

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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Цели и задачи работы

Цель лабораторной работы

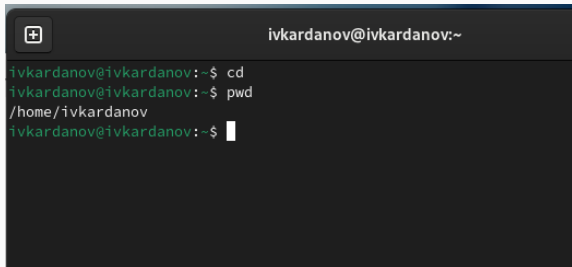
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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



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

A terminal window with a dark background. The title bar shows a window icon and the text "ivkardanov@ivkardanov:~". The terminal content shows a series of commands and their outputs: "cd" is executed, "pwd" is executed and returns "/home/ivkardanov", and then a new prompt line is shown.

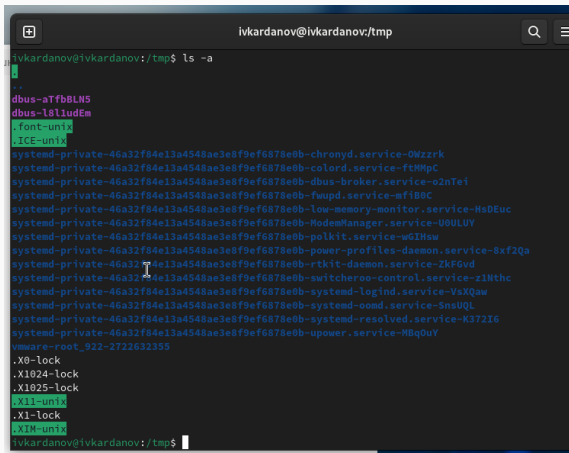
Рис. 1: Путь к домашнему каталогу

Опции команды ls

```
ivkardanov@ivkardanov:~$ cd /tmp
ivkardanov@ivkardanov:/tmp$ ls
dbus-aTfbBLN5
dbus-l8l1udEm
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-chrond.service-0Wzrk
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-colord.service-ftMHPc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-dbus-broker.service-o2nTei
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-fwupd.service-mfi80C
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-geoclue.service-gVShfo
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-low-memory-monitor.service-HsDEuc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-ModemManager.service-U0ULUY
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-polkit.service-w6IHsw
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-power-profiles-daemon.service-8xf2Qa
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-rtkit-daemon.service-ZkFGvd
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-switcheroo-control.service-z1Nthc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-hostnamed.service-H0Fpk9
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-logind.service-VsXQaw
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-oomd.service-SnsUQL
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-resolved.service-K372I6
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-upower.service-MBq0uY
vmware-root_922-2722632355
ivkardanov@ivkardanov:/tmp$
```

Рис. 2: Команда ls

Опции команды ls



```
ivkardanov@ivkardanov:/tmp$ ls -a
.
..
dbus-aTfbBLN5
dbus-l8liudEm
.font-unix
.ICE-unix
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-chrond.service-0Wzzrk
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-color.service-ftMhpc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-dbus-broker.service-o2nTei
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-fwupd.service-mfi8BC
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-low-memory-monitor.service-HsDEuc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-ModemManager.service-U0ULUY
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-polkit.service-wGIHsw
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-power-profiles-daemon.service-8xf2Qa
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-rtkit-daemon.service-ZkFGvd
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-switcheroo-control.service-z1Nthc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-logind.service-VsXQaw
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-oomd.service-SnsUQL
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-resolved.service-K372IG
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-upower.service-MBqOuY
vmware-root_922-2722632355
.X0-lock
.X1024-lock
.X1025-lock
.X11-unix
.X1-lock
.XIM-unix
ivkardanov@ivkardanov:/tmp$
```

