

Операционные системы

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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1. Цели и задачи работы
2. Процесс выполнения лабораторной работы
3. Выводы по проделанной работе

1. Цели и задачи работы

1.1 Цель лабораторной работы

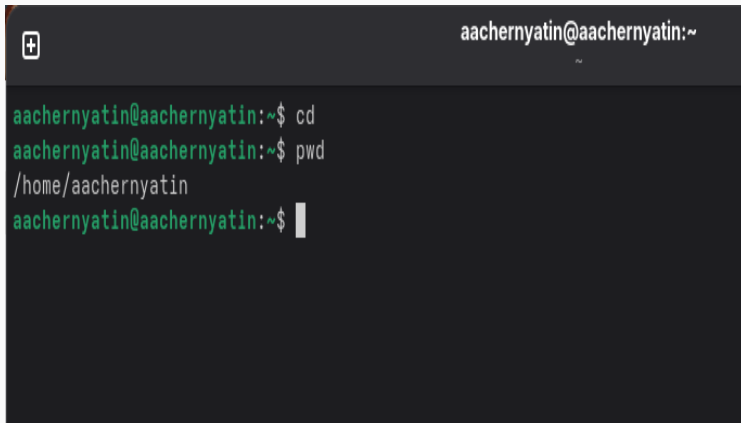
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

1.2 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`.

2. Процесс выполнения лабораторной работы

2.1 Имя и путь к домашнему каталогу



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

Рисунок 1: Путь к домашнему каталогу

2.2 Опции команды ls

```
aachernyatin@aachernyatin:~$ cd /tmp
aachernyatin@aachernyatin:/tmp$ ls
13d13f5a-cc0e-4ebe-8507-a29c01649936.zip
hsperfdata_aachernyatin
node-compile-cache
par-6161636865726e796174696e
snap-private-tmp
systemd-private-29c93401c92a45c5888046ec9e0c56ff-abrt.service-s8BCQ1
systemd-private-29c93401c92a45c5888046ec9e0c56ff-chrond.service-pfSkS6
systemd-private-29c93401c92a45c5888046ec9e0c56ff-colord.service-CqhcCU
systemd-private-29c93401c92a45c5888046ec9e0c56ff-dbus-broker.service-8Ic4FP
systemd-private-29c93401c92a45c5888046ec9e0c56ff-fwupd.service-M5PKZk
systemd-private-29c93401c92a45c5888046ec9e0c56ff-irqbalance.service-qxNJhx
systemd-private-29c93401c92a45c5888046ec9e0c56ff-low-memory-monitor.service-nQZPse
systemd-private-29c93401c92a45c5888046ec9e0c56ff-ModemManager.service-3ZpK7r
systemd-private-29c93401c92a45c5888046ec9e0c56ff-passim.service-HfCYWk
systemd-private-29c93401c92a45c5888046ec9e0c56ff-polkit.service-MR9bN4
systemd-private-29c93401c92a45c5888046ec9e0c56ff-rtkit-daemon.service-LuIjW6
systemd-private-29c93401c92a45c5888046ec9e0c56ff-switcheroo-control.service-z9s5r3
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-logind.service-71C1kd
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-oomd.service-SvLDJ0
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-resolved.service-5NoAH8
systemd-private-29c93401c92a45c5888046ec9e0c56ff-upower.service-cFUNSI
VMwareDnD
vmware-root_933-3988752732
aachernyatin@aachernyatin:/tmp$
```

Рисунок 2: Команда ls

2.3 Опции команды ls

```
aachernyatin@aachernyatin:/tmp$  
aachernyatin@aachernyatin:/tmp$ ls -la  
.  
..  
13d13f5a-cc0e-4ebe-8507-a29c01649936.zip  
font-unix  
hspcrfdata_aachernyatin  
ICE-unix  
node-compile-cache  
par-6161636865726e796174696e  
snap-private-tmp  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-abrt.service-s8BCQ1  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-chronyd.service-pf5kSG  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-colord.service-CqhcCU  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-dbus-broker.service-8Ic4FP  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-fwupd.service-M5PKZk  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-irqbalance.service-qxNJhx  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-low-memory-monitor.service-nQZPse  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-ModemManager.service-3ZpK7r  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-passim.service-HfCYWk  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-polkit.service-MR9bN4  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-rtkit-daemon.service-LuIjW6  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-switcheroo-control.service-z9s5r3  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-logind.service-71C1kd  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-oomd.service-SvldJ0  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-resolved.service-5NoAH8  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-upower.service-cFUNSI  
VMwareDnD  
vmware-root_933-3988752732  
.X0-lock  
.X1024-lock  
.X1025-lock  
X11-unix  
.X1-lock  
XIM-unix  
aachernyatin@aachernyatin:/tmp$
```

