

Лабораторная работа 7

КОНТРОЛЬ ИСПОЛЬЗОВАНИЯ РЕСУРСОВ ОС LINUX

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1. Вывести список всех процессов системы.

```
vboxuser@test2025:~$ ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root        1  0.3  0.2 169572 13108 ?        Ss   10:32  0:11 /sbin/init s
root        2  0.0  0.0     0    0 ?        S    10:32  0:00 [kthreadd]
root        3  0.0  0.0     0    0 ?        I<  10:32  0:00 [rcu_gp]
root        4  0.0  0.0     0    0 ?        I<  10:32  0:00 [rcu_par_gp]
root        5  0.0  0.0     0    0 ?        I<  10:32  0:00 [slub_flushw]
root        6  0.0  0.0     0    0 ?        I<  10:32  0:00 [netns]
root        8  0.0  0.0     0    0 ?        I<  10:32  0:00 [kworker/0:0
root       10  0.0  0.0     0    0 ?        I<  10:32  0:00 [mm_percpu_w
root       11  0.0  0.0     0    0 ?        S    10:32  0:00 [rcu_tasks_r
root       12  0.0  0.0     0    0 ?        S    10:32  0:00 [rcu_tasks_t
root       13  0.0  0.0     0    0 ?        S    10:32  0:02 [ksoftirqd/0
root       14  0.0  0.0     0    0 ?        I    10:32  0:01 [rcu_sched]
root       15  0.0  0.0     0    0 ?        S    10:32  0:00 [migration/0
root       16  0.0  0.0     0    0 ?        S    10:32  0:00 [idle_inject
root       18  0.0  0.0     0    0 ?        S    10:32  0:00 [cpuhp/0]
root       19  0.0  0.0     0    0 ?        S    10:32  0:00 [cpuhp/1]
root       20  0.0  0.0     0    0 ?        S    10:32  0:00 [idle_inject
root       21  0.0  0.0     0    0 ?        S    10:32  0:00 [migration/1
root       22  0.0  0.0     0    0 ?        S    10:32  0:01 [ksoftirqd/1
root       24  0.0  0.0     0    0 ?        I<  10:32  0:00 [kworker/1:0
root       25  0.0  0.0     0    0 ?        S    10:32  0:00 [kdevtmpfs]
root       26  0.0  0.0     0    0 ?        I<  10:32  0:00 [inet_frag_w
root       27  0.0  0.0     0    0 ?        S    10:32  0:00 [kauditfd]
root       28  0.0  0.0     0    0 ?        S    10:32  0:00 [khungtaskd]
root       29  0.0  0.0     0    0 ?        S    10:32  0:00 [oom_reaper]
root       30  0.0  0.0     0    0 ?        I<  10:32  0:00 [writeback]
root       31  0.0  0.0     0    0 ?        S    10:32  0:00 [kcompactd0]
```

2. Вывести дерево процессов.

```
vboxuser@test2025:~$ pstree
systemd--ModemManager---2*[{ModemManager}]
systemd--NetworkManager---2*[{NetworkManager}]
systemd--accounts-daemon---2*[{accounts-daemon}]
systemd--acpid
systemd--avahi-daemon--avahi-daemon
systemd--colord---2*[{colord}]
systemd--cron
systemd--cups-browsed---2*[{cups-browsed}]
systemd--cupsd
systemd--dbus-daemon
systemd--gdm3---gdm-session-wor---gdm-x-session---Xorg---{Xorg}
systemd--gdm3---gdm-session-wor---gdm-x-session---gnome-session-b---ssh-agent
systemd--gdm3---gdm-session-wor---gdm-x-session---gnome-session-b---2*[{gnome+}
systemd--gdm3---gdm-session-wor---gdm-x-session---2*[{gdm-x-session}]
systemd--gdm3---gdm-keyring-d---3*[{gdm-keyring-d}]
systemd--irqbalance---{irqbalance}
systemd--2*[{kerneloops}]
systemd--networkd-dispat
systemd--polkitd---2*[{polkitd}]
systemd--rsyslogd---3*[{rsyslogd}]
systemd--rtkit-daemon---2*[{rtkit-daemon}]
systemd--snapd---9*[{snapd}]
systemd--switcheroo-cont---2*[{switcheroo-cont}]
systemd---(sd-pam)
systemd---at-spi-bus-laun---dbus-daemon
systemd---at-spi-bus-laun---3*[{at-spi-bus-laun}]
```

3. С помощью команды top получить список 5 процессов, потребляющих наибольшее количество процессорного времени.

