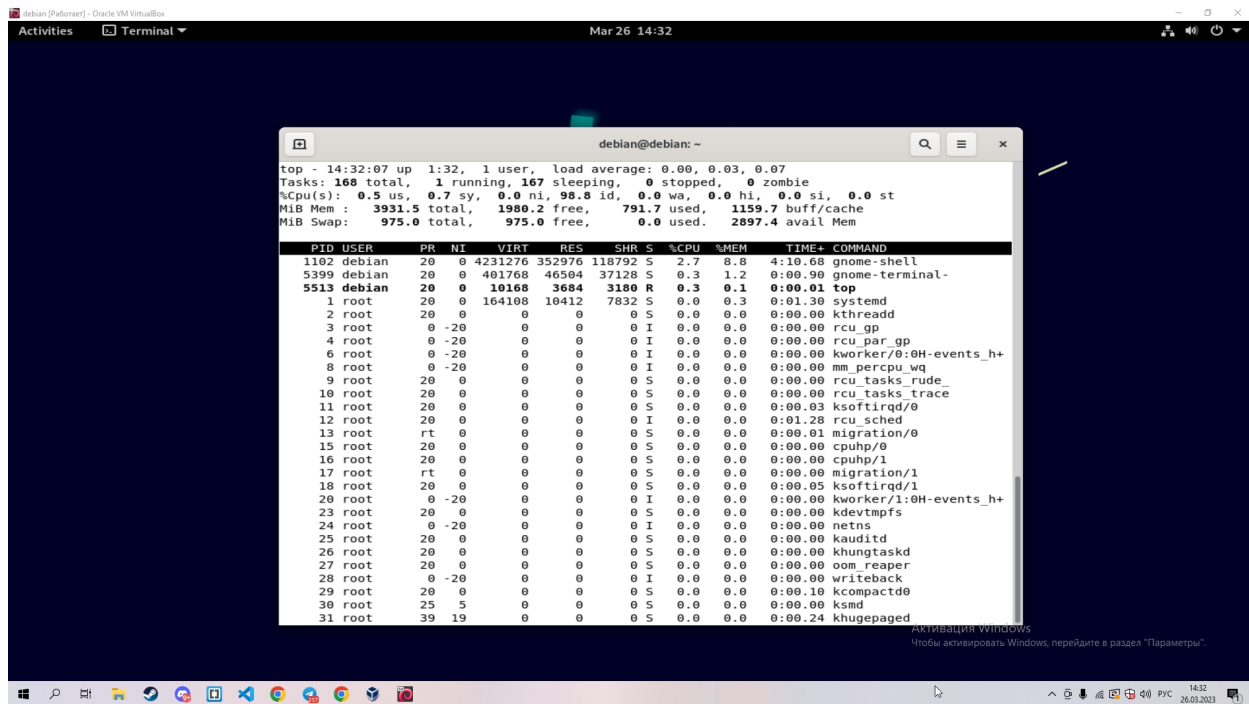


1. Предоставить изображение текущих процессов вашего ПК с помощью утилиты top. Найти там процессы с приоритетом, отличным от значения по умолчанию (20):



```
top - 14:32:07 up 1:32, 1 user, load average: 0.00, 0.03, 0.07
Tasks: 168 total, 1 running, 167 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.5 us, 0.7 sy, 0.0 ni, 98.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 3931.5 total, 1980.2 free, 791.7 used, 1159.7 buff/cache
MiB Swap: 975.0 total, 975.0 free, 0.0 used, 2897.4 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM    TIME+  COMMAND
 1102 debian    20   0 4231276 352976 118792 S   2.7   8.8   4:10.68 gnome-shell
5399 debian    20   0 401768 46504 37128 S   0.3   1.2   0:00.90 gnome-terminal-
5513 debian    20   0 10168 3684 3180 R   0.3   0.1   0:00.01 top
   1 root      20   0 164108 10412 7832 S   0.0   0.3   0:01.30 systemd
   2 root      20   0   0   0   0 S   0.0   0.0   0:00.00 kthreadd
   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_par_gp
   6 root      0 -20   0   0   0 I   0.0   0.0   0:00.00 kworker/0:0H-events_h+
   8 root      0 -20   0   0   0 I   0.0   0.0   0:00.00 mm_percpu_wq
   9 root      20   0   0   0   0 S   0.0   0.0   0:00.00 rcu_tasks_rude_
  10 root      20   0   0   0   0 S   0.0   0.0   0:00.00 rcu_tasks_trace
  11 root      20   0   0   0   0 S   0.0   0.0   0:00.03 ksoftirqd/0
  12 root      20   0   0   0   0 S   0.0   0.0   0:01.28 rcu_sched
  13 root      rt    0   0   0   0 S   0.0   0.0   0:00.01 migration/0
  15 root      20   0   0   0   0 S   0.0   0.0   0:00.00 cpuhp/0
  16 root      20   0   0   0   0 S   0.0   0.0   0:00.00 cpuhp/1
  17 root      rt    0   0   0   0 S   0.0   0.0   0:00.00 migration/1
  18 root      20   0   0   0   0 S   0.0   0.0   0:00.05 ksoftirqd/1
  20 root      0 -20   0   0   0 I   0.0   0.0   0:00.00 kworker/1:0H-events_h+
  23 root      20   0   0   0   0 S   0.0   0.0   0:00.00 kdevtmpfs
  24 root      0 -20   0   0   0 I   0.0   0.0   0:00.00 netns
  25 root      20   0   0   0   0 S   0.0   0.0   0:00.00 kauditd
  26 root      20   0   0   0   0 S   0.0   0.0   0:00.00 khungtaskd
  27 root      20   0   0   0   0 S   0.0   0.0   0:00.00 oom_reaper
  28 root      0 -20   0   0   0 I   0.0   0.0   0:00.00 writeback
  29 root      20   0   0   0   0 S   0.0   0.0   0:00.10 kcompactd0
  30 root      25   5   0   0   0 S   0.0   0.0   0:00.00 ksm
  31 root      39  19   0   0   0 S   0.0   0.0   0:00.24 khugepaged
```