Рисунок 3: Команда ls -la

2.4 Опции команды ls

```
aachernyatin@aachernyatin:/tmp$ ls -l
total 3812
-rw-r--r--. 1 aachernyatin aachernyatin 3988964 Dec  8 16:43 13d13f5a-cc0e-4ebe-8507-a29c01649936.zip
drwxr-xr-x. 2 aachernyatin aachernyatin      40 Dec  8 17:25 hspcrdata_aachernyatin
drwxr-xr-x. 3 aachernyatin aachernyatin      60 Dec  8 17:40 node-compile-cache
drwx-----. 3 aachernyatin aachernyatin      60 Dec  8 17:15 par-6161636865726e796174696e
drwx-----. 2 root        root              40 Dec  8 16:33 snap-private-tmp
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-abrt.service-s8BCQl
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-chrond.service-pfSKSG
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-colord.service-CqhcCU
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-dbus-broker.service-8lc4FP
drwx-----. 3 root        root              60 Dec  8 16:38 systemd-private-29c93401c92a45c5888046ec9e0c56ff-fwupd.service-W5PKZk
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-irqbalance.service-qxJjhx
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-low-memory-monitor.service-nQZPse
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-ModemManager.service-3ZpK7r
drwx-----. 3 root        root              60 Dec  8 16:39 systemd-private-29c93401c92a45c5888046ec9e0c56ff-passim.service-HfCYWk
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-polkit.service-WR9bN4
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-rtkit-daemon.service-LuijW6
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-switcheroo-control.service-z9s5r3
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-logind.service-71C1kd
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-oomd.service-SvLDJO
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-resolved.service-5NoAH8
drwx-----. 3 root        root              60 Dec  8 16:33 systemd-private-29c93401c92a45c5888046ec9e0c56ff-upower.service-cFUNSI
drwxrwxrwt. 2 aachernyatin aachernyatin    380 Dec  8 18:13 vmware0n0
drwx-----. 2 root        root              40 Dec  8 16:33 vmware-root_933-3988752732
aachernyatin@aachernyatin:/tmp$
```

Рисунок 4: Команда ls -l

2.5 Опции команды ls

```
aachernyatin@aachernyatin: /tmp$  
aachernyatin@aachernyatin: /tmp$ ls -f  
.  
..  
node-compile-cache  
hspcrfdata_aachernyatin  
par-6161636865726e796174696e  
VMwareDnD  
13d13f5a-cc0e-4ebe-8507-a29c01649936.zip  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-passim.service-HfCYWk  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-fwupd.service-M5PKZk  
.X1-lock  
.X0-lock  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-colord.service-CqhcCU  
.X1025-lock  
.X1024-lock  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-ModemManager.service-3ZpK7r  
vmware-root_933-3988752732  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-upower.service-cFUNSI  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-logind.service-71C1kd  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-switcheroo-control.service-z9s5r3  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-rtkit-daemon.service-LuIjW6  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-polkit.service-MR9bN4  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-low-memory-monitor.service-nQZPse  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-chrond.service-pfSkSG  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-irqbalance.service-qxNJhx  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-abrt.service-s8BCQL  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-dbus-broker.service-8ic4FP  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-resolved.service-5NoA8B  
systemd-private-29c93401c92a45c5888046ec9e0c56ff-systemd-oomd.service-SvldJO  
.font-unix  
.XIM-unix  
.ICE-unix  
.X11-unix  
snap-private-tmp  
aachernyatin@aachernyatin: /tmp$
```

