系統程式設計 System Programming 2021

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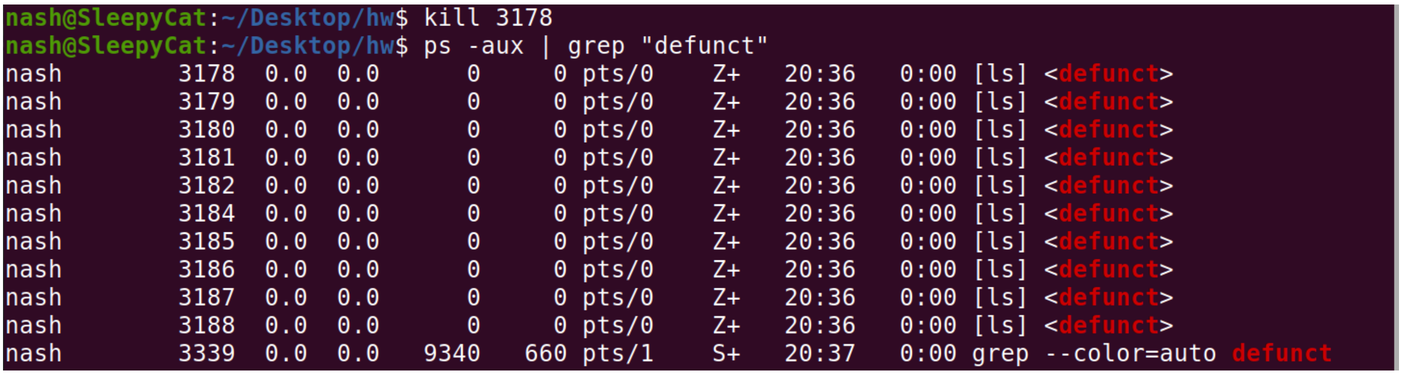
Hw10　Zombie Process

<回答問題>

<1>產生 zombie 以後是否可以使用 kill 指令將 zombie 殺掉？

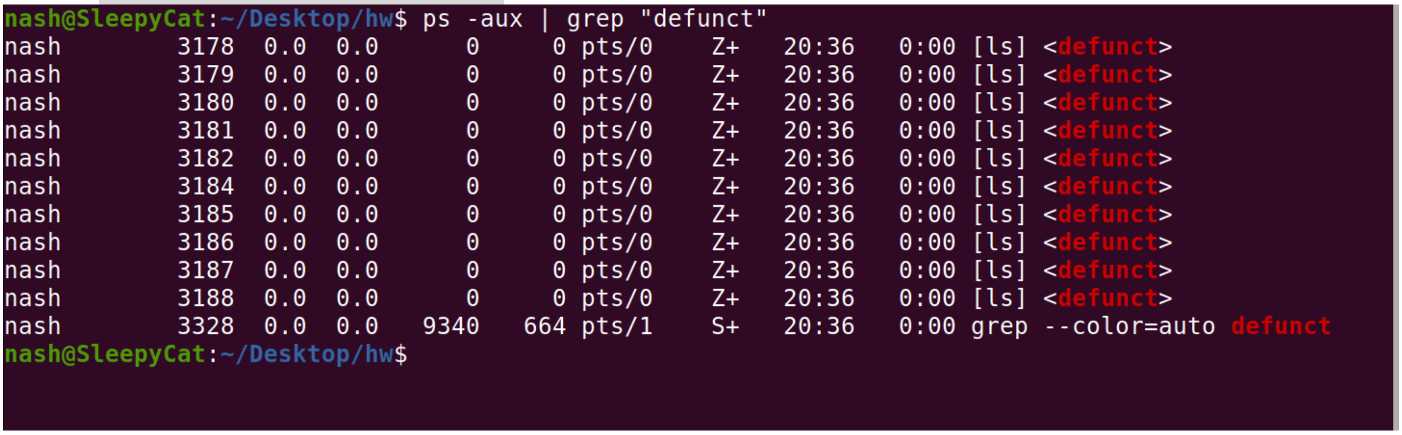
執行我寫的 zombie，kill pid = 3178，可以看到 zombie 依然存在，因為他早就死掉了



```
nash@SleepyCat:~/Desktop/hw$ kill 3178
nash@SleepyCat:~/Desktop/hw$ ps -aux | grep "defunct"
nash        3178  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3179  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3180  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3181  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3182  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3184  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3185  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3186  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3187  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3188  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3339  0.0  0.0   9340   660 pts/1    S+   20:37   0:00 grep --color=auto defunct
```

