

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

Диденко Дмитрий Владимирович¹

2 июня, 2024, Москва, Россия

¹Российский Университет Дружбы Народов

Цели и задачи работы

Цель лабораторной работы

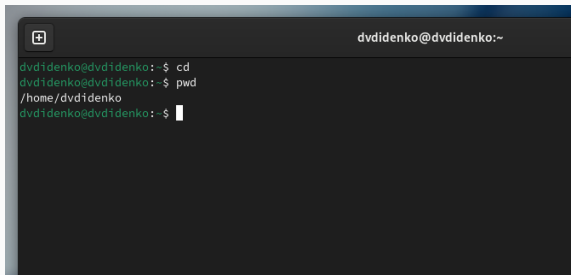
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

Задачи лабораторной работы

- 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

Имя и путь к домашнему каталогу

A terminal window with a dark background and a blue title bar. The title bar contains a window control icon on the left and the text 'dvdidenko@dvdidenko:~' on the right. The terminal shows a sequence of commands and their output: 'cd' is entered, followed by 'pwd', which outputs '/home/dvdidenko'. The prompt 'dvdidenko@dvdidenko:~\$' is shown at the end of the output line.

```
dvdidenko@dvdidenko:~$ cd
dvdidenko@dvdidenko:~$ pwd
/home/dvdidenko
dvdidenko@dvdidenko:~$
```

Рис. 1: Путь к домашнему каталогу

Опции команды ls

```
dvdidenko@dvdidenko:~$ cd /tmp
dvdidenko@dvdidenko:/tmp$ ls
dbus-1DfBHrEP
dbus-BPvPNIu1
hsperfdata_dvdidenko
systemd-private-16ff2d41b2954a2cad62652751e03ef9-chronyd.service-pTzP6x
systemd-private-16ff2d41b2954a2cad62652751e03ef9-color.service-RjV96Y
systemd-private-16ff2d41b2954a2cad62652751e03ef9-dbus-broker.service-vof3Vv
systemd-private-16ff2d41b2954a2cad62652751e03ef9-low-memory-monitor.service-ck3dim
systemd-private-16ff2d41b2954a2cad62652751e03ef9-ModemManager.service-ger5hN
systemd-private-16ff2d41b2954a2cad62652751e03ef9-polkit.service-vWUy7J
systemd-private-16ff2d41b2954a2cad62652751e03ef9-power-profiles-daemon.service-XdLhN9
systemd-private-16ff2d41b2954a2cad62652751e03ef9-rtkit-daemon.service-vIWqvh
systemd-private-16ff2d41b2954a2cad62652751e03ef9-switcheroo-control.service-VhTLKS
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-logind.service-76eVh8
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-oomd.service-4pBy8g
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-resolved.service-ho2coY
systemd-private-16ff2d41b2954a2cad62652751e03ef9-upower.service-jmwSR2
VMwareDnD
vmware-root_913-4013723377
dvdidenko@dvdidenko:/tmp$
```

Рис. 2: Команда ls

Опции команды ls

```
dvdidenko@dvdidenko: /tmp$ ls -la
..
dbus-10fBHRpP
dbus-BPvPNIu1
.font-unix
hperfdata_dvdidenko
.ICE-unix
systemd-private-16ff2d41b2954a2cad62652751e03ef9-chrond.service-pTzP6x
systemd-private-16ff2d41b2954a2cad62652751e03ef9-colord.service-RjV96Y
systemd-private-16ff2d41b2954a2cad62652751e03ef9-dbus-broker.service-vofJ3Vv
systemd-private-16ff2d41b2954a2cad62652751e03ef9-low-memory-monitor.service-ck3dim
systemd-private-16ff2d41b2954a2cad62652751e03ef9-ModemManager.service-ger5hN
systemd-private-16ff2d41b2954a2cad62652751e03ef9-polkit.service-vWUy7J
systemd-private-16ff2d41b2954a2cad62652751e03ef9-power-profiles-daemon.service-XdLhN9
systemd-private-16ff2d41b2954a2cad62652751e03ef9-rtkit-daemon.service-vIWqvh
systemd-private-16ff2d41b2954a2cad62652751e03ef9-switcheroo-control.service-VhTLKS
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-logind.service-76eVh0
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-oomd.service-4pBy8g
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-resolved.service-hoZcoY
systemd-private-16ff2d41b2954a2cad62652751e03ef9-upower.service-jmwSR2
.VMwareDnD
vmware-root_913-4013723377
.X0-lock
.X1024-lock
.X1025-lock
.X11-unix
.X1-lock
.XIM-unix
dvdidenko@dvdidenko: /tmp$
```