Командой top вывожу динамически обновляющийся список всех процессов

```
vboxuser@test2025:~$ top

top - 12:07:31 up 1:35, 1 user, load average: 0,00, 0,00, 0,02
Tasks: 178 total, 1 running, 177 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0,3 us, 2,1 sy, 0,0 ni, 97,6 id, 0,0 wa, 0,0 hi, 0,0 si, 0,0 st
MiB Mem : 6393,1 total, 989,3 free, 823,8 used, 4579,9 buff/cache
MiB Swap: 1442,1 total, 1442,1 free, 0,0 used. 5272,5 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
 2676 vboxuser  20   0 258400 71020 44044 S  4,0  1,1  0:32.90 Xorg
 2810 vboxuser  20   0 3919172 358144 126312 S  1,3  5,5  0:38.84 gnome+-+
 4062 vboxuser  20   0 814748 51180 38532 S  1,0  0,8  0:01.59 gnome+-+
 1 root      20   0 169572 13108  8492 S  0,0  0,2  0:11.46 systemd
 2 root      20   0      0    0    0 S  0,0  0,0  0:00.01 kthrea+
 3 root      0 -20    0    0    0 I  0,0  0,0  0:00.00 rcu_gp
 4 root      0 -20    0    0    0 I  0,0  0,0  0:00.00 rcu_pa+
 5 root      0 -20    0    0    0 I  0,0  0,0  0:00.00 slab_f+
 6 root      0 -20    0    0    0 I  0,0  0,0  0:00.00 netns
 8 root      0 -20    0    0    0 I  0,0  0,0  0:00.00 kworker+
10 root     0 -20    0    0    0 I  0,0  0,0  0:00.00 mm_per+
11 root     20   0      0    0    0 S  0,0  0,0  0:00.00 rcu_ta+
12 root     20   0      0    0    0 S  0,0  0,0  0:00.00 rcu_ta+
13 root     20   0      0    0    0 S  0,0  0,0  0:02.43 ksoftti+
14 root     20   0      0    0    0 I  0,0  0,0  0:02.00 rcu_sc+
15 root     rt   0      0    0    0 S  0,0  0,0  0:00.12 migrat+
16 root    -51   0      0    0    0 S  0,0  0,0  0:00.00 idle_i+
18 root     20   0      0    0    0 S  0,0  0,0  0:00.00 cpuhp/0
19 root     20   0      0    0    0 S  0,0  0,0  0:00.00 cpuhp/1
20 root    -51   0      0    0    0 S  0,0  0,0  0:00.00 idle_i+
```

Нажимаю f для сортировки, после чего выбирают time+, затем q для выхода из меню. Теперь список отсортирован по потреблению времени.

