

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

Ахмед Нурыев¹

7 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



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

Рис. 1: Путь к домашнему каталогу

Опции команды ls

```
ahmednuriev@ahmednuriev:~$  
ahmednuriev@ahmednuriev:~$ cd /tmp  
ahmednuriev@ahmednuriev:/tmp$ ls  
dbus-6P9hxNvn  
dbus-CiG7xY26  
systemd-private-3423f544cfb2449487ff0cc23b329083-chrond.service-I8N1aw  
systemd-private-3423f544cfb2449487ff0cc23b329083-colord.service-B68rqo  
systemd-private-3423f544cfb2449487ff0cc23b329083-dbus-broker.service-XFTTLd  
systemd-private-3423f544cfb2449487ff0cc23b329083-fwupd.service-C3kbc5  
systemd-private-3423f544cfb2449487ff0cc23b329083-low-memory-monitor.service-FIJje9  
systemd-private-3423f544cfb2449487ff0cc23b329083-ModemManager.service-xDnDw  
systemd-private-3423f544cfb2449487ff0cc23b329083-polkit.service-lj38uX  
systemd-private-3423f544cfb2449487ff0cc23b329083-power-profiles-daemon.service-9N1kkQ  
systemd-private-3423f544cfb2449487ff0cc23b329083-rtkit-daemon.service-RD8Gum  
systemd-private-3423f544cfb2449487ff0cc23b329083-switcheroo-control.service-GX8Wjl  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-hostnamed.service-OruS3l  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-logind.service-32G0BU  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-oomd.service-HntimO  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-resolved.service-WNBINz  
systemd-private-3423f544cfb2449487ff0cc23b329083-upower.service-AhIWtl  
vmware-root_875-4022308853  
ahmednuriev@ahmednuriev:/tmp$
```

Рис. 2: Команда ls

Опции команды ls

```
ahmednuriev@ahmednuriev:/tmp$ ls -la
.
..
dbus-6P9hXNvn
dbus-CiG7xY26
.font-unix
.ICE-unix
systemd-private-3423f544cfb2449487ff0cc23b329083-chronyd.service-I8N1aw
systemd-private-3423f544cfb2449487ff0cc23b329083-colord.service-B6Brqo
systemd-private-3423f544cfb2449487ff0cc23b329083-dbus-broker.service-XFTTLd
systemd-private-3423f544cfb2449487ff0cc23b329083-fwupd.service-C3kbc5
systemd-private-3423f544cfb2449487ff0cc23b329083-low-memory-monitor.service-FIJje9
systemd-private-3423f544cfb2449487ff0cc23b329083-ModemManager.service-xDnDVw
systemd-private-3423f544cfb2449487ff0cc23b329083-polkit.service-1j38uX
systemd-private-3423f544cfb2449487ff0cc23b329083-power-profiles-daemon.service-9N1kkQ
systemd-private-3423f544cfb2449487ff0cc23b329083-rtkit-daemon.service-RD8Gum
systemd-private-3423f544cfb2449487ff0cc23b329083-switcheroo-control.service-GX8Wjl
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-logind.service-32G0BU
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-oond.service-Hntim0
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-resolved.service-WN0INz
systemd-private-3423f544cfb2449487ff0cc23b329083-upower.service-AhIWtl
vmware-root_875-4022308853
.X0-lock
.X1024-lock
.X1025-lock
.X11-unix
.X1-lock
.XIM-unix
ahmednuriev@ahmednuriev:/tmp$
```

