

Programming Project

Team members and Responsibility:

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Environment

下載GCC:

1. sudo apt update (更新軟體包)
2. sudo apt install build-essential (安裝build-essential)
3. gcc --version (確認gcc安裝成功)

Proj1 (Ch2 Proj1)

Part I: Creating, loading, and removing kernel modules

How to execute?

1. compile code
make
2. insert the compiled module
sudo insmod apple.ko
3. remove the module
sudo rmmod apple
4. Check the kernel log for expected messages
sudo dmesg

Execution snapshot

The screenshot shows a terminal window titled "guest@osm-public: ~" with a session ID "hw1-proj1". The terminal displays the following sequence of commands and their outputs:

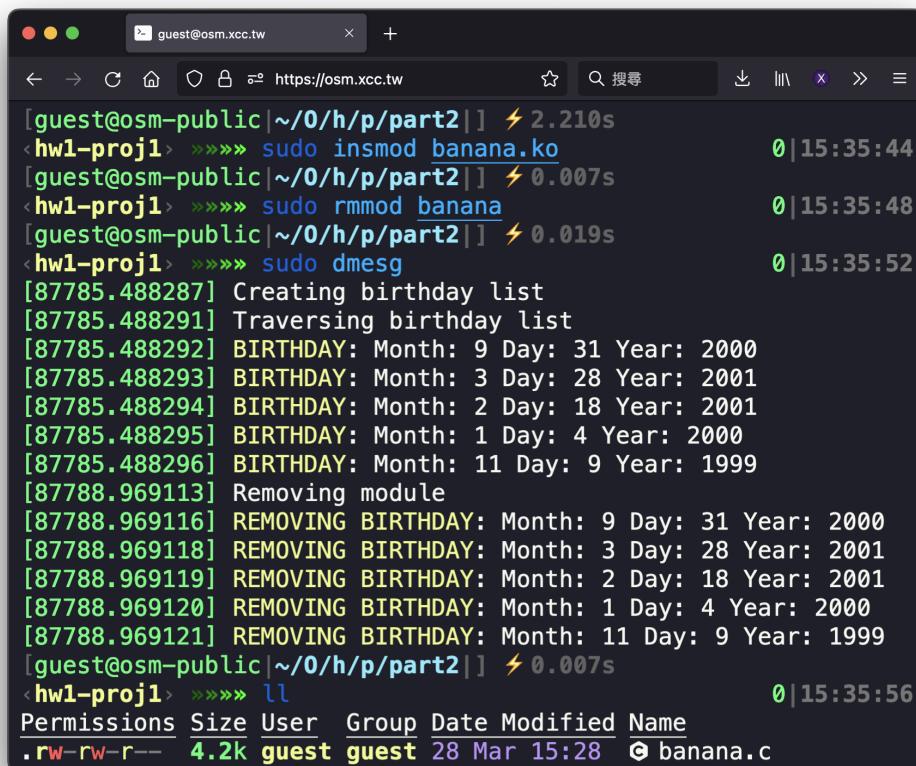
- [guest@osm-public|~/0/h/p/part1|] ↳ 2.366s
ll
Permissions Size User Group Date Modified Name
.rw-rw-r-- 566 guest guest 27 Mar 16:44 apple.c
.rw-rw-r-- 59k guest guest 27 Mar 16:44 apple.ko
.rw-rw-r-- 48 guest guest 27 Mar 16:44 apple.mod
.rw-rw-r-- 816 guest guest 27 Mar 16:44 apple.mod.c
.rw-rw-r-- 48k guest guest 27 Mar 16:44 apple.mod.o
.rw-rw-r-- 12k guest guest 27 Mar 16:44 apple.o
.rw-rw-r-- 237 guest guest 27 Mar 16:41 Makefile
.rw-rw-r-- 0 guest guest 27 Mar 16:44 Module.symvers
.rw-rw-r-- 48 guest guest 27 Mar 16:44 modules.order
- [guest@osm-public|~/0/h/p/part1|] ↳ 0.004s
sudo insmod apple.ko
[guest@osm-public|~/0/h/p/part1|] ↳ 0.007s
- [hw1-proj1> >>> sudo rmmod apple
[guest@osm-public|~/0/h/p/part1|] ↳ 0.022s
- [hw1-proj1> >>> sudo dmesg
[6235.965625] Hello world !
[6238.901234] Bye !
[guest@osm-public|~/0/h/p/part1|] ↳ 0.006s
- [hw1-proj1> >>>

Part II: Creating, traversing, and deleting kernel data structures

How to execute?

