

Лабораторная работа 6

Генералов Даниил, НПИбд-01-21, 1032202280

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¹RUDN University, Moscow, Russian Federation

Задача

1. Продемонстрируйте навыки управления заданиями операционной системы (см. раздел 6.4.1).

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2. Продемонстрируйте навыки управления процессами операционной системы (см. раздел 6.4.2).

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2. Продемонстрируйте навыки управления процессами операционной системы (см. раздел 6.4.2).
3. Выполните задания для самостоятельной работы (см. раздел 6.5)

Выполнение

```

Password:
Last login: Fri Nov 25 01:37:38 on tty1
root@dmgeneralov ~]# sleep 3600 &
[1] 1252
root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null
^C912184+0 records in
912184+0 records out
467838288 bytes (467 MB, 445 MiB) copied, 1.16347 s, 401 MB/s

root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[2] 1255
root@dmgeneralov ~]# sleep 7200 &
[3] 1256
root@dmgeneralov ~]# jobs
[1]  Running                  sleep 3600 &
[2]-  Running                  dd if=/dev/zero of=/dev/null &
[3]+  Running                  sleep 7200 &
root@dmgeneralov ~]# fg 3
sleep 7200
^C
root@dmgeneralov ~]# sleep 7200
^Z
[3]+  Stopped                  sleep 7200
root@dmgeneralov ~]# jobs
[1]  Running                  sleep 3600 &
[2]-  Running                  dd if=/dev/zero of=/dev/null &
[3]+  Stopped                  sleep 7200
root@dmgeneralov ~]# bg 3
[3]+  sleep 7200 &
root@dmgeneralov ~]# jobs
[1]  Running                  sleep 3600 &
[2]-  Running                  dd if=/dev/zero of=/dev/null &
[3]+  Running                  sleep 7200 &
root@dmgeneralov ~]# fg 1
sleep 3600
^C
root@dmgeneralov ~]# jobs
[2]-  Running                  dd if=/dev/zero of=/dev/null &
[3]+  Running                  sleep 7200 &
root@dmgeneralov ~]# fg 2
dd if=/dev/zero of=/dev/null
^C56987975+0 records in
56987975+0 records out
29177043200 bytes (29 GB, 27 GiB) copied, 74.6852 s, 391 MB/s

root@dmgeneralov ~]# fg 3
sleep 7200
^C
root@dmgeneralov ~]# jobs
[1]  Running                  sleep 3600 &
[2]-  Running                  dd if=/dev/zero of=/dev/null &
[3]+  Running                  sleep 7200 &

```

```
Rocky Linux 9.0 (Blue Onyx)
Kernel 5.14.0-70.13.1.el9_0.x86_64 on an x86_64

Hint: Num Lock on

dmgeneralov login: dmgeneralov
Last login: Sat Nov 19 15:41:54 on tty2
[dmgeneralov@dmgeneralov ~]$ dd if=/dev/zero of=/dev/null &
[1] 1294
[dmgeneralov@dmgeneralov ~]$ exit
```

Рис. 2: bg


```

top - 15:37:54 up 6 min, 1 user, load average: 0.72, 0.39, 0.18
Tasks: 141 total, 2 running, 139 sleeping, 0 stopped, 0 zombie
%Cpu(s): 13.5 us, 11.0 sy, 0.0 ni, 74.8 id, 0.0 wa, 0.6 hi, 0.1 si, 0.1 st
MiB Mem : 1774.4 total, 1439.9 free, 177.8 used, 156.7 buff/cache
MiB Swap: 720.0 total, 720.0 free, 0.0 used, 1447.6 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
 1294 dmgener+  20   0   5624    1012    928 R   97.4   0.1   1:07.22 dd
   653 root       20   0   33744   12100   8056 S    0.3   0.7   0:00.30 systemd-udevd
  1297 root       20   0        0        0        0 I    0.3   0.0   0:00.02 kworker/1:0-mm_percpu_wq
  1301 root       20   0   10608    4028   3384 R    0.3   0.2   0:00.03 top
     1 root       20   0   171360  15728   9044 S    0.0   0.9   0:02.62 systemd
     2 root       20   0        0        0        0 S    0.0   0.0   0:00.02 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_highpri

