

# Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

---

Раджаб Раджабов НКАбд-05-23<sup>1</sup>

11 марта, 2024, Москва, Россия

<sup>1</sup>Российский Университет Дружбы Народов

# Цели и задачи работы

---

# Цель лабораторной работы

Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

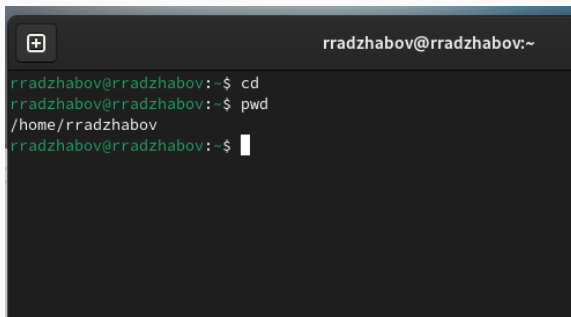
# Задачи лабораторной работы

- 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



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

A terminal window with a dark background. The title bar shows a plus icon in a square and the text "rradzhabov@rradzhabov:~". The terminal content shows a sequence of commands: "cd", "pwd", and the output "/home/rradzhabov". The prompt "rradzhabov@rradzhabov:~\$" is shown at the end of the last line.

Рис. 1: Путь к домашнему каталогу

# Опции команды ls

```
rradzhabov@rradzhabov:~$ cd /tmp
rradzhabov@rradzhabov:/tmp$ ls
dbus-HFNlgGEA
dbus-USL0dtAI
systemd-private-5e7cf732386c418b9c085c54360b0e8c-chronyd.service-HjEkGo
systemd-private-5e7cf732386c418b9c085c54360b0e8c-colord.service-Sh4PF7
systemd-private-5e7cf732386c418b9c085c54360b0e8c-dbus-broker.service-pVAKKx
systemd-private-5e7cf732386c418b9c085c54360b0e8c-fwupd.service-FZu2BU
systemd-private-5e7cf732386c418b9c085c54360b0e8c-low-memory-monitor.service-Kh7KwA
systemd-private-5e7cf732386c418b9c085c54360b0e8c-ModemManager.service-Uk2I3w
systemd-private-5e7cf732386c418b9c085c54360b0e8c-polkit.service-7kTpq8
systemd-private-5e7cf732386c418b9c085c54360b0e8c-power-profiles-daemon.service-Qs3T3h
systemd-private-5e7cf732386c418b9c085c54360b0e8c-rtkit-daemon.service-i3t1Zo
systemd-private-5e7cf732386c418b9c085c54360b0e8c-switcheroo-control.service-v5Kb6I
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-hostnamed.service-XPm7i8
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-logind.service-2RrRk8
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-oomd.service-00vHVE
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-resolved.service-Cvgux1
systemd-private-5e7cf732386c418b9c085c54360b0e8c-upower.service-NxRLzV
vmware-root_914-2689209517
rradzhabov@rradzhabov:/tmp$
```

Рис. 2: Команда ls

# Опции команды ls

```
rradzhabov@rradzhabov: /tmp$  
rradzhabov@rradzhabov: /tmp$ ls -a  
.  
..  
dbus-HFnlGGEA  
dbus-USL0dtAI  
font-unix  
ICE-unix  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-chrond.service-HjEkGo  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-colord.service-Sh4PF7  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-dbus-broker.service-pVAKKx  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-fwupd.service-FZu2BU  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-low-memory-monitor.service-Kh7KwA  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-ModemManager.service-Uk2I3w  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-polkit.service-7kTpq8  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-power-profiles-daemon.service-Qs3T3h  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-rtkit-daemon.service-i3t1Zo  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-switcheroo-control.service-v5KbGI  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-logind.service-2RrRk0  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-oomd.service-00vHVE  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-resolved.service-Cvgux1  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-upower.service-NxRLzV  
vmware-root_914-2689209517  
.X0-lock  
.X1024-lock  
.X1025-lock  
X11-unix  
.X1-lock  
XIM-unix  
rradzhabov@rradzhabov: /tmp$
```

