Лабораторная работа №6

Управление процессами

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Цель работы

Формулировка цели

Получить практические навыки управления заданиями и процессами в операционной системе Linux: запуск, перевод между фоном и передним планом, мониторинг, изменение приоритетов и завершение процессов.

Ход выполнения работы

Управление заданиями: запуск процессов

```
ivschemelev@ivschemelev:~$ su
Password:
root@ivschemelev:/home/ivschemelev# sleep 3600 &
[1] 4305
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[2] 4350
root@ivschemelev:/home/ivschemelev# sleep 7200
^Z
[3]+  Stopped                 sleep 7200
root@ivschemelev:/home/ivschemelev# jobs
[1]   Running                 sleep 3600 &
[2]-  Running                 dd if=/dev/zero of=/dev/null &
[3]+  Stopped                 sleep 7200
root@ivschemelev:/home/ivschemelev# bg 3
[3]+ sleep 7200 &
root@ivschemelev:/home/ivschemelev# fg 1
sleep 3600
^C
root@ivschemelev:/home/ivschemelev# fg 2
dd if=/dev/zero of=/dev/null
^C186450855+0 records in
186450854+0 records out
95462837248 bytes (95 GB, 89 GiB) copied, 70.0073 s, 1.4 GB/s

root@ivschemelev:/home/ivschemelev# fg 3
sleep 7200
^C
root@ivschemelev:/home/ivschemelev#
```

Управление заданиями: мониторинг через top

```
top - 11:11:52 up 7 min,  4 users,  load average: 0.51, 0.37, 0.19
Tasks: 268 total,   2 running, 266 sleeping,   0 stopped,   0 zombie
%Cpu(s):  7.2 us,  7.2 sy,  0.1 ni, 85.0 id,  0.0 wa,  0.6 hi,  0.0 si,  0.0 st
MiB Mem :   3652.9 total,   1904.2 free,   1304.5 used,    674.4 buff/cache
MiB Swap:   4040.0 total,   4040.0 free,      0.0 used.   2348.5 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   4658 ivschem+  20   0  226848   2012   1888 R  99.3   0.1   0:15.04 dd
   2708 ivschem+  20   0 4880204 323556 122220 S   6.3   8.6   0:03.27 gnome-shell
   4080 ivschem+  20   0 3044232 356668 102800 S   4.6   9.5   0:01.78 ptyxis
   3717 root      20   0       0      0      0 I   2.0   0.0   0:00.17 kworker/u19:5-events_unbound
      1 root      20   0   50188  42036  10552 S   0.0   1.1   0:01.56 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_release
      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-slub_flushwq
      7 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-netns
      8 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0-cgroup_destroy
      9 root      20   0       0      0      0 I   0.0   0.0   0:00.01 kworker/0:1-ata_sff
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0H-xfs-log/dm-0
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/u16:0-events_unbound
     12 root      20   0       0      0      0 I   0.0   0.0   0:00.03 kworker/u16:1-netns
     13 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-mm_percpu_wq
     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_kthread
     16 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
     17 root      20   0       0      0      0 S   0.0   0.0   0:00.00 ksoftirqd/0
     18 root      20   0       0      0      0 I   0.0   0.0   0:00.10 rcu_preempt
     19 root      20   0       0      0      0 S   0.0   0.0   0:00.00 rcu_exp_par_gp_kthread_worker/0
```