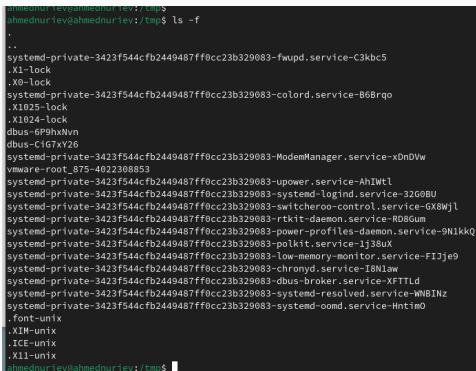
Рис. 3: Команда ls -la

Опции команды ls

```
ahmednuriev@ahmednuriev:/tmp$ ls -l
итого 0
srw-rw-rw-. 1 root root 0 map 7 15:08 dbus-6P9hxNvn
srw-rw-rw-. 1 root root 0 map 7 15:08 dbus-CtG7xY26
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-chronyd.serv
vice-I8Nl1aw
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-colord.serv
ice-B68rqo
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-dbus-broker
.service-XFTTLd
drwx-----, 3 root root 60 map 7 15:09 systemd-private-3423f544cfb2449487ff0cc23b329083-funupd.servi
ce-C3kbc5
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-low-memory-
monitor.service-FtJje9
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-ModemManage
r.service-xDn0Vw
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-polkit.serv
ice-lj38uX
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-power-profi
les-daemon.service-9N1kkQ
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-rtkit-daemo
n.service-R08Gum
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-switcheroo-
control.service-0X8Wj1
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-log
ind.service-3260BU
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-oom
d.service-Hntim0
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-res
olved.service-WNBINz
drwx-----, 3 root root 60 map 7 15:08 systemd-private-3423f544cfb2449487ff0cc23b329083-upower.serv
ice-AhIWt1
drwx-----, 2 root root 40 map 7 15:08 vmware-root_875-4022308853
ahmednuriev@ahmednuriev:/tmp$
```

Рис. 4: Команда ls -l

Опции команды ls



```
ahmednuriev@ahmednuriev: /tmp$  
ahmednuriev@ahmednuriev: /tmp$ ls -f  
.  
..  
systemd-private-3423f544cfb2449487ff0cc23b329083-fwupd.service-C3kbc5  
.X1-lock  
.X0-lock  
systemd-private-3423f544cfb2449487ff0cc23b329083-colord.service-B6Brqo  
.X1025-lock  
.X1024-lock  
dbus-6P9hXNvn  
dbus-C1G7xY26  
systemd-private-3423f544cfb2449487ff0cc23b329083-ModemManager.service-xDnDVw  
vmware-root_875-4022308853  
systemd-private-3423f544cfb2449487ff0cc23b329083-upower.service-AhIWtl  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-logind.service-32G0BU  
systemd-private-3423f544cfb2449487ff0cc23b329083-switcheroo-control.service-GX8Wjl  
systemd-private-3423f544cfb2449487ff0cc23b329083-rtkit-daemon.service-RD8Gum  
systemd-private-3423f544cfb2449487ff0cc23b329083-power-profiles-daemon.service-9N1kkQ  
systemd-private-3423f544cfb2449487ff0cc23b329083-polkit.service-1j38uX  
systemd-private-3423f544cfb2449487ff0cc23b329083-low-memory-monitor.service-F1Jje9  
systemd-private-3423f544cfb2449487ff0cc23b329083-chrond.service-I8N1aw  
systemd-private-3423f544cfb2449487ff0cc23b329083-dbus-broker.service-XFTTLd  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-resolved.service-WNBINz  
systemd-private-3423f544cfb2449487ff0cc23b329083-systemd-oomd.service-HntimO  
.font-unix  
.XIM-unix  
.ICE-unix  
.X11-unix  
ahmednuriev@ahmednuriev: /tmp$
```

Рис. 5: Команда ls -f

```
ahmednuriev@ahmednuriev:/tmp$  
ahmednuriev@ahmednuriev:/tmp$ cd /var/spool/  
ahmednuriev@ahmednuriev:/var/spool$ ls  
abrt abrt-upload cups lpd mail plymouth  
ahmednuriev@ahmednuriev:/var/spool$ ls -l  
итого 0  
drwxr-x--x. 1 root abrt 1366 мар  7 10:09 abrt  
drwx-----. 1 abrt abrt  0 июл 19  2023 abrt-upload  
drwx--x---. 1 root lp  6 ноя  1 04:09 cups  
drwxr-xr-x. 1 root root  0 июл 21  2023 lpd  
drwxrwxr-x. 1 root mail 1178 мар  6 14:27 mail  
drwxr-xr-x. 1 root root  0 июл 21  2023 plymouth  
ahmednuriev@ahmednuriev:/var/spool$
```