1. compile code
make
2. insert the compiled module
sudo insmod banana.ko
3. remove the module
sudo rmmod banana
4. Check the kernel log for expected messages
sudo dmesg

Execution snapshot



The screenshot shows a terminal window titled "guest@osm.xcc.tw" with the URL "https://osm.xcc.tw". The terminal displays a sequence of kernel log entries and a file listing command.

```
[guest@osm-public|~/0/h/p/part2|] ⚡ 2.210s
<hw1-proj1> >>> sudo insmod banana.ko          0|15:35:44
[guest@osm-public|~/0/h/p/part2|] ⚡ 0.007s
<hw1-proj1> >>> sudo rmmod banana           0|15:35:48
[guest@osm-public|~/0/h/p/part2|] ⚡ 0.019s
<hw1-proj1> >>> sudo dmesg                0|15:35:52
[87785.488287] Creating birthday list
[87785.488291] Traversing birthday list
[87785.488292] BIRTHDAY: Month: 9 Day: 31 Year: 2000
[87785.488293] BIRTHDAY: Month: 3 Day: 28 Year: 2001
[87785.488294] BIRTHDAY: Month: 2 Day: 18 Year: 2001
[87785.488295] BIRTHDAY: Month: 1 Day: 4 Year: 2000
[87785.488296] BIRTHDAY: Month: 11 Day: 9 Year: 1999
[87788.969113] Removing module
[87788.969116] REMOVING BIRTHDAY: Month: 9 Day: 31 Year: 2000
[87788.969118] REMOVING BIRTHDAY: Month: 3 Day: 28 Year: 2001
[87788.969119] REMOVING BIRTHDAY: Month: 2 Day: 18 Year: 2001
[87788.969120] REMOVING BIRTHDAY: Month: 1 Day: 4 Year: 2000
[87788.969121] REMOVING BIRTHDAY: Month: 11 Day: 9 Year: 1999
[guest@osm-public|~/0/h/p/part2|] ⚡ 0.007s
<hw1-proj1> >>> ll                      0|15:35:56
Permissions Size User Group Date Modified Name
.rw-rw-r-- 4.2k guest guest 28 Mar 15:28 banana.c
```

Proj2 (Ch3 Proj1)

How to execute?

1. compile code
 gcc 3-1.c
2. insert the compiled module
 ./a.out

Execution snapshot

```
bo@bo-VirtualBox:~/Desktop/OS_programming/project_3-1$ gcc 3-1.c
bo@bo-VirtualBox:~/Desktop/OS_programming/project_3-1$ ./a.out
osh>!!
No commands in history.
osh>history
No commands in history.
osh>!!
No commands in history.
osh>history
No commands in history.
osh>ls
3-1.c  a.out
osh>!!
3-1.c  a.out
osh>history
2.      ls
1.      ls
```

Proj3 (Ch3 Proj2)

How to execute?