Рис. 2: Мониторинг процессов в top

Управление заданиями: завершение процесса в top

```
top - 11:12:15 up 8 min,  4 users,  load average: 0.65, 0.41, 0.21
Tasks: 267 total,   1 running, 266 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.2 us,  0.1 sy,  0.0 ni, 99.7 id,  0.0 wa,  0.1 hi,  0.0 si,  0.0 st
MiB Mem :   3652.9 total,   1900.8 free,   1307.6 used,    674.6 buff/cache
MiB Swap:   4040.0 total,   4040.0 free,      0.0 used.   2345.3 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   2708 ivschem+  20   0 4876444 324744 122220 S   0.3   8.7   0:03.51 gnome-shell
   4080 ivschem+  20   0 3044232 358168 102800 S   0.3   9.6   0:02.17 ptyxis
      1 root      20   0   50188  42036  10552 S   0.0   1.1   0:01.57 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_release
      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-slub_flushwq
      7 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-netns
      8 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0-cgroup_destroy
      9 root      20   0       0      0      0 I   0.0   0.0   0:00.01 kworker/0:1-ata_sff
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0H-xfs-log/dm-0
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/u16:0-events_unbound
     12 root      20   0       0      0      0 I   0.0   0.0   0:00.03 kworker/u16:1-netns
     13 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-mm_percpu_wq
     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_kthread
     16 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
     17 root      20   0       0      0      0 S   0.0   0.0   0:00.00 ksoftirqd/0
     18 root      20   0       0      0      0 I   0.0   0.0   0:00.10 rcu_preempt
     19 root      20   0       0      0      0 S   0.0   0.0   0:00.00 rcu_exp_par_gp_kthread_worker/0
     20 root      20   0       0      0      0 S   0.0   0.0   0:00.02 rcu_exp_gp_kthread_worker
```

Рис. 3: Завершение процесса через top

Запуск нескольких процессов dd

```
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[1] 5032
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[2] 5034
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[3] 5036
root@ivschemelev:/home/ivschemelev# ps aux | grep dd
root           2  0.0  0.0      0     0 ?        S    11:04   0:00 [kthreadd]
root          93  0.0  0.0      0     0 ?        I<   11:04   0:00 [kworker/R-ipv6_addrconf]
dbus        1083  0.0  0.1   8200  6020 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a8
05e47e9bc9a702cdd313842 --max-bytes 536870912 --max-fds 4096 --max-matches 131072 --audit
root        1354  0.0  0.0 512956  3476 ?        Sl   11:04   0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxadd-service.
sh
ivschem+    2618  0.0  0.1   6492  4524 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a8
05e47e9bc9a702cdd313842 --max-bytes 100000000000000 --max-fds 2500000000000 --max-matches 5000000000
ivschem+    2761  0.0  0.0   4768  2708 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a8
05e47e9bc9a702cdd313842 --max-bytes 100000000000000 --max-fds 6400000 --max-matches 5000000000
ivschem+    3095  0.0  0.6 963600 26000 ?        Ssl  11:04   0:00 /usr/libexec/evolution-addressbook-factory
root        5032 99.4  0.0 226848  1860 pts/0    R    11:13   0:12 dd if=/dev/zero of=/dev/null
root        5034 99.1  0.0 226848  2028 pts/0    R    11:13   0:11 dd if=/dev/zero of=/dev/null
root        5036 98.8  0.0 226848  1888 pts/0    R    11:13   0:10 dd if=/dev/zero of=/dev/null
root        5071  0.0  0.0 227688  2192 pts/0    S+   11:14   0:00 grep --color=auto dd
root@ivschemelev:/home/ivschemelev# renice -n 5 5032
5032 (process ID) old priority 0, new priority 5
root@ivschemelev:/home/ivschemelev#
```