Рис. 6: Каталог /var/spool

Домашний каталог

```
ahmednuriev@ahmednuriev:/var/spool$  
ahmednuriev@ahmednuriev:/var/spool$ cd  
ahmednuriev@ahmednuriev:~$ ls  
bash: ls: команда не найдена...  
Аналогичная команда: 'ls'  
ahmednuriev@ahmednuriev:~127$ ls  
git-extended  Видео      Загрузки    Музыка      'Рабочий стол'  
work          Документы  Изображения  Общиедоступные  Шаблоны  
ahmednuriev@ahmednuriev:~$ ls -al  
итого 20  
drwx----- 1 ahmednuriev ahmednuriev 498 мар 1 21:57 .  
drwxr-xr-x. 1 root root 1172 мар 6 14:27 ..  
-rw----- 1 ahmednuriev ahmednuriev 3146 мар 1 22:18 .bash_history  
-rw-r--r-- 1 ahmednuriev ahmednuriev 18 июл 19 2023 .bash_logout  
-rw-r--r-- 1 ahmednuriev ahmednuriev 144 июл 19 2023 .bash_profile  
-rw-r--r-- 1 ahmednuriev ahmednuriev 681 мар 1 21:56 .bashrc  
drwx----- 1 ahmednuriev ahmednuriev 418 мар 1 21:58 .cache  
drwx----- 1 ahmednuriev ahmednuriev 442 мар 1 21:58 .config  
-rw-r--r-- 1 ahmednuriev ahmednuriev 235 фев 26 11:38 .gitconfig  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 74 мар 1 22:02 git-extended  
drwx----- 1 ahmednuriev ahmednuriev 136 фев 9 12:26 .gnupg  
drwx----- 1 ahmednuriev ahmednuriev 20 фев 9 12:14 .local  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 48 фев 9 12:19 .mozilla  
drwx----- 1 ahmednuriev ahmednuriev 132 фев 9 12:32 .ssh  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 10 фев 9 12:31 work  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 Видео  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 Документы  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 13:13 Загрузки  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 Изображения  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 Музыка  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 Общиедоступные  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 'Рабочий стол'  
drwxr-xr-x. 1 ahmednuriev ahmednuriev 0 фев 9 12:14 Шаблоны  
ahmednuriev@ahmednuriev:~$
```

Рис. 7: Файлы в домашнем каталоге

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

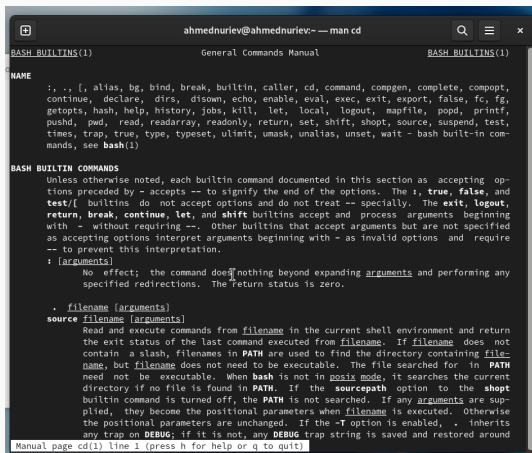
Рис. 8: Действия с каталогами

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:  
ahmednuriev@ahmednuriev:~$ ls -lt  
git-extended work Документы Музыка 'Рабочий стол'  
Загрузки Видео Изображения Общедоступные Шаблоны  
ahmednuriev@ahmednuriev:~$
```

Рис. 9: Команда ls -R и ls -t

Справка по командам



The screenshot shows a terminal window with the title bar "ahmednuriev@ahmednuriev:~ — man cd". The terminal displays the output of the `man cd` command, showing the "BASH BUILTINS(1)" manual page. The page lists various built-in commands and provides detailed information about the `cd` command, including its options and behavior. The terminal window has a dark background with light-colored text.

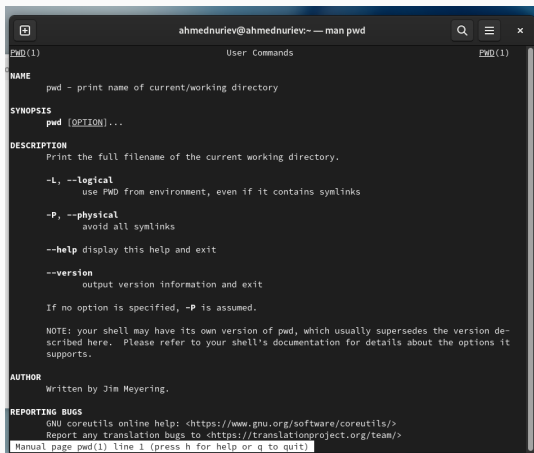
```
BASH BUILTINS(1)                                General Commands Manual                                BASH BUILTINS(1)

NAME
., ., [, alias, bg, bind, break, builtin, caller, cd, command, compgen, complete, compopt,
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 com-
mands, 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, 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 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 return
    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 file-
    name, 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 sup-
    plied, they become the positional parameters 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
    Manual page cd(1) line 1 (press h for help or q to quit)
```

Рис. 10: Справка по команде cd

Справка по командам



```
ahmednuriev@ahmednuriev:~ -- 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.