<2>附上截圖證明 zombie 確實會產生 10 個 zombie

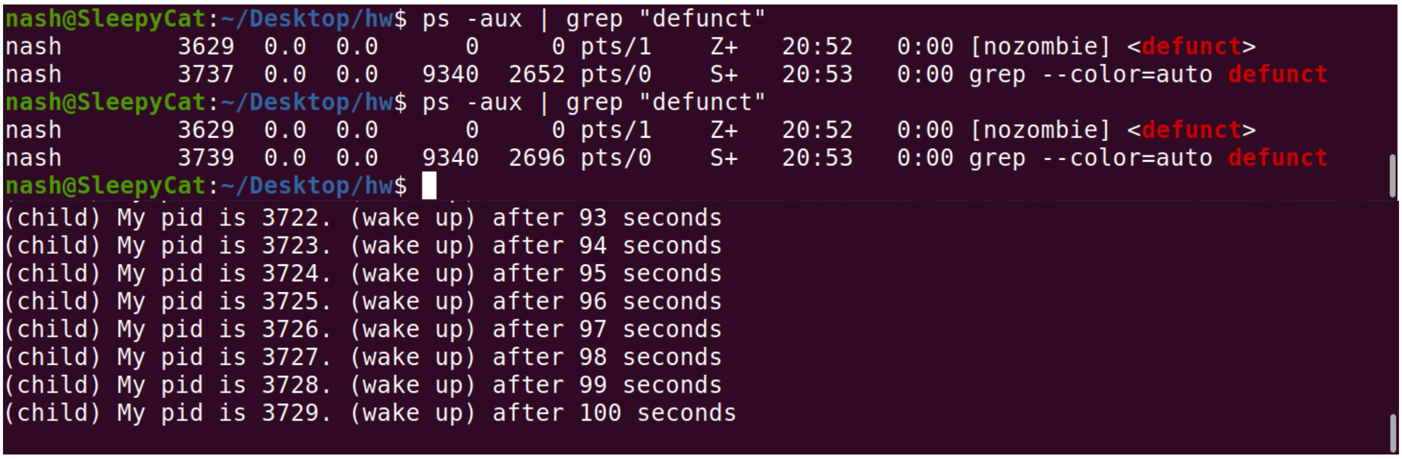
如下圖，我的 zombie 裡面的父行程用 getchar()停住它，沒有讓程式結束，開另外一個終端並執行 ps -aux | grep “defunct”



```
nash@SleepyCat:~/Desktop/hw$ ps -aux | grep "defunct"
nash        3178  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3179  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3180  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3181  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3182  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3184  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3185  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3186  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3187  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3188  0.0  0.0      0     0 pts/0    Z+   20:36   0:00 [ls] <defunct>
nash        3328  0.0  0.0   9340   664 pts/1    S+   20:36   0:00 grep --color=auto defunct
nash@SleepyCat:~/Desktop/hw$
```

