

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

Зырянов Артём Алексеевич НБИбд-01-22¹

27 февраля, 2023, Москва, Россия

¹Российский Университет Дружбы Народов

Цели и задачи работы

Цель лабораторной работы

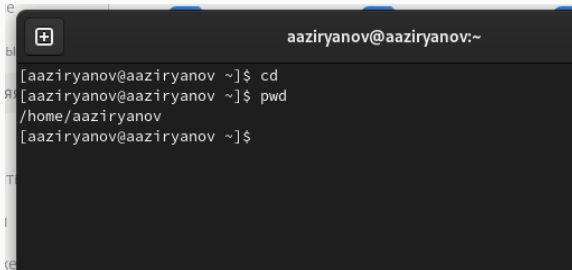
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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

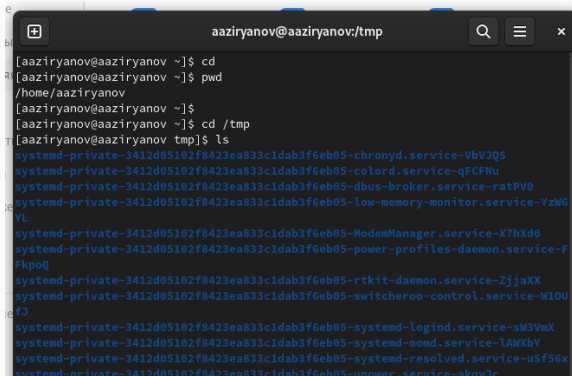
A terminal window with a dark background. The title bar shows a plus icon and the text 'aaziryanov@aaziryanov:~'. The terminal content shows the following commands and output:

```
[aaziryanov@aaziryanov ~]$ cd  
[aaziryanov@aaziryanov ~]$ pwd  
/home/aaziryanov  
[aaziryanov@aaziryanov ~]$
```

The terminal window displays the execution of the `cd` and `pwd` commands. The `pwd` command outputs the full path to the home directory, `/home/aaziryanov`.

Рис. 1: Путь к домашнему каталогу

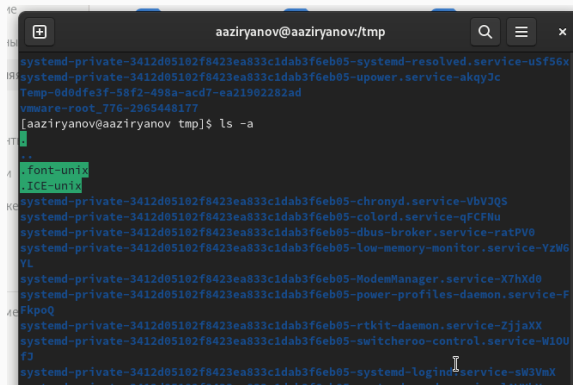
Опции команды ls

A terminal window titled 'aaziryanov@aaziryanov:/tmp' with search, menu, and close icons. The terminal shows a sequence of commands: 'cd', 'pwd' (output: '/home/aaziryanov'), 'cd /tmp', and 'ls'. The 'ls' command output lists various systemd services with their full paths, such as 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-chronyd.service-VbVJQS' and 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-colord.service-qFCFNU'.

```
aaziryanov@aaziryanov: ~]$ cd
aaziryanov@aaziryanov: ~]$ pwd
/home/aaziryanov
aaziryanov@aaziryanov: ~]$ cd /tmp
aaziryanov@aaziryanov: /tmp]$ ls
systemd-private-3412d05102f8423ea833c1dab3f6eb05-chronyd.service-VbVJQS
systemd-private-3412d05102f8423ea833c1dab3f6eb05-colord.service-qFCFNU
systemd-private-3412d05102f8423ea833c1dab3f6eb05-dbus-broker.service-ratPV0
systemd-private-3412d05102f8423ea833c1dab3f6eb05-low-memory-monitor.service-YzW6
YL
systemd-private-3412d05102f8423ea833c1dab3f6eb05-ModemManager.service-X7hXd0
systemd-private-3412d05102f8423ea833c1dab3f6eb05-power-profiles-daemon.service-F
FkpoQ
systemd-private-3412d05102f8423ea833c1dab3f6eb05-rtkit-daemon.service-ZjjaXX
systemd-private-3412d05102f8423ea833c1dab3f6eb05-switcheroo-control.service-W10U
fJ
systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-logind.service-sW3VmX
systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-oomd.service-lANXbY
systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-resolved.service-uSf56x
systemd-private-3412d05102f8423ea833c1dab3f6eb05-upower.service-akovJc
```