```

Рис. 3: top

```

top - 15:38:38 up 7 min, 1 user, load average: 0.97, 0.49, 0.23
Tasks: 139 total, 2 running, 137 sleeping, 0 stopped, 0 zombie
%Cpu(s): 13.9 us, 10.4 sy, 0.0 ni, 74.8 id, 0.0 wa, 0.7 hi, 0.0 si, 0.1 st
MiB Mem : 1774.4 total, 1439.9 free, 177.8 used, 156.7 buff/cache
MiB Swap: 720.0 total, 720.0 free, 0.0 used, 1447.6 avail Mem
Send pid 1294 signal [15/sigterm]

```

PID	USER	PR	NI	UIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1294	dmgener+	20	0	5624	1012	928	R	97.0	0.1	1:42.38	dd
1297	root	20	0	0	0	0	I	0.3	0.0	0:00.09	kworker/1:0-mm_percpu_wq
1301	root	20	0	10608	4028	3384	R	0.3	0.2	0:00.13	top
1	root	20	0	171360	15728	9044	S	0.0	0.9	0:02.62	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.02	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_highpri
7	root	20	0	0	0	0	I	0.0	0.0	0:00.49	kworker/0:1-events

Рис. 4: k

```

[root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[1] 1308
[root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[2] 1309
[root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[3] 1310
[root@dmgeneralov ~]# ps aux | grep dd
root      2  0.0  0.0   0   0 ?        S    15:31   0:00 [kthreadd]
root     84  0.0  0.0   0   0 ?        I<   15:31   0:00 [ip6_addrconf]
root    1308 97.6  0.0  5624 1852 tty1    R    15:40   0:07 dd if=/dev/zero of=/dev/null
root    1309 103  0.0  5624 1828 tty1    R    15:40   0:07 dd if=/dev/zero of=/dev/null
root    1310 95.2  0.0  5624 1812 tty1    R    15:40   0:06 dd if=/dev/zero of=/dev/null
root    1312  0.0  0.1  6412 2268 tty1    S+   15:40   0:00 grep --color=auto dd
[root@dmgeneralov ~]# renice -n 5 1309
1309 (process ID) old priority 0, new priority 5
[root@dmgeneralov ~]# ps fax | grep -B5 dd
  PID TTY          STAT TIME COMMAND
    2 ?           S      0:00 [kthreadd]
--
   79 ?           S      0:00 \_ [hwngl]
   80 ?           I<     0:00 \_ [kmpath_rdad]
   81 ?           I<     0:00 \_ [kaluad]
   82 ?           I<     0:00 \_ [mld]
   83 ?           I<     0:00 \_ [kworker/0:1H-kblockd]
   84 ?           I<     0:00 \_ [ip6_addrconf]
--
  760 ?          Ss1    0:00 /usr/sbin/NetworkManager --no-daemon
  772 ?          Ss     0:00 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
  780 ?          Ss     0:00 /usr/sbin/crond -n
  782 ?          Ss     0:00 login -- root
 1231 tty1       Ss     0:00 \_ -bash
 1308 tty1       R       1:03 \_ dd if=/dev/zero of=/dev/null
 1309 tty1       Rn      1:02 \_ dd if=/dev/zero of=/dev/null
 1310 tty1       R       1:02 \_ dd if=/dev/zero of=/dev/null
 1314 tty1       R+      0:00 \_ ps fax
 1315 tty1       S+      0:00 \_ grep --color=auto -B5 dd
[root@dmgeneralov ~]# kill 1231

```

Рис. 5: ps

```

Rocky Linux 9.0 (Blue Onyx)
Kernel 5.14.0-70.13.1.el9_0.x86_64 on an x86_64

Hint: Num Lock on

dmgeneralov login: root
Password:
Last login: Sat Nov 26 15:43:13 on tty1
[root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[1] 1389
[root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[2] 1390
[root@dmgeneralov ~]# dd if=/dev/zero of=/dev/null &
[3] 1391
[root@dmgeneralov ~]# renice -n -5 1389
1389 (process ID) old priority 0, new priority -5
[root@dmgeneralov ~]# renice -n -15 1389
1389 (process ID) old priority -5, new priority -15
[root@dmgeneralov ~]# ps aux | grep dd
root      2  0.0  0.0      0   0 ?        S   15:31   0:00 [kthreadd]
root      84  0.0  0.0      0   0 ?        I<  15:31   0:00 [ipv6_addrconf]
root     1356 93.2  0.0  5624 1004 ?        R   15:43   1:27 dd if=/dev/zero of=/dev/null
root     1357 93.1  0.0  5624 1048 ?        R   15:43   1:27 dd if=/dev/zero of=/dev/null
root     1358 93.6  0.0  5624 1016 ?        R   15:43   1:27 dd if=/dev/zero of=/dev/null
root     1389 85.4  0.0  5624 1012 tty1    R<  15:44   0:17 dd if=/dev/zero of=/dev/null
root     1390 41.9  0.0  5624 1048 tty1    R   15:44   0:00 dd if=/dev/zero of=/dev/null
root     1391 44.6  0.0  5624 1020 tty1    R   15:44   0:00 dd if=/dev/zero of=/dev/null
root     1395  0.0  0.1  6412 2324 tty1    S+  15:44   0:00 grep --color=auto dd