Рисунок 5: Команда ls -f

2.6 Каталог /var/spool

```
aachernyatin@aachernyatin:/tmp$  
aachernyatin@aachernyatin:/tmp$ cd /var/spool/  
aachernyatin@aachernyatin:/var/spool$ ls -l  
total 0  
drwxr-x--x. 1 root abrt 72 Dec 8 17:17 abrt  
drwx-----. 1 abrt abrt 0 Jan 16 2025 abrt-upload  
drwxr-xr-x. 1 root root 66 Apr 9 2025 anacron  
drwx-----. 1 root root 18 Apr 9 2025 at  
drwx-----. 1 root root 0 Jan 27 2025 cron  
drwx--x---. 1 root lp 6 Apr 9 2025 cups  
drwxr-xr-x. 1 root root 0 Jan 16 2025 lpd  
drwxrwxr-x. 1 root mail 302 Dec 8 16:33 mail  
drwxr-xr-x. 1 root root 0 Mar 6 2025 plymouth  
aachernyatin@aachernyatin:/var/spool$
```

Рисунок 6: Каталог /var/spool

2.7 Домашний каталог

```
aachernyatin@aachernyatin:/var/spool$ cd
aachernyatin@aachernyatin:~$ ls
Desktop  Documents  Downloads  git-extended  Music  Pictures  Public  Templates  Videos  work
aachernyatin@aachernyatin:~$ ls -al
total 24
drwx-----. 1 aachernyatin aachernyatin 346 Dec  8 17:42 .
drwxr-xr-x. 1 root         root         302 Dec  8 16:33 ..
-rw-----. 1 aachernyatin aachernyatin 2853 Dec  8 18:13 .bash_history
-rw-r--r--. 1 aachernyatin aachernyatin  18 Nov  8 2024 .bash_logout
-rw-r--r--. 1 aachernyatin aachernyatin 144 Nov  8 2024 .bash_profile
-rw-r--r--. 1 aachernyatin aachernyatin 682 Dec  8 17:40 .bashrc
drwx-----. 1 aachernyatin aachernyatin 512 Dec  8 17:45 .cache
drwx-----. 1 aachernyatin aachernyatin 346 Dec  8 17:45 .config
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Desktop
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Documents
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Downloads
-rw-r--r--. 1 aachernyatin aachernyatin 334 Aug 17 03:00 .emacs
-rw-r--r--. 1 aachernyatin aachernyatin 236 Dec  8 17:06 .gitconfig
drwxr-xr-x. 1 aachernyatin aachernyatin  74 Dec  8 17:55 git-extended
drwx-----. 1 aachernyatin aachernyatin 136 Dec  8 17:02 .gnupg
drwx-----. 1 aachernyatin aachernyatin  20 Dec  8 16:38 .local
drwxr-xr-x. 1 aachernyatin aachernyatin  48 Dec  8 16:42 .mozilla
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Music
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Pictures
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Public
drwx-----. 1 aachernyatin aachernyatin 132 Dec  8 17:08 .ssh
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Templates
drwxr-xr-x. 1 aachernyatin aachernyatin   0 Dec  8 16:38 Videos
drwxr-xr-x. 1 aachernyatin aachernyatin  10 Dec  8 17:08 work
aachernyatin@aachernyatin:~$ █
```

Рисунок 7: Файлы в домашнем каталоге

2.8 Работа с каталогами

```
aachernyatin@aachernyatin:~$  
aachernyatin@aachernyatin:~$ mkdir newdir  
aachernyatin@aachernyatin:~$ mkdir newdir/morefun  
aachernyatin@aachernyatin:~$ mkdir letters memo misk  
aachernyatin@aachernyatin:~$ ls  
Desktop Documents Downloads git-extended letters memo misk Music newdir Pictures Public Templates Videos work  
aachernyatin@aachernyatin:~$ rm letters/ memo/ misk/  
rm: cannot remove 'letters/': Is a directory  
rm: cannot remove 'memo/': Is a directory  
rm: cannot remove 'misk/': Is a directory  
aachernyatin@aachernyatin:~$ rm -r letters/ memo/ misk/  
aachernyatin@aachernyatin:~$ rm -r newdir/  
aachernyatin@aachernyatin:~$ ls  
Desktop Documents Downloads git-extended Music Pictures Public Templates Videos work  
aachernyatin@aachernyatin:~$
```

