

Операционные системы

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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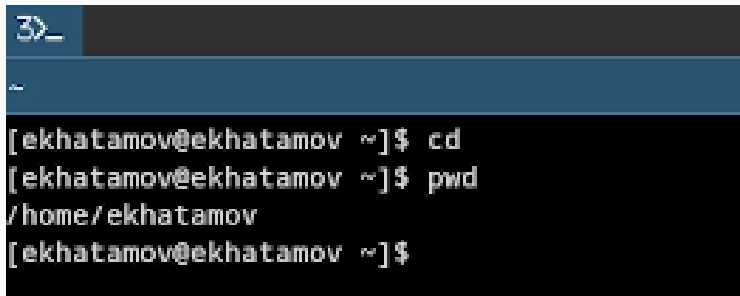
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Цели и задачи работы

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. The prompt is '3>_'. Below it, a blue bar contains a tilde '~'. The terminal shows the command 'cd' being executed, followed by 'pwd' which outputs '/home/ekhatamov'.

```
3>_  
~  
[ekhatamov@ekhatamov ~]$ cd  
[ekhatamov@ekhatamov ~]$ pwd  
/home/ekhatamov  
[ekhatamov@ekhatamov ~]$
```

Рис. 1: Путь к домашнему каталогу

```
[ekhatamov@ekhatamov ~]$ cd /tmp
[ekhatamov@ekhatamov tmp]$ ls
hsperfdata_ekhatamov
sddm-auth-b77d5d0b-3e60-4167-9eba-6e73900eaf75
sddm--CEVAUG
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-abrt.service-9wvEFZ
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-chrond.service-gJWDz8
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-dbus-broker.service-N6ag86
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-irqbalance.service-H0WKP3
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-ModemManager.service-Mln59r
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-polkit.service-3qVDMq
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-rtkit-daemon.service-53fto1
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-switcheroo-control.service-wvg6NH
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-logind.service-77dMcx
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-oomd.service-prEBNV
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-resolved.service-awspuR
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-upower.service-2iWZoo
[ekhatamov@ekhatamov tmp]$
```

Рис. 2: Команда ls

Опции команды ls

```
[ekhatamov@ekhatamov tmp]$ ls -a
.
..
.font-unix
hsperfdata_ekhatamov
ICE-unix
sddm-auth-b77d5d0b-3e60-4167-9eba-6e73900eaf75
sddm--CEVAUG
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-abrtd.service-9wvEFZ
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-chronyd.service-gJWDz8
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-dbus-broker.service-N6ag86
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-irqbalance.service-H0MKp3
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-ModemManager.service-Mln59r
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-polkit.service-3qVDmq
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-rtkit-daemon.service-53fto1
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-switcheroo-control.service-wvg6MH
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-logind.service-77dMcx
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-oomd.service-prEBNV
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-resolved.service-awspuR
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-upower.service-2iWZoo
.X0-lock
.X11-unix
.XIM-unix
[ekhatamov@ekhatamov tmp]$ |
```

Рис. 3: Команда ls -a

Опции команды ls

```
[ekhatamov@ekhatamov tmp]$ ls -l
итого 0
drwxr-xr-x. 2 ekhatamov ekhatamov 40 map 19 16:20 hspcrdata_ekhatamov
srwxr-xr-x. 1 root      root      0 map 19 16:19 sddm-auth-b77d5d0b-3e60-4167-9eba-6e73900eaf75
srwx-----. 1 sddm      sddm      0 map 19 16:19 sddm--CEVAUG
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-abrtd.service-
9wvEFZ
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-chronyd.servic
e-gJwDz8
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-dbus-broker.se
rvice-N6ag86
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-irqbalance.ser
vice-H0Wkp3
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-ModemManager.s
ervice-Mln59r
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-polkit.service
-3qVDMq
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-rtkit-daemon.s
ervice-53ftol
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-switcheroo-con
trol.service-wvg6MH
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-logind
.service-77dMcx
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-oomd.s
ervice-prEBNV
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-resolv
ed.service-awspuR
drwx-----. 3 root      root      60 map 19 16:19 systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-upower.service
-2lWZoo
[ekhatamov@ekhatamov tmp]$
```

Рис. 4: Команда ls -l

```
[ekhatamov@ekhatamov tmp]$ ls -f
.
..
hspcrfdata_ekhatamov
.X0-lock
sddm--CEVAUG
sddm-auth-b77d5d0b-3e60-4167-9eba-6e73900eaf75
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-ModemManager.service-MlnS9r
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-upower.service-2iWZoo
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-logind.service-77dMcx
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-switcheroo-control.service-wvg6MH
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-rtkit-daemon.service-53ftol
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-polkit.service-3qVDMq
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-chrond.service-gJWDz8
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-irqbalance.service-H0WKp3
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-abrt.service-9wvEFZ
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-dbus-broker.service-N6ag86
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-resolved.service-awspuR
systemd-private-d6d2c04e229f4d9989e1e4a181421fa0-systemd-oomd.service-prEBNV
.font-unix
.XIM-unix
.ICE-unix
.X11-unix
[ekhatamov@ekhatamov tmp]$ |
```