1. compile code

```
make
```

Part 1

2. Insert ListTaskLinear module

```
sudo insmod ListTasksLinear.ko
```

3. Remove ListTaskLinear module

```
sudo rmmod ListTasksLinear
```

4. View kernel log buffer

```
dmesg
```

5. If you want to clear the kernel buffer

```
sudo dmesg -c
```

Part 2

6. Insert ListTaskDFS module

```
sudo insmod ListTasksDFS.ko
```

7. Remove ListTaskDFS module

```
sudo rmmod ListTasksDFS`
```

8. View kernel log buffer

```
dmesg
```

9. If you want to clear the kernel buffer

```
sudo dmesg -c
```

10. Clean

```
make clean
```

Execution snapshot

```
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ make
make -C /lib/modules/5.13.0-30-generic/build M=/home/ubuntu/Desktop/hw1/ch3_proj_2 modules
make[1]: Entering directory '/usr/src/linux-headers-5.13.0-30-generic'
  CC [M]  /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksLinear.o
  CC [M]  /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksDFS.o
  MODPOST /home/ubuntu/Desktop/hw1/ch3_proj_2/Module.symvers
  CC [M]  /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksDFS.mod.o
  LD [M]  /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksDFS.ko
  BTF [M] /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksDFS.ko
Skipping BTF generation for /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksDFS.ko due to unavailability of vmlinux
  CC [M]  /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksLinear.mod.o
  LD [M]  /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksLinear.ko
  BTF [M] /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksLinear.ko
Skipping BTF generation for /home/ubuntu/Desktop/hw1/ch3_proj_2/ListTasksLinear.ko due to unavailability of vmlinux
make[1]: Leaving directory '/usr/src/linux-headers-5.13.0-30-generic'
```

Part1:

Compare between the output of *dmesg* and *ps -el* can find they are almost the same.
Tasks listed with *ListTasksLinear* are in the order of increasing process id.

```
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ sudo insmod ListTasksLinear.ko
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ sudo rmmod ListTasksLinear
[ 111.500000] ListTasksLinear: removed
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ dmesg > mesg_linear
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ ps -el > ps_linear
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ ps -el > ps_linear
ubuntu@ubuntu2004:~/Desktop/hw1/ch3_proj_2$ sudo dmesg -c
```

The following snapshot only contains part of the output. Please refer to *mesg_linear*, *ps_linear* for the whole log.

```

1  [425639.896013] Inserting ListTasksLinear
2  [425639.896016] Started listing tasks
3  [425639.896016] Name: systemd           State: 1 Process ID: 1
4  [425639.896018] Name: kthreadd         State: 1 Process ID: 2
5  [425639.896019] Name: rcu_gp          State: 1026 Process ID: 3
6  [425639.896020] Name: rcu_par_gp      State: 1026 Process ID: 4
7  [425639.896021] Name: kworker/0:0H     State: 1026 Process ID: 6
8  [425639.896022] Name: mm_percpu_wq     State: 1026 Process ID: 9
9  [425639.896023] Name: rcu_tasks_rude_   State: 1 Process ID: 10
10 [425639.896024] Name: rcu_tasks_trace    State: 1 Process ID: 11
11 [425639.896025] Name: ksoftirqd/0       State: 1 Process ID: 12
12 [425639.896026] Name: rcu_sched         State: 1026 Process ID: 13
13 [425639.896027] Name: migration/0       State: 1 Process ID: 14
14 [425639.896027] Name: idle_inject/0     State: 1 Process ID: 15
15 [425639.896028] Name: cpuhp/0           State: 1 Process ID: 16
16 [425639.896029] Name: cpuhp/1           State: 1 Process ID: 17
17 [425639.896030] Name: idle_inject/1     State: 1 Process ID: 18
18 [425639.896031] Name: migration/1       State: 1 Process ID: 19
19 [425639.896032] Name: ksoftirqd/1       State: 1 Process ID: 20
20 [425639.896032] Name: kworker/1:0H     State: 1026 Process ID: 22
21 [425639.896066] Name: kdevtmpfs        State: 1 Process ID: 23
22 [425639.896068] Name: netns            State: 1026 Process ID: 24
23 [425639.896069] Name: inet_frag_wq     State: 1026 Process ID: 25
24 [425639.896070] Name: kaudittd         State: 1 Process ID: 26
25 [425639.896071] Name: khungtaskd       State: 1 Process ID: 28
26 [425639.896072] Name: oom_reaper        State: 1 Process ID: 29
27 [425639.896073] Name: writeback        State: 1026 Process ID: 30
28 [425639.896075] Name: kcompactd0       State: 1 Process ID: 31
29 [425639.896076] Name: ksmd             State: 1 Process ID: 32
30 [425639.896077] Name: khugepaged       State: 1 Process ID: 33
31 [425639.896078] Name: kintegrityd      State: 1026 Process ID: 80
32 [425639.896079] Name: kblockd          State: 1026 Process ID: 81
33 [425639.896080] Name: blkcg_punt_bio   State: 1026 Process ID: 82