Рисунок 8: Действия с каталогами

2.9 Опции команды ls

```
./work/study/2025-2026/Операционные системы/os-intro/template/report/report/_assets':
preamble.tex

./work/study/2025-2026/Операционные системы/os-intro/template/report/report/bib':
cite.bib

./work/study/2025-2026/Операционные системы/os-intro/template/report/report/image':
solvay.jpg

./work/study/2025-2026/Операционные системы/os-intro/template/report/report/_resources':
csl

./work/study/2025-2026/Операционные системы/os-intro/template/report/report/_resources/csl':
gost-r-7-0-5-2008-numeric.csl

./work/study/2025-2026/Операционные системы/os-intro/template/report/scripts':
image-report mpv-shot
aachernyatin@aachernyatin:~$ ls -t
git-extended work Desktop Documents Downloads Music Pictures Public Templates Videos
aachernyatin@aachernyatin:~$
```

Рисунок 9: Команда ls -R и ls -t

2.10 Справка по командам

```
aachernyatin@aachernyatin:~$ help cd
cd: cd [-L|[-P [-e]] [-@]] [dir]
    Change the shell working directory.

    Change the current directory to DIR.  The default DIR is the value of the
    HOME shell variable.  If DIR is "-", it is converted to $OLDPWD.

    The variable CDPATH defines the search path for the directory containing
    DIR.  Alternative directory names in CDPATH are separated by a colon (:).
    A null directory name is the same as the current directory.  If DIR begins
    with a slash (/), then CDPATH is not used.

    If the directory is not found, and the shell option `cdable_vars' is set,
    the word is assumed to be a variable name.  If that variable has a value,
    its value is used for DIR.

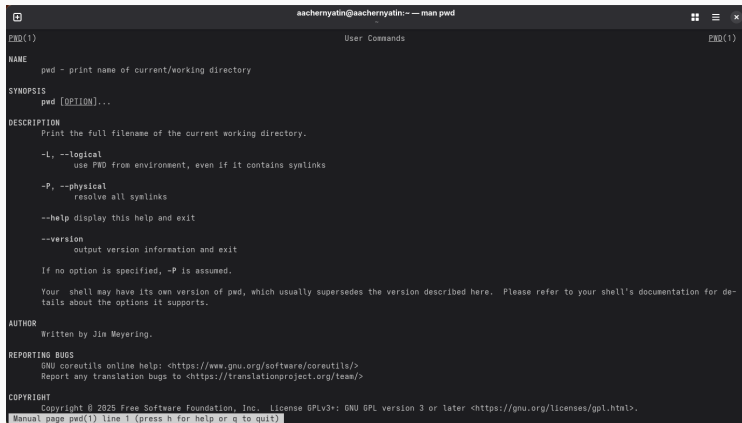
Options:
  -L      force symbolic links to be followed: resolve symbolic
          links in DIR after processing instances of `..'
  -P      use the physical directory structure without following
          symbolic links: resolve symbolic links in DIR before
          processing instances of `..'
  -e      if the -P option is supplied, and the current working
          directory cannot be determined successfully, exit with
          a non-zero status
  -@      on systems that support it, present a file with extended
          attributes as a directory containing the file attributes

The default is to follow symbolic links, as if `-L' were specified.
`..' is processed by removing the immediately previous pathname component
back to a slash or the beginning of DIR.

Exit Status:
Returns 0 if the directory is changed, and if $PWD is set successfully when
-P is used; non-zero otherwise.
aachernyatin@aachernyatin:~$
```

Рисунок 10: Справка по команде cd

2.11 Справка по командам



```
aachernyatin@aachernyatin:~ — 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
        resolve all symlinks

  --help display this help and exit

  --version
        output version information and exit

  If no option is specified, -P is assumed.

  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.

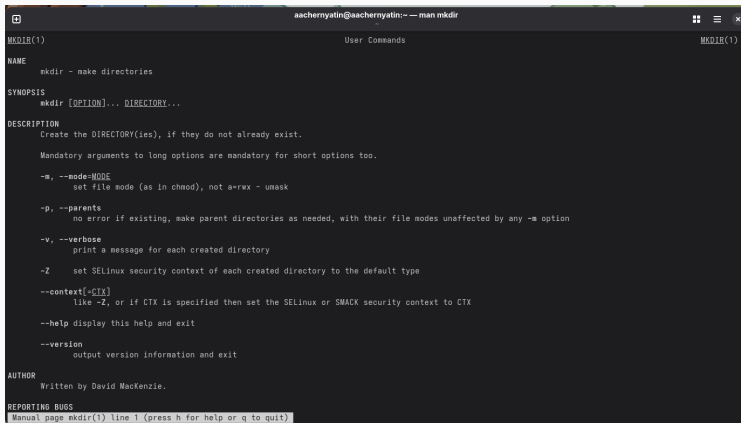
AUTHOR
  Written by Jim Meyering.

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

COPYRIGHT
  Copyright © 2025 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
  Manual page pwd(1) line 1 (press h for help or q to quit)
```