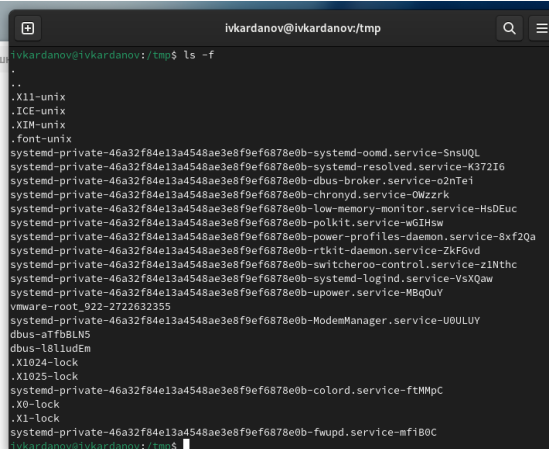
Рис. 3: Команда ls -a

Опции команды ls

```
tkardanov@tkardanov:/$  
tkardanov@tkardanov:/tmp$ ls -l  
итого 0  
srw-rw-rw-. 1 root root 0 map 10 13:04 dbus-attfBLN5  
srw-rw-rw-. 1 root root 0 map 10 13:04 dbus-taliudfe  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-chronyd.service-0Wzrk  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-colord.service-ftMgC  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-dbus-broker.service-o2nTel  
drwx----- 3 root root 60 map 10 13:10 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-fuupd.service-mf1B6C  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-low-memory-monitor.service-HsDEuc  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-ModemManager.service-0BUUY  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-polkit.service-wG1hw  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-power-profiles-daemon.service-bxf2qa  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-rtkit-daemon.service-ZKfQvd  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-switcheroo-control.service-zjnthc  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-systemd-logind.service-VsXQw  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-systemd-oomd.service-SnsUQL  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-systemd-resolved.service-K37ZIG  
drwx----- 3 root root 60 map 10 13:04 systemd-private-46a32f84e13a4548ae3ef9ef6878e0b-upower.service-M8guy  
drwx----- 2 root root 40 map 10 13:04 vmware-root_922-2722632355  
tkardanov@tkardanov:/$
```

Рис. 4: Команда ls -l

Опции команды ls

A terminal window with a dark background and light text. The title bar shows the user 'ivkardanov' and the current directory 'ivkardanov:/tmp'. The prompt is 'ivkardanov@ivkardanov:/tmp\$'. The command 'ls -f' has been entered, and the output is a long list of files and directories, including '.X11-unix', '.ICE-unix', '.XIM-unix', '.font-unix', and various systemd-private directories with long UUIDs, as well as 'dbus-aTfb8LN5', 'dbus-l8liudEm', '.X1024-lock', '.X1025-lock', and 'systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-fwupd.service-mfiB0C'.

```
ivkardanov@ivkardanov:/tmp$ ls -f
.
..
.X11-unix
.ICE-unix
.XIM-unix
.font-unix
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-oomd.service-SnsUQL
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-resolved.service-K372I6
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-dbus-broker.service-o2Ntei
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-chronyd.service-0Wzzrk
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-low-memory-monitor.service-HsDEuc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-polkit.service-wGIHsw
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-power-profiles-daemon.service-8xf2Qa
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-rtkit-daemon.service-ZkFGvd
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-switcheroo-control.service-z1Nthc
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-systemd-logind.service-VsXQaw
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-upower.service-MBq0UY
vmware-root_922-2722632355
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-ModemManager.service-U0ULUY
dbus-aTfb8LN5
dbus-l8liudEm
.X1024-lock
.X1025-lock
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-colord.service-ftMmPC
.X0-lock
.X1-lock
systemd-private-46a32f84e13a4548ae3e8f9ef6878e0b-fwupd.service-mfiB0C
ivkardanov@ivkardanov:/tmp$
```

Рис. 5: Команда ls -f

Каталог /var/spool

```
ivkardanov@ivkardanov:/tmp$  
ivkardanov@ivkardanov:/tmp$ cd /var/spool/  
ivkardanov@ivkardanov:/var/spool$ ls  
abrt  abrt-upload  cups  lpd  mail  plymouth  
ivkardanov@ivkardanov:/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  
ivkardanov@ivkardanov:/var/spool$
```