Рис. 3: Команда ls -a



# Опции команды ls

```
radzhabov@radzhabov: /tmp$  
radzhabov@radzhabov: /tmp$ ls -l  
итого 0  
srwx-rw-rw-. 1 root root 0 map 11 11:41 dbus-MFWlgGEA  
srwx-rw-rw-. 1 root root 0 map 11 11:41 dbus-USL0d5AI  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-chromyd.service-njEk6o  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-colord.service-5h4FF7  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-dbus-braker.service-pjAKx  
drwx----- 3 root root 60 map 11 11:44 systemd-private-567c7722386c418b0c085c54360b0e8c-fcpgd.service-fZu2BU  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-low-memory-monitor.service-Kh7KwA  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-ModemManager.service-Uk213w  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-polkkit.service-7hTqqh  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-power-profiles-daemon.service-Qs373h  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-rtkit-daemon.service-1h126  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-swifttherm-control.service-v8Kb2  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-systemd-logind.service-2RvR8h  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-systemd-oomd.service-00UVE  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-systemd-resolved.service-Cygs1  
drwx----- 3 root root 60 map 11 11:41 systemd-private-567c7722386c418b0c085c54360b0e8c-upower.service-NxRLzv  
drwx----- 2 root root 40 map 11 11:41 vmware-root_514-2689209517  
radzhabov@radzhabov: /tmp$
```

Рис. 4: Команда ls -l

# Опции команды ls

```
rradzhabov@rradzhabov:/tmp$  
rradzhabov@rradzhabov:/tmp$ ls -f  
.  
..  
.X11-unix  
.ICE-unix  
.XIM-unix  
.font-unix  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-oomd.service-00vHVE  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-resolved.service-Cvgux1  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-dbus-broker.service-pVAKKx  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-chrond.service-HjEkGo  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-low-memory-monitor.service-Kh7KwA  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-polkit.service-7kTpq8  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-power-profiles-daemon.service-Qs3tH  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-rtkit-daemon.service-i3t1Zo  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-switcheroo-control.service-v5KbGI  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-systemd-logind.service-2RrRk0  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-upower.service-NxRLzV  
vmware-root_914-2689209517  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-ModemManager.service-Uk2I3w  
dbus-USLodtAI  
dbus-HFNlgGEA  
.X1024-lock  
.X1025-lock  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-colord.service-Sh4PF7  
.X0-lock  
.X1-lock  
systemd-private-5e7cf732386c418b9c085c54360b0e8c-fwupd.service-FZu2BU  
rradzhabov@rradzhabov:/tmp$
```

Рис. 5: Команда ls -f

```
rradzhabov@rradzhabov: /tmp$ cd /var/spool/  
rradzhabov@rradzhabov: /var/spool$ ls -l  
итого 0  
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  
rradzhabov@rradzhabov: /var/spool$
```

Рис. 6: Каталог /var/spool

```
rradzhabov@rradzhabov: /var/spool$  
rradzhabov@rradzhabov: /var/spool$ cd  
rradzhabov@rradzhabov:~$ ls  
git-extended Видео Загрузки Музыка 'Рабочий стол'  
work Документы Изображения Общедоступные Шаблоны  
rradzhabov@rradzhabov:~$ ls -al  
итого 20  
drwx----- 1 rradzhabov rradzhabov 498 мар 5 11:46 .  
drwxr-xr-x 1 root root 1216 мар 8 17:40 ..  
-rw----- 1 rradzhabov rradzhabov 107 мар 5 11:46 .bash_history  
-rw-r--r-- 1 rradzhabov rradzhabov 18 июл 19 2023 .bash_logout  
-rw-r--r-- 1 rradzhabov rradzhabov 144 июл 19 2023 .bash_profile  
-rw-r--r-- 1 rradzhabov rradzhabov 680 мар 5 11:34 .bashrc  
drwx----- 1 rradzhabov rradzhabov 462 мар 11 11:44 .cache  
drwx----- 1 rradzhabov rradzhabov 402 мар 5 11:35 .config  
-rw-r--r-- 1 rradzhabov rradzhabov 238 мар 5 11:46 .gitconfig  
drwxr-xr-x 1 rradzhabov rradzhabov 74 мар 5 11:38 git-extended  
drwx----- 1 rradzhabov rradzhabov 136 фев 29 10:54 .gnupg  
drwx----- 1 rradzhabov rradzhabov 20 фев 29 10:40 .local  
drwxr-xr-x 1 rradzhabov rradzhabov 48 фев 29 10:44 .mozilla  
drwx----- 1 rradzhabov rradzhabov 132 фев 29 10:59 .ssh  
drwxr-xr-x 1 rradzhabov rradzhabov 10 фев 29 10:58 work  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Видео  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Документы  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Загрузки  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Изображения  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Музыка  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Общедоступные  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 'Рабочий стол'  
drwxr-xr-x 1 rradzhabov rradzhabov 0 фев 29 10:40 Шаблоны  
rradzhabov@rradzhabov:~$
```