Fields Management for window 1:Def, whose current sort field is TIME+										
Navigate with Up/Dn, Right selects for move then <Enter> or Left commits, 'd' or <Space> toggles display, 's' sets sort. Use 'q' or <Esc> to end!										
*	PID	= Process Id	PGRP	= Process Gr	OOMs	= OOMEM	Scor	RSS	= Res Mem	(s)
*	USER	= Effective	TTY	= Controllin	ENVIRON	= Environmen	PSS	= Proportion		
*	PR	= Priority	TPGID	= Tty Proces	vMj	= Major Faul	PSan	= Proportion		
*	NI	= Nice Value	SID	= Session Id	vMn	= Minor Faul	PSfd	= Proportion		
*	VIRT	= Virtual Im	nTH	= Number of	USED	= Res+Swap	S	PSsh	= Proportion	
*	RES	= Resident S	P	= Last Used	nsIPC	= IPC namesp	USS	= Unique RSS		
*	SHR	= Shared Mem	TIME	= CPU Time	nsMNT	= MNT namesp	ioR	= I/O Bytes		
*	S	= Process St	SWAP	= Swapped Si	nsNET	= NET namesp	ioRop	= I/O Read 0		
*	%CPU	= CPU Usage	CODE	= Code Size	nsPID	= PID namesp	ioW	= I/O Bytes		
*	%MEM	= Memory Usa	DATA	= Data+Stack	nsUSER	= USER names	ioWop	= I/O Write		
*	TIME+	= CPU Time,	nMaj	= Major Page	nsUTS	= UTS namesp	AGID	= Autogroup		
*	COMMAND	= Command Na	nMin	= Minor Page	LXC	= LXC contai	AGNI	= Autogroup		
PPID	= Parent Pro	nDRT	= Dirty Page	RSan	= RES Anonym	STARTED		STARTED	= Start Time	
UID	= Effective	WCHAN	= Sleeping i	RSfd	= RES File-b	ELAPSED		ELAPSED	= Elapsed Ru	

```
top - 12:41:36 up 40 min, 1 user, load average: 1.70, 2.22, 3.84
Tasks: 213 total, 1 running, 212 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.2 us, 22.1 sy, 0.0 ni, 0.0 id, 66.0 wa, 0.0 hi, 10.7 si, 0.0 st
MiB Mem : 1968.7 total, 91.5 free, 1823.2 used, 845.2 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 145.5 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
 1 root      20   0  23228   8348   3484 S  0,0  0,4  6:36.06 systemd
 2516 ubuntu  20   0 3454040 242892 27256 S  1,0 12,0  1:53.69 gnome-shell
 2145 ubuntu  20   0  21568   5336   2008 S  0,0  0,3  1:42.97 systemd
 6625 root     20   0  61072  24076  1592 S  0,0  1,2  1:13.18 python3.10
 1654 root     20   0 1847964 15000   420 S  0,0  0,7  1:08.12 snapd
 17 root      20   0      0    0    0 S  0,0  0,0  0:39.46 ksoftirqd/0
 2293 ubuntu  20   0 318232 52252 13360 S  1,3  2,6  0:37.35 Xorg
 4094 root     20   0 646852 62156  3908 S  0,0  3,1  0:26.86 python3.10
 12 root      20   0      0    0    0 I  0,3  0,0  0:24.34 kworker/u4:0-ext4-r+
 6393 root     20   0      0    0    0 I  0,0  0,0  0:23.90 kworker/0:2-cgroup_+
 1315 root     20   0      0    0    0 I  0,0  0,0  0:20.35 kworker/u4:8-events+
 47 root      20   0      0    0    0 S  0,3  0,0  0:16.97 kswapd0
 7733 root     20   0  43696 28508   2756 S 19,3  1,4  0:14.58 dpkg
 6424 root     20   0      0    0    0 I  0,0  0,0  0:14.51 kworker/0:0-cgroup_+
 6151 ubuntu  20   0 776548 18744  7560 S  0,3  0,9  0:13.72 gnome-terminal-
```

После нажимаю p и ввожу число 5 чтобы оставить только 5 верхних строчек.

```
top - 12:42:18 up 41 min, 1 user, load average: 1.41, 2.08, 3.72
Tasks: 213 total, 2 running, 211 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.2 us, 30.5 sy, 0.0 ni, 0.0 id, 56.0 wa, 0.0 hi, 12.4 si, 0.0 st
MiB Mem : 1968.7 total, 83.0 free, 1826.1 used, 851.8 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 142.6 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
 2516 ubuntu    20   0 3454040 243352 27716 S  4.3 12.1  1:42.07 gnome-shell
 17 root       20   0      0      0      0 S  0.0  0.0  0:39.55 ksoftirqd/0
 2293 ubuntu    20   0 318232 52896 14004 S  4.3  2.6  0:37.97 Xorg
 12 root       20   0      0      0      0 I  1.0  0.0  0:24.68 kworker/u4:0-writeb+
 1654 root     20   0 1847964 18392 3812 S  0.0  0.9  0:24.13 snapd
```

4. Найти 2 процесса, имеющих более двух потоков. Использовать состояние процесса.