Рис. 3: Команда ls -la

Опции команды ls

```
dvdsenko@dvdsenko: /tmp$  
dvdsenko@dvdsenko: /tmp$ ls -l  
итого 8  
srw-rw-rw-. 1 root root 0 июн 2 13:55 dbus-10F8HrEP  
srw-rw-rw-. 1 root root 0 июн 2 13:55 dbus-BPyPNU1  
drwxr-xr-x. 2 dvdsenko dvdsenko 40 июн 2 14:12 hyperfida_dvdsenko  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-chronyd.service-gTzP0x  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-calend.service-8JVS6Y  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-dbus-broker.service-vof30v  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-low-memory-monitor.service-ck3dIn  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-mudamanager.service-gvRtH  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-peliki.service-dm0Y73  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-power-profiles-daemon.service-kdLW8  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-rtkit-daemon.service-vf0qch  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-softburn-control.service-wBTLAS  
drwx----- 3 root root 60 июн 2 13:55 systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-logind.service-76uVW  
drwx----- 3 root root 60 июн 2 13:54 systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-wood.service-4phytg  
drwx----- 3 root root 60 июн 2 13:54 systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-resolved.service-hoZcoY  
drwxrwxrwt. 2 dvdsenko dvdsenko 300 июн 2 14:48 tmpfsroot  
drwx----- 2 root root 40 июн 2 13:55 vmware-root_913-4013723377  
dvdsenko@dvdsenko: /tmp$
```

Рис. 4: Команда ls -l

Опции команды ls

```
dvdidenko@dvdidenko:/tmp$  
dvdidenko@dvdidenko:/tmp$ ls -f  
.  
..  
.X11-unix  
.ICE-unix  
.XIM-unix  
.font-unix  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-oomd.service-4pBy8g  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-resolved.service-hoZcoY  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-dbus-broker.service-vofJvV  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-chrond.service-pTzP6x  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-low-memory-monitor.service-ck3dim  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-polkit.service-vWUy7J  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-power-profiles-daemon.service-XdLhN9  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-rtkit-daemon.service-vIWqvH  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-switcheroo-control.service-VhTLKS  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-systemd-logind.service-76eVh0  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-upower.service-jmwSR2  
vmware-root_913-4013723377  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-ModemManager.service-ger5hN  
dbus-1DfBHrEP  
dbus-BPvPNIu1  
.X1024-lock  
.X1025-lock  
systemd-private-16ff2d41b2954a2cad62652751e03ef9-colord.service-RjV96Y  
.X0-lock  
.X1-lock  
VMwareDnD  
hsperfdata_dvdidenko  
dvdidenko@dvdidenko:/tmp$
```

Рис. 5: Команда ls -f

```
dvddenko@dvddenko:/tmp$  
dvddenko@dvddenko:/tmp$ cd /var/spool/  
dvddenko@dvddenko:/var/spool$ ls -l  
итого 0  
drwxr-x--x. 1 root abrt 1438 авг 26 11:49 abrt  
drwx-----. 1 abrt abrt    0 июл 19 2023 abrt-upload  
drwx--x---. 1 root lp      6 фев 16 03:00 cups  
drwxr-xr-x. 1 root root    0 июл 21 2023 lpd  
drwxrwxr-x. 1 root mail 1490 июн  2 13:54 mail  
drwxr-xr-x. 1 root root    0 июл 21 2023 plymouth  
dvddenko@dvddenko:/var/spool$
```

