

OPERATING SYSTEMS PROJECT
UE20CS254
LINUX KERNEL DEVELOPMENT
PROJECT REPORT



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1.USER PROCESS RUNNING ON AN INFINITE LOOP

```
Open  infileop.c
1 #include <stdio.h>
2 void main()
3 {
4     int i = 10;
5     for( ; ; )
6
7         printf("%d\n",i);
8
9 }
```

```
gaurav@gaurav-VirtualBox: ~/dfs
[ 673.231614] PARENT PID: 2556 PROCESS: kworker/1:0 STATE: 1026
[ 673.231616] -----
[ 673.231639] PARENT PID: 2563 PROCESS: Web Content STATE: 1
[ 673.231640] -----
[ 673.231641] PARENT PID: 2599 PROCESS: gnome-calendar STATE: 1
[ 673.231642] -----
[ 673.231643] PARENT PID: 2743 PROCESS: gedit STATE: 1
[ 673.231644] -----
[ 673.231645] PARENT PID: 2767 PROCESS: kworker/2:0 STATE: 1026
[ 673.231647] -----
[ 673.231648] PARENT PID: 2782 PROCESS: gvfsd-network STATE: 1
[ 673.231649] -----
[ 673.231650] PARENT PID: 2795 PROCESS: gvfsd-dnssd STATE: 1
[ 673.231651] -----
[ 673.231652] PARENT PID: 2842 PROCESS: kworker/0:1 STATE: 1026
[ 673.231653] -----
[ 673.231653] PARENT PID: 2874 PROCESS: bash STATE: 1
[ 673.231655] CHILD OF bash[2874] PID: 2906 PROCESS: a.out STATE: 0
[ 673.231656] -----
[ 673.231657] PARENT PID: 2906 PROCESS: a.out STATE: 0
[ 673.231658] -----
[ 673.231659] PARENT PID: 2907 PROCESS: kworker/u8:1 STATE: 0
[ 673.231660] -----
[ 673.231660] PARENT PID: 2908 PROCESS: kworker/u8:4 STATE: 512
[ 673.231662] -----
[ 673.231662] PARENT PID: 2913 PROCESS: sudo STATE: 1
[ 673.231663] CHILD OF sudo[2913] PID: 2914 PROCESS: insmod STATE: 0
[ 673.231664] -----
[ 673.231665] PARENT PID: 2914 PROCESS: insmod STATE: 0
gaurav@gaurav-VirtualBox:~/dfs$
```

2.ZOMBIE PROCESS RUNNING

```
gaurav@gaurav-VirtualBox:~$ gcc zombie.c
gaurav@gaurav-VirtualBox:~$ ./a.out
gaurav@gaurav-VirtualBox:~$ ./a.out
```

```
gaurav@gaurav-VirtualBox: ~/dfs
[ 980.496329] -----
[ 980.496330] PARENT PID: 2907 PROCESS: kworker/u8:1 STATE: 1026
[ 980.496332] -----
[ 980.496333] PARENT PID: 2908 PROCESS: kworker/u8:4 STATE: 1026
[ 980.496334] -----
[ 980.496336] PARENT PID: 2963 PROCESS: gnome-terminal- STATE: 1
[ 980.496337] CHILD OF gnome-terminal-[2963] PID: 2971 PROCESS: bash STATE: 1
[ 980.496339] CHILD OF gnome-terminal-[2963] PID: 2998 PROCESS: bash STATE: 1
[ 980.496341] -----
[ 980.496343] PARENT PID: 2971 PROCESS: bash STATE: 1
[ 980.496344] CHILD OF bash[2971] PID: 3028 PROCESS: sudo STATE: 1
[ 980.496346] -----
[ 980.496360] PARENT PID: 2988 PROCESS: gedit STATE: 1
[ 980.496370] -----
[ 980.496371] PARENT PID: 2998 PROCESS: bash STATE: 1
[ 980.496375] CHILD OF bash[2998] PID: 3026 PROCESS: a.out STATE: 1
[ 980.496377] -----
[ 980.496378] PARENT PID: 3015 PROCESS: tracker-store STATE: 1
[ 980.496379] -----
[ 980.496380] PARENT PID: 3026 PROCESS: a.out STATE: 1
[ 980.496382] CHILD OF a.out[3026] PID: 3027 PROCESS: a.out STATE: 128
[ 980.496384] -----
[ 980.496385] PARENT PID: 3027 PROCESS: a.out STATE: 128
[ 980.496387] -----
[ 980.496388] PARENT PID: 3028 PROCESS: sudo STATE: 1
[ 980.496389] CHILD OF sudo[3028] PID: 3029 PROCESS: insmod STATE: 0
[ 980.496391] -----
[ 980.496392] PARENT PID: 3029 PROCESS: insmod STATE: 0
gaurav@gaurav-VirtualBox:~/dfs$
```