Рис. 4: Запуск нескольких процессов dd

Изменение приоритета и анализ иерархии

```
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[1] 5032
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[2] 5034
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[3] 5036
root@ivschemelev:/home/ivschemelev# ps aux | grep dd
root           2  0.0  0.0      0     0 ?        S    11:04   0:00 [kthreadd]
root          93  0.0  0.0      0     0 ?        I<   11:04   0:00 [kworker/R-ipv6_addrconf]
dbus        1083  0.0  0.1   8200  6020 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a8
05e47e9bc9a702cdd313842 --max-bytes 536870912 --max-fds 4096 --max-matches 131072 --audit
root        1354  0.0  0.0 512956  3476 ?        Sl   11:04   0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxadd-service.
sh
ivschem+    2618  0.0  0.1   6492  4524 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a8
05e47e9bc9a702cdd313842 --max-bytes 100000000000000 --max-fds 2500000000000 --max-matches 5000000000
ivschem+    2761  0.0  0.0   4768  2708 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a8
05e47e9bc9a702cdd313842 --max-bytes 100000000000000 --max-fds 6400000 --max-matches 5000000000
ivschem+    3095  0.0  0.6 963600 26000 ?        Ssl  11:04   0:00 /usr/libexec/evolution-addressbook-factory
root        5032 99.4  0.0 226848  1860 pts/0    R    11:13   0:12 dd if=/dev/zero of=/dev/null
root        5034 99.1  0.0 226848  2028 pts/0    R    11:13   0:11 dd if=/dev/zero of=/dev/null
root        5036 98.8  0.0 226848  1888 pts/0    R    11:13   0:10 dd if=/dev/zero of=/dev/null
root        5071  0.0  0.0 227688  2192 pts/0    S+   11:14   0:00 grep --color=auto dd
root@ivschemelev:/home/ivschemelev# renice -n 5 5032
5032 (process ID) old priority 0, new priority 5
root@ivschemelev:/home/ivschemelev#
```

Рис. 5: Изменение приоритета процесса

Завершение группы процессов через родительскую оболочку

```
--
   3010 ?        Ssl    0:00  \_ /usr/libexec/goa-daemon
   3023 ?        Ssl    0:00  \_ /usr/libexec/gvfs-gphoto2-volume-monitor
   3051 ?        Ssl    0:00  \_ /usr/libexec/evolution-calendar-factory
   3052 ?        Ssl    0:00  \_ /usr/libexec/goa-identity-service
   3053 ?        Ssl    0:00  \_ /usr/libexec/gvfs-goa-volume-monitor
   3095 ?        Ssl    0:00  \_ /usr/libexec/evolution-addressbook-factory
--
   4080 ?        Ssl    0:03  \_ /usr/bin/ptyxis --gapplication-service
   4088 ?        Ssl    0:00  |   \_ /usr/libexec/ptyxis-agent --socket-fd=3 --rlimit-nofile=1024
   4156 pts/0    Ss     0:00  |       \_ /usr/bin/bash
   4205 pts/0    S      0:00  |       |   \_ su
   4249 pts/0    S      0:00  |       |       \_ bash
   5032 pts/0    RN     1:11  |       |           \_ dd if=/dev/zero of=/dev/null
   5034 pts/0    R      1:10  |       |           \_ dd if=/dev/zero of=/dev/null
   5036 pts/0    R      1:08  |       |           \_ dd if=/dev/zero of=/dev/null
   5195 pts/0    R+     0:00  |       |           \_ ps fax
   5196 pts/0    S+     0:00  |       |           \_ grep --color=auto -B5 dd
root@ivschemelev:/home/ivschemelev# kill -9 4249
Killed
```