Рис. 6: Каталог /var/spool

```
dvddenko@dvddenko:/var/spool$ cd
dvddenko@dvddenko:~$ ls
git-extended work Видео Документы Загрузки Изображения Музыка Общедоступные 'Рабочий стол' Шаблоны
dvddenko@dvddenko:~$ ls -al
total 24
drwx-----, 1 dvddenko dvddenko 510 янв 2 14:27 .
drwxr-xr-x, 1 root root 1484 янв 2 13:54 ..
-rw-----, 1 dvddenko dvddenko 2720 янв 2 14:48 .bash_history
-rw-r--r--, 1 dvddenko dvddenko 18 янв 22 03:00 .bash_logout
-rw-r--r--, 1 dvddenko dvddenko 144 янв 22 03:00 .bash_profile
-rw-r--r--, 1 dvddenko dvddenko 679 янв 2 14:25 .bashrc
drwx-----, 1 dvddenko dvddenko 452 янв 2 14:29 .cache
drwx-----, 1 dvddenko dvddenko 398 янв 2 14:29 .config
-rw-r--r--, 1 dvddenko dvddenko 334 янв 25 03:00 .emacs
-rw-r--r--, 1 dvddenko dvddenko 233 янв 2 14:07 .gitconfig
drwxr-xr-x, 1 dvddenko dvddenko 74 янв 2 14:34 git-extended
drwx-----, 1 dvddenko dvddenko 136 янв 2 14:01 .gnupg
drwx-----, 1 dvddenko dvddenko 20 янв 2 13:55 .local
drwxr-xr-x, 1 dvddenko dvddenko 48 янв 2 13:56 .mozilla
drwx-----, 1 dvddenko dvddenko 132 янв 2 14:04 .ssh
drwxr-xr-x, 1 dvddenko dvddenko 10 янв 2 14:03 work
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Видео
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Документы
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Загрузки
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Изображения
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Музыка
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Общедоступные
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 'Рабочий стол'
drwxr-xr-x, 1 dvddenko dvddenko 0 янв 2 13:55 Шаблоны
dvddenko@dvddenko:~$
```

Рис. 7: Файлы в домашнем каталоге

```
dvddenko@dvddenko:~$  
dvddenko@dvddenko:~$ mkdir newdir  
dvddenko@dvddenko:~$ mkdir newdir/morefun  
dvddenko@dvddenko:~$ mkdir letters memos misk  
dvddenko@dvddenko:~$ ls  
git-extended  letters  memos  misk  newdir  work  Видео  
dvddenko@dvddenko:~$ rm letters memos misk  
rm: невозможно удалить 'letters': Это каталог  
rm: невозможно удалить 'memos': Это каталог  
rm: невозможно удалить 'misk': Это каталог  
dvddenko@dvddenko:~$ rm -r letters memos misk  
dvddenko@dvddenko:~$ rm -r newdir  
dvddenko@dvddenko:~$ ls  
git-extended  work  Видео  Документы  Загрузки  Изображ  
dvddenko@dvddenko:~$
```

Рис. 8: Действия с каталогами

Опции команды ls

```
"/work/study/2023-2024/Операционные системы/os-intro/template/report/scripts":  
image-report mpv-shot  
./Видео:  
./Документы:  
./Загрузки:  
./Изображения:  
./Музыка:  
./Общедоступные:  
"/Рабочий стол":  
./Шаблоны:  
dvdidenko@dvdidenko: $ ls -t  
git-extended work Видео Документы Загрузки Изображения Музыка Общедоступные "Рабочий стол" Шаблоны  
dvdidenko@dvdidenko: $
```

Рис. 9: Команда ls -R и ls -t

```
dvdidenko@dvdidenko:~$ help cd
cd: cd [-L|[-P [-e]] [-@]] [karanor]
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.

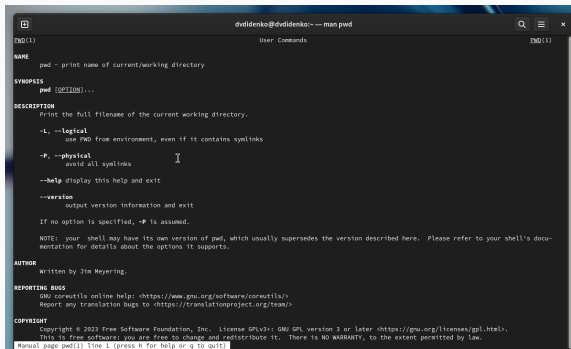
Options:
-L      force symbolic links to be followed: resolve symbolic
        links in DIR after processing instances of '..'
-P      use the physical directory structure without following
        symbolic links: resolve symbolic links in DIR before
        processing instances of '..'
-e      if the -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 $PWD is set successfully when
-P is used; non-zero otherwise.
dvdidenko@dvdidenko:~$
```

