

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

Дмитрий Джало ¹

11 марта, 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 light blue title bar. The terminal shows the following commands and output:

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

Рис. 1: Путь к домашнему каталогу

Опции команды ls

```
dadzhalo@dadzhalo:~$  
dadzhalo@dadzhalo:~$ cd /tmp  
dadzhalo@dadzhalo:/tmp$ ls  
dbus-9aNjF9Am  
dbus-QK7ivNKE  
systemd-private-69e865f131b745c8a10892a8d555066a-chronyd.service-aMtEun  
systemd-private-69e865f131b745c8a10892a8d555066a-color.service-PqhFqL  
systemd-private-69e865f131b745c8a10892a8d555066a-dbus-broker.service-Y8NnyL  
systemd-private-69e865f131b745c8a10892a8d555066a-fwupd.service-ecGhz5  
systemd-private-69e865f131b745c8a10892a8d555066a-low-memory-monitor.service-DqSseK  
systemd-private-69e865f131b745c8a10892a8d555066a-ModemManager.service-soatu9  
systemd-private-69e865f131b745c8a10892a8d555066a-polkit.service-hLlf5v  
systemd-private-69e865f131b745c8a10892a8d555066a-power-profiles-daemon.service-NY5Mq8  
systemd-private-69e865f131b745c8a10892a8d555066a-rtkit-daemon.service-SqXnJR  
systemd-private-69e865f131b745c8a10892a8d555066a-switcheroo-control.service-0GEFCX  
systemd-private-69e865f131b745c8a10892a8d555066a-systemd-logind.service-Bf8BVM  
systemd-private-69e865f131b745c8a10892a8d555066a-systemd-oomd.service-aczWk2  
systemd-private-69e865f131b745c8a10892a8d555066a-systemd-resolved.service-9pom7P  
systemd-private-69e865f131b745c8a10892a8d555066a-upower.service-nuBd5G  
vmware-root_929-3980167385  
dadzhalo@dadzhalo:/tmp$
```

Рис. 2: Команда ls

Опции команды ls

```
dadzhalo@dadzhalo: /tmp$ ls -la
total 16
drwxr-xr-x  2 dadzhalo dadzhalo 4096 Nov 11 10:54 .
drwxr-xr-x  2 dadzhalo dadzhalo 4096 Nov 11 10:54 ..
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 dbus-9aHjF9Am
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 dbus-QK7ivNKE
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .font-unix
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .ICE-unix
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-chronyd.service-aMtEun
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-colord.service-PqhFql
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-dbus-broker.service-Y8NHyL
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-fwupd.service-ecGhz5
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-low-memory-monitor.service-DqSseK
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-ModemManager.service-soatu9
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-polkit.service-hL1fSv
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-power-profiles-daemon.service-HY5Mq8
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-rtkit-daemon.service-SqXnJR
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-switcheroo-control.service-0GEFCX
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-systemd-logind.service-Bf8BVH
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-systemd-oomd.service-aczWk2
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-systemd-resolved.service-9pom7P
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 systemd-private-69e865f131b745c8a10892a8d555066a-upower.service-nuBd56
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 vmware-root_929-3980167385
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .X0-lock
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .X1024-lock
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .X1025-lock
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .X11-unix
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .X1-lock
-rw-r--r--  1 dadzhalo dadzhalo  100 Nov 11 10:54 .XIM-unix
dadzhalo@dadzhalo: /tmp$
```

Рис. 3: Команда ls -la

Опции команды ls

```
dadzhalo@dadzhaloz:~$ ls -l
total 0
srwxrwxrwx. 1 root root 0 nap 11 10:33 dbus-9aHjF9Am
srwxrwxrwx. 1 root root 0 nap 11 10:33 dbus-QR7ivNIKE
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-chronyd.service-8MIEun
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-colord.service-PqhFqI
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-dbus-broker.service-Y8HWyl
drwx----- 3 root root 60 nap 11 10:35 systemd-private-63e865f131b745c8a10892a8d555066a-fuupd.service-ecGhzS
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-low-memory-monitor.service-DgSseK
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-ModemManager.service-ssatu9
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-polkit.service-Ba1f5u
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-power-profiles-daemon.service-NY3Nq8
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-rtkit-daemon.service-SqXn2R
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-switcheroo-control.service-0G6FCX
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-systemd-logind.service-Bf8BVH
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-systemd-oomd.service-aczWk2
drwx----- 3 root root 60 nap 11 10:33 systemd-private-63e865f131b745c8a10892a8d555066a-systemd-resolved.service-8pom7P
drwx----- 2 root root 40 nap 11 10:33 vmware-root_929-3900167383
dadzhalo@dadzhaloz:~$
```

