Одесский национальный политехнический университет
Институт компьютерных систем
Кафедра информационных систем

Лабораторная работа № 7
По дисциплине: «Операционные системы»
Тема: «Основы управления правами доступа к файловой системе»

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Цель работы: получение навыков в управлении процессами в ОС Unix средствами командной оболочки.

План работы.

1 Теоретические сведения

1.1 Понятие процесса

1.2 Управление процессами

1.3 Программирование поведения процессов

Решение:

Память: 6

ОС: 1

Программа: 0,5

Ожидание завершения входа/выхода: 65%

Решение:

6-1 = 5

5/0.5 = 10

$1 - 0{,}65^{10}$=0,987

Задание 2:

```
[koldunova_anastasiya@vpsj3IeQ ~]$ pstree -u
systemd-+-NetworkManager---2*[{NetworkManager}]
        |-agetty
        |-auditd---{auditd}
        |-belobrov.sh(belobrov_artur)---belobrov.sh
        |-belobrov2.sh(belobrov_artur)---belobrov2.sh
        |-belobrov3.sh(belobrov_artur)---belobrov3.sh
        |-chronyd(chrony)
        |-crond
        |-dbus-daemon(dbus)
        |-exim(exim)
        |-gssproxy---5*[{gssproxy}]
        |-httpd---10*[httpd(apache)]
        |-irqbalance
        |-mysqld(mysql)---30*[{mysqld}]
        |-named(named)---4*[{named}]
        |-nano(bogachik_egor)
        |-nano(baranyuk_dmitro)
        |-nesterenko.sh(nesterenko_mikola)---nesterenko.sh
        |-nesterenko2.sh(nesterenko_mikola)---nesterenko2.sh
        |-nesterenko3.sh(nesterenko_mikola)---nesterenko3.sh
        |-nginx---nginx(emps)
        |-php-fpm---6*[php-fpm(soft)]
        |-php-fpm-+-3*[php-fpm]
        |         |-3*[php-fpm(emps)]
        |         `-3*[php-fpm(soft)]
        |-ping(oracle)
        |-2*[ping(evchev_denis)]
        |-ping(kostetskij_bogdan)
        |-ping(bojchuk_oleksandr)
        |-polkitd(polkitd)---6*[{polkitd}]
        |-pure-ftpd
        |-rpcbind(rpc)
        |-rsyslogd---2*[{rsyslogd}]
        |-3*[sh(kolesnik_kirilo)---sh]
        |-smartd
        |-soffice.bin(nosov_andrij)---2*[{soffice.bin}]
        |-soffice.bin(bojchuk_oleksandr)---2*[{soffice.bin}]
        |-soffice.bin(shostak_roman)---2*[{soffice.bin}]
        |-sshd-+-2*[sshd---sshd(sshd)]
        |      |-sshd---sshd(shapovalova_viktoriya)---bash
        |      |-sshd---sshd(koldunova_anastasiya)---bash---pstree
        |      |-sshd---sshd(shulyak_mikola)---bash
        |      |-sshd---sshd(kalina_marina)---bash---nano
        |      `-sshd---sshd(bodnar_illya)---bash
        |-systemd-journal
        |-systemd-logind
        |-systemd-udevd
        |-test1.sh(oracle)
        |-test2.sh(oracle)
        |-test3.sh(oracle)
        |-tnslsnr(oracle)---{tnslsnr}
        `-tuned---4*[{tuned}]
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ pstree -p
 systemd(1)-+-NetworkManager(500)-+-{NetworkManager}(544)
            |                     `-{NetworkManager}(550)
            |-agetty(545)
            |-auditd(413)---{auditd}(414)
            |-belobrov.sh(27717)---belobrov.sh(12914)
            |-belobrov2.sh(13532)---belobrov2.sh(12918)
            |-belobrov3.sh(14315)---belobrov3.sh(12921)
            |-chronyd(520)
            |-crond(535)
            |-dbus-daemon(473)
            |-exim(802)
            |-gssproxy(482)-+-{gssproxy}(492)
            |               |-{gssproxy}(493)
            |               |-{gssproxy}(494)
            |               |-{gssproxy}(495)
            |               `-{gssproxy}(496)
            |-httpd(932)-+-httpd(7203)
            |            |-httpd(8933)
            |            |-httpd(9780)
            |            |-httpd(10166)
            |            |-httpd(21432)
            |            |-httpd(25999)
            |            |-httpd(27377)
            |            |-httpd(27540)