Рис. 2: Команда ls

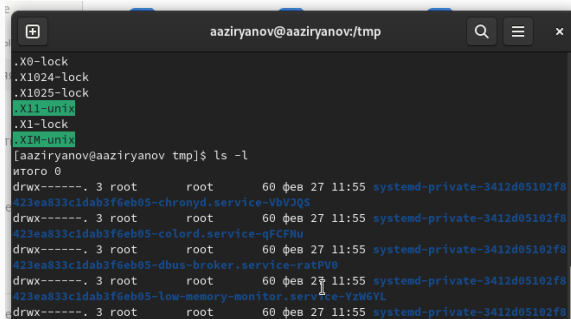
Опции команды ls



```
aaziryanov@aaziryanov:/tmp$ ls -a
.
..
.font-unix
.ICE-unix
systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-resolved.service-uSf56x
systemd-private-3412d05102f8423ea833c1dab3f6eb05-upower.service-akqy3c
Temp-0d0dfe3f-58f2-498a-acd7-ea21902282ad
vmware-root_776-2965448177
systemd-private-3412d05102f8423ea833c1dab3f6eb05-chronyd.service-VbVJQS
systemd-private-3412d05102f8423ea833c1dab3f6eb05-colord.service-qFCFNu
systemd-private-3412d05102f8423ea833c1dab3f6eb05-dbus-broker.service-ratPV0
systemd-private-3412d05102f8423ea833c1dab3f6eb05-low-memory-monitor.service-YzW6
YL
systemd-private-3412d05102f8423ea833c1dab3f6eb05-ModemManager.service-X7hXd0
systemd-private-3412d05102f8423ea833c1dab3f6eb05-power-profiles-daemon.service-F
FkpoQ
systemd-private-3412d05102f8423ea833c1dab3f6eb05-rtkit-daemon.service-ZjjaXX
systemd-private-3412d05102f8423ea833c1dab3f6eb05-switcheroo-control.service-W10U
fJ
systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-logind.service-sW3VmX
```

Рис. 3: Команда ls -a

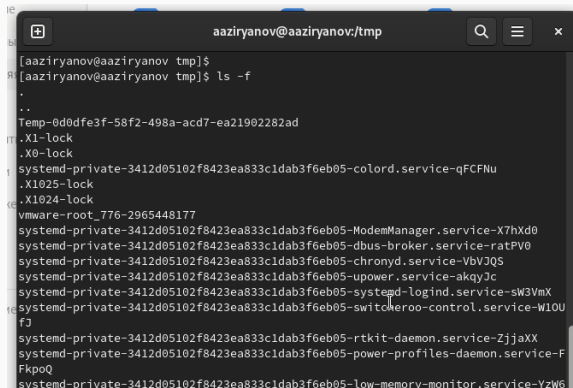
Опции команды ls



```
aaziryanov@aaziryanov:/tmp$ ls -l
-rwxr-xr-x 1 aaziryanov aaziryanov 4096 Feb 27 11:55 .X0-lock
-rwxr-xr-x 1 aaziryanov aaziryanov 4096 Feb 27 11:55 .X1024-lock
-rwxr-xr-x 1 aaziryanov aaziryanov 4096 Feb 27 11:55 .X1025-lock
-rwxr-xr-x 1 aaziryanov aaziryanov 4096 Feb 27 11:55 .X11-unix
-rwxr-xr-x 1 aaziryanov aaziryanov 4096 Feb 27 11:55 .X1-lock
-rwxr-xr-x 1 aaziryanov aaziryanov 4096 Feb 27 11:55 .XIM-unix
[aaaziryanov@aaziryanov tmp]$ ls -l
итого 0
drwx-----, 3 root      root      60 фев 27 11:55 systemd-private-3412d05102f8
423ea833c1dab3f6eb05-chrond.service-VbVJQS
drwx-----, 3 root      root      60 фев 27 11:55 systemd-private-3412d05102f8
423ea833c1dab3f6eb05-colord.service-qFCFNU
drwx-----, 3 root      root      60 фев 27 11:55 systemd-private-3412d05102f8
423ea833c1dab3f6eb05-dbus-broker.service-ratPV0
drwx-----, 3 root      root      60 фев 27 11:55 systemd-private-3412d05102f8
423ea833c1dab3f6eb05-low-memory-monitor.service-YzW6YL
drwx-----, 3 root      root      60 фев 27 11:55 systemd-private-3412d05102f8
```