```

```

288 [425639.897943] Name: jfsIO           State: 1 Process ID: 12581
289 [425639.897944] Name: jfsCommit        State: 1 Process ID: 12582
290 [425639.897944] Name: jfsCommit        State: 1 Process ID: 12583
291 [425639.897946] Name: jfsSync          State: 1 Process ID: 12584
292 [425639.897947] Name: code             State: 1 Process ID: 37039
293 [425639.897948] Name: bash             State: 1 Process ID: 39363
294 [425639.897949] Name: cupsd            State: 1 Process ID: 65170
295 [425639.897950] Name: cups-browsed     State: 1 Process ID: 65171
296 [425639.897951] Name: kworker/u256:2    State: 1026 Process ID: 76221
297 [425639.897952] Name: kworker/0:2       State: 1026 Process ID: 76245
298 [425639.897953] Name: kworker/1:1       State: 1026 Process ID: 77142
299 [425639.897954] Name: kworker/0:1       State: 1026 Process ID: 77152
300 [425639.897955] Name: kworker/u256:1    State: 1026 Process ID: 77195
301 [425639.897957] Name: kworker/1:3       State: 1026 Process ID: 77202
302 [425639.897958] Name: kworker/u256:0    State: 1026 Process ID: 77212
303 [425639.897959] Name: kworker/0:0       State: 1026 Process ID: 77220
304 [425639.897960] Name: kworker/1:0       State: 1026 Process ID: 77263
305 [425639.897961] Name: tracker-store     State: 1 Process ID: 77354
306 [425639.897962] Name: sh               State: 1 Process ID: 77901
307 [425639.897963] Name: cpuUsage.sh      State: 1 Process ID: 77902
308 [425639.897964] Name: sleep            State: 1 Process ID: 77905
309 [425639.897965] Name: sudo             State: 1 Process ID: 77906
310 [425639.897966] Name: insmod          State: 0 Process ID: 77907
311 [425639.897967] Stopped listing tasks
312 [425648.583983] Removing ListTasksLinear
313