            |            |-httpd(28772)
            |            `-httpd(29760)
            |-irqbalance(501)
            |-mysqld(1157)-+-{mysqld}(1158)
            |              |-{mysqld}(1159)
            |              |-{mysqld}(1160)
            |              |-{mysqld}(1161)
            |              |-{mysqld}(1162)
            |              |-{mysqld}(1163)
            |              |-{mysqld}(1164)
            |              |-{mysqld}(1165)
            |              |-{mysqld}(1166)
            |              |-{mysqld}(1167)
            |              |-{mysqld}(1168)
            |              |-{mysqld}(1169)
            |              |-{mysqld}(1173)
            |              |-{mysqld}(1174)
            |              |-{mysqld}(1175)
            |              |-{mysqld}(1176)
            |              |-{mysqld}(1177)
            |              |-{mysqld}(1178)
            |              |-{mysqld}(1179)
            |              |-{mysqld}(1180)
            |              |-{mysqld}(1181)
            |              |-{mysqld}(1182)
            |              |-{mysqld}(1183)
            |              |-{mysqld}(1184)
            |              |-{mysqld}(1185)
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps
  PID TTY          TIME CMD
16107 pts/4    00:00:00 ps
24966 pts/4    00:00:00 bash
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -f -u koldunova_anastasiya
UID        PID  PPID  C STIME TTY          TIME CMD
kolduno+ 18335 24966  0 18:44 pts/4    00:00:00 ps -f -u koldunova_anastasiya
kolduno+ 24831 11294  0 18:28 ?        00:00:00 sshd: koldunova_anastasiya@pts/4
kolduno+ 24966 24831  0 18:28 pts/4    00:00:00 -bash
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -o pid,tty,ppid,stat,ni,cmd
  PID TT        PPID STAT  NI CMD
20891 pts/4    24966 R+     0 ps -o pid,tty,ppid,stat,ni,cmd
24966 pts/4    24831 Ss     0 -bash
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[koldunova_anastasiya@vpsj3IeQ ~]$ ps -e r -N
  PID TTY      STAT   TIME COMMAND
    1 ?        Ss    41:26 /usr/lib/systemd/systemd --switched-root --system --deserial
    2 ?        S      0:01 [kthreadd]
    4 ?        S<     0:00 [kworker/0:0H]
    6 ?        S      0:54 [ksoftirqd/0]
    7 ?        S      0:09 [migration/0]
    8 ?        S      0:00 [rcu_bh]
   10 ?        S<     0:00 [lru-add-drain]
   11 ?        S      0:17 [watchdog/0]
   12 ?        S      0:20 [watchdog/1]
   13 ?        S      0:05 [migration/1]
   14 ?        S     12:12 [ksoftirqd/1]
   16 ?        S<     0:00 [kworker/1:0H]
   18 ?        S      0:00 [kdevtmpfs]
   19 ?        S<     0:00 [netns]
   20 ?        S      0:01 [khungtaskd]
   21 ?        S<     0:00 [writeback]
   22 ?        S<     0:00 [kintegrityd]
   23 ?        S<     0:00 [bioset]
   24 ?        S<     0:00 [bioset]
   25 ?        S<     0:00 [bioset]
   26 ?        S<     0:00 [kblockd]
   27 ?        S<     0:00 [md]
   28 ?        S<     0:00 [edac-poller]
   29 ?        S<     0:00 [watchdogd]
   35 ?        S     18:50 [kswapd0]
   36 ?        SN     0:00 [ksmd]
   37 ?        S<     0:00 [crypto]
   45 ?        S<     0:00 [kthrotld]
   47 ?        S<     0:00 [kmpath_rdacd]
   48 ?        S<     0:00 [kaluad]
   49 ?        S<     0:00 [kpsmoused]
   50 ?        S<     0:00 [ipv6_addrconf]
   64 ?        S<     0:00 [deferwq]
  114 ?        S      1:24 [kauditd]
  247 ?        S<     0:00 [ata_sff]
  248 ?        S<     0:00 [ttm_swap]
  256 ?        S      0:00 [scsi_eh_0]
  257 ?        S<     0:00 [scsi_tmf_0]
  258 ?        S      0:00 [scsi_eh_1]
  259 ?        S<     0:00 [scsi_tmf_1]
  262 ?        S<     1:37 [kworker/0:1H]
  268 ?        S<     2:12 [kworker/1:1H]