Ввожу команду top, после чего нажимаю о для фильтра и ввожу S=I, чтобы отображались только процессы с двумя и более потоками.

The screenshot shows a terminal window titled "ubuntu@ubuntu:~". The terminal displays two instances of the "top" command output. The first instance shows a system with 218 tasks, including 3 running processes. The second instance shows a system with 223 tasks, including 2 running processes. Both outputs include CPU usage statistics, memory usage, and a detailed process list. The process list is filtered to show only those with multiple threads (PR > 1). The last few lines of each output show the following processes:

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
7732	root	20	0	0	0	0	I	3.4	0.0	0:10.66	kworker/0:1-ata_sff
18	root	20	0	0	0	0	I	0.6	0.0	0:07.00	rcu_preempt
13784	root	20	0	0	0	0	I	0.3	0.0	0:00.43	kworker/u4:3-events+
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-rcu_gp
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-sync_wq
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-kvfree_rc+
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-slub_flush+
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-netns
12	root	20	0	0	0	0	I	0.0	0.0	0:25.36	kworker/u4:0-loop2
13	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-mm_percpu+
14	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_kthread
15	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_rude_kthr+
16	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_trace_kth+
25	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-inet_frag+
31	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-writeback
35	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-kintegrity

5. Используя команду top, изменить приоритеты 2 процессов.

После вызова команды sudo top, чтобы вызвать команду в режиме суперпользователя, нажимаю r и ввожу pid процесса.

top - 12:59:49 up 59 min, 1 user, load average: 6.30, 4.96, 3.76												
Tasks: 225 total, 1 running, 222 sleeping, 0 stopped, 2 zombie												
%Cpu(s): 0.0 us, 29.4 sy, 5.9 ni, 0.0 id, 47.1 wa, 0.0 hi, 17.6 si, 0.0 st												
MiB Mem : 1968.7 total, 75.8 free, 1908.8 used, 759.3 buff/cache												
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 59.9 avail Mem												
PID to renice [default pid = 14928] 8												
PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND	
14928	root	39	19	210776	70472	29184	D	4.8	3.5	0:03.45	apt-check	
1	root	20	0	23484	5940	1076	S	0.0	0.3	0:16.30	systemd	
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd	
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_workqueue_rele+	
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-rcu_gp	
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-sync_wq	
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-kvfree_rc+	
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-slub_flush	
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-netns	
12	root	20	0	0	0	0	T	0.0	0.0	0:25.26	lvmflush/sync+0.100000	

Выбираем процесс 1 и меняем ему приоритет на -10

MiB Mem : 1968.7 total, 74.5 free, 978.1 used, 1101.3 buff/cache												
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 990.6 avail Mem												
Renice PID 1 to value -10												
PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND	
1951	vboxuser	20	0	3462708	382340	144156	S	13.0	19.0	0:21.00	gnome-s+	
3916	vboxuser	20	0	554060	53088	42316	S	4.0	2.6	0:00.82	gnome-t+	
3785	root	20	0	0	0	0	I	0.3	0.0	0:00.17	kworker+	

В столбцах pr и ni можно увидеть изменения.

1951	vboxuser	20	0	3454572	320716	82700	S	0.7	15.9	1:05.59	gnome-s+	
284	root	20	0	0	0	0	I	0.3	0.0	0:03.72	kworker+	
3916	vboxuser	20	0	624392	40424	28500	S	0.3	2.0	0:03.43	gnome-t+	
4179	root	20	0	14536	5828	3652	R	0.3	0.3	0:00.32	top	
1	root	10	-10	23272	14076	9476	S	0.0	0.7	0:33.07	systemd	
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd	
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_wo+	
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	

Проделываю то же самое с процессом 2.