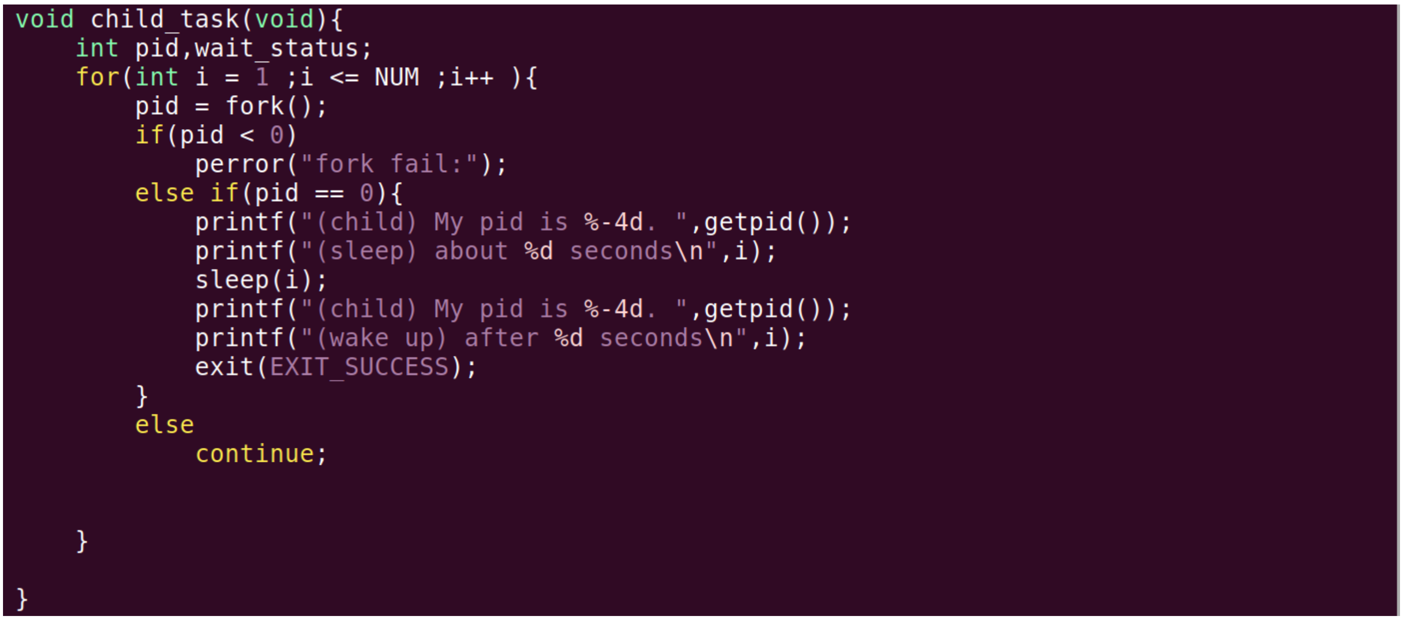
<3>附上截圖證明 nozombie 幾乎不會產生 zombies

如下圖

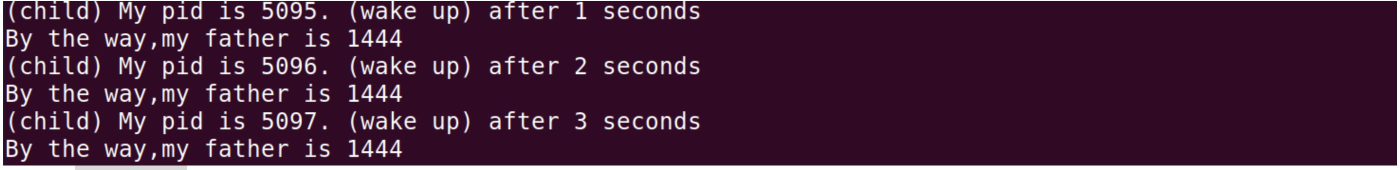


```
nash@SleepyCat:~/Desktop/hw$ ps -aux | grep "defunct"
nash        3629  0.0  0.0      0     0 pts/1    Z+   20:52   0:00 [nozombie] <defunct>
nash        3737  0.0  0.0   9340  2652 pts/0    S+   20:53   0:00 grep --color=auto defunct
nash@SleepyCat:~/Desktop/hw$ ps -aux | grep "defunct"
nash        3629  0.0  0.0      0     0 pts/1    Z+   20:52   0:00 [nozombie] <defunct>
nash        3739  0.0  0.0   9340  2696 pts/0    S+   20:53   0:00 grep --color=auto defunct
nash@SleepyCat:~/Desktop/hw$
(child) My pid is 3722. (wake up) after 93 seconds
(child) My pid is 3723. (wake up) after 94 seconds
(child) My pid is 3724. (wake up) after 95 seconds
(child) My pid is 3725. (wake up) after 96 seconds
(child) My pid is 3726. (wake up) after 97 seconds
(child) My pid is 3727. (wake up) after 98 seconds
(child) My pid is 3728. (wake up) after 99 seconds
(child) My pid is 3729. (wake up) after 100 seconds
```