2. С помощью утилиты time замерить время выполнения задачи по архивированию большого объёма данных (не менее 1Гб) при использовании приоритета по умолчанию и при установке минимального приоритета (nice -n 20 ...). Перед каждым запуском архивирования перезагрузить виртуальную машину Сделать выводы с обоснованием:

The screenshot shows a terminal window in a Debian VM. The top bar indicates the date and time as Mar 26 14:37. The terminal output displays a table of system processes with columns for PID, username, PPID, priority, nice value, total memory, free memory, shared memory, and command. The processes listed include rtkit, root, kthreadd, rcu_tasks_rude_, rcu_tasks_trace, ksoftirqd/0, rcu_sched, cpuhp/0, cpuhp/1, ksoftirqd/1, kdevtmpfs, kauditd, khungtaskd, oom_reaper, kcompactd0, kswapd0, scsi_eh_0, scsi_eh_1, scsi_eh_2, jbd2/sda1-8, systemd-journal, systemd-udev, systemd-timesyn, accounts-daemon, and avahi-daemon. Below the table, the command 'time' is executed, followed by 'dd if=/dev/urandom of=test bs=1G count=1'. The output shows the disk write test completed in 17.0501 seconds, copying 1.1 GB at 63.0 MB/s.

```
553 rtkit 21 1 153752 2952 2700 S 0.0 0.1 0:00.06 rtkit-daemon
1 root 20 0 164108 10412 7832 S 0.0 0.3 0:01.31 systemd
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kthreadd
9 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_tasks_rude_
10 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_tasks_trace
11 root 20 0 0 0 0 S 0.0 0.0 0:00.03 ksoftirqd/0
12 root 20 0 0 0 0 I 0.0 0.0 0:01.29 rcu_sched
15 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
16 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/1
18 root 20 0 0 0 0 S 0.0 0.0 0:00.05 ksoftirqd/1
23 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kdevtmpfs
25 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kauditd
26 root 20 0 0 0 0 S 0.0 0.0 0:00.00 khungtaskd
27 root 20 0 0 0 0 S 0.0 0.0 0:00.00 oom_reaper
29 root 20 0 0 0 0 S 0.0 0.0 0:00.10 kcompactd0
56 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kswapd0
123 root 20 0 0 0 0 S 0.0 0.0 0:00.01 scsi_eh_0
125 root 20 0 0 0 0 S 0.0 0.0 0:00.00 scsi_eh_1
126 root 20 0 0 0 0 S 0.0 0.0 0:00.00 scsi_eh_2
183 root 20 0 0 0 0 S 0.0 0.0 0:00.15 jbd2/sda1-8
221 root 20 0 50560 21888 18460 S 0.0 0.5 0:00.36 systemd-journal
251 root 20 0 24132 7168 4100 S 0.0 0.2 0:00.38 systemd-udev
263 systemd+ 20 0 88576 6132 5408 S 0.0 0.2 0:00.03 systemd-timesyn
437 root 20 0 236364 7208 6480 S 0.0 0.2 0:00.05 accounts-daemon
439 avahi 20 0 7332 3564 3212 S 0.0 0.1 0:00.03 avahi-daemon

debian@debian:~$ time
real    0m0.000s
user    0m0.000s
sys     0m0.000s
debian@debian:~$ dd if=/dev/urandom of=test bs=1G count=1
1+0 records in
1+0 records out
1073741824 bytes (1.1 GB, 1.0 GiB) copied, 17.0501 s, 63.0 MB/s
debian@debian:~$
```

The screenshot shows a terminal window in a Debian VM. The top bar indicates the date and time as Mar 26 14:58. The terminal output shows the command 'time tar -czvf test.gz test' being executed, followed by 'time nice -n 20 tar -czvf test.gz test'. The output shows that the second command, which runs with a nice value of 20, takes slightly longer to complete (0m33.426s real time) compared to the first command (0m33.381s real time).

```
debian@debian:~$ time tar -czvf test.gz test
test

real    0m33.381s
user    0m30.339s
sys     0m3.127s
debian@debian:~$ time nice -n 20 tar -czvf test.gz test
test

real    0m33.426s
user    0m29.753s
sys     0m3.478s
debian@debian:~$
```

3. Провести предыдущий эксперимент с изменением приоритета примерно в середине выполнения архивирования. Аналогично, замерить время и делать выводы с обоснованием:

The screenshot shows a terminal window titled "debian@debian: ~" with the following commands and output:

```
debian@debian:~$ time tar -czvf test.gz test & PID=$!  
[2] 5740  
debian@debian:~$ test  
sleep 10  
renice 20 -p $PID  
wait $PID  
debian@debian:~$ renice 20 -p $PID  
5740 (process ID) old priority 0, new priority 19  
debian@debian:~$ wait $PID  
  
real    0m33.092s  
user    0m30.044s  
sys     0m3.321s  
[2]-  Done                  time tar -czvf test.gz test  
debian@debian:~$
```

The terminal window is part of a desktop environment with a taskbar at the bottom showing various application icons. A Windows activation watermark is visible in the bottom right corner of the desktop area.

Ссылка на репозиторий: <https://github.com/Volodin-Ilya/operating-systems.git>