

Операционные системы

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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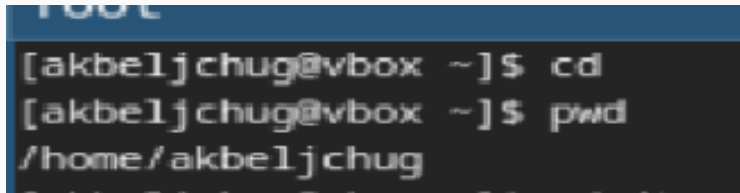
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Цели и задачи работы

Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

- 1 Определить имя и путь домашнего каталога
- 2 Изучить команду `ls`.
- 3 Выполнить действия с каталогами.
- 4 Получить дополнительные сведения при помощи справки по командам.
- 5 Изучить команду `history`.

Процесс выполнения лабораторной работы

A terminal window with a dark background and a blue header bar. The header bar contains the text "root" in white. The terminal shows a user named "akbeljchug" at a machine named "vbox" in the "~" directory. The user enters the command "cd" and then "pwd". The output of "pwd" is "/home/akbeljchug".

```
root
[akbeljchug@vbox ~]$ cd
[akbeljchug@vbox ~]$ pwd
/home/akbeljchug
```

Рис. 1: Путь к домашнему каталогу

```
[akbel]chug@vbox: ~$ cd /tmp
[akbel]chug@vbox: /tmp$ ls
sdm-auth-1047c9fa-8573-4152-881c-563bd400a1d
sdm-1a2aM
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-ahrted.service-57KluJ
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-chronyd.service-7XqoZr
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-dbus-broker.service-nrc29b
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-lrpbalance.service-671d6J
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-ModemManager.service-158jaR
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-polkit.service-dwH4ff
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-rtkit-daemon.service-KVCPcQ
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-systemd-logind.service-g466sd
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-systemd-oomd.service-BZcne2
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-systemd-resolved.service-0vjry1
systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-upower.service-4DjF8t
```

Рис. 2: Команда ls

```
[akbeljchug@vbox tmp]$ ls -a
.
.
font-unicode
ICE-unicode
sddm-auth.1047c9fa.8573-4152-881c-563bd4800a1d
sddm-unicode
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-aptfd.service-57K1uJ
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-chromed.service-fKqzZ
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-dbus-broker.service-nce2Xb
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-rqbalance.service-6Xin9J
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-ModemManager.service-L30jsR
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-polkit.service-0a44FF
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-rtkit-daemon.service-KVCPcQ
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-systemd-logind.service-g466ad
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-systemd-oomd.service-BZcns2
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-systemd-resolved.service-0vjry1
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-upower.service-4DjF8t
.XD-lock
.X11-unix
.XIM-unix
```

Рис. 3: Команда ls -a


```
[akbeljchug@vbox tmp]$ ls -l
итого 0
drwxr-xr-x. 1 root root 0 map 14 13:42 sddm-auth-1047c9fa-8573-4152-881c-563bd4800a1d
drwx----- 1 sddm sddm 0 map 14 13:42 sddm-.isiwM
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-abrt.service-57KIuJ
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-chronyd.service-fXqoZz
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-dbus-broker.service-nce2Xb
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-irqbalance.service-6Xin9J
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-ModemManager.service-L50jsR
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-polkit.service-dw04fF
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-rtkit-daemon.service-KVCpQ
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-systemd-logind.service-g466sd
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-systemd-oomd.service-BZcne2
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-systemd-resolved.service-0vjry1
drwx----- 3 root root 60 map 14 13:42 systemd-private-0a64c583d6de4d4c91fb2d10dd6f62a5-upower.service-4DjF8t
```

Рис. 4: Команда ls -l

```
[akke]jchu@vbox tmp]$ ls -l
```

```

X0-lock
006-1224M
odm-auth-1047079f-8575-4152-881c-562b348800dd
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-ModemManager.service-1e5J9S
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-upower.service-4DJf8T
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-systemd-logind.service-g466sd
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-rtkit-daemon.service-RVCPQ
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-polkitt.service-dw4fF
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-chrondy.service-6XkpZr
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-irqbalance.service-6Xln9J
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-abrtt.service-57HlU
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-dbus-broker.service-nc2N8
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-systemd-resolved.service-DwyljY
systemd-private-0a64c583d6de4d4c91fb2d18dd6f62a5-systemd-oomd.service-BZcne2
font-unix
X11-unix
X11-unix
X11-unix
X11-unix
```

```
[akke]jchu@vbox tmp]$
```