Рис. 6: Каталог /var/spool

```
ivkardanov@ivkardanov:/var/spool$  
ivkardanov@ivkardanov:/var/spool$ cd  
ivkardanov@ivkardanov:~$ ls  
git-extended  Видео  Загрузки  Музыка  'Рабочий стол'  
work          Документы  Изображения  Общедоступные  Шаблоны  
ivkardanov@ivkardanov:~$ ls -al  
итого 20  
drwx-----, 1 ivkardanov ivkardanov 498 мар  4 12:24 .  
drwxr-xr-x, 1 root      root      1216 мар  8 17:40 ..  
-rw-----, 1 ivkardanov ivkardanov 1615 мар 10 13:04 .bash_history  
-rw-r--r--, 1 ivkardanov ivkardanov   18 июл 19 2023 .bash_logout  
-rw-r--r--, 1 ivkardanov ivkardanov  144 июл 19 2023 .bash_profile  
-rw-r--r--, 1 ivkardanov ivkardanov  680 мар  4 12:23 .bashrc  
drwx-----, 1 ivkardanov ivkardanov  462 мар 10 13:03 .cache  
drwx-----, 1 ivkardanov ivkardanov  402 мар  4 12:25 .config  
-rw-r--r--, 1 ivkardanov ivkardanov  234 мар  4 12:22 .gitconfig  
drwxr-xr-x, 1 ivkardanov ivkardanov   74 мар  4 12:28 git-extended  
drwx-----, 1 ivkardanov ivkardanov  136 фев 27 11:00 .gnupg  
drwx-----, 1 ivkardanov ivkardanov   20 фев 27 10:49 .local  
drwxr-xr-x, 1 ivkardanov ivkardanov   48 фев 27 10:56 .mozilla  
drwx-----, 1 ivkardanov ivkardanov  132 фев 27 11:02 .ssh  
drwxr-xr-x, 1 ivkardanov ivkardanov   10 фев 27 11:02 work  
drwxr-xr-x, 1 ivkardanov ivkardanov   0 фев 27 10:49 Видео  
drwxr-xr-x, 1 ivkardanov ivkardanov   0 фев 27 10:49 Документы  
drwxr-xr-x, 1 ivkardanov ivkardanov   0 фев 27 10:49 Загрузки  
drwxr-xr-x, 1 ivkardanov ivkardanov   0 фев 27 10:49 Изображения  
drwxr-xr-x, 1 ivkardanov ivkardanov   0 фев 27 10:49 Музыка  
drwxr-xr-x, 1 ivkardanov ivkardanov   0 фев 27 10:49 Общедоступные
```

Рис. 7: Файлы в домашнем каталоге

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

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:

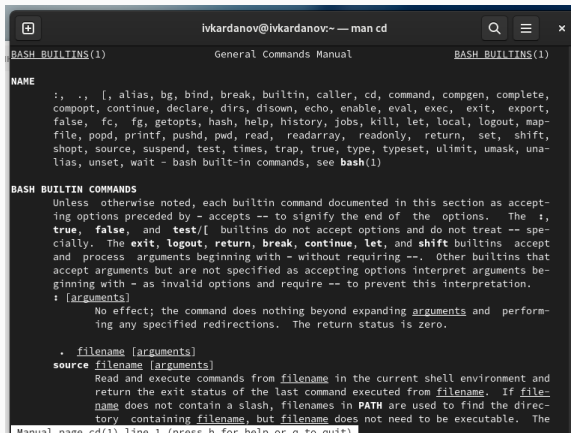
./Рабочий стол':

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

```

Рис. 9: Команда `ls -R` и `ls -t`

Справка по командам



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

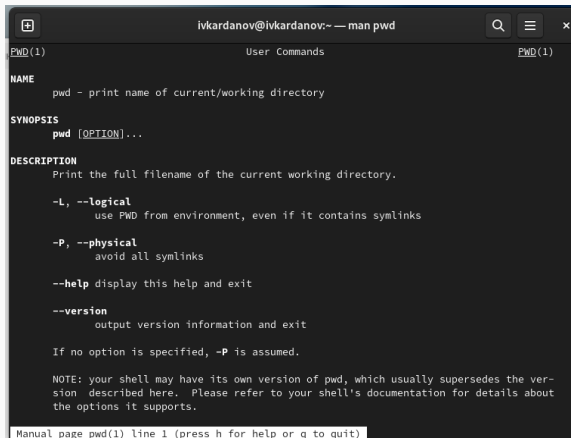
NAME
: , . , [ , alias , bg , bind , break , builtin , caller , cd , command , compgen , complete ,
comptop , continue , declare , dirs , disown , echo , enable , eval , exec , exit , export ,
false , fc , fg , getopts , hash , help , history , jobs , kill , let , local , logout , map-
file , popd , 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
    Manual page cd(1) line 1 (press h for help or q to quit)
```