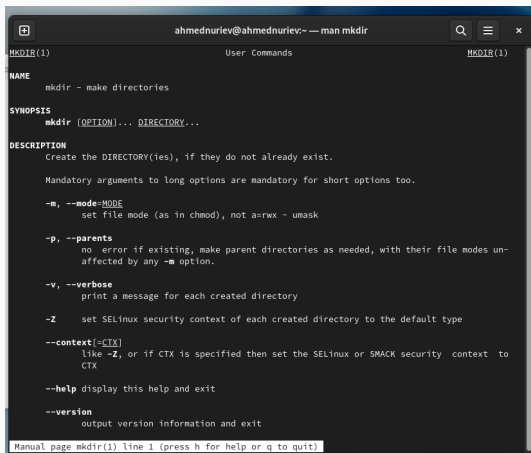
    NOTE: your shell may have its own version of pwd, which usually supersedes the version de-
    scribed here. Please refer to your shell's documentation for details about the options it
    supports.

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



```
ahmednuriev@ahmednuriev:~ — 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

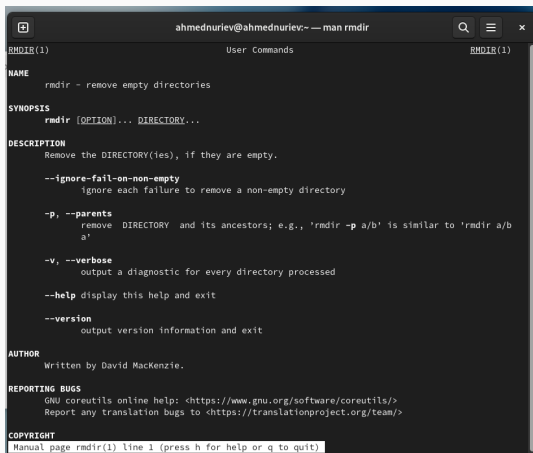
  --context[=CTX]
        like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX

  --help display this help and exit

  --version
        output version information and exit

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

Рис. 12: Справка по команде mkdir



```
ahmednuriev@ahmednuriev:~ -- 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

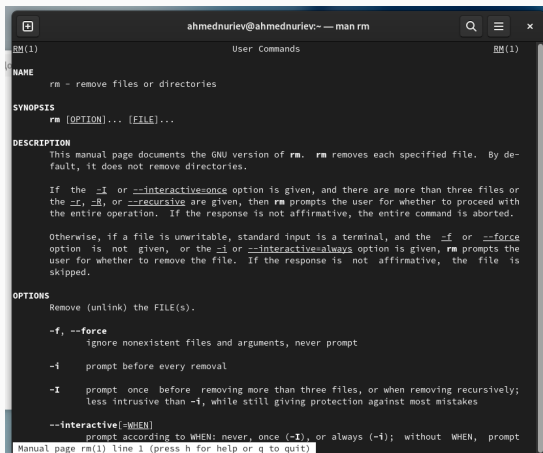
AUTHOR
    Written by David MacKenzie.

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

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

Рис. 13: Справка по команде rmdir

Справка по командам



```
ahmednuriev@ahmednuriev:~$ 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 -f, -B, 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

```
132 ls -l
133 ls -f
134 cd /var/spool/
135 ls
136 ls -l
137 cd
138 lss
139 ls
140 ls -al
141 mkdir newdir
142 mkdir newdir/morefun
143 mkdir letters memos misk
144 ls
145 rm letters/ memos/ misk/
146 rm -r letters/ memos/ misk/
147 rm -r newdir/
148 ls
149 ls -R
150 ls -t
151 man cd
152 man pwd
153 man mkdir
154 man rmdir
155 man rm
156 history
ahmednuriev@ahmednuriev:~$
```

Рис. 15: Команда history

Выводы по проделанной работе

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