Рис. 4: Команда ls -l

Опции команды ls

A terminal window titled 'aaziryanov@aaziryanov:/tmp' with search, menu, and close icons in the title bar. The prompt is '[aaziryanov@aaziryanov tmp]\$'. The command 'ls -f' has been entered, and the output is a list of files and directories in the current directory. The output includes: '.', '..', 'Temp-0d0dfe3f-58f2-498a-acd7-ea21902282ad', '.X1-lock', '.X0-lock', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-colord.service-qFCFNU', '.X1025-lock', '.X1024-lock', 'vmware-root_776-2965448177', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-ModemManager.service-X7hXd0', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-dbus-broker.service-ratPV0', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-chronyd.service-VbVJQS', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-upower.service-akqyJc', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-logind.service-sW3VmX', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-switcheroo-control.service-W10UfJ', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-rtkit-daemon.service-ZjjaXX', 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-power-profiles-daemon.service-F', 'FkpoQ', and 'systemd-private-3412d05102f8423ea833c1dab3f6eb05-low-memory-monitor.service-YZW6'.

```
[aaziryanov@aaziryanov tmp]$  
[aaziryanov@aaziryanov tmp]$ ls -f  
.  
..  
Temp-0d0dfe3f-58f2-498a-acd7-ea21902282ad  
.X1-lock  
.X0-lock  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-colord.service-qFCFNU  
.X1025-lock  
.X1024-lock  
vmware-root_776-2965448177  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-ModemManager.service-X7hXd0  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-dbus-broker.service-ratPV0  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-chronyd.service-VbVJQS  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-upower.service-akqyJc  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-systemd-logind.service-sW3VmX  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-switcheroo-control.service-W10UfJ  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-rtkit-daemon.service-ZjjaXX  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-power-profiles-daemon.service-F  
FkpoQ  
systemd-private-3412d05102f8423ea833c1dab3f6eb05-low-memory-monitor.service-YZW6
```

Рис. 5: Команда ls -f

Каталог /var/spool

```
[aaziryanov@aaziryanov tmp]$  
[aaziryanov@aaziryanov tmp]$  
[aaziryanov@aaziryanov tmp]$ cd /var/spool/  
[aaziryanov@aaziryanov spool]$ ls  
abrt abrt-upload cups lpd mail plymouth  
[aaziryanov@aaziryanov spool]$ ls -l  
итого 0  
drwxr-x--x. 1 root abrt 578 фев 21 15:05 abrt  
drwx-----. 1 abrt abrt  0 мар 11 2022 abrt-upload  
drwx--x---. 1 root lp    6 окт 3 11:46 cups  
drwxr-xr-x. 1 root root  0 авг 9 2022 lpd  
drwxrwxr-x. 1 root mail 910 фев 24 11:56 mail  
drwxr-xr-x. 1 root root  0 мар 7 2022 plymouth  
[aaziryanov@aaziryanov spool]$
```

