

LAB3

第一題截圖：

```
[ 3271.767150] Hello World!!!
```

名稱		pid	state	prio	policy
systemd	1	1	120	0	
kthreadd	2	1	120	0	
kworker/0:0H		4	1026	100	0
mm_percpu_wq		6	1026	100	0
ksoftirqd/0		7	1	120	0
rcu_sched		8	1026	120	0
rcu_bh	9	1026	120	0	
migration/0		10	1	0	1
watchdog/0		11	1	0	1
cpuhp/0	12	1	120	0	
cpuhp/1	13	1	120	0	
watchdog/1		14	1	0	1
migration/1		15	1	0	1
ksoftirqd/1		16	1	120	0
kworker/1:0H		18	1026	100	0
kdevtmpfs		19	1	120	0
netns	20	1026	100	0	
rcu_tasks_kthre		21	1	120	0
kauditd	22	1	120	0	
khungtaskd		24	1	120	0
oom_reaper		25	1	120	0
writeback		26	1026	100	0
kcompactd0		27	1	120	0
ksmd	28	1	125	0	
khugepaged		29	1	139	0
crypto	30	1026	100	0	
kintegrityd		31	1026	100	0
kblockd	32	1026	100	0	
ata_sff	34	1026	100	0	
md	35	1026	100	0	
edac-poller		36	1026	100	0
devfreq_wq		37	1026	100	0
watchdogd		38	1026	100	0
kswapd0	41	1	120	0	
kworker/u257:0		42	1026	100	0
ecryptfs-kthrea		43	1	120	0
kthrotld	85	1026	100	0	
acpi_thermal_pm		86	1026	100	0
scsi_eh_0		87	1	120	0
scsi_tmf_0		88	1026	100	0

[3271.767221]	scsi_eh_1	89	1	120	0
[3271.767222]	scsi_tmf_1	90	1026	100	0
[3271.767222]	ipv6_addrconf	96	1026	100	0
[3271.767223]	kstrp	105	1026	100	0
[3271.767224]	charger_manager	122	1026	100	0
[3271.767224]	mpt_poll_0	185	1026	100	0
[3271.767225]	mpt/0	186	1026	100	0
[3271.767225]	scsi_eh_2	187	1	120	0
[3271.767226]	scsi_tmf_2	188	1026	100	0
[3271.767227]	scsi_eh_3	189	1	120	0
[3271.767227]	scsi_tmf_3	190	1026	100	0
[3271.767228]	scsi_eh_4	191	1	120	0
[3271.767229]	scsi_tmf_4	192	1026	100	0
[3271.767229]	scsi_eh_5	193	1	120	0
[3271.767230]	scsi_tmf_5	194	1026	100	0
[3271.767231]	scsi_eh_6	195	1	120	0
[3271.767231]	scsi_tmf_6	196	1026	100	0
[3271.767232]	scsi_eh_7	197	1	120	0
[3271.767233]	scsi_tmf_7	198	1026	100	0
[3271.767233]	scsi_eh_8	199	1	120	0
[3271.767234]	scsi_tmf_8	200	1026	100	0
[3271.767235]	scsi_eh_9	201	1	120	0
[3271.767235]	scsi_tmf_9	202	1026	100	0
[3271.767236]	scsi_eh_10	203	1	120	0
[3271.767237]	scsi_tmf_10	204	1026	100	0
[3271.767237]	scsi_eh_11	205	1	120	0
[3271.767238]	scsi_tmf_11	206	1026	100	0
[3271.767238]	scsi_eh_12	207	1	120	0
[3271.767239]	scsi_tmf_12	208	1026	100	0
[3271.767240]	scsi_eh_13	209	1	120	0
[3271.767240]	scsi_tmf_13	210	1026	100	0
[3271.767241]	scsi_eh_14	211	1	120	0
[3271.767241]	scsi_tmf_14	212	1026	100	0
[3271.767242]	scsi_eh_15	213	1	120	0
[3271.767243]	scsi_tmf_15	214	1026	100	0
[3271.767243]	scsi_eh_16	215	1	120	0
[3271.767244]	scsi_tmf_16	216	1026	100	0
[3271.767244]	scsi_eh_17	217	1	120	0
[3271.767245]	scsi_tmf_17	218	1026	100	0
[3271.767246]	scsi_eh_18	219	1	120	0
[3271.767246]	scsi_tmf_18	220	1026	100	0
[3271.767247]	scsi_eh_19	221	1	120	0
[3271.767248]	scsi_tmf_19	222	1026	100	0
[3271.767248]	scsi_eh_20	223	1	120	0
[3271.767249]	scsi_tmf_20	224	1026	100	0