Рис. 6: Завершение родительского процесса и дочерних dd

Задание 1: приоритеты dd

```
root@ivschemelev:/home/ivschemelev# dd if=/dev/zero of=/dev/null &
[3] 5551
root@ivschemelev:/home/ivschemelev# renice -n 5 5547
5547 (process ID) old priority 0, new priority 5
root@ivschemelev:/home/ivschemelev# renice -n 15 5547
5547 (process ID) old priority 5, new priority 15
root@ivschemelev:/home/ivschemelev# ps | grep dd
   5032 pts/0    00:03:46 dd
   5034 pts/0    00:04:03 dd
   5036 pts/0    00:04:01 dd
   5547 pts/0    00:00:12 dd
   5549 pts/0    00:00:27 dd
   5551 pts/0    00:00:26 dd
root@ivschemelev:/home/ivschemelev# ps aux| grep dd
root           2  0.0  0.0      0     0 ?        S    11:04   0:00 [kthreadd]
root          93  0.0  0.0      0     0 ?        I<   11:04   0:00 [kworker/R-ipv6_addrconf]
dbus        1083  0.0  0.1   8200  6020 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a805e47e9bc9a7
dd313842 --max-bytes 536870912 --max-fds 4096 --max-matches 131072 --audit
root        1354  0.0  0.0 512956  3476 ?        Sl   11:04   0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxadd-service.sh
ivschem+    2618  0.0  0.1   6492  4524 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a805e47e9bc9a7
dd313842 --max-bytes 100000000000000 --max-fds 250000000000 --max-matches 500000000
ivschem+    2761  0.0  0.0   4768  2708 ?        S    11:04   0:00 dbus-broker --log 4 --controller 9 --machine-id 473c978a805e47e9bc9a7
dd313842 --max-bytes 100000000000000 --max-fds 6400000 --max-matches 5000000000
ivschem+    3095  0.0  0.6 963600 26000 ?        Ssl  11:04   0:00 /usr/libexec/evolution-addressbook-factory
root        5032 88.8  0.0 226848  1860 pts/0    RN   11:13   3:48 dd if=/dev/zero of=/dev/null
root        5034 96.9  0.0 226848  2028 pts/0    R    11:13   4:08 dd if=/dev/zero of=/dev/null
root        5036 96.4  0.0 226848  1888 pts/0    R    11:13   4:05 dd if=/dev/zero of=/dev/null
root        5547 33.1  0.0 226848  1924 pts/0    RN   11:17   0:13 dd if=/dev/zero of=/dev/null
root        5549 83.6  0.0 226848  1864 pts/0    R    11:17   0:32 dd if=/dev/zero of=/dev/null
root        5551 83.6  0.0 226848  1924 pts/0    R    11:17   0:31 dd if=/dev/zero of=/dev/null
root        5651  0.0  0.0 227688  2132 pts/0    S+   11:18   0:00 grep --color=auto dd
root@ivschemelev:/home/ivschemelev# killall dd
[2]-  Terminated              dd if=/dev/zero of=/dev/null
[3]+  Terminated              dd if=/dev/zero of=/dev/null
[1]+  Terminated              dd if=/dev/zero of=/dev/null
root@ivschemelev:/home/ivschemelev#
```

Задание 2: запуск yes в фоне с подавлением вывода

```
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[1] 5985
root@ivschemelev:/home/ivschemelev# yes > /dev/null
^Z
[2]+  Stopped                 yes > /dev/null
root@ivschemelev:/home/ivschemelev# fg 2
yes > /dev/null
^C
root@ivschemelev:/home/ivschemelev# jobs
[1]+  Running                 yes > /dev/null &
root@ivschemelev:/home/ivschemelev#
```

Рис. 8: Задание 2: yes в фоне с подавлением вывода

Задание 2: yes без подавления вывода

```
y
y
y
^C
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# jobs
[1]+  Running                 yes > /dev/null &
root@ivschemelev:/home/ivschemelev# fg 1
yes > /dev/null
^C
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[1] 6237
root@ivschemelev:/home/ivschemelev# fg 1
yes > /dev/null
^C
root@ivschemelev:/home/ivschemelev# yes > /dev/null
^Z
[1]+  Stopped                 yes > /dev/null
root@ivschemelev:/home/ivschemelev# bg 1
[1]+ yes > /dev/null &
root@ivschemelev:/home/ivschemelev# jobs
[1]+  Running                 yes > /dev/null &
root@ivschemelev:/home/ivschemelev# nohup yes > /dev/null &
[2] 6347
root@ivschemelev:/home/ivschemelev# nohup: ignoring input and redirecting stderr to stdout

root@ivschemelev:/home/ivschemelev#
```