  273 ?        S      2:20 [jbd2/vda1-8]
  274 ?        S<     0:00 [ext4-rsv-conver]
  357 ?        Ss    38:12 /usr/lib/systemd/systemd-journald
  390 ?        Ss     0:00 /usr/lib/systemd/systemd-udevd
  413 ?        S<sl   6:19 /sbin/auditd
  431 ?        S<     0:00 [rpciod]
  432 ?        S<     0:00 [xprtiod]
  471 ?        Ssl    5:15 /usr/lib/polkit-1/polkitd --no-debug
```

```
[koldunova_anastasiya@vpsj3IeQ ~]$ ps -ef --sort pid
UID          PID  PPID  C STIME TTY          TIME CMD
root           1     0  0 Feb16 ?        00:41:26 /usr/lib/systemd/systemd --switched-roo
root           2     0  0 Feb16 ?        00:00:01 [kthreadd]
root           4     2  0 Feb16 ?        00:00:00 [kworker/0:0H]
root           6     2  0 Feb16 ?        00:00:54 [ksoftirqd/0]
root           7     2  0 Feb16 ?        00:00:09 [migration/0]
root           8     2  0 Feb16 ?        00:00:00 [rcu_bh]
root           9     2  0 Feb16 ?        02:23:41 [rcu_sched]
root          10     2  0 Feb16 ?        00:00:00 [lru-add-drain]
root          11     2  0 Feb16 ?        00:00:17 [watchdog/0]
root          12     2  0 Feb16 ?        00:00:20 [watchdog/1]
root          13     2  0 Feb16 ?        00:00:05 [migration/1]
root          14     2  0 Feb16 ?        00:12:12 [ksoftirqd/1]
root          16     2  0 Feb16 ?        00:00:00 [kworker/1:0H]
root          18     2  0 Feb16 ?        00:00:00 [kdevtmpfs]
root          19     2  0 Feb16 ?        00:00:00 [netns]
root          20     2  0 Feb16 ?        00:00:01 [khungtaskd]
root          21     2  0 Feb16 ?        00:00:00 [writeback]
root          22     2  0 Feb16 ?        00:00:00 [kintegrityd]
root          23     2  0 Feb16 ?        00:00:00 [bioset]
root          24     2  0 Feb16 ?        00:00:00 [bioset]
root          25     2  0 Feb16 ?        00:00:00 [bioset]
root          26     2  0 Feb16 ?        00:00:00 [kblockd]
root          27     2  0 Feb16 ?        00:00:00 [md]
root          28     2  0 Feb16 ?        00:00:00 [edac-poller]
root          29     2  0 Feb16 ?        00:00:00 [watchdogd]
root          35     2  0 Feb16 ?        00:18:50 [kswapd0]
root          36     2  0 Feb16 ?        00:00:00 [ksmd]
root          37     2  0 Feb16 ?        00:00:00 [crypto]
root          45     2  0 Feb16 ?        00:00:00 [kthrotld]
root          47     2  0 Feb16 ?        00:00:00 [kmpath_rdacd]
root          48     2  0 Feb16 ?        00:00:00 [kaluad]
root          49     2  0 Feb16 ?        00:00:00 [kpsmoused]
root          50     2  0 Feb16 ?        00:00:00 [ipv6_addrconf]
root          64     2  0 Feb16 ?        00:00:00 [deferwq]
root         114     2  0 Feb16 ?        00:01:24 [kauditd]
root         247     2  0 Feb16 ?        00:00:00 [ata_sff]
root         248     2  0 Feb16 ?        00:00:00 [ttm_swap]
root         256     2  0 Feb16 ?        00:00:00 [scsi_eh_0]
root         257     2  0 Feb16 ?        00:00:00 [scsi_tmf_0]
root         258     2  0 Feb16 ?        00:00:00 [scsi_eh_1]
root         259     2  0 Feb16 ?        00:00:00 [scsi_tmf_1]
root         262     2  0 Feb16 ?        00:01:37 [kworker/0:1H]
root         268     2  0 Feb16 ?        00:02:12 [kworker/1:1H]
root         273     2  0 Feb16 ?        00:02:20 [jbd2/vda1-8]
root         274     2  0 Feb16 ?        00:00:00 [ext4-rsv-conver]
root         357     1  0 Feb16 ?        00:38:12 /usr/lib/systemd/systemd-journald
root         390     1  0 Feb16 ?        00:00:00 /usr/lib/systemd/systemd-udevd
root         413     1  0 Feb16 ?        00:06:19 /sbin/auditd
root         431     2  0 Feb16 ?        00:00:00 [rpciod]
root         432     2  0 Feb16 ?        00:00:00 [xprtiod]
polkitd      471     1  0 Feb16 ?        00:05:15 /usr/lib/polkit-1/polkitd --no-debug
```