```

Рис. 6: renice

```
[root@dmgeneralov ~]# yes > /dev/null
^C
[root@dmgeneralov ~]# yes > /dev/null &
[1] 1437
[root@dmgeneralov ~]# yes > /dev/null
^Z
[2]+  Stopped                  yes > /dev/null
[root@dmgeneralov ~]# yes > /dev/null
^C
[root@dmgeneralov ~]# jobs
[1]-  Running                  yes > /dev/null &
[2]+  Stopped                  yes > /dev/null
[root@dmgeneralov ~]#
```

Рис. 7: yes

```
[root@dmgeneralov ~]# jobs
[1]  Running                  yes > /dev/null &
[2]-  Stopped                 yes > /dev/null
[3]+  Stopped                 yes
[root@dmgeneralov ~]# fg 1
yes > /dev/null
^C
[root@dmgeneralov ~]# yes > /dev/null
^Z
[4]+  Stopped                 yes > /dev/null
[root@dmgeneralov ~]# bg 4
[4]+ yes > /dev/null &
[root@dmgeneralov ~]# jobs
[2]-  Stopped                 yes > /dev/null
[3]+  Stopped                 yes
[4]  Running                  yes > /dev/null &
[root@dmgeneralov ~]# _
```

Рис. 8: bg

```

Rocky Linux 9.0 (Blue Onyx)
Kernel 5.14.0-70.13.1.el9_0.x86_64 on an x86_64

Hint: Num Lock on

dmgeneralov login: root
Password:
Last login: Sat Nov 26 15:53:29 on tty1
[root@dmgeneralov ~]# ps aux | grep yes
root      1589  99.5  0.0  5584   984 ?        R    15:54   0:23 yes
root      1536   0.0  0.1   6412  2188 tty1    S+   15:55   0:00 grep --color=auto yes
[root@dmgeneralov ~]# ps aux | grep nohup
root      1538   0.0  0.1   6412  2116 tty1    S+   15:55   0:00 grep --color=auto nohup
[root@dmgeneralov ~]# ps faux | grep -B5 nohup
root      1328   0.0  0.3 172544   6012 ?        S    15:43   0:00 \_ (sd-pam)
root      1589  97.6  0.0  5584   984 ?        R    15:54   0:42 yes
root      1510   0.0  0.3 12536   6396 ?        Ss   15:54   0:00 login -- root
root      1514   0.0  0.2   7440   4376 tty1    Ss   15:55   0:00 \_ -bash
root      1539   0.0  0.2 10324   3684 tty1    R+   15:55   0:00 \_ ps faux
root      1540   0.0  0.1   6412  2188 tty1    S+   15:55   0:00 \_ grep --color=auto -B5 nohup
[root@dmgeneralov ~]# ps faux | grep -B5 yes
root      772   0.0  0.5 16116   9204 ?        Ss   15:31   0:00 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
root      780   0.0  0.2   8576   3744 ?        Ss   15:31   0:00 /usr/sbin/crond -n
root      1299   0.0  0.0   3048   1108 tty2    Ss+  15:37   0:00 /sbin/agetty -o -p -- \u --noclear - linux
root      1326   0.0  0.7  21408 13140 ?        Ss   15:43   0:00 /usr/lib/systemd/systemd --user
root      1328   0.0  0.3 172544   6012 ?        S    15:43   0:00 \_ (sd-pam)
root      1589  98.0  0.0  5584   984 ?        R    15:54   0:40 yes
root      1510   0.0  0.3 12536   6396 ?        Ss   15:54   0:00 login -- root
root      1514   0.0  0.2   7440   4376 tty1    Ss   15:55   0:00 \_ -bash
root      1541   0.0  0.2 10324   3652 tty1    R+   15:55   0:00 \_ ps faux
root      1542   0.0  0.1   6412  2316 tty1    S+   15:55   0:00 \_ grep --color=auto -B5 yes