Рис. 5: Команда ls -f

```
[ekhatamov@ekhatamov tmp]$ cd /var/spool/
[ekhatamov@ekhatamov spool]$ ls =al
ls: невозможно получить доступ к '=al': Нет такого файла или каталога
[ekhatamov@ekhatamov 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 212 мар 19 16:34 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 24 фев 27 13:44 mail
drwxr-xr-x. 1 root root 0 сен 21 03:00 plymouth
[ekhatamov@ekhatamov spool]$
```

Рис. 6: Каталог /var/spool

```
[ekhatamov@ekhatamov spool]$ cd
[ekhatamov@ekhatamov ~]$ ls
bin Downloads public key.asc Видео Загрузки Музыка 'Рабочий стол'
Documents LICENSE work Документы Изображения Общедоступные Шаблоны
[ekhatamov@ekhatamov ~]$ ls -al
итого 80
drwx----- 1 ekhatamov ekhatamov 1098 мар 19 16:20 .
drwxr-xr-x 1 root root 18 фев 27 13:44 ..
drwxr-xr-x 1 ekhatamov ekhatamov 90 мар 7 01:33 .asy
-rw----- 1 ekhatamov ekhatamov 7962 мар 19 16:34 .bash_history
-rw-r--r-- 1 ekhatamov ekhatamov 18 авг 12 2024 .bash_logout
-rw-r--r-- 1 ekhatamov ekhatamov 246 мар 15 00:18 .bash_profile
-rw-r--r-- 1 ekhatamov ekhatamov 840 мар 15 00:18 .bashrc
drwxr-xr-x 1 ekhatamov ekhatamov 142 мар 15 00:18 .bashrc.d
drwxr-xr-x 1 ekhatamov ekhatamov 14 мар 15 00:17 bin
drwxr-xr-x 1 ekhatamov ekhatamov 496 мар 15 15:29 .cache
drwxr-xr-x 1 ekhatamov ekhatamov 422 мар 15 00:18 .config
drwxr-xr-x 1 ekhatamov ekhatamov 0 мар 19 16:20 Documents
drwxr-xr-x 1 ekhatamov ekhatamov 20 мар 19 16:30 Downloads
drwx----- 1 ekhatamov ekhatamov 46 мар 7 01:42 .emacs.d
-rw-r--r-- 1 ekhatamov ekhatamov 264 мар 2 16:26 .gitconfig
drwx----- 1 ekhatamov ekhatamov 158 мар 14 23:52 .gnupg
-rw-r--r-- 1 ekhatamov ekhatamov 569 мар 15 00:18 .gtkrc-2.0
-rw-r--r-- 1 ekhatamov ekhatamov 18657 мар 15 00:18 LICENSE
drwx----- 1 ekhatamov ekhatamov 20 фев 27 13:47 .local
drwxr-xr-x 1 ekhatamov ekhatamov 48 фев 27 23:34 .mozilla
drwxr-xr-x 1 ekhatamov ekhatamov 26 мар 15 00:08 .npm
drwx----- 1 ekhatamov ekhatamov 88 мар 14 23:52 .password-store
-rw-r--r-- 1 ekhatamov ekhatamov 3139 мар 2 02:44 public-key.asc
drwx----- 1 ekhatamov ekhatamov 132 мар 2 03:50 .ssh
drwxr-xr-x 1 ekhatamov ekhatamov 18 мар 6 19:54 .texlive2023
-rw-r----- 1 ekhatamov ekhatamov 5 мар 19 16:19 .vboxclient-clipboard-tty2-control.pid
-rw-r----- 1 ekhatamov ekhatamov 5 мар 19 16:19 .vboxclient-clipboard-tty2-service.pid
-rw-r----- 1 ekhatamov ekhatamov 5 мар 19 16:19 .vboxclient-draganddrop-tty2-control.pid
```

Рис. 7: Файлы в домашнем каталоге

```
[ekhatamov@ekhatamov ~]$ mkdir newdir
[ekhatamov@ekhatamov ~]$ mkdir newdir/morefun
[ekhatamov@ekhatamov ~]$ mkdir letters memos misk
[ekhatamov@ekhatamov ~]$ ls
bin      letters  misk      work      Загрузки  Общедоступные
Documents LICENSE newdir     Видео     Изображения 'Рабочий стол'
Downloads memos    public-key.asc  Документы Музыка     Шаблоны
[ekhatamov@ekhatamov ~]$ rm letter/memos/misk
rm: невозможно удалить 'letter/memos/misk': Нет такого файла или каталога
[ekhatamov@ekhatamov ~]$ rm letter memos misk
rm: невозможно удалить 'letter': Нет такого файла или каталога
rm: невозможно удалить 'memos': Это каталог
rm: невозможно удалить 'misk': Это каталог
[ekhatamov@ekhatamov ~]$ rm -r letters / memos / misk
rm: опасно рекурсивно обрабатывать '/'
rm: используйте --no-preserve-root, чтобы отменить предупреждение об опасности
rm: опасно рекурсивно обрабатывать '/'
rm: используйте --no-preserve-root, чтобы отменить предупреждение об опасности
[ekhatamov@ekhatamov ~]$ rm -r letters memos misk
rm: невозможно удалить 'letters': Нет такого файла или каталога
rm: невозможно удалить 'memos': Нет такого файла или каталога
rm: невозможно удалить 'misk': Нет такого файла или каталога
[ekhatamov@ekhatamov ~]$ ls
bin      Downloads  newdir     work      Документы  Изображения  Общедоступные  Шаблоны
Documents LICENSE    public-key.asc  Видео     Загрузки    Музыка     'Рабочий стол'
[ekhatamov@ekhatamov ~]$ rm -r newdir
[ekhatamov@ekhatamov ~]$ ls
bin      Downloads  public-key.asc  Видео     Загрузки    Музыка     'Рабочий стол'
Documents LICENSE    work            Документы  Изображения  Общедоступные  Шаблоны
```