```

	F	S	UID	PID	PPID	C	PRI	NI	ADDR	SZ	WCHAN	TTY	TIME	CMD
2	4	S	0	1	0	0	80	0	-	42243	-	?	00:00:18	systemd
3	1	S	0	2	0	0	80	0	-	0	-	?	00:00:00	kthreadd
4	1	I	0	3	2	0	60	-20	-	0	-	?	00:00:00	rcu_gp
5	1	I	0	4	2	0	60	-20	-	0	-	?	00:00:00	rcu_par_gp
6	1	I	0	6	2	0	60	-20	-	0	-	?	00:00:00	kworker/0:0H-events_highpri
7	1	I	0	9	2	0	60	-20	-	0	-	?	00:00:00	mm_percpu_wq
8	1	S	0	10	2	0	80	0	-	0	-	?	00:00:00	rcu_tasks_rude_
9	1	S	0	11	2	0	80	0	-	0	-	?	00:00:00	rcu_tasks_trace
10	1	S	0	12	2	0	80	0	-	0	-	?	00:00:25	ksoftirqd/0
11	1	I	0	13	2	0	80	0	-	0	-	?	00:03:25	rcu_sched
12	1	S	0	14	2	0	-40	--	-	0	-	?	00:00:06	migration/0
13	1	S	0	15	2	0	9	--	-	0	-	?	00:00:00	idle_inject/0
14	1	S	0	16	2	0	80	0	-	0	-	?	00:00:00	cpuhp/0
15	1	S	0	17	2	0	80	0	-	0	-	?	00:00:00	cpuhp/1
16	1	S	0	18	2	0	9	--	-	0	-	?	00:00:00	idle_inject/1
17	1	S	0	19	2	0	-40	--	-	0	-	?	00:00:11	migration/1
18	1	S	0	20	2	0	80	0	-	0	-	?	00:00:09	ksoftirqd/1
19	1	I	0	22	2	0	60	-20	-	0	-	?	00:00:00	kworker/1:0H-events_highpri
20	5	S	0	23	2	0	80	0	-	0	-	?	00:00:00	kdevtmpfs
21	1	I	0	24	2	0	60	-20	-	0	-	?	00:00:00	netns
22	1	I	0	25	2	0	60	-20	-	0	-	?	00:00:00	inet_frag_wq
23	1	S	0	26	2	0	80	0	-	0	-	?	00:00:00	kauditd
24	1	S	0	28	2	0	80	0	-	0	-	?	00:00:00	khungtaskd
25	1	S	0	29	2	0	80	0	-	0	-	?	00:00:00	oom_reaper
26	1	I	0	30	2	0	60	-20	-	0	-	?	00:00:00	writeback
27	1	S	0	31	2	0	80	0	-	0	-	?	00:00:55	kcompactd0
28	1	S	0	32	2	0	85	5	-	0	-	?	00:00:00	ksmd
29	1	S	0	33	2	0	99	19	-	0	-	?	00:00:00	khugepaged
30	1	I	0	80	2	0	60	-20	-	0	-	?	00:00:00	kintegrityd
31	1	I	0	81	2	0	60	-20	-	0	-	?	00:00:00	kblockd
32	1	I	0	82	2	0	60	-20	-	0	-	?	00:00:00	blkcg_punt_bio
33	1	I	0	83	2	0	60	-20	-	0	-	?	00:00:00	tpm_dev_wq
34	1	I	0	84	2	0	60	-20	-	0	-	?	00:00:00	ata_sff
35	1	I	0	85	2	0	60	-20	-	0	-	?	00:00:00	md

Part2:

Compare output between `dmesg` and `ps -eLf` can find they are very similar

Tasks listed with `ListTasksDFS` are in the order of DFS, so process id 2 is not immediately after process id 1.

```
ubuntu@ubuntu2004:~/Desktop/OS_team_pj/hw1/proj3$ sudo insmod ListTasksDFS.ko
ubuntu@ubuntu2004:~/Desktop/OS_team_pj/hw1/proj3$ sudo rmmod ListTasksDFS
ubuntu@ubuntu2004:~/Desktop/OS_team_pj/hw1/proj3$ dmesg > mesg_DFS
```

```
ubuntu@ubuntu2004:~/Desktop/OS_team_pj/hw1/proj3$ ps -eLf > ps_DFS
ubuntu@ubuntu2004:~/Desktop/OS_team_pj/hw1/proj3$ sudo dmesg -c
```

The following snapshot only contains part of the output. Please refer to `mesg_DFS`, `ps_DFS` for the whole log.

1	[425912.160222] Inserting ListTasksDFS	
2	[425912.160225] Started listing tasks	
3	[425912.160226] Name: swapper/0	State: 0 Process ID: 0
4	[425912.160228] Name: systemd	State: 1 Process ID: 1
5	[425912.160229] Name: systemd-journal	State: 1 Process ID: 383
6	[425912.160231] Name: systemd-udevd	State: 1 Process ID: 405
7	[425912.160232] Name: systemd-resolve	State: 1 Process ID: 723
8	[425912.160233] Name: systemd-timesyncd	State: 1 Process ID: 724
9	[425912.160233] Name: VGAAuthService	State: 1 Process ID: 741
10	[425912.160234] Name: vmtoolsd	State: 1 Process ID: 742
11	[425912.160270] Name: accounts-daemon	State: 1 Process ID: 771
12	[425912.160271] Name: acpid	State: 1 Process ID: 772
13	[425912.160272] Name: avahi-daemon	State: 1 Process ID: 776
14	[425912.160274] Name: avahi-daemon	State: 1 Process ID: 825
15	[425912.160275] Name: cron	State: 1 Process ID: 778
16	[425912.160276] Name: dbus-daemon	State: 1 Process ID: 782
17	[425912.160277] Name: NetworkManager	State: 1 Process ID: 783
18	[425912.160278] Name: irqbalance	State: 1 Process ID: 790
19	[425912.160300] Name: networkd-dispatcher	State: 1 Process ID: 792
20	[425912.160301] Name: polkitd	State: 1 Process ID: 793
21	[425912.160302] Name: rsyslogd	State: 1 Process ID: 796
22	[425912.160303] Name: snapd	State: 1 Process ID: 806
23	[425912.160305] Name: switcheroo-control	State: 1 Process ID: 807
24	[425912.160306] Name: systemd-logind	State: 1 Process ID: 812
25	[425912.160307] Name: udisksd	State: 1 Process ID: 814
26	[425912.160308] Name: wpa_supplicant	State: 1 Process ID: 815
27	[425912.160309] Name: ModemManager	State: 1 Process ID: 856
28	[425912.160310] Name: unattended-upgrader	State: 1 Process ID: 873
29	[425912.160311] Name: sshd	State: 1 Process ID: 882
30	[425912.160312] Name: gdm3	State: 1 Process ID: 889
31	[425912.160313] Name: gdm-session-worker	State: 1 Process ID: 1443