Рис. 5: Команда ls -f

```
[akbeljchug@vbox tmp]$ cd /var/spool
[akbeljchug@vbox spool]$ ls =al
ls: невозможно получить доступ к '=al': Нет такого файла или каталога
[akbeljchug@vbox spool]$ ls -al
итого 0
drwxr-xr-x. 1 root root 94 окт 24 17:50 .
drwxr-xr-x. 1 root root 194 окт 24 17:53 ..
drwxr-x--x. 1 root abrt 0 мар 6 18:44 abrt
drwx-----. 1 abrt abrt 0 ноя 20 03:00 abrt-upload
drwxr-xr-x. 1 root root 66 окт 24 17:49 anacron
drwx-----. 1 root root 18 окт 24 17:50 at
drwx-----. 1 root root 0 июл 17 2024 cron
drwx--x---. 1 root lp 6 янв 7 03:00 cups
drwxr-xr-x. 1 root root 0 июл 17 2024 lpd
drwxrwxr-x. 1 root mail 26 фев 20 14:16 mail
drwxr-xr-x. 1 root root 0 сен 21 03:00 plymouth
[akbeljchug@vbox spool]$
```

Рис. 6: Каталог /var/spool

Домашний каталог

```
[akbeljchug@vbox spool]$ cd
[akbeljchug@vbox ~]$ ls -ls
end git git-test test work Видео Документы Загрузки Изображения Музыка Общедоступные 'Рабочий стол' Шаблоны
[akbeljchug@vbox ~]$ ls -al
итого 40
drwx----- 1 akbeljchug akbeljchug 920 мар 14 13:43 .
drwx--x--x 1 root root 20 фев 20 14:16 ..
-rw----- 1 akbeljchug akbeljchug 2022 мар 4 22:31 .bash_history
-rw-r--r-- 1 akbeljchug akbeljchug 18 апр 12 2024 .bash_logout
-rw-r--r-- 1 akbeljchug akbeljchug 144 апр 12 2024 .bash_profile
-rw-r--r-- 1 akbeljchug akbeljchug 680 мар 6 16:11 .bashrc
drwx--x--x 1 akbeljchug akbeljchug 450 мар 6 16:12 .cache
drwx----- 1 akbeljchug akbeljchug 212 мар 2 17:39 .config
-rw-r--r-- 1 akbeljchug akbeljchug 0 фев 23 19:32 end
drwx--x--x 1 akbeljchug akbeljchug 0 мар 6 15:21 git
-rw-r--r-- 1 akbeljchug akbeljchug 421 фев 24 12:12 .gitconfig
drwx--x--x 1 akbeljchug akbeljchug 74 мар 6 20:21 git-test
drwx----- 1 akbeljchug akbeljchug 136 мар 8 22:36 .gnupg
drwx----- 1 akbeljchug akbeljchug 20 фев 20 14:21 .local
drwx--x--x 1 akbeljchug akbeljchug 48 фев 23 23:18 .mozilla
drwx----- 1 akbeljchug akbeljchug 132 мар 6 15:24 .ssh
drwx--x--x 1 akbeljchug akbeljchug 0 мар 6 15:21 test
drwx--x--x 1 akbeljchug akbeljchug 18 мар 4 22:31 .texlive2023
-rw-r----- 1 akbeljchug akbeljchug 5 мар 14 13:42 .vboxclient-clipboard-tty2-control.pid
-rw-r----- 1 akbeljchug akbeljchug 5 мар 14 13:42 .vboxclient-clipboard-tty2-service.pid
-rw-r----- 1 akbeljchug akbeljchug 5 мар 14 13:42 .vboxclient-draganddrop-tty2-control.pid
-rw-r----- 1 akbeljchug akbeljchug 5 мар 14 13:42 .vboxclient-hostversion-tty2-control.pid
-rw-r----- 1 akbeljchug akbeljchug 5 мар 14 13:42 .vboxclient-seamless-tty2-control.pid
drwx--x--x 1 akbeljchug akbeljchug 10 мар 2 16:35 work
drwx--x--x 1 akbeljchug akbeljchug 0 фев 20 14:21 Видео
drwx--x--x 1 akbeljchug akbeljchug 0 фев 20 14:21 Документы
drwx--x--x 1 akbeljchug akbeljchug 96 мар 2 17:54 Загрузки
drwx--x--x 1 akbeljchug akbeljchug 234 фев 20 16:02 Изображения
drwx--x--x 1 akbeljchug akbeljchug 0 фев 20 14:21 Музыка
drwx--x--x 1 akbeljchug akbeljchug 0 фев 20 14:21 Общедоступные
drwx--x--x 1 akbeljchug akbeljchug 0 фев 20 14:21 'Рабочий стол'
drwx--x--x 1 akbeljchug akbeljchug 0 фев 20 14:21 Шаблоны
[akbeljchug@vbox ~]$
```