Рис. 6: Каталог /var/spool

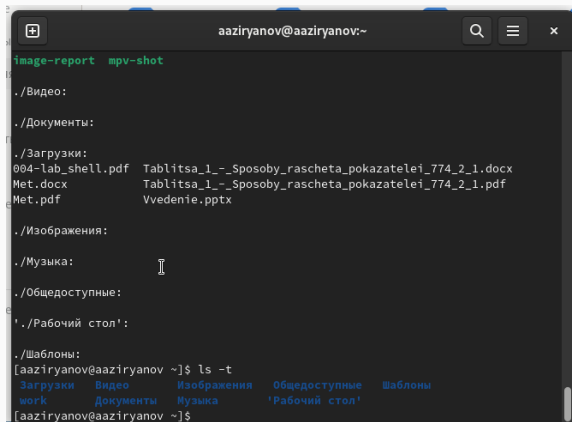
```
[aaziryanov@aaziryanov spool]$  
[aaziryanov@aaziryanov spool]$ cd  
[aaziryanov@aaziryanov ~]$ ls  
work      Документы  Изображения  Общедоступные  Шаблоны  
Видео     Загрузки    Музыка       'Рабочий стол'  
[aaziryanov@aaziryanov ~]$ ls -al  
итого 24  
drwx-----, 1 aaziryanov aaziryanov 498 фев 20 19:07 .  
drwxr-xr-x, 1 root      root      904 фев 24 11:56 ..  
-rw-----, 1 aaziryanov aaziryanov 6009 фев 20 19:38 .bash_history  
-rw-r--r--, 1 aaziryanov aaziryanov 18 янв 20 2022 .bash_logout  
-rw-r--r--, 1 aaziryanov aaziryanov 141 янв 20 2022 .bash_profile  
-rw-r--r--, 1 aaziryanov aaziryanov 492 янв 20 2022 .bashrc  
drwx-----, 1 aaziryanov aaziryanov 412 фев 14 12:31 .cache  
drwx-----, 1 aaziryanov aaziryanov 334 фев 14 12:24 .config  
-rw-r--r--, 1 aaziryanov aaziryanov 133 фев 14 12:27 .gitconfig  
drwx-----, 1 aaziryanov aaziryanov 134 фев 14 12:36 .gnupg  
drwx-----, 1 aaziryanov aaziryanov 26 фев 14 12:31 .local  
drwxr-xr-x, 1 aaziryanov aaziryanov 48 ноя 4 22:10 .mozilla  
drwx-----, 1 aaziryanov aaziryanov 132 фев 14 12:14 .ssh
```

Рис. 7: Файлы в домашнем каталоге

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

Рис. 8: Действия с каталогами

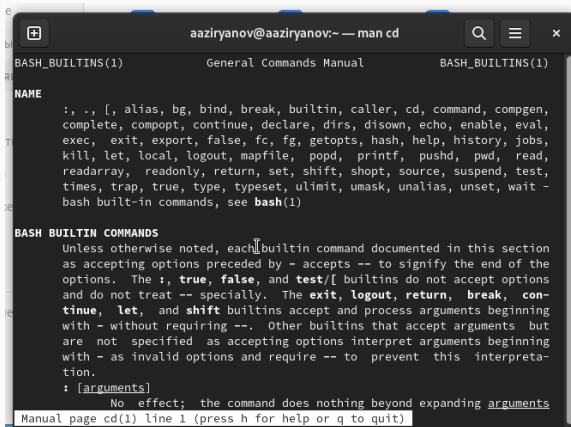
Опции команды ls



```
aaziryanov@aaziryanov:~  
image-report mpv-shot  
./Видео:  
./Документы:  
./Загрузки:  
004-lab_shell.pdf  Tablitsa_1_-_Sposoby_rascheta_pokazatelei_774_2_1.docx  
Met.docx          Tablitsa_1_-_Sposoby_rascheta_pokazatelei_774_2_1.pdf  
Met.pdf           Vvedenie.pptx  
./Изображения:  
./Музыка:  
./Общедоступные:  
'./Рабочий стол':  
./Шаблоны:  
[aaziryanov@aaziryanov ~]$ ls -t  
Загрузки  Видео  Изображения  Общедоступные  Шаблоны  
work      Документы  Музыка      'Рабочий стол'  
[aaziryanov@aaziryanov ~]$
```