[3271.767250]	scsi_eh_21		225	1	120	0
[3271.767250]	scsi_tmf_21		226	1026	100	0
[3271.767251]	scsi_eh_22		227	1	120	0
[3271.767251]	scsi_tmf_22		228	1026	100	0
[3271.767252]	scsi_eh_23		229	1	120	0
[3271.767252]	scsi_tmf_23		230	1026	100	0
[3271.767253]	scsi_eh_24		231	1	120	0
[3271.767254]	scsi_tmf_24		232	1026	100	0
[3271.767254]	scsi_eh_25		233	1	120	0
[3271.767255]	scsi_tmf_25		234	1026	100	0
[3271.767255]	scsi_eh_26		235	1	120	0
[3271.767256]	scsi_tmf_26		236	1026	100	0
[3271.767257]	scsi_eh_27		237	1	120	0
[3271.767257]	scsi_tmf_27		238	1026	100	0
[3271.767258]	scsi_eh_28		239	1	120	0
[3271.767258]	scsi_tmf_28		240	1026	100	0
[3271.767259]	scsi_eh_29		241	1	120	0
[3271.767260]	scsi_tmf_29		242	1026	100	0
[3271.767260]	scsi_eh_30		243	1	120	0
[3271.767261]	scsi_tmf_30		244	1026	100	0
[3271.767261]	scsi_eh_31		245	1	120	0
[3271.767262]	scsi_tmf_31		246	1026	100	0
[3271.767263]	scsi_eh_32		247	1	120	0
[3271.767263]	scsi_tmf_32		248	1026	100	0
[3271.767264]	kworker/u256:27		271	1026	120	0
[3271.767265]	ttm_swap	276	1026	100	0	
[3271.767265]	irq/16-vmwgfx		277	1	49	1
[3271.767266]	kworker/0:1H		280	1026	100	0
[3271.767267]	kworker/1:1H		281	1026	100	0
[3271.767267]	jbd2/sda1-8		305	1	120	0
[3271.767268]	ext4-rsv-conver		306	1026	100	0
[3271.767268]	systemd-journal		342	1	120	0
[3271.767269]	systemd-udev		373	1	120	0
[3271.767269]	loop0	383	1	100	0	
[3271.767270]	loop1	384	1	100	0	
[3271.767270]	loop2	385	1	100	0	
[3271.767271]	systemd-timesyn		399	1	120	0
[3271.767272]	vmware-vmblock-		405	1	120	0
[3271.767272]	vmtoolsd	408	1	120	0	
[3271.767273]	VGAuthService		887	1	120	0
[3271.767274]	systemd-logind		892	1	120	0
[3271.767275]	rsyslogd	895	1	120	0	
[3271.767275]	dbus-daemon		896	1	120	0
[3271.767276]	NetworkManager		918	1	120	0
[3271.767277]	acpid	926	1	120	0	
[3271.767277]	avahi-daemon		930	1	120	0