Рисунок 11: Справка по команде pwd

2.12 Справка по командам



```
aachernyatin@aachernyatin:~ -- 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

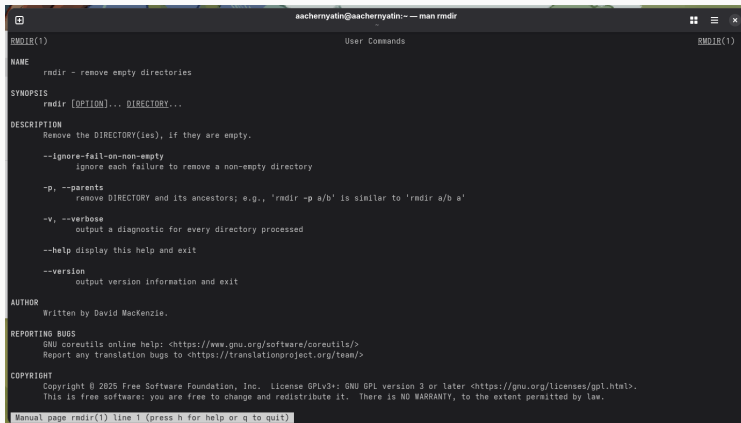
    --version
        output version information and exit

AUTHOR
    Written by David MacKenzie.

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

Рисунок 12: Справка по команде mkdir

2.13 Справка по командам



```
aachernyatin@aachernyatin:~ — 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.

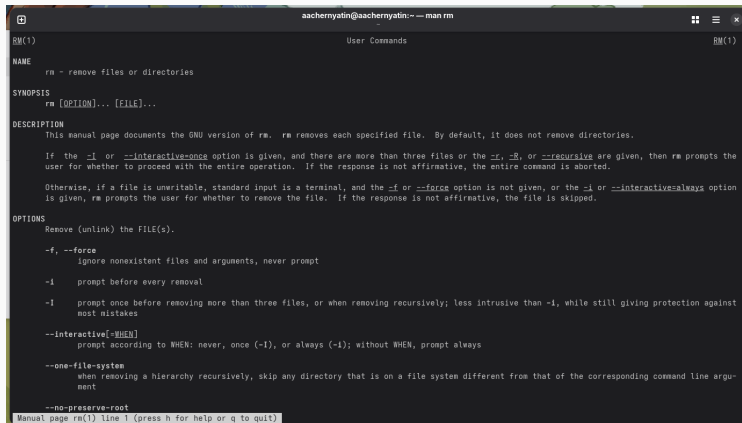
REPORTING BUGS
    GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
    Report any translation bugs to <https://translationproject.org/team/>

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    This is free software: you are free to change and redistribute it.  There is NO WARRANTY, to the extent permitted by law.

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

Рисунок 13: Справка по команде rmdir

2.14 Справка по командам



```
aachernyatin@aachernyatin:~ -- 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 always

  --one-file-system
        when removing a hierarchy recursively, skip any directory that is on a file system different from that of the corresponding command line argument

  --no-preserve-root
Manual page rm(1) line 1 (press h for help or q to quit)
```

Рисунок 14: Справка по команде rm

2.15 История командной строки

```
120  ls -f
121  cd /var/spool/
122  ls -l
123  cd
124  ls
125  ls -al
126  mkdir newdir
127  mkdir newdir/morefun
128  mkdir letters memo misk
129  ls
130  rm letters/ memo/ misk/
131  rm -r letters/ memo/ misk/
132  rm -r newdir/
133  ls
134  ls -R
135  ls -t
136  help cd
137  man pwd
138  man mkdir
139  man rmdir
140  man rm
141  history
aachernyatin@aachernyatin:~$
```

Рисунок 15: Команда history

3. Выводы по проделанной работе

3.1 Вывод

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