Рис. 8: Действия с каталогами

```
./Изображения:
2025-02-27T14:17:43,696895030+03:00.png 2025-02-27T14:18:02,166218338+03:00.png
2025-02-27T14:17:50,029060931+03:00.png 2025-03-01T21:37:45,938445541+03:00.png
2025-02-27T14:17:53,461393826+03:00.png 2025-03-02T01:45:09,493982862+03:00.png
2025-02-27T14:17:55,196619226+03:00.png 2025-03-03T20:26:40,203320647+03:00.png
2025-02-27T14:17:55,425436482+03:00.png 2025-03-03T20:26:44,550078129+03:00.png
2025-02-27T14:17:55,625177092+03:00.png 2025-03-03T20:26:46,764703493+03:00.png
2025-02-27T14:17:55,818059026+03:00.png 2025-03-03T20:26:46,959851788+03:00.png
2025-02-27T14:17:56,009101397+03:00.png 2025-03-03T20:26:47,133084804+03:00.png
2025-02-27T14:17:56,197249422+03:00.png 2025-03-03T20:26:47,323429589+03:00.png
2025-02-27T14:17:56,363121817+03:00.png 2025-03-03T20:26:47,506311631+03:00.png
2025-02-27T14:17:56,530879964+03:00.png 2025-03-03T20:26:47,695553702+03:00.png
2025-02-27T14:17:56,711865097+03:00.png 2025-03-03T20:26:47,880771358+03:00.png
2025-02-27T14:17:56,884845447+03:00.png 2025-03-03T20:26:48,075656197+03:00.png
2025-02-27T14:17:57,048724077+03:00.png 2025-03-04T17:03:02,795076575+03:00.png
2025-02-27T14:17:57,196642355+03:00.png 2025-03-04T17:07:36,874625883+03:00.png
2025-02-27T14:17:57,342127315+03:00.png 2025-03-04T17:07:38,545617879+03:00.png
2025-02-27T14:17:59,696194412+03:00.png 2025-03-07T01:38:37,067107791+03:00.png
2025-02-27T14:18:01,956527477+03:00.png

./Музыка:

./Общедоступные:

'./Рабочий стол':
report.docx

./Шаблоны:
[ekhatamov@ekhatamov ~]$ ls -lt
Downloads  LICENSE  Загрузки  'Рабочий стол'  public-key.asc  Документы  общедоступные
Documents  bin      Изображения  work            Видео          Музыка      Шаблоны
```

Рис. 9: Команда ls -R и ls -t

```
[ekhatamov@ekhatamov ~]$ help cd
cd: cd [-L|[-P [-e]] [-@]] [путь]
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:
```

Рис. 10: Справка по команде cd

```
man pwd
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 Meyering.

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

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

Рис. 11: Справка по команде pwd


```
man mkdir
MKDIR(1)                                User Commands                                MKDIR(1)

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=IWX - 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
    Manual page mkdir(1) line 1 (press h for help or q to quit)
```

Рис. 12: Справка по команде mkdir

```
man rmdir
RMDIR(1)                                User Commands                                RMDIR(1)

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/>

COPYRIGHT
    Copyright © 2024 Free Software Foundation, Inc.  License GPLv3+: GNU GPL version 3 or later
    Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir

```
man rm
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 -I, -R, 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 mistakes

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

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

Рис. 14: Справка по команде rm

```
242 pwd
243 cd /tmp
244 ls
245 ls -a
246 ls -l
247 ls -f
248 cd /var/spool/
249 ls =al
250 ls -al
251 cd
252 ls
253 ls -al
254 mkdir newdir
255 mkdir newdir/morefun
256 mkdir letters memos misk
257 ls
258 rm letter/memos/misk
259 rm letter memos misk
260 rm -r letters / memos / misk
261 rm -r letters memos misk
262 ls
263 rm -r newdir
264 ls
265 man ls
266 ls -R
267 ls -t
268 help cd
269 man pwd
270 man mkdir
271 man rmdir
272 man rm
273 history
[ekhatamov@ekhatamov ~]$ man pwd
```

Рис. 15: Команда history

Выводы по проделанной работе

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