[3271.767277]	avahi-daemon		930	1	120	0
[3271.767278]	cron	933	1	120	0	
[3271.767278]	agetty	948	1	120	0	
[3271.767279]	irqbalance		968	1	120	0
[3271.767279]	avahi-daemon		982	1	120	0
[3271.767280]	polkitd	987	1	120	0	
[3271.767281]	unattended-upgr		996	1	120	0
[3271.767281]	lightdm	1015	1	120	0	
[3271.767282]	sshd	1021	1	120	0	
[3271.767283]	Xorg	1037	1	120	0	
[3271.767283]	dhclient	1070	1	120	0	
[3271.767284]	dnsmasq	1118	1	120	0	
[3271.767285]	whoopsie	1305	1	120	0	
[3271.767286]	lightdm	1419	1	120	0	
[3271.767286]	rtkit-daemon		1527	1	121	0
[3271.767287]	systemd	1768	1	120	0	
[3271.767288]	(sd-pam)	1769	1	120	0	
[3271.767288]	gnome-keyring-d		1774	1	120	0
[3271.767289]	upstart	1776	1	120	0	
[3271.767289]	dbus-daemon		1861	1	120	0
[3271.767290]	upstart-udev-br		1864	1	120	0
[3271.767291]	window-stack-br		1875	1	120	0
[3271.767291]	ibus-daemon		1905	1	120	0
[3271.767292]	gvfsd	1916	1	120	0	
[3271.767293]	gvfsd-fuse		1923	1	120	0
[3271.767293]	upstart-dbus-br		1926	1	120	0
[3271.767294]	ibus-dconf		1928	1	120	0
[3271.767295]	upstart-dbus-br		1930	1	120	0
[3271.767295]	ibus-ui-gtk3		1941	1	120	0
[3271.767296]	upstart-file-br		1945	1	120	0
[3271.767298]	ibus-x11	1949	1	120	0	
[3271.767298]	at-spi-bus-laun		1958	1	120	0
[3271.767299]	dbus-daemon		1963	1	120	0
[3271.767299]	at-spi2-registr		1965	1	120	0
[3271.767300]	bamfdaemon		1977	1	120	0
[3271.767301]	ibus-engine-sim		1983	1	120	0
[3271.767301]	gpg-agent		1995	1	120	0
[3271.767302]	hud-service		2006	1	120	0
[3271.767303]	unity-settings-		2008	1	120	0
[3271.767304]	gnome-session-b		2016	1	120	0

[3271.767304]	unity-panel-ser		2035	1	120	0
[3271.767305]	upowerd	2065	1	120	0	
[3271.767306]	indicator-messa		2073	1	120	0
[3271.767307]	indicator-bluet		2076	1	120	0
[3271.767307]	indicator-power		2081	1	120	0
[3271.767308]	indicator-datet		2082	1	120	0
[3271.767309]	indicator-keybo		2083	1	120	0
[3271.767310]	indicator-sound		2084	1	120	0
[3271.767310]	indicator-print		2085	1	120	0
[3271.767311]	indicator-sessi		2086	1	120	0
[3271.767312]	indicator-appli		2133	1	120	0
[3271.767312]	pulseaudio		2147	1	109	0
[3271.767313]	dconf-service		2174	1	120	0
[3271.767314]	colord	2178	1	120	0	
[3271.767315]	nautilus	2186	1	120	0	
[3271.767316]	evolution-sourc		2188	1	120	0
[3271.767316]	polkit-gnome-au		2192	1	120	0
[3271.767317]	vmtoolsd	2202	1	120	0	
[3271.767318]	unity-fallback-		2203	1	120	0
[3271.767318]	sshd	2227	1	120	0	
[3271.767319]	nm-applet		2228	1	120	0
[3271.767320]	gnome-software		2229	1	120	0
[3271.767320]	gvfs-udisks2-vo		2244	1	120	0
[3271.767321]	udisksd	2253	1	120	0	
[3271.767322]	fwupd	2261	1	120	0	
[3271.767322]	evolution-calen		2264	1	120	0
[3271.767323]	gvfs-gphoto2-vo		2288	1	120	0
[3271.767324]	gvfs-mtp-volume		2301	1	120	0
[3271.767324]	gvfs-goa-volume		2306	1	120	0
[3271.767325]	gvfs-afc-volume		2313	1	120	0
[3271.767326]	gvfsd-trash		2362	1	120	0
[3271.767326]	sshd	2363	1	120	0	
[3271.767327]	bash	2364	1	120	0	
[3271.767327]	compiz	2382	1	120	0	
[3271.767328]	evolution-calen		2390	1	120	0
[3271.767328]	evolution-addre		2402	1	120	0
[3271.767329]	evolution-calen		2404	1	120	0
[3271.767330]	gvfsd-metadata		2406	1	120	0
[3271.767330]	evolution-addre		2425	1	120	0
[3271.767331]	zeitgeist-datah		2475	1	120	0
[3271.767332]	sh	2482	1	120	0	
[3271.767332]	zeitgeist-daemo		2486	1	120	0
[3271.767333]	zeitgeist-fts		2493	1	120	0
[3271.767333]	sshd	2518	1	120	0	
[3271.767334]	sshd	2553	1	120	0	
[3271.767334]	sftp-server		2554	1	120	0