MiB Mem : 1968.7 total, 526.9 free, 993.8 used, 632.6 buff/cache												
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 974.9 avail Mem												
Renice PID 2 to value -10												
PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND	
1951	vboxuser	20	0	3454572	320716	82700	S	0.7	15.9	1:06.52	gnome-s+	
284	root	20	0	0	0	0	I	0.3	0.0	0:03.90	kworker+	
835	root	20	0	1865340	39624	24080	S	0.3	2.0	0:46.98	snapd	
3899	root	20	0	0	0	0	I	0.3	0.0	0:01.25	kworker+	
4179	root	20	0	14536	5828	3652	R	0.3	0.3	0:00.49	top	
1	root	10	-10	23272	14076	9476	S	0.0	0.7	0:33.07	systemd	
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd	
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_wo+	
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
3810	root	20	0	0	0	0	I	0.5	0.0	0:00.24	kworker+	
4179	root	20	0	14536	5828	3652	R	0.5	0.3	0:00.51	top	
1	root	10	-10	23272	14076	9476	S	0.0	0.7	0:04.12	systemd	
2	root	10	-10	0	0	0	S	0.0	0.0	0:00.00	kthreadd	
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_wo+	
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+	

6. Получить список открытых файлов пользователя

```
ts01      2100  VBOXUSER    714  715          0,15      0,00      55563 p
::: ipe
vboxuser@test2025:~$ lsof -u vboxuser
```

/lib/x86_64-linux-gnu/libsharpyuv.so.0.0.1							
gnome-she	1951	vboxuser	mem	REG	8,2	14344	1322820 /usr
/lib/x86_64-linux-gnu/libwayland-egl.so.1.22.0							
gnome-she	1951	vboxuser	mem	REG	8,2	510592	1322808 /usr
/lib/x86_64-linux-gnu/libvulkan.so.1.3.275							
gnome-she	1951	vboxuser	mem	REG	8,2	1189616	1322305 /usr
/lib/x86_64-linux-gnu/libepoxy.so.0.0.0							
gnome-she	1951	vboxuser	mem	REG	8,2	22600	1322498 /usr
/lib/x86_64-linux-gnu/libkeyutils.so.1.10							
gnome-she	1951	vboxuser	mem	REG	8,2	18504	1322241 /usr
/lib/x86_64-linux-gnu/libcom_err.so.2.1							
gnome-she	1951	vboxuser	mem	REG	8,2	41804	1323961 /usr
/lib/x86_64-linux-gnu/girepository-1.0/Gsk-4.0.typelib							
gnome-she	1951	vboxuser	mem	REG	8,2	570548	1323968 /usr
/lib/x86_64-linux-gnu/girepository-1.0/Gtk-4.0.typelib							
gnome-she	1951	vboxuser	mem	REG	8,2	14972	1323975 /usr
/lib/x86_64-linux-gnu/girepository-1.0/NMA4-1.0.typelib							
gnome-she	1951	vboxuser	mem	REG	8,2	19176	1313326 /usr
/lib/gnome-shell/Gvc-1.0.typelib							
gnome-she	1951	vboxuser	mem	REG	8,2	340688	1323974 /usr
/lib/x86_64-linux-gnu/girepository-1.0/NM-1.0.typelib							
gnome-she	1951	vboxuser	mem	REG	8,2	45580	1313328 /usr
/lib/gnome-shell/St-14.typelib							
gnome-she	1951	vboxuser	mem	REG	8,2	212868	1324215 /usr

7. Получить текущее состояние системной памяти

```
vboxuser@test2025:~$ free
```

	total	used	free	shared	buff/cache	available
Mem:	6546512	781840	5109840	5184	654832	5524624
Swap:	1476668	0	1476668			