Задание 2:

```
[koldunova_anastasiya@vpsj3IeQ ~]$ ping localhost
PING localhost (127.0.0.1) 56(84) bytes of data.
64 bytes from localhost (127.0.0.1): icmp_seq=1 ttl=64 time=0.028 ms
64 bytes from localhost (127.0.0.1): icmp_seq=2 ttl=64 time=0.038 ms
64 bytes from localhost (127.0.0.1): icmp_seq=3 ttl=64 time=0.037 ms
64 bytes from localhost (127.0.0.1): icmp_seq=4 ttl=64 time=0.036 ms
64 bytes from localhost (127.0.0.1): icmp_seq=5 ttl=64 time=0.040 ms
64 bytes from localhost (127.0.0.1): icmp_seq=6 ttl=64 time=0.036 ms
64 bytes from localhost (127.0.0.1): icmp_seq=7 ttl=64 time=0.036 ms
64 bytes from localhost (127.0.0.1): icmp_seq=8 ttl=64 time=0.038 ms
64 bytes from localhost (127.0.0.1): icmp_seq=9 ttl=64 time=0.040 ms
64 bytes from localhost (127.0.0.1): icmp_seq=10 ttl=64 time=0.042 ms
64 bytes from localhost (127.0.0.1): icmp_seq=11 ttl=64 time=0.040 ms
64 bytes from localhost (127.0.0.1): icmp_seq=12 ttl=64 time=0.042 ms
64 bytes from localhost (127.0.0.1): icmp_seq=13 ttl=64 time=0.040 ms
64 bytes from localhost (127.0.0.1): icmp_seq=14 ttl=64 time=0.039 ms
64 bytes from localhost (127.0.0.1): icmp_seq=15 ttl=64 time=0.040 ms
64 bytes from localhost (127.0.0.1): icmp_seq=16 ttl=64 time=0.038 ms
```

```
[koldunova_anastasiya@vpsj3IeQ ~]$ kill -18 8195
[koldunova_anastasiya@vpsj3IeQ ~]$ kill -9 8195
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
stasiya
  TIME CMD
:00:00 sshd: koldunova_
:00:00 -bash
koldуno+  4213  3143  0 40384  2344   1 11:13 ?        00:00:00 sshd: koldunova_
[[koldunova_anastasiya@vpsj3IeQ ~]$ nohub ping localhost &
[1] 12238
[koldunova_anastasiya@vpsj3IeQ ~]$ -bash: nohub: command not found

[1]+  Exit 127                nohub ping localhost
[[koldunova_anastasiya@vpsj3IeQ ~]$ nohup ping localhost &
[1] 15726
[koldunova_anastasiya@vpsj3IeQ ~]$ nohup: ignoring input and appending output to 'nohup
.out'
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -p 15726 -o pid,stat,cmd
  PID STAT CMD
15726 S    ping localhost
64 bytes from localhost (127.0.0.1): icmp_seq=157 ttl=64 time=0.038 ms
[[koldunova_anastasiya@vpsj3IeQ ~]$ kill -9 15726
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -p 15726 -o pid,stat,cmd
  PID STAT CMD
[koldunova_anastasiya@vpsj3IeQ ~]$
64 bytes from localhost (127.0.0.1): icmp_seq=162 ttl=64 time=0.040 ms
64 bytes from localhost (127.0.0.1): icmp_seq=163 ttl=64 time=0.039 ms

[1]+  Stopped                 ping localhost
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -aux|egrep "ping localhost"
sinyako+  3110  0.0  0.0 130680  1640 ?        S    Apr13   0:04 ping localhost