258	[425912.162071]	Name: kdmflush	State: 1026 Process ID: 298
259	[425912.162072]	Name: kdmflush	State: 1026 Process ID: 299
260	[425912.162073]	Name: jbd2/dm-0-8	State: 1 Process ID: 338
261	[425912.162074]	Name: ext4-rsv-conver	State: 1026 Process ID: 339
262	[425912.162075]	Name: loop0	State: 1 Process ID: 413
263	[425912.162076]	Name: loop1	State: 1 Process ID: 415
264	[425912.162077]	Name: loop2	State: 1 Process ID: 417
265	[425912.162078]	Name: loop3	State: 1 Process ID: 418
266	[425912.162079]	Name: loop4	State: 1 Process ID: 425
hal] 7	[425912.162097]	Name: loop5	State: 1 Process ID: 435
_8	[425912.162098]	Name: loop6	State: 1 Process ID: 442
269	[425912.162099]	Name: loop7	State: 1 Process ID: 444
270	[425912.162100]	Name: loop8	State: 1 Process ID: 450
271	[425912.162101]	Name: loop9	State: 1 Process ID: 453
272	[425912.162102]	Name: ttm_swap	State: 1026 Process ID: 466
273	[425912.162103]	Name: irq/16-vmwgfx	State: 1 Process ID: 467
274	[425912.162103]	Name: card0-crtc0	State: 1 Process ID: 468
275	[425912.162104]	Name: card0-crtc1	State: 1 Process ID: 469
276	[425912.162105]	Name: card0-crtc2	State: 1 Process ID: 470
277	[425912.162106]	Name: card0-crtc3	State: 1 Process ID: 471
278	[425912.162107]	Name: card0-crtc4	State: 1 Process ID: 472
279	[425912.162108]	Name: card0-crtc5	State: 1 Process ID: 473
280	[425912.162109]	Name: card0-crtc6	State: 1 Process ID: 474
281	[425912.162110]	Name: card0-crtc7	State: 1 Process ID: 475
282	[425912.162110]	Name: cryptd	State: 1026 Process ID: 491
283	[425912.162111]	Name: xfsalloc	State: 1026 Process ID: 12577
284	[425912.162113]	Name: xfs_mru_cache	State: 1026 Process ID: 12578
285	[425912.162114]	Name: jfsIO	State: 1 Process ID: 12581
286	[425912.162115]	Name: jfsCommit	State: 1 Process ID: 12582
287	[425912.162116]	Name: jfsCommit	State: 1 Process ID: 12583
288	[425912.162117]	Name: jfsSync	State: 1 Process ID: 12584
289	[425912.162118]	Name: kworker/u256:2	State: 1026 Process ID: 76221
290	[425912.162151]	Name: kworker/0:1	State: 1026 Process ID: 77152
291	[425912.162152]	Name: kworker/u256:1	State: 1026 Process ID: 77195
292	[425912.162153]	Name: kworker/1:3	State: 1026 Process ID: 77202
293	[425912.162154]	Name: kworker/u256:0	State: 1026 Process ID: 77212
294	[425912.162155]	Name: kworker/0:0	State: 1026 Process ID: 77220
295	[425912.162156]	Name: kworker/1:0	State: 1026 Process ID: 77263
296	[425912.162157]	Name: kworker/u256:3	State: 1026 Process ID: 78041
297	[425912.162157]	Stopped listing tasks	
298	[425926.816494]	Removing ListTasksDFS	
299			