Рис. 4: Команда ls -l

Опции команды ls

```
dadzhalo@dadzhalo: /tmp$  
dadzhalo@dadzhalo: /tmp$ ls -f  
.  
..  
.X11-unix  
.ICE-unix  
.XIM-unix  
.font-unix  
systemd-private-69e865f131b745c8a10892a8d555066a-systemd-oomd.service-aczWk2  
systemd-private-69e865f131b745c8a10892a8d555066a-systemd-resolved.service-9pom7P  
systemd-private-69e865f131b745c8a10892a8d555066a-dbus-broker.service-Y8NNyL  
systemd-private-69e865f131b745c8a10892a8d555066a-chrond.service-aMtEun  
systemd-private-69e865f131b745c8a10892a8d555066a-low-memory-monitor.service-DqSseK  
systemd-private-69e865f131b745c8a10892a8d555066a-polkit.service-hLlf5v  
systemd-private-69e865f131b745c8a10892a8d555066a-power-profiles-daemon.service-NY5Mq8  
systemd-private-69e865f131b745c8a10892a8d555066a-rtkit-daemon.service-SqXnJR  
systemd-private-69e865f131b745c8a10892a8d555066a-switcheroo-control.service-0GEFCX  
systemd-private-69e865f131b745c8a10892a8d555066a-systemd-logind.service-Bf8BVM  
systemd-private-69e865f131b745c8a10892a8d555066a-upower.service-nuBd5G  
vmware-root_929-3980167385  
systemd-private-69e865f131b745c8a10892a8d555066a-ModemManager.service-soatu9  
dbus-9aJfF9Am  
dbus-QK7ivNKE  
.X1024-lock  
.X1025-lock  
systemd-private-69e865f131b745c8a10892a8d555066a-colord.service-PqhFql  
.X0-lock  
.X1-lock  
systemd-private-69e865f131b745c8a10892a8d555066a-fwupd.service-ecGhz5  
dadzhalo@dadzhalo: /tmp$
```

Рис. 5: Команда ls -f

```
dadzhalo@dadjhalo: /tmp$  
dadzhalo@dadjhalo: /tmp$ cd /var/spool/  
dadzhalo@dadjhalo: /var/spool$ ls -al  
итого 0  
drwxr-xr-x. 1 root root 68 ноя 1 04:09 .  
drwxr-xr-x. 1 root root 200 ноя 1 04:15 ..  
drwxr-x--x. 1 root abrt 1510 мар 10 12:45 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 1222 мар 8 17:40 mail  
drwxr-xr-x. 1 root root 0 июл 21 2023 plymouth  
dadzhalo@dadjhalo: /var/spool$
```

Рис. 6: Каталог /var/spool

Домашний каталог

```
dadzhalo@dadzhalo: /var/spool$  
dadzhalo@dadzhalo: /var/spool$ cd  
dadzhalo@dadzhalo: ~$ ls  
git-extended  Видео          Загрузки      Музыка        'Рабочий стол'  
work          Документы      Изображения  Общедоступные  Шаблоны  
dadzhalo@dadzhalo: ~$ ls -al  
итого 20  
drwx-----. 1 dadzhalo dadzhalo 498 мар  4 19:20 .  
drwxr-xr-x. 1 root    root    1216 мар  8 17:40 ..  
-rw-----. 1 dadzhalo dadzhalo 481 мар  4 19:20 .bash_history  
-rw-r--r--. 1 dadzhalo dadzhalo  18 июл 19 2023 .bash_logout  
-rw-r--r--. 1 dadzhalo dadzhalo 144 июл 19 2023 .bash_profile  
-rw-r--r--. 1 dadzhalo dadzhalo 678 мар  4 19:07 .bashrc  
drwx-----. 1 dadzhalo dadzhalo 452 мар 11 10:35 .cache  
drwx-----. 1 dadzhalo dadzhalo 402 мар  4 19:09 .config  
-rw-r--r--. 1 dadzhalo dadzhalo 232 мар  4 19:20 .gitconfig  
drwxr-xr-x. 1 dadzhalo dadzhalo  74 мар  4 19:11 git-extended  
drwx-----. 1 dadzhalo dadzhalo 136 фев 28 18:25 .gnupg  
drwx-----. 1 dadzhalo dadzhalo  20 фев 28 18:18 .local  
drwxr-xr-x. 1 dadzhalo dadzhalo  48 фев 28 18:18 .mozilla  
drwx-----. 1 dadzhalo dadzhalo 132 фев 28 18:28 .ssh  
drwxr-xr-x. 1 dadzhalo dadzhalo  10 фев 28 18:27 work  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Видео  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Документы  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Загрузки  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Изображения  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Музыка  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Общедоступные  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 'Рабочий стол'  
drwxr-xr-x. 1 dadzhalo dadzhalo   0 фев 28 18:18 Шаблоны  
dadzhalo@dadzhalo: ~$
```