Рис. 10: Справка по команде cd

Справка по командам



The screenshot shows a terminal window with the title bar "ivkardanov@ivkardanov:~ — man pwd". The window displays the manual page for the 'pwd' command. The content is organized into sections: NAME, SYNOPSIS, and DESCRIPTION. The NAME section states that 'pwd' prints the name of the current/working directory. The SYNOPSIS section shows the command 'pwd [OPTION]...'. The DESCRIPTION section explains that 'pwd' prints the full filename of the current working directory and lists several options: -L (logical), -P (physical), --help, and --version. A note at the bottom states that if no option is specified, -P is assumed. The footer of the terminal window reads "Manual page pwd(1) line 1 (press h for help or q to quit)".

```
ivkardanov@ivkardanov:~ — 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

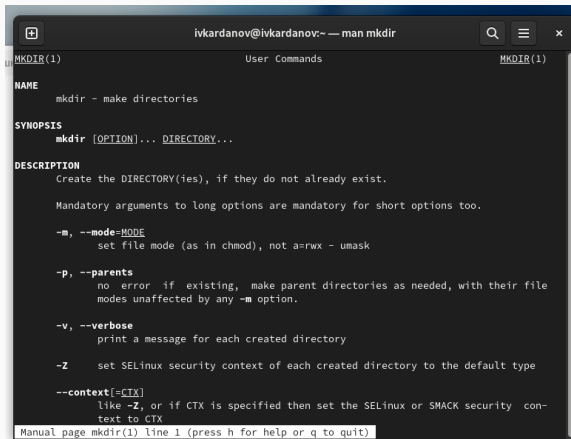
    If no option is specified, -P is assumed.

    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.

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

Рис. 11: Справка по команде pwd

Справка по командам



The screenshot shows a terminal window titled "ivkardanov@ivkardanov:~ — man mkdir". The window displays the manual page for the "mkdir" command. The content is as follows:

```
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

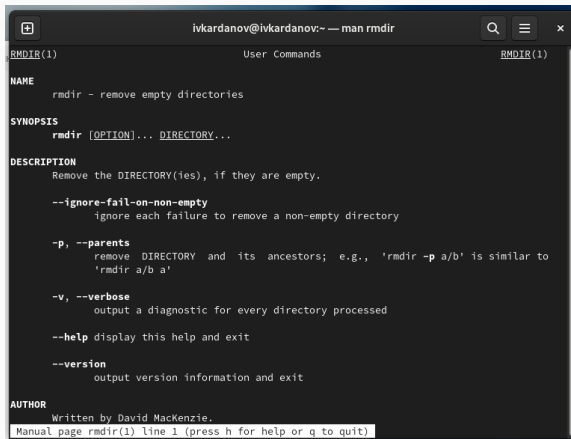
  -Z
      set SELinux security context of each created directory to the default type

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

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

Рис. 12: Справка по команде mkdir

Справка по командам



```
ivkardanov@ivkardanov:~ — 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

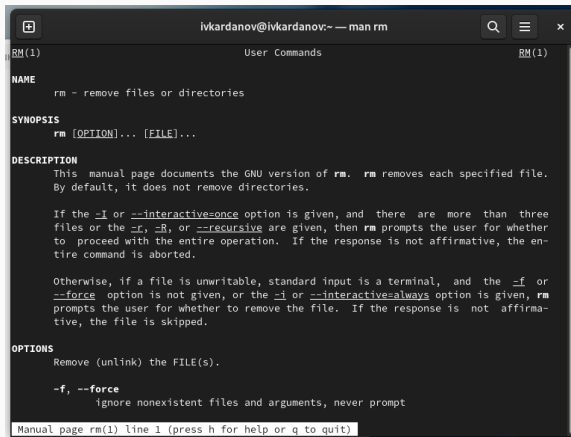
    --version
        output version information and exit

AUTHOR
    Written by David MacKenzie.

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

Рис. 13: Справка по команде rmdir

Справка по командам



```
ivkardanov@ivkardanov:~ — 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 affirma-
tive, the file is skipped.

OPTIONS
Remove (unlink) the FILE(s).

-f, --force
    ignore nonexistent files and arguments, never prompt

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

Рис. 14: Справка по команде rm

История командной строки

```
90 cd
91 mkdir newdir
92 mkdir newdir/morefun
93 mkdir letters memos misk
94 ls
95 rm letters/ memos/ misk/
96 rm -r letters/ memos/ misk/
97 rm -r newdir/
98 ls
99 ls -R
100 ls -t
101 man cd
102 man pwd
103 man mkdir
104 man rmdir
105 man rm
106 history
ivkardanov@ivkardanov:~$
```

Рис. 15: Команда history

Выводы по проделанной работе

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