	UID	PID	PPID	LWP	C	NLWP	STIME	TTY	TIME	CMD
1	root	1	0	1	0	1	Mar20	?	00:00:18	/sbin/init splash
2	root	2	0	2	0	1	Mar20	?	00:00:00	[kthreadd]
3	root	3	2	3	0	1	Mar20	?	00:00:00	[rcu_gp]
4	root	4	2	4	0	1	Mar20	?	00:00:00	[rcu_par_gp]
5	root	6	2	6	0	1	Mar20	?	00:00:00	[kworker/0:0H-events_highpri]
6	root	9	2	9	0	1	Mar20	?	00:00:00	[mm_percpu_wq]
8	root	10	2	10	0	1	Mar20	?	00:00:00	[rcu_tasks_rude_]
9	root	11	2	11	0	1	Mar20	?	00:00:00	[rcu_tasks_trace]
10	root	12	2	12	0	1	Mar20	?	00:00:25	[ksoftirqd/0]
11	root	13	2	13	0	1	Mar20	?	00:03:25	[rcu_sched]
12	root	14	2	14	0	1	Mar20	?	00:00:06	[migration/0]
13	root	15	2	15	0	1	Mar20	?	00:00:00	[idle_inject/0]
14	root	16	2	16	0	1	Mar20	?	00:00:00	[cpuhp/0]
15	root	17	2	17	0	1	Mar20	?	00:00:00	[cpuhp/1]
16	root	18	2	18	0	1	Mar20	?	00:00:00	[idle_inject/1]
17	root	19	2	19	0	1	Mar20	?	00:00:11	[migration/1]
18	root	20	2	20	0	1	Mar20	?	00:00:09	[ksoftirqd/1]
19	root	22	2	22	0	1	Mar20	?	00:00:00	[kworker/1:0H-events_highpri]
20	root	23	2	23	0	1	Mar20	?	00:00:00	[kdevtmpfs]
21	root	24	2	24	0	1	Mar20	?	00:00:00	[netns]
22	root	25	2	25	0	1	Mar20	?	00:00:00	[inet_frag_wq]
23	root	26	2	26	0	1	Mar20	?	00:00:00	[kauditfd]
24	root	28	2	28	0	1	Mar20	?	00:00:00	[khungtaskd]
25	root	29	2	29	0	1	Mar20	?	00:00:00	[oom_reaper]
26	root	30	2	30	0	1	Mar20	?	00:00:00	[writeback]
27	root	31	2	31	0	1	Mar20	?	00:00:55	[kcompactd0]
28	root	32	2	32	0	1	Mar20	?	00:00:00	[ksmd]
29	root	33	2	33	0	1	Mar20	?	00:00:00	[khugepaged]
30	root	80	2	80	0	1	Mar20	?	00:00:00	[integrityd]
31	root	81	2	81	0	1	Mar20	?	00:00:00	[kblockd]
32	root	82	2	82	0	1	Mar20	?	00:00:00	[blkcg_punt_bio]
33	root	83	2	83	0	1	Mar20	?	00:00:00	[tpm_dev_wq]
34	root	84	2	84	0	1	Mar20	?	00:00:00	[ata_sff]
35	root	85	2	85	0	1	Mar20	?	00:00:00	[md]
36	root	86	2	86	0	1	Mar20	?	00:00:00	[edac-poller]
37	root	87	2	87	0	1	Mar20	?	00:00:00	[devfreq_wq]
38	root	88	2	88	0	1	Mar20	?	00:00:00	[watchdogd]