Рис. 9: Команда ls -R и ls -t

Справка по командам



The screenshot shows a terminal window with the title bar "aaziryanov@aaziryanov:~ — man cd". The window displays the manual page for the `cd` command. The top of the page shows "BASH_BUILTINS(1)" and "General Commands Manual". The "NAME" section lists various built-in commands, including `cd`. The "BASH BUILTIN COMMANDS" section explains that built-in commands accept options preceded by `-`, with `--` indicating the end of options. It also notes that `exit`, `logout`, `return`, `break`, `continue`, `let`, and `shift` accept arguments differently. The `cd` command is described as having no effect beyond expanding arguments. The bottom of the window shows "Manual page cd(1) line 1 (press h for help or q to quit)".

```
BASH_BUILTINS(1)          General Commands Manual          BASH_BUILTINS(1)

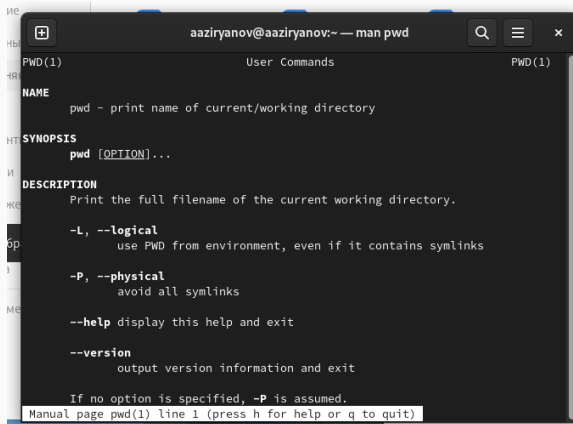
NAME
: , . , [ , alias , bg , bind , break , builtin , caller , cd , command , compgen ,
complete , compopt , continue , declare , dirs , disown , echo , enable , eval ,
exec , exit , export , false , fc , fg , getopts , hash , help , history , jobs ,
kill , let , local , logout , mapfile , popd , printf , 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 commands, see bash(1)

BASH BUILTIN COMMANDS
Unless otherwise noted, each builtin command documented in this section
as accepting 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 -- specially. The exit, logout, return, break, con-
tinue, 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 interpreta-
tion.
: [arguments]
    No effect; the command does nothing beyond expanding arguments

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 titled "aaziryanov@aaziryanov:~ — man pwd". The window displays the manual page for the 'pwd' command. The content is as follows:

```
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

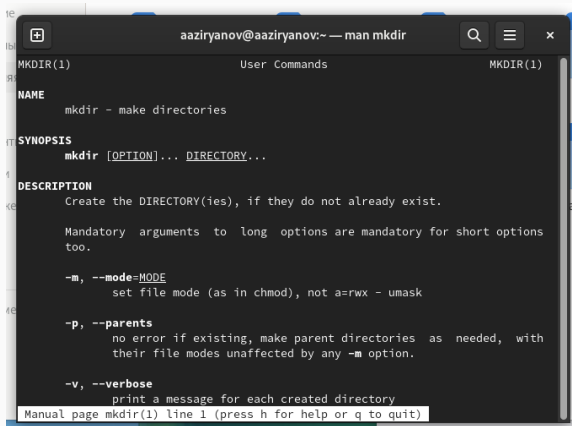
    --help display this help and exit

    --version
        output version information and exit

    If no option is specified, -P is assumed.
    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 "aaziryanov@aaziryanov:~ — 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

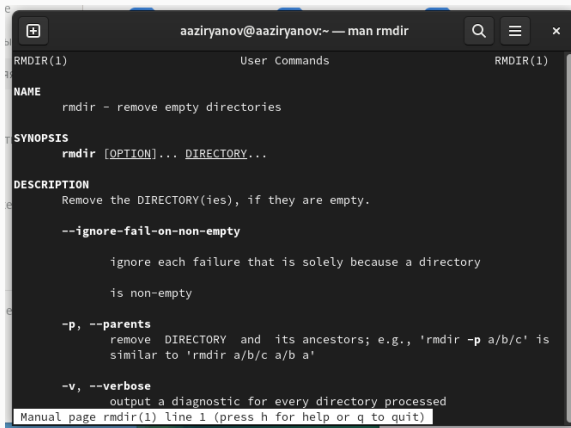
    -p, --parents
        no error if existing, make parent directories as needed, with
        their file modes unaffected by any -m option.