Рис. 10: Справка по команде cd

Справка по командам



```
dvidenko@dvidenko:~ — man pwd
END(1)                                User Commands                                END(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.

NOTE: 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.

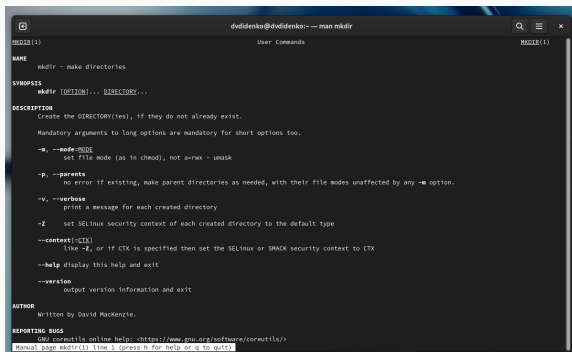
AUTHOR
  Written by Jim Meyering.

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

COPYRIGHT
  Copyright © 2023 Free Software Foundation, Inc.  License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it.  There is NO WARRANTY, to the extent permitted by law.

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

Рис. 11: Справка по команде pwd



```
dvidenko@dvidenko:~ -- 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-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
      like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX

  --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

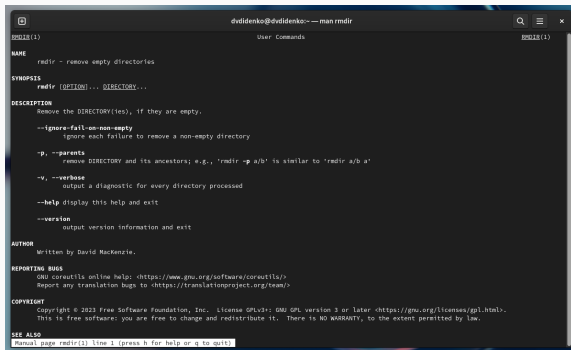
  --version
      output version information and exit

AUTHOR
  Written by David Mackenzie.

REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Manual page mkdir(1) line 1 (press h for help or q to quit)
```

Рис. 12: Справка по команде mkdir

Справка по командам



```
dvidenko@dvidenko:~$ man rmdir

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.

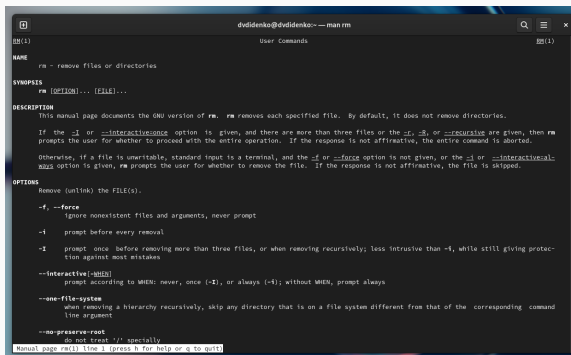
REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Report any translation bugs to <https://translationproject.org/team/>

COPYRIGHT
  Copyright © 2023 Free Software Foundation, Inc.  License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it.  There is NO WARRANTY, to the extent permitted by law.

SEE ALSO
  Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir

Справка по командам



```
dvvidenko@dvvidenko:~$ man rm
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 mistakes

--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

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

Рис. 14: Справка по команде rm

История командной строки

```
115 cd /var/spool/
116 ls -l
117 cd
118 ls
119 ls -al
120 mkdir newdir
121 mkdir newdir/morefun
122 mkdir letters memos misk
123 ls
124 rm letters memos misk
125 rm -r letters memos misk
126 rm -r newdir
127 ls
128 ls -R
129 ls -t
130 help cd
131 man pwd
132 man mkdir
133 man rmdir
134 man rm
135 history
dvdidenko@dvdidenko:~$
```

Рис. 15: Команда history

Выводы по проделанной работе

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