-dir/ CLOSE_NOWRITE,CLOSE file_in_bdir
watched/b-dir/ OPEN file_in_bdir
watched/b-dir/ CLOSE_NOWRITE,CLOSE file_in_bdir
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
```

```
~ ❯ cd watched
~/watched ❯ touch a
~/watched ❯ mkdir b-dir

~/watched ❯ cd b-dir
~/watched/b-dir ❯ touch file_in_bdir
~/watched/b-dir ❯ vim
~/watched/b-dir ❯ vim file_in_bdir
~/watched/b-dir ❯
```

己、cat file_in_bdir會出現什麼訊息


```
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/b-dir/ OPEN file_in_bdir
watched/b-dir/ CLOSE_NOWRITE,CLOSE file_in_bdir
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
watched/b-dir/ OPEN file_in_bdir
watched/b-dir/ CLOSE_NOWRITE,CLOSE file_in_bdir
watched/ OPEN,ISDIR b-dir
watched/b-dir/ OPEN,ISDIR
watched/ CLOSE_NOWRITE,CLOSE,ISDIR b-dir
watched/b-dir/ CLOSE_NOWRITE,CLOSE,ISDIR
```

```
~ ❯ cd watched
~/watched ❯ touch a
~/watched ❯ mkdir b-dir

~/watched ❯ cd b-dir
~/watched/b-dir ❯ touch file_in_bdir
~/watched/b-dir ❯ vim
~/watched/b-dir ❯ vim file_in_bdir
~/watched/b-dir ❯ cat file_in_bdir
~/watched/b-dir ❯ cat file_in_bdir
~/watched/b-dir ❯
```

庚、echo hello >> file_in_bdir會出現什麼訊息

辛、『sudo inotifywait -m -r /』會出現什麼訊息


```
∧ ➦ ~/watched/b-dir ❯ sudo inotifywait -m -r /
Setting up watches.  Beware: since -r was given, this may take a while!
```

2.撰寫程式，監看檔案是否被修改


```
⬚ ⬚ ~/Desktop/homework/SystemProgramming/hw7 ❯ ./watchFile test.txt
        ✘ INT ⬚ 00:35:21
test.txt 修改的時間：Sat Apr 15 00:35:29 2023

meow
wolf
上次修改的時間：Sat Apr 15 00:35:29 2023

這次修改的時間：Sat Apr 15 00:35:43 2023

meow
```

註: 有參考學長姐的作業