kostets+  3575  0.0  0.0 130680  1644 ?        S    Apr12   0:17 ping localhost
evchev_+  4317  0.0  0.0 130680  1640 ?        S    Apr12   0:19 ping localhost
oracle    7126  0.0  0.0 130680  1636 ?        S    Apr09   0:44 ping localhost
markovs+  7817  0.0  0.0 130680  1640 ?        S    Apr13   0:05 ping localhost
kolduno+  7936  0.0  0.0 112784   736 pts/17   R+   11:19   0:00 grep -E --color
=auto ping localhost
kolduno+  8195  0.0  0.0 130680  1656 pts/11   T    11:14   0:00 ping localhost
melnich+  9657  0.0  0.0 130680  1644 ?        S    10:07   0:00 ping localhost
lobko_d+ 10253  0.0  0.0 130680  1640 ?        S    02:15   0:03 ping localhost
bojchuk+ 12757  0.0  0.0 130680  1644 ?        S    Apr11   0:25 ping localhost
stepane+ 12820  0.0  0.0 130680  1640 ?        S    Apr13   0:04 ping localhost
markovs+ 17416  0.0  0.0 130680  1640 ?        S    Apr13   0:05 ping localhost
golovan+ 19217  0.0  0.0 130680  1640 ?        S    10:49   0:00 ping localhost
melnich+ 21171  0.0  0.0 130680  1640 ?        S    10:04   0:00 ping localhost
markovs+ 21724  0.0  0.0 130680  1644 ?        S    Apr13   0:05 ping localhost
maksime+ 22468  0.0  0.0 130680  1640 ?        S    Apr13   0:04 ping localhost
melnich+ 24306  0.0  0.0 130680  1640 ?        S    10:10   0:00 ping localhost
melnich+ 26396  0.0  0.0 130680  1640 ?        S    10:10   0:00 ping localhost
malofee+ 26589  0.0  0.0 130680  1640 ?        S    Apr13   0:05 ping localhost
evchev_+ 28415  0.0  0.0 130680  1644 ?        S    Apr12   0:19 ping localhost
kovach_+ 28743  0.0  0.0 130680  1640 ?        S    Apr13   0:04 ping localhost
kelembe+ 30450  0.0  0.0 130680  1644 ?        S    01:26   0:03 ping localhost
kovach_+ 28743  0.0  0.0 130680  1640 ?        S    Apr13   0:04 ping localhost
[1]+  Stopped                 ping localhost
[koldunova_anastasiya@vpsj3IeQ ~]$ 64 bytes from localhost (127.0.0.1): icmp_seq=164 tt
l=64 time=0.037 ms
64 bytes from localhost (127.0.0.1): icmp_seq=165 ttl=64 time=0.038 ms
64 bytes from localhost (127.0.0.1): icmp_seq=166 ttl=64 time=0.037 ms
64 bytes from localhost (127.0.0.1): icmp_seq=167 ttl=64 time=0.033 ms
64 bytes from localhost (127.0.0.1): icmp_seq=168 ttl=64 time=0.032 ms
64 bytes from localhost (127.0.0.1): icmp_seq=169 ttl=64 time=0.031 ms
64 bytes from localhost (127.0.0.1): icmp_seq=170 ttl=64 time=0.037 ms
64 bytes from localhost (127.0.0.1): icmp_seq=171 ttl=64 time=0.023 ms
64 bytes from localhost (127.0.0.1): icmp_seq=172 ttl=64 time=0.020 ms
64 bytes from localhost (127.0.0.1): icmp_seq=173 ttl=64 time=0.018 ms
64 bytes from localhost (127.0.0.1): icmp_seq=174 ttl=64 time=0.030 ms
```