[3271.767335]	update-notifier	2637	1	120	0
[3271.767336]	deja-dup-monito	2671	1	120	0
[3271.767336]	cupsd	5094	1	120	0
[3271.767337]	cup-browsed	5095	1	120	0
[3271.767337]	dbus	5097	1	120	0
[3271.767338]	dbus	5098	1	120	0
[3271.767339]	dbus	5099	1	120	0
[3271.767339]	dbus	5100	1	120	0
[3271.767340]	unity-panel-ser	11971	1	120	0
[3271.767340]	kworker/0:1	32722	1026	120	0
[3271.767341]	snappd	32731	1	120	0
[3271.767342]	accounts-daemon	34295	1	120	0
[3271.767342]	xfsalloc	52617	1026	100	0
[3271.767343]	xfs_mru_cache	52618	1026	100	0
[3271.767343]	jfsIO	52631	1	120	0
[3271.767344]	jfsCommit	52632	1	120	0
[3271.767344]	jfsCommit	52633	1	120	0
[3271.767345]	jfsSync	52634	1	120	0
[3271.767346]	kworker/1:1	54309	1026	120	0
[3271.767346]	kworker/u256:0	54529	1026	120	0
[3271.767347]	kworker/0:2	54532	1026	120	0
[3271.767348]	kworker/1:2	54534	1026	120	0
[3271.767348]	kworker/u256:1	54649	1026	120	0
[3271.767349]	kworker/0:0	55706	1026	120	0
[3271.767349]	sudo	55713	1	120	0
[3271.767350]	insmod	55714	0	120	0
[3271.767350]	systemd-udev	55715	0	120	0
[3280.966734]	Goodbye World!!!				

第二題: 承上題，請依序列出 Policy 的常見種類，並加以解釋。 (40%)

1. **SCHED_NORMAL** : (也叫 **SCHED_OTHER**) 用於普通進程，通過 **CFS** 調度器實現。這些進程是按照他們的動態優先級（由 **nice** 值決定）來調度的。
2. **SCHED_FIFO** : 先入先出調度演算法（即時調度策略），相同優先順序的任務先到先服務，高優先順序的任務可以搶佔低優先順序的任務
3. **SCHED_RR** : 輪流調度演算法（即時調度策略），此策略也用於實時進程。提供 **Round-Robin** 語義，採用時間片，相同優先順序的任務當用完時間片會被放到佇列尾部，以保證公平性，同樣，高優先順序的任務可以搶佔低優先順序的任務。不同要求的即時任務可以根據需要用 **sched_setscheduler()** API 設置策略，以便其他同等優先級的進程可以運行。
4. **SCHED_BATCH** : 此策略用於非互動、CPU 密集型的工作負載。採用分時策略，根據動態優先順序（可用 **nice()** API 設置），分配 CPU 運算資源。它使用與 **SCHED_NORMAL** 相同的調度算法，但是會提供更公平的 CPU 分配，以防止單個長期運行的工作負載佔據 CPU。
5. **SCHED_IDLE** : 此策略用於運行非常低優先級的背景任務，在系統空閒時才跑這類進程。
6. **SCHED_DEADLINE** : 新支援的即時進程調度策略，針對突發型計算，且對延遲和完成時間高度敏感的任務適用。基於 **Earliest Deadline First (EDF)** 調度演算法。