```

Рис. 9: nohup

```

[root@dmgeneralov ~]# yes > /dev/null &
[1] 1548
[root@dmgeneralov ~]# yes > /dev/null &
[2] 1549
[root@dmgeneralov ~]# yes > /dev/null &
[3] 1550
[root@dmgeneralov ~]# kill 1548
[root@dmgeneralov ~]# kill %2
[1] Terminated          yes > /dev/null
[root@dmgeneralov ~]# jobs
[2]-  Running            yes > /dev/null &
[3]+  Running            yes > /dev/null &
[root@dmgeneralov ~]# kill %2
[root@dmgeneralov ~]# kill %2
[root@dmgeneralov ~]# kill %2
[root@dmgeneralov ~]# jobs
[2]-  Running            yes > /dev/null &
[3]+  Running            yes > /dev/null &
[root@dmgeneralov ~]# jobs -p %2
1549
[root@dmgeneralov ~]# kill $(jobs -p %2)
-bash: kill: (1549) - No such process
[2]-  Terminated        yes > /dev/null
[root@dmgeneralov ~]#
[root@dmgeneralov ~]# nohup yes > /dev/null &
[4] 1553
[root@dmgeneralov ~]# nohup: ignoring input and redirecting stderr to stdout

[root@dmgeneralov ~]# kill -HUP 1550
[root@dmgeneralov ~]#
[3]-  Hangup              yes > /dev/null
[root@dmgeneralov ~]# kill -HUP 1553
[root@dmgeneralov ~]#
[root@dmgeneralov ~]#
[root@dmgeneralov ~]# jobs
[4]+  Running             nohup yes > /dev/null &
[root@dmgeneralov ~]# kill -HUP $(jobs -p 4)
-bash: kill: [4]:: arguments must be process or job IDs
-bash: kill: Running: arguments must be process or job IDs
-bash: kill: nohup: arguments must be process or job IDs
-bash: kill: yes: arguments must be process or job IDs
-bash: kill: >: arguments must be process or job IDs
-bash: kill: /dev/null: arguments must be process or job IDs
-bash: kill: &: arguments must be process or job IDs
[root@dmgeneralov ~]# kill -HUP $(jobs -p 4)
-bash: jobs: -: invalid option
jobs: usage: jobs [-lnpsl] [jobspec ...] or jobs -x command [args]
kill: usage: kill [-s sigspec | -n signum | -sigspec] pid | jobspec ... or kill -l [sigspec]

```



```

[root@dmgeneralov ~]# killall yes
[41]+ Terminated          nohup yes > /dev/null
[root@dmgeneralov ~]#
[root@dmgeneralov ~]# yes > /dev/null &
[1] 1575
[root@dmgeneralov ~]# nice -h
nice: invalid option -- 'h'
Try 'nice --help' for more information.
[root@dmgeneralov ~]# nice --hel
Usage: nice [OPTION] [COMMAND [ARG]...]
Run COMMAND with an adjusted niceness, which affects process scheduling.
With no COMMAND, print the current niceness. Niceness values range from
-20 (most favorable to the process) to 19 (least favorable to the process).

Mandatory arguments to long options are mandatory for short options too.
  -n, --adjustment=N  add integer N to the niceness (default 10)
  --help              display this help and exit
  --version           output version information and exit

NOTE: your shell may have its own version of nice, which usually supersedes
the version described here. Please refer to your shell's documentation
for details about the options it supports.

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Full documentation <https://www.gnu.org/software/coreutils/nice/>
or available locally via: info '(coreutils) nice invocation'
[root@dmgeneralov ~]# nice -n 15 yes > /dev/null &
[2] 1578
[root@dmgeneralov ~]# ps aux | grep yes
root      1575 99.9  0.0  5504 1044 tty1    R   16:02   0:38 yes
root      1578 107  0.0  5504 1044 tty1    RM   16:03   0:09 yes
root      1580  0.0  0.1  6412 2180 tty1    S+   16:03   0:00 grep --color=auto yes
[root@dmgeneralov ~]# ps ax -o pid,ni,cmd | grep yes
   1575   0 yes
   1578  15 yes
   1596   0 grep --color=auto yes
[root@dmgeneralov ~]# cat /proc/1575/sched | grep prio
prio      :
[root@dmgeneralov ~]# cat /proc/1578/sched | grep prio
prio      :
[root@dmgeneralov ~]# renice -n 15 1575
1575 (process ID) old priority 0, new priority 15
[root@dmgeneralov ~]# cat /proc/1575/sched | grep prio
prio      :

```

Я получил опыт работы с процессами операционной системы.