Рис. 7: Файлы в домашнем каталоге

```
dadzhalo@dadzhalo:~$ mkdir newdir
dadzhalo@dadzhalo:~$ mkdir newdir/morefun
dadzhalo@dadzhalo:~$ mkdir letters memos misk
dadzhalo@dadzhalo:~$ ls
git-extended  memos  newdir  Видео  Загрузки  Музыка  'Рабочий стол'
letters      misk   work    Документы  Изображения  Общедоступные  Шаблоны
dadzhalo@dadzhalo:~$ rm letters memos misk
rm: невозможно удалить 'letters': Это каталог
rm: невозможно удалить 'memos': Это каталог
rm: невозможно удалить 'misk': Это каталог
dadzhalo@dadzhalo:~$ rm -r letters/ memos/ misk/
dadzhalo@dadzhalo:~$ rm -r newdir/
dadzhalo@dadzhalo:~$ ls
git-extended  Видео  Загрузки  Музыка  'Рабочий стол'
work          Документы  Изображения  Общедоступные  Шаблоны
dadzhalo@dadzhalo:~$
```

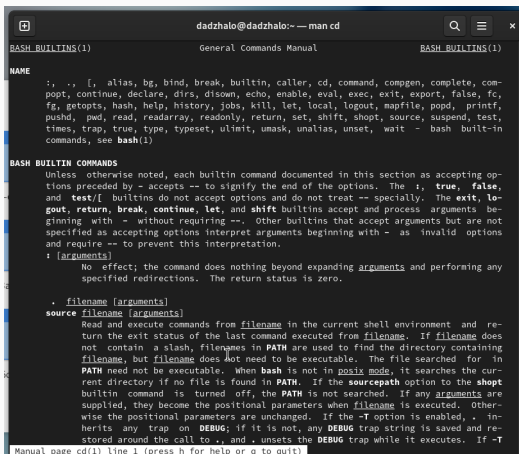
Рис. 8: Действия с каталогами

Опции команды ls

```
it-4
'./work/study/2023-2024/Операционные системы/os-intro/template/report/scripts':
image-report mpv-shot
./Видео:
./Документы:
3a ./Загрузки:
./Изображения:
./Музыка:
./Общедоступные:
збо './Рабочий стол':
./Шаблоны:
dadzhalo@dadzhalo:~$ ls -t
git-extended Видео Загрузки Музыка 'Рабочий стол'
work Документы Изображения Общедоступные Шаблоны
dadzhalo@dadzhalo:~$
```

Рис. 9: Команда ls -R и ls -t

Справка по командам

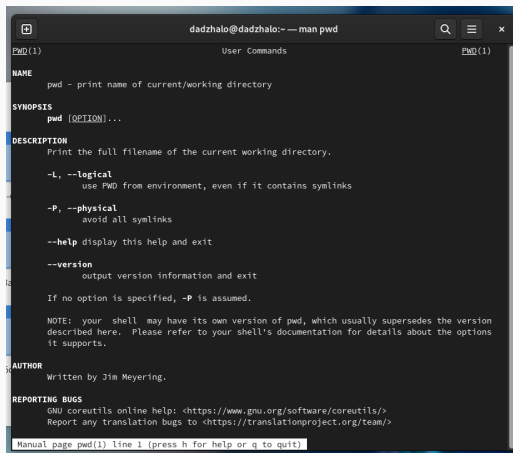


```
dadzhalo@dadzhalo:~ — man cd
BASH_BUILTINS(1) General Commands Manual BASH_BUILTINS(1)

NAME
:, ., [, alias, bg, bind, break, builtin, caller, cd, command, compgen, complete, compo
pt, continue, declare, dirs, disown, echo, enable, eval, exec, exit, export, false, fc,
fg, getopts, hash, help, history, jobs, kill, let, local, logout, mapfile, popd, printf,
pushd, pwd, read, readarray, readonly, return, set, shift, shopt, source, suspend, test,
times, trap, true, type, typeset, ulimit, umask, unalias, unset, wait - bash built-in
commands, see bash(1)

BASH BUILTIN COMMANDS
Unless otherwise noted, each builtin command documented in this section as accepting op
tions preceded by - accepts -- to signify the end of the options. The :, true, false,
and test/[ builtins do not accept options and do not treat -- specially. The exit, lo
gout, return, break, continue, let, and shift builtins accept and process arguments be
ginning with - without requiring --. Other builtins that accept arguments but are not
specified as accepting options interpret arguments beginning with - as invalid options
and require -- to prevent this interpretation.
: [arguments]
    No effect; the command does nothing beyond expanding arguments and performing any
    specified redirections. The return status is zero.
. filename [arguments]
source filename [arguments]
    Read and execute commands from filename in the current shell environment and re
    turn the exit status of the last command executed from filename. If filename does
    not contain a slash, filenames in PATH are used to find the directory containing
    filename, but filename does not need to be executable. The file searched for in
    PATH need not be executable. When bash is not in posix mode, it searches the cur
    rent directory if no file is found in PATH. If the sourcepath option to the shopt
    builtin command is turned off, the PATH is not searched. If any arguments are
    supplied, they become the positional parameters when filename is executed. Other
    wise the positional parameters are unchanged. If the -T option is enabled, . in
    herits any trap on DEBUG; if it is not, any DEBUG trap string is saved and re
    stored around the call to ., and . unsets the DEBUG trap while it executes. If -T
    Manual page cd(1) line 1 (press h for help or q to quit)
```