8. Получить справку об использовании дискового пространства.

```
vboxuser@test2025:~$ df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
udev	3,1G	0	3,1G	0%	/dev
tmpfs	640M	1,4M	638M	1%	/run
/dev/sda5	30G	10G	19G	36%	/
tmpfs	3,2G	0	3,2G	0%	/dev/shm
tmpfs	5,0M	4,0K	5,0M	1%	/run/lock
tmpfs	3,2G	0	3,2G	0%	/sys/fs/cgroup

9. Вывести информацию о каком-либо процессе, используя содержимое каталога /proc

```
vboxuser@test2025:~$ ls /proc/1
ls: cannot read symbolic link '/proc/1/cwd': Permission denied
ls: cannot read symbolic link '/proc/1/root': Permission denied
ls: cannot read symbolic link '/proc/1/exe': Permission denied
a [Ubuntu Software] cwd mem patch_state stat
autogroup environ mountinfo personality statm
auxv exe mounts projid_map status
cgroup fd mountstats root syscall
clear_refs fdinfo net sched task
cmdline gid_map ns schedstat timens_offsets
comm io numa_maps sessionid timers
coredump_filter loginuid oom_adj setgroups timerslack_ns
cpu_resctrl_groups map_files oom_score smaps uid_map
cpuset maps oom_score_adj smaps_rollup wchan
paqemap stack
```

10. Вывести информацию о процессоре ПК, используя содержимое каталога /proc

```
vboxuser@test2025:~$ cat /proc/cpuinfo
processor      : 0
vendor_id     : AuthenticAMD
cpu family    : 25
model         : 97
model name    : AMD Ryzen 7 7700 8-Core Processor
stepping       : 2
microcode     : 0xffffffff
cpu MHz       : 3792.800
cache size    : 1024 KB
physical id   : 0
siblings       : 2
core id        : 0
cpu cores     : 2
apicid         : 0
initial apicid: 0
fpu            : yes
fpu_exception  : yes
cpuid level   : 13
wp             : yes
flags          : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                  Help se36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt rdtscp lm
                  noexec_tsc rep_good nopl nonstop_tsc cpuid extd_apicid tsc_known_freq pni pclmu
                  lqdq ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand hyperv
                  isor lahf_lm cmp_legacy cr8_legacy abm sse4a misalignsse 3dnowprefetch vmmcall
                  fsgsbbase bmi1 avx2 bmi2 invpcid rdseed adx clflushopt sha_ni arat
                  bugs          : fxsave_leak sysret_ss_attrs null_seg spectre_v1 spectre_v2 sr
so
bogomips      : 7585.60
```

11. Вывести список модулей, используемых в настоящий момент ядром ОС.

```
vboxuser@test2025:~$ lsmod
Module                  Size  Used by
nls_iso8859_1           16384  1
binfmt_misc              24576  1
intel_rapl_msr           20480  0
snd_intel8x0              49152  2
intel_rapl_common         40960  1 intel_rapl_msr
crct10dif_pclmul          16384  1
snd_ac97_codec            155648  1 snd_intel8x0
ac97_bus                  16384  1 snd_ac97_codec
ghash_clmulni_intel        16384  0
snd_pcm                   135168  2 snd_intel8x0,snd_ac97_codec
sha256_ssse3                32768  0
sha1_ssse3                  32768  0
snd_seq_midi                 20480  0
snd_seq_midi_event          16384  1 snd_seq_midi
joydev                      32768  0
UbuntuSoftware               49152  1 snd_seq_midi
aesni_intel                  376832  0
crypto_simd                  16384  1 aesni_intel
cryptd                      24576  2 crypto_simd,ghash_clmulni_intel
snd_seq                     77824  2 snd_seq_midi,snd_seq_midi_event
snd_seq_device                 16384  3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer                     40960  2 snd_seq,snd_pcm
vmwgfx                      364544  2
input_leds                      16384  0
ttm                          86016  1 vmwgfx
serio_raw                     20480  0
```