    -v, --verbose
        print a message for each created directory

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

Рис. 12: Справка по команде mkdir

Справка по командам



The image shows a terminal window titled "aaziryanov@aaziryanov:~ — man rmdir". The window displays the manual page for the `rmdir` command. The content is as follows:

```
RMDIR(1)                                User Commands                                RMDIR(1)

NAME
    rmdir - remove empty directories

SYNOPSIS
    rmdir [OPTION]... DIRECTORY...

DESCRIPTION
    Remove the DIRECTORY(ies), if they are empty.

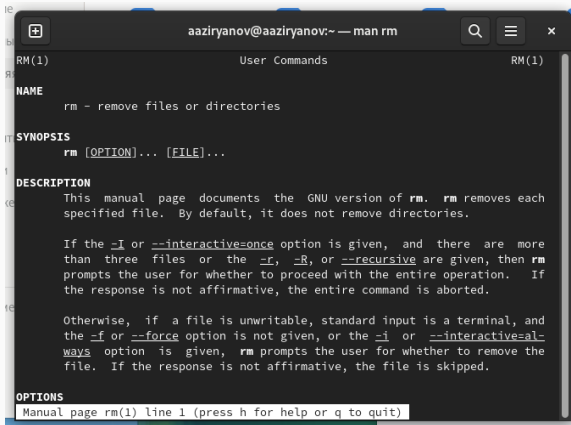
    --ignore-fail-on-non-empty
        ignore each failure that is solely because a directory
        is non-empty

    -p, --parents
        remove DIRECTORY and its ancestors; e.g., 'rmdir -p a/b/c' is
        similar to 'rmdir a/b/c a/b a'

    -v, --verbose
        output a diagnostic for every directory processed

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

Рис. 13: Справка по команде `rmdir`



```
aaziryanov@aaziryanov:~ — 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.

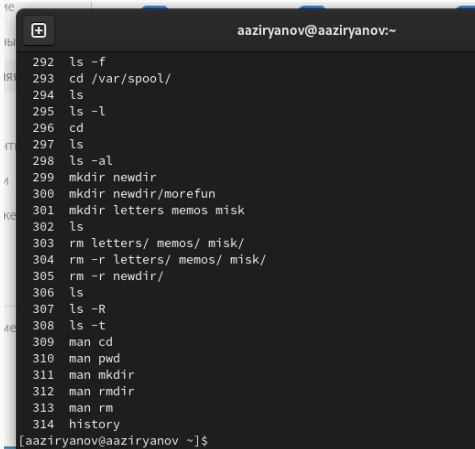
If the -I or --interactive=once option is given, and there are more
than three files or the -r, -R, or --recursive are given, then rm
prompts the user for whether to proceed with the entire operation. If
the response is not affirmative, the entire command is aborted.

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=al-
ways option is given, rm prompts the user for whether to remove the
file. If the response is not affirmative, the file is skipped.

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

Рис. 14: Справка по команде rm

История командной строки

A terminal window titled 'aaziryanov@aaziryanov:~' with a dark background and light text. It displays a list of 14 commands, each preceded by a line number from 292 to 314. The commands are: 'ls -f', 'cd /var/spool/', 'ls', 'ls -l', 'cd', 'ls', 'ls -al', 'mkdir newdir', 'mkdir newdir/morefun', 'mkdir letters memos misk', 'ls', 'rm letters/ memos/ misk/', 'rm -r letters/ memos/ misk/', 'rm -r newdir/', 'ls', 'ls -R', 'ls -t', 'man cd', 'man pwd', 'man mkdir', 'man rmdir', 'man rm', and 'history'. The prompt '[aaziryanov@aaziryanov ~]\$' is visible at the bottom.

```
292 ls -f
293 cd /var/spool/
294 ls
295 ls -l
296 cd
297 ls
298 ls -al
299 mkdir newdir
300 mkdir newdir/morefun
301 mkdir letters memos misk
302 ls
303 rm letters/ memos/ misk/
304 rm -r letters/ memos/ misk/
305 rm -r newdir/
306 ls
307 ls -R
308 ls -t
309 man cd
310 man pwd
311 man mkdir
312 man rmdir
313 man rm
314 history
[aaziryanov@aaziryanov ~]$
```

Рис. 15: Команда history

Выводы по проделанной работе

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