Рис. 7: Файлы в домашнем каталоге

```
[akbeljchug@vbox ~]$ mkdir newdir
[akbeljchug@vbox ~]$ mkdir newdir/morefun
[akbeljchug@vbox ~]$ mkdir letters memos misk
[akbeljchug@vbox ~]$ ls
end  git  git-test  letters  memos  misk  newdir  test  work  Видео  Документы  Загрузки  Изображения  Музыка  Общедоступные  "Рабочий стол"  Шаблоны
[akbeljchug@vbox ~]$ rm letters/ memos/ misk/
rm: невозможно удалить 'letters/': Это каталог
rm: невозможно удалить 'memos/': Это каталог
rm: невозможно удалить 'misk/': Это каталог
[akbeljchug@vbox ~]$ rm -r letters/ memos/ misk/
[akbeljchug@vbox ~]$ rm -r newdir/
[akbeljchug@vbox ~]$
```

Рис. 8: Действия с каталогами

```
ls(1) User Commands
NAME
  ls - list directory contents

SYNOPSIS
  ls [OPTION]... [FILE]...

DESCRIPTION
  List information about the FILES (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

  Mandatory arguments to long options are mandatory for short options too.

  -a, --all
      do not ignore entries starting with .

  -A, --almost-all
      do not list implied . and ..

  --author
      with -l, print the author of each file

  -b, --escape
      print C-style escapes for nongraphic characters

  --block-size=SIZE
      with -l, scale sizes by SIZE when printing them; e.g., '--block-size=M'; see SIZE format below

  -B, --ignore-backups
      do not list implied entries ending with ~

  -c
      with -lt: sort by, and show, ctime (time of last change of file status information); with -l: show ctime and sort by name; otherwise: first

  -C
      list entries by columns

  --color[=WHEN]
      color the output WHEN; more info below
```

Рис. 9: Команда ls -R и ls -t

```
[akbeljchug@vbox ~]$ help cd
cd: cd [-L|[-P [-e]] [-@]] [directory]
    Change the shell working directory.

Change the current directory to DIR.  The default DIR is the value of the
HOME shell variable.  If DIR is "-", it is converted to $OLDPWD.

The variable CDPATH defines the search path for the directory containing
DIR.  Alternative directory names in CDPATH are separated by a colon (:).
A null directory name is the same as the current directory.  If DIR begins
with a slash (/), then CDPATH is not used.

If the directory is not found, and the shell option 'cdable_vars' is set,
the word is assumed to be a variable name.  If that variable has a value,
its value is used for DIR.

Options:
-L      force symbolic links to be followed: resolve symbolic
        links in DIR after processing instances of '..'
-P      use the physical directory structure without following
        symbolic links: resolve symbolic links in DIR before
        processing instances of '..'
-e      if the -P option is supplied, and the current working
        directory cannot be determined successfully, exit with
        a non-zero status
-@      on systems that support it, present a file with extended
        attributes as a directory containing the file attributes

The default is to follow symbolic links, as if '-L' were specified.
'..' is processed by removing the immediately previous pathname component
back to a slash or the beginning of DIR.

Exit Status:
Returns 0 if the directory is changed, and if $PWD is set successfully when
-P is used; non-zero otherwise.
[akbeljchug@vbox ~]$
```

Рис. 10: Справка по команде cd

```
pwd(1) User Commands pwd(1)
NAME
  pwd - print name of current/working directory
SYNOPSIS
  pwd [OPTION]...
DESCRIPTION
  Print the full filename of the current working directory.
  -L, --logical
    use PWD from environment, even if it contains symlinks
  -P, --physical
    avoid all symlinks
  --help display this help and exit
  --version
    output version information and exit
  If no option is specified, -P is assumed.
  Your shell may have its own version of pwd, which usually supersedes the version described here. Please refer to your shell's documentation for details about the options it supports.
AUTHOR
  Written by Jim Meyerizing.
REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Report any translation bugs to <https://translationproject.org/team/>
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SEE ALSO
  getcwd(3)
  Full documentation <https://www.gnu.org/software/coreutils/pwd>
  or available locally via: info '(coreutils) pwd invocation'
  Manual page pwd(1) line 1 (press h for help or q to quit)
```