Рис. 7: Файлы в домашнем каталоге

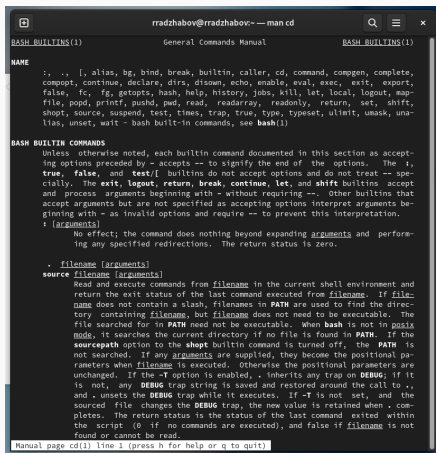
```
rradzhabov@rradzhabov:~$ mkdir morefun
rradzhabov@rradzhabov:~$ mkdir newdir
rradzhabov@rradzhabov:~$ mv morefun/ newdir/
rradzhabov@rradzhabov:~$ ls
git-extended  work  Документы  Изображения  Общедоступные  Шаблоны
newdir        Видео  Загрузки  Музыка      'Рабочий стол'
rradzhabov@rradzhabov:~$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

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:  
rradzhabov@rradzhabov:~$ ls -t  
git-extended Видео Загрузки Музыка Шаблоны  
work Документы Изображения Общедоступные 'Рабочий стол'  
rradzhabov@rradzhabov:~$
```

Рис. 9: Команда ls -R и ls -t



```
rradzhabov@rradzhabov:~ -- man cd
BASH_BUILTINS(1)  General Commands Manual  BASH_BUILTINS(1)

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

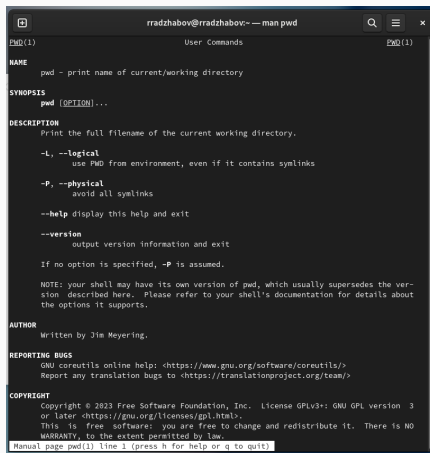
BASH BUILTIN COMMANDS
Unless otherwise noted, each builtin command documented in this section as accept-
ing options preceded by - accepts -- to signify the end of the options. The :,
true, false, and test/[ builtins do not accept options and do not treat -- spec-
ially. The exit, logout, return, break, continue, let, and shift builtins accept
and process arguments beginning with - without requiring --. Other builtins that
accept arguments but are not specified as accepting options interpret arguments be-
ginning with - as invalid options and require -- to prevent this interpretation.
* [arguments]
    No effect; the command does nothing beyond expanding arguments and perform-
    ing 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
    return the exit status of the last command executed from filename. If file-
    name does not contain a slash, filenames in PATH are used to find the direc-
    tory 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 current 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 pa-
    rameters when filename is executed. Otherwise the positional parameters are
    unchanged. If the -T option is enabled, . inherits any trap on DEBUG; if it
    is not, any DEBUG trap string is saved and restored around the call to .,
    and . unsets the DEBUG trap while it executes. If -T is not set, and the
    sourced file changes the DEBUG trap, the new value is retained when . com-
    pletes. The return status is the status of the last command exited within
    the script (0 if no commands are executed), and false if filename is not
    found or cannot be read.

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

Рис. 10: Справка по команде cd

# Справка по командам