3.ALL THE KERNEL PROCESS RUNNING

```
gaurav@gaurav-VirtualBox: ~/dfs
PARENT PID: 2599 PROCESS: gnome-calendar STATE: 1
[ 1121.293595] -----
[ 1121.293596]
PARENT PID: 2767 PROCESS: kworker/2:0 STATE: 1026
[ 1121.293596] -----
[ 1121.293597]
PARENT PID: 2782 PROCESS: gvfsd-network STATE: 1
[ 1121.293598] -----
[ 1121.293598]
PARENT PID: 2795 PROCESS: gvfsd-dnssd STATE: 1
[ 1121.293599] -----
[ 1121.293600]
PARENT PID: 2842 PROCESS: kworker/0:1 STATE: 1026
[ 1121.293601] -----
[ 1121.293602]
PARENT PID: 2907 PROCESS: kworker/u8:1 STATE: 1026
[ 1121.293603] -----
[ 1121.293604]
PARENT PID: 2908 PROCESS: kworker/u8:4 STATE: 1026
[ 1121.293605] -----
[ 1121.293605]
PARENT PID: 2963 PROCESS: gnome-terminal- STATE: 1
[ 1121.293606]
CHILD OF gnome-terminal-[2963] PID: 2971 PROCESS: bash STATE: 1
[ 1121.293608]
CHILD OF gnome-terminal-[2963] PID: 2998 PROCESS: bash STATE: 1
[ 1121.293609] -----
[ 1121.293610]
PARENT PID: 2971 PROCESS: bash STATE: 1
[ 1121.293611]
CHILD OF bash[2971] PID: 3051 PROCESS: sudo STATE: 1
[ 1121.293612] -----
[ 1121.293613]
PARENT PID: 2988 PROCESS: gedit STATE: 1
[ 1121.293614] -----
[ 1121.293614]
PARENT PID: 2998 PROCESS: bash STATE: 1
[ 1121.293615] -----
[ 1121.293616]
PARENT PID: 3051 PROCESS: sudo STATE: 1
[ 1121.293617]
CHILD OF sudo[3051] PID: 3052 PROCESS: insmod STATE: 0
[ 1121.293618] -----
[ 1121.293619]
PARENT PID: 3052 PROCESS: insmod STATE: 0
gaurav@gaurav-VirtualBox:~/dfs$
```

4.WHAT DO DIFFERENT STATES REPRESENT?

STATE 0: PROCESS RUNNING

STATE 1: INTERRUPTIBLE PROCESS

STATE 2: UNINTERRUPTIBLE PROCESS

STATE 4: PROCESS STOPPED

STATE 8: PROCESS TRACED

STATE 128: ZOMBIE PROCESS

5.MODULES AND MACROS USED

iterate_init

- A module used for initialising or entering the kernel

for_each_process

- A macro for iterating through each task located in os.

- Its present in <linux/sched/signal.h>

list_for_each

- A macro to iterate through task children

cleanup_exit

- A module used for exiting the kernel

`module_init(iterate_init);`

- macro for loading module

`module_exit(cleanup_exit);`

- macro to remove the loaded module

`MODULE_LICENSE("GPL")`

- macro to define the type of licensing