Рис. 10: Справка по команде cd



```
dadzhalo@dadzhalo:~ — 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.

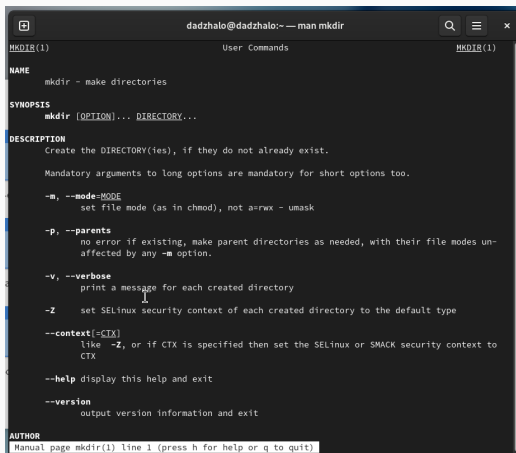
    NOTE: your shell may have its own version of pwd, which usually supersedes the version
    described here. Please refer to your shell's documentation for details about the options
    it supports.

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/>

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

Рис. 11: Справка по команде pwd



```
dadzhalo@dadzhalo:~ -- 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

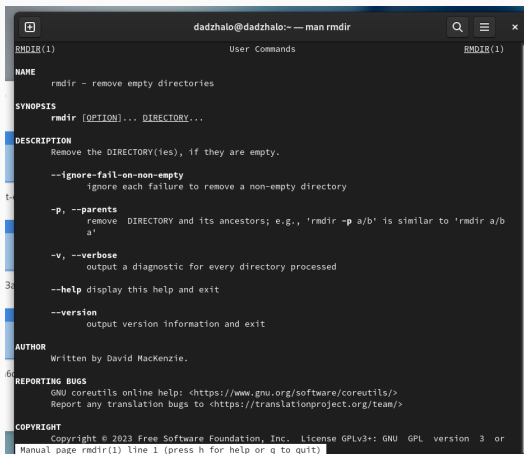
    --context[=CTX]
        like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX

    --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



```
dadzhalo@dadzhalo:~ — 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

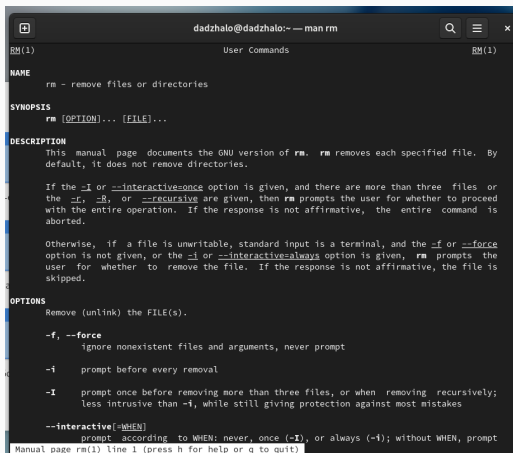
    --version
        output version information and exit

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 © 2023 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3 or
    Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir



```
dadzhalo@dadzhalo:~ -- 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 -r, -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

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

Рис. 14: Справка по команде rm

История командной строки

```
30 ls
31 ls -al
32 mkdir newdir
33 mkdir newdir/morefun
34 mkdir letters memos misk
35 ls
36 rm letters memos misk
37 rm -r letters/ memos/ misk/
38 rm -r newdir/
39 ls
40 ls -R
41 ls -t
42 man cd
43 man pwd
44 man mkdir
45 man rmdir
46 man rm
47 history
dadzhalo@dadzhalo:~$
```

Рис. 15: Команда history

Выводы по проделанной работе

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