Задание 4:

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ touch koldunova.sh
[[koldunova_anastasiya@vpsj3IeQ ~]$ nano koldunova.sh
[[koldunova_anastasiya@vpsj3IeQ ~]$ cat koldunova.sh
#!/bin/bash
x=6
n=5
while[ true ]
do
  x=$(($x + $n))
done
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -o pid,ppid,stat,ni,cpu,cmd 26266
  PID  PPID STAT  NI CPU CMD
26266 24959 R      0   - sh koldunova.sh
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ kill -19 26266
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -o pid,ppid,stat,ni,cpu,cmd 26266
  PID  PPID STAT  NI CPU CMD
26266 24959 T      0   - sh koldunova.sh

[1]+  Stopped                 sh koldunova.sh
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[[koldunova_anastasiya@vpsj3IeQ ~]$ ln -s koldunova.sh koldunova1.sh
[[koldunova_anastasiya@vpsj3IeQ ~]$ ln -s koldunova.sh koldunova2.sh
[[koldunova_anastasiya@vpsj3IeQ ~]$ sh koldunova1.sh &
[2] 14973
[[koldunova_anastasiya@vpsj3IeQ ~]$ sh koldunova2.sh &
[3] 17277
[[koldunova_anastasiya@vpsj3IeQ ~]$ ps -o pid,ppid,stat,ni,cpu,cmd 26266 14973 17
277
  PID  PPID STAT  NI CPU CMD
14973 24959 R      0   - sh koldunova1.sh
17277 24959 R      0   - sh koldunova2.sh
26266 24959 T      0   - sh koldunova.sh
[koldunova_anastasiya@vpsj3IeQ ~]$
```

```
[koldunova_anastasiya@vpsj3IeQ ~]$ renice -n 5 -p 14973
14973 (process ID) old priority 0, new priority 5
[[koldunova_anastasiya@vpsj3IeQ ~]$ renice -n 10 -p 17277
17277 (process ID) old priority 0, new priority 10
[[koldunova_anastasiya@vpsj3IeQ ~]$  ps -o pid,ppid,stat,ni,cpu,cmd 26266 14973 17277
  PID  PPID STAT  NI CPU CMD
14973 24959 RN     5   - sh koldunova1.sh
17277 24959 RN    10   - sh koldunova2.sh
26266 24959 T      0   - sh koldunova.sh
[koldunova_anastasiya@vpsj3IeQ ~]$
```

Вывод: В данной лабораторной работе мы получили навыки в управлении процессами в ОС Unix средствами командной оболочки.