Рис. 11: Справка по команде pwd


```
mkdir(1)                                User Commands

NAME
    mkdir - make directories

SYNOPSIS
    mkdir [OPTION]... DIRECTORY...

DESCRIPTION
    Create the DIRECTORY(ies), if they do not already exist.

    Mandatory arguments to long options are mandatory for short options too.

    -m, --mode=MODE
        set file mode (as in chmod), not a=rwx - umask

    -p, --parents
        no error if existing, make parent directories as needed, with their file modes unaffected by any -m option.

    -v, --verbose
        print a message for each created directory

    -Z
        set SELinux security context of each created directory to the default type

    --context[=CTX]
        like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX

    --help
        display this help and exit

    --version
        output version information and exit

AUTHOR
    Written by David MacKenzie.

REPORTING BUGS
    GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
    Report any translation bugs to <https://translationproject.org/team/>

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Manual page mkdir(1) line 1 [press h for help or q to quit]
```

Рис. 12: Справка по команде mkdir

```
rmDir(1)                                     User Commands

NAME
    rmdir - remove empty directories

SYNOPSIS
    rmdir [OPTION]... DIRECTORY...

DESCRIPTION
    Remove the DIRECTORY(ies), if they are empty.

    --ignore-fail-on-non-empty
        ignore each failure to remove a non-empty directory

    -p, --parents
        remove DIRECTORY and its ancestors; e.g., 'rmdir -p a/b' is similar to 'rmdir a/b a'

    -v, --verbose
        output a diagnostic for every directory processed

    --help
        display this help and exit

    --version
        output version information and exit

AUTHOR
    Written by David MacKenzie.

REPORTING BUGS
    GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
    Report any translation bugs to <https://translationproject.org/team/>

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    This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.

SEE ALSO
    rmdir(2)

    Full documentation <https://www.gnu.org/software/coreutils/rmdir>
    or available locally via: info '(coreutils) rmdir invocation'

GNU coreutils 9.5                             November 2024
Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir

```
rm(1)                                User Commands                                rm(1)
NAME
rm - remove files or directories

SYNOPSIS
rm [OPTION]... (FILE)...

DESCRIPTION
This manual page documents the GNU version of rm.  rm removes each specified file.  By default, it does not remove directories.

If the -i or --interactive=once option is given, and there are more than three files or the -r, -d, or --recursive are given, then rm prompts the user for whether
to proceed with the entire operation.  If the response is not affirmative, the entire command is aborted.

Otherwise, if a file is unwritable, standard input is a terminal, and the -f or --force option is not given, or the -i or --interactive=always option is given, rm
prompts the user for whether to remove the file.  If the response is not affirmative, the file is skipped.

OPTIONS
Remove (unlink) the FILE(s).

-f, --force
    ignore nonexistent files and arguments, never prompt

-i
    prompt before every removal

-I
    prompt once before removing more than three files, or when removing recursively; less intrusive than -i, while still giving protection against most mis-
takes

--interactive[=WHEN]
    prompt according to WHEN: never, once (-I), or always (-i); without WHEN, prompt always

--one-file-system
    when removing a hierarchy recursively, skip any directory that is on a file system different from that of the corresponding command line argument

--no-preserve-root
    do not treat '/' specially

--preserve-root[=all]
    do not remove '/' (default); with 'all', reject any command line argument on a separate device from its parent

-r, -R, --recursive
    remove directories and their contents recursively

Manual page rm(1) line 1 (press h for help or q to quit)
```

Рис. 14: Справка по команде rm

```
90 cd ~/work/study/2024-2025/"Operating system"/os-intro/labs/lab02/presentation/
91 cd
92 pwd
93 cd /tmp
94 ls
95 ls -a
96 ls -l
97 ls -F
98 cd /var/spool
99 ls -al
100 ls -al
101 cd
102 ls
103 ls -al
104 clear
105 mkdir newdir
106 mkdir newdir/morefun
107 mkdir letters memos misk
108 ls
109 rm letters/ memos/ misk/
110 rm -r letters/ memos/ misk/
111 rm -r newdir/
112 man
113 man
114 man ls
115 ls -t
116 clear
117 man ls
118 help cd
119 clear
120 man cd
121 clear
122 help cd
123 man pwd
124 man mkdir
125 man rmdir
126 man pwd
127 man mkdir
128 man rmdir
129 history
130 history
131 clear
132 history
[akbel]chug@vbox ~]$
```

Рис. 15: Команда history

Выводы по проделанной работе

Мы приобрели практические навыки взаимодействия пользователя с системой посредством командной строки.