Задание 2: проверка jobs и перевод процессов

```
top - 11:24:53 up 20 min,  5 users,  load average: 1.78, 1.48, 1.05
Tasks: 264 total,   3 running, 261 sleeping,   0 stopped,   0 zombie
%Cpu(s): 27.0 us, 29.7 sy,  0.0 ni, 43.2 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   3652.9 total,   1871.3 free,   1326.1 used,    685.8 buff/cache
MiB Swap:   4040.0 total,   4040.0 free,      0.0 used.   2326.8 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   6271 root      20   0  226820   1892   1772 R 100.0   0.1   1:49.52 yes
   6347 root      20   0  226820   1928   1808 R  90.9   0.1   1:15.34 yes
   2708 ivschem+  20   0 4941812 325532 122864 S  27.3   8.7   0:09.04 gnome-shell
   4080 ivschem+  20   0 3044848 365472 102580 S   9.1   9.8   0:09.32 ptyxis
      1 root      20   0   50188  42036  10552 S   0.0   1.1   0:02.13 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_release
      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-slub_flushwq
      7 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-netns
      9 root      20   0       0      0      0 I   0.0   0.0   0:00.01 kworker/0:1-events
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.01 kworker/0:0H-xfs-log/dm-0
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/u16:0-events_unbound
     12 root      20   0       0      0      0 I   0.0   0.0   0:00.07 kworker/u16:1-netns
     13 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-mm_percpu_wq
     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_kthread
     16 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
```

Рис. 10: Задание 2: состояния заданий jobs

Задание 2: процессы yes в top

```
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[1] 6674
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[2] 6676
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[3] 6678
root@ivschemelev:/home/ivschemelev# kill -9 6674
[1]   Killed                  yes > /dev/null
root@ivschemelev:/home/ivschemelev# kill -1 2
root@ivschemelev:/home/ivschemelev# fg 2
yes > /dev/null
^C
root@ivschemelev:/home/ivschemelev# kill -1 6678
[3]+  Hangup                  yes > /dev/null
root@ivschemelev:/home/ivschemelev# kill -1 6347
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[1] 6875
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[2] 6877
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[3] 6879
root@ivschemelev:/home/ivschemelev# killall yes
[1]   Terminated              yes > /dev/null
[2]-  Terminated              yes > /dev/null
[3]+  Terminated              yes > /dev/null
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev#
```

Задание 2: завершение процессов и групповая остановка

```
root@ivschemelev:/home/ivschemelev# yes > /dev/null &
[1] 6960
root@ivschemelev:/home/ivschemelev# nice -n 5 yes > /dev/null &
[2] 6983
root@ivschemelev:/home/ivschemelev# ps -l | grep yes
4 R     0    6960    6517 99  80   0 - 56705 -      pts/2    00:00:21 yes
4 R     0    6983    6517 99  85   5 - 56705 -      pts/2    00:00:10 yes
root@ivschemelev:/home/ivschemelev# renice -n 5 6960
6960 (process ID) old priority 0, new priority 5
root@ivschemelev:/home/ivschemelev# ps -l | grep yes
4 R     0    6960    6517 99  85   5 - 56705 -      pts/2    00:00:42 yes
4 R     0    6983    6517 99  85   5 - 56705 -      pts/2    00:00:30 yes
root@ivschemelev:/home/ivschemelev# killall yes
[1]-  Terminated              yes > /dev/null
[2]+  Terminated              nice -n 5 yes > /dev/null
root@ivschemelev:/home/ivschemelev#
```

Рис. 12: Задание 2: завершение и групповая остановка yes

Итоги работы

Заключение

В ходе выполнения лабораторной работы изучены и отработаны приёмы управления заданиями и процессами в Linux: запуск в фоне и на переднем плане, приостановка и завершение, изменение приоритетов, работа с сигналами, а также мониторинг нагрузки системы. Полученные навыки позволяют эффективно контролировать выполнение программ и рационально распределять вычислительные ресурсы.