```
rradzhabov@rradzhabov:~ — man pwd
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

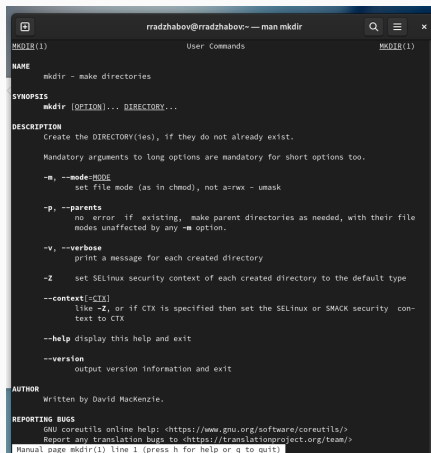
    --version
        output version information and exit

    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/>
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





```
rradzhabov@rradzhabov:~$ 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

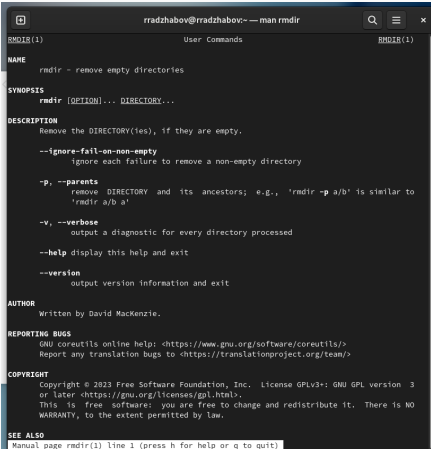
  --help
      display this help and exit

  --version
      output version information and exit

AUTHOR
  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/>
  Manual page mkdir(1) line 1 (press h for help or q to quit)
```

Рис. 12: Справка по команде mkdir



```
rradzhahov@rradzhahov:~ -- 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

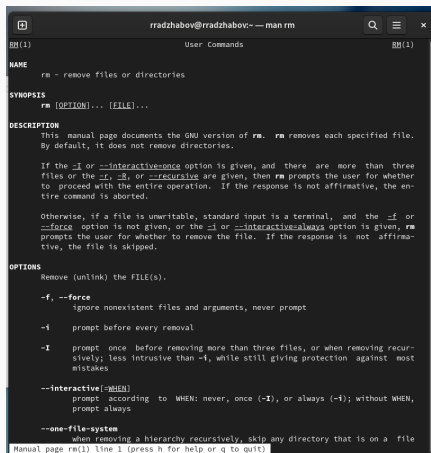
AUTHOR
  Written by David MacKenzie.

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 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



```
rradzhabov@rradzhabov:~$ 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 en-
  tire 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 affirma-
  tive, 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 recur-
      sively; 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
  Manual page rm(1) line 1 (press h for help or q to quit)
```

Рис. 14: Справка по команде rm

# История командной строки

```
20 ls -al
21 mkdir morefun
22 mkdir newdir
23 mv morefun/ newdir/
24 ls
25 mkdir letters memos misk
26 ls
27 rm letters/ memos/ misk/
28 rm -r letters/ memos/ misk/
29 rm -r newdir/
30 ls
31 ls -R
32 ls -t
33 man cd
34 man pwd
35 man mkdir
36 man rmdir
37 man rm
38 history
rradzhabov@rradzhabov:~$
```

Рис. 15: Команда history

## **Выводы по проделанной работе**

---

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