

# 系統程式 HW8

---

410410060 資工二 林柔均

## 題目一 將 nice 複製到自己的目錄下，名為 nice\_pro，必且讓 nice\_pro 擁有提高優先權的能力

---

複製nice到當前目錄，名為nice-pro和nice-pro-2

```
~/De/homework/SystemProgramming/hw8 > cp /usr/bin/nice nice-pro
~/De/homework/SystemProgramming/hw8 > cp /usr/bin/nice nice-pro-2
~/De/homework/SystemProgramming/hw8 > ls
example makefile nice-pro nice-pro-2 nice_testing nice_testing.c README.md
```

讓nice-pro有提高優先權的能力

```
sudo setcap CAP_SYS_NICE+ep ./nice-pro
```

```
~/De/homework/SystemProgramming/hw8 > sudo setcap CAP_SYS_NICE+ep ./nice-pro
[sudo] password for rogewood:
```

讓nice-pro-2有root權限

```
sudo chown root:root ./nice-pro-2
```

```
sudo chmod +s ./nice-pro-2
```

```
~/De/homework/SystemProgramming/hw8 > sudo chown root:root ./nice-pro-2
~/De/homework/SystemProgramming/hw8 > sudo chmod +s ./nice-pro-2
```

```
~/De/homework/SystemProgramming/hw8 > nice -n -10 ls
nice: cannot set niceness: Permission denied
example makefile nice-pro nice-pro-2 nice_testing nice_testing.c README.md
~/De/homework/SystemProgramming/hw8 > ./nice-pro -n -10 ls
example makefile nice-pro nice-pro-2 nice_testing nice_testing.c README.md
~/De/homework/SystemProgramming/hw8 > ./nice-pro-2 -n -10 ls
example makefile nice-pro nice-pro-2 nice_testing nice_testing.c README.md
```

nice 必須要 sudo 才能執行(root權限)，nice-pro相較於 nice-pro-2較為安全(nice-pro-2會直接取得super user的權限)

## 題目二 想辦法量測 nice 提高優先權的比例

---

```
~/De/homework/SystemProgramming/hw8 > ./nice_test  
cpp = 197232680  
cpp = 605615883
```

$605615883/197232680 = 3.0705656$  約等於  $1.25^5$

=> nice 每一等級差 1.25倍，預設5 =>  $1.25^5 = 3.05$  (大概3倍)

## 從mancapabilities裡面隨便挑三個權限，並說明那三個權限是什麼樣的用途

- `CAP_SETUID`: 准許改變進程的UID
- `CAP_SYS_BOOT`: 准許重新開機系統
- `CAP_SYS_TIME`: 設置系統內建的時間函示庫，給予其硬體內的real-time

## 想辦法量測『優先權高一等級的task比正常優先權的task速度快多少』？

```
~/De/h/SystemProgramming/hw8 > ./nice_test 1  
cpp = 336431503  
cpp = 432877702  
~/De/homework/SystemProgramming/hw8 > ./nice_test 2  
cpp = 472719068  
cpp = 296764701
```

```
$ ./nice_test 1
```

$432877702/336431503 = 1.2866741$

```
$ ./nice_test 2
```

$472719068/296764701 = 1.59290868$

$1.25^2 = 1.5625$  大約兩個等級

註: 有參考學長姐的作業