父行程裡面不寫 wait 也沒關係，是因為用 fork 函式時，父親行程很快就執行結束了(死)，子行程還在 sleep，那他就會變成太上老君的孩子。我的電腦中 1444 是 systemd。

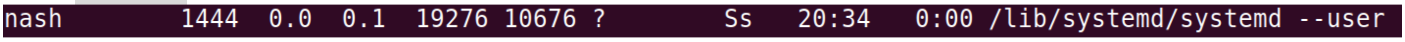


```
void child_task(void){
    int pid,wait_status;
    for(int i = 1 ;i <= NUM ;i++ ){
        pid = fork();
        if(pid < 0)
            perror("fork fail:");
        else if(pid == 0){
            printf("(child) My pid is %-4d. ",getpid());
            printf("(sleep) about %d seconds\n",i);
            sleep(i);
            printf("(child) My pid is %-4d. ",getpid());
            printf("(wake up) after %d seconds\n",i);
            exit(EXIT_SUCCESS);
        }
        else
            continue;


    }

}
```



```
(child) My pid is 5095. (wake up) after 1 seconds
By the way,my father is 1444
(child) My pid is 5096. (wake up) after 2 seconds
By the way,my father is 1444
(child) My pid is 5097. (wake up) after 3 seconds
By the way,my father is 1444
```

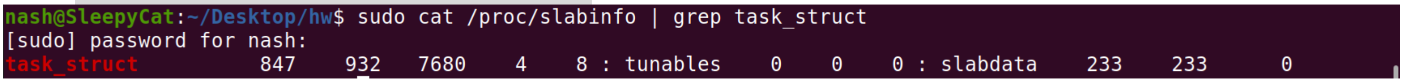
利用 ps aux 找到的



```
nash         1444  0.0  0.1  19276 10676 ?        Ss   20:34   0:00 /lib/systemd/systemd --user
```

<4>說明你的系統中 task_struct 有多大

輸入 cat proc/slabinfo | grep task_struct



```
nash@SleepyCat:~/Desktop/hw$ sudo cat /proc/slabinfo | grep task_struct
[sudo] password for nash:
task_struct          847    932   7680    4    8 : tunables    0    0    0 : slabdata    233    233      0
```

Object size = 7680 bytes

<5>在網路上找一張你覺得最能描述「辛棄疾」的風景畫

辛棄疾，字幼安，號稼軒居士，山東人。

生於金國，少年抗金歸宋，曾任江西安撫使、福建安撫使等職，18 歲與愛妻劉敏康結為連理。因歸正人身份，辛棄疾也始終未能得到南宋朝廷的重用以及實現他北伐的夙願。

辛棄疾是中國南宋豪放派詞人，人稱詞中之龍，與蘇軾合稱「蘇辛」，和愛國詩人陸游雙峰並峙。辛棄疾詞風「激昂豪邁，風流豪放」，代表著南宋豪放詞的最高成就。

辛棄疾給我一種壯志未酬的悲傷感，就像現在缺水缺電一樣，一整個很蕭索。

<參考資料>

https://www.itread01.com/content/1541398471.html

task_struct 結構如何檢視及分析

https://ithelp.ithome.com.tw/articles/10102045

Linux 系統效能分析與探討 - [15] slabinfo

<致謝>

羅 O 五老師

摯友 博禕