

Операционные системы

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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Цели и задачи работы

Цель лабораторной работы

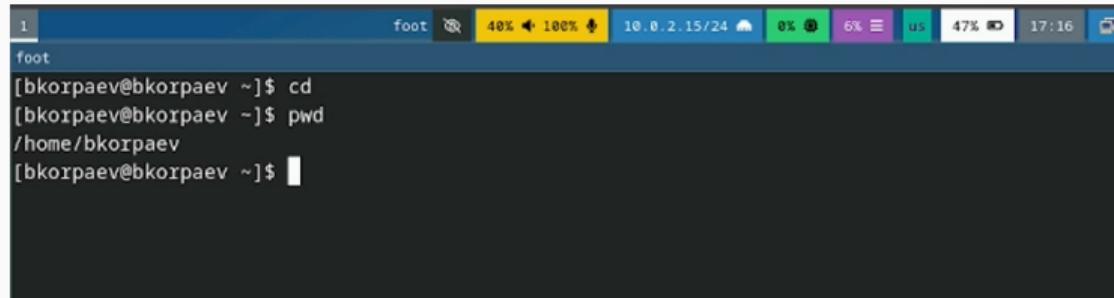
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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



The screenshot shows a terminal window with a blue header bar containing various icons and status information. The terminal itself has a dark background and displays the following command-line session:

```
1                               foot 40% 100% 10.0.2.15/24 0% 6% us 47% 17:16
foot
[bkorpaev@bkorpaev ~]$ cd
[bkorpaev@bkorpaev ~]$ pwd
/home/bkorpaev
[bkorpaev@bkorpaev ~]$
```

Рис. 1: Путь к домашнему каталогу

Опции команды ls

```
[bkorpaev@bkorpaev ~]$ cd /tmp
[bkorpaev@bkorpaev tmp]$ ls
sddm-auth-0a7a0fed-b5fa-488b-b473-3436cdfa5a93
sddm-MIfiwv
systemd-private-c55e284c64a041b2b8afe23b88df3949-abrtd.service-ghDkva
systemd-private-c55e284c64a041b2b8afe23b88df3949-chronyd.service-Nrv71Y
systemd-private-c55e284c64a041b2b8afe23b88df3949-dbus-broker.service-GJzp0G
systemd-private-c55e284c64a041b2b8afe23b88df3949-irqbalance.service-7gwNoQ
systemd-private-c55e284c64a041b2b8afe23b88df3949-ModemManager.service-7Ff6og
systemd-private-c55e284c64a041b2b8afe23b88df3949-polkit.service-40jw4T
systemd-private-c55e284c64a041b2b8afe23b88df3949-rtkit-daemon.service-mcvxie
systemd-private-c55e284c64a041b2b8afe23b88df3949-switcheroo-control.service-581T2P
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-logind.service-uCYDjb
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-oomd.service-nRPp0Y
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-resolved.service-sNWhPb
systemd-private-c55e284c64a041b2b8afe23b88df3949-upower.service-8tZDWI
[bkorpaev@bkorpaev tmp]$ █
```

Рис. 2: Команда ls

Опции команды ls

```
[bkorpaev@bkorpaev tmp]$ ls -a
.
..
,.font-unix
,.ICE-unix
sddm-auth-0a7a0fed-b5fa-488b-b473-3436cd5a5a93
sddm--Mifiwv
systemd-private-c55e284c64a041b2b8afe23b88df3949-abrt.service-ghDkva
systemd-private-c55e284c64a041b2b8afe23b88df3949-chrony.service-Nrv71Y
systemd-private-c55e284c64a041b2b8afe23b88df3949-dbus-broker.service-GJzp0G
systemd-private-c55e284c64a041b2b8afe23b88df3949-irqbalance.service-7gwNoQ
systemd-private-c55e284c64a041b2b8afe23b88df3949-ModemManager.service-7Ff6og
systemd-private-c55e284c64a041b2b8afe23b88df3949-polkit.service-40jw4T
systemd-private-c55e284c64a041b2b8afe23b88df3949-rtkit-daemon.service-mcvxie
systemd-private-c55e284c64a041b2b8afe23b88df3949-swswitcheroo-control.service-5BLT2P
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-logind.service-uCYDjb
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-oomd.service-nRPp0Y
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-resolved.service-sNWhPb
systemd-private-c55e284c64a041b2b8afe23b88df3949-upower.service-8tZDWI
.X0-lock
.X11-unix
.XIM-unix
[bkorpaev@bkorpaev tmp]$
```

Рис. 3: Команда ls -a

Опции команды ls

```
[bkorpaev@bkorpaev tmp]$ ls -l
итого 0
srwxr-xr-x. 1 root root 0 мар 20 17:15 sddm-auth-0a7a0fed-b5fa-488b-b473-3436cdfa5a93
srwx----- 1 sddm sddm 0 мар 20 17:15 sddm-Mifiwv
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-abx
td.service-ghDkva
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-chrx
onyd.service-Nrv71Y
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-dbu
s-broker.service-GJzp0G
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-irq
balance.service-7gwNoQ
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-Mod
emManager.service-7Ff6og
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-pol
Kit.service-40jw4T
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-rtk
it-daemon.service-mcvxie
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-swi
tcheroo-control.service-58lt2P
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-sys
temd-logind.service-uCYDjb
drwx----- 3 root root 60 мар 20 17:15 systemd-private-c55e284c64a041b2b8afe23b88df3949-sys
```

Рис. 4: Команда ls -l

Опции команды ls

```
[bkorpaev@bkorpaev tmp]$ ls -f
.
..
.X0-lock
sddm--MIfiwv
sddm-auth-0a7a0fed-b5fa-488b-b473-3436cd5a93
systemd-private-c55e284c64a041b2b8afe23b88df3949-ModemManager.service-7Ff6og
systemd-private-c55e284c64a041b2b8afe23b88df3949-upower.service-8tZDWI
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-logind.service-uCYDjb
systemd-private-c55e284c64a041b2b8afe23b88df3949-switcheroo-control.service-5BLT2P
systemd-private-c55e284c64a041b2b8afe23b88df3949-rtkit-daemon.service-mcvxie
systemd-private-c55e284c64a041b2b8afe23b88df3949-polkit.service-40jw4T
systemd-private-c55e284c64a041b2b8afe23b88df3949-chronyd.service-Nrv71Y
systemd-private-c55e284c64a041b2b8afe23b88df3949-irqbalance.service-7gwNoQ
systemd-private-c55e284c64a041b2b8afe23b88df3949-abrtd.service-ghDkva
systemd-private-c55e284c64a041b2b8afe23b88df3949-dbus-broker.service-GJzp0G
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-resolved.service-sNWhPb
systemd-private-c55e284c64a041b2b8afe23b88df3949-systemd-oomd.service-nRPpOY
.font-unix
.XIM-unix
.ICE-unix
.X11-unix
[bkorpaev@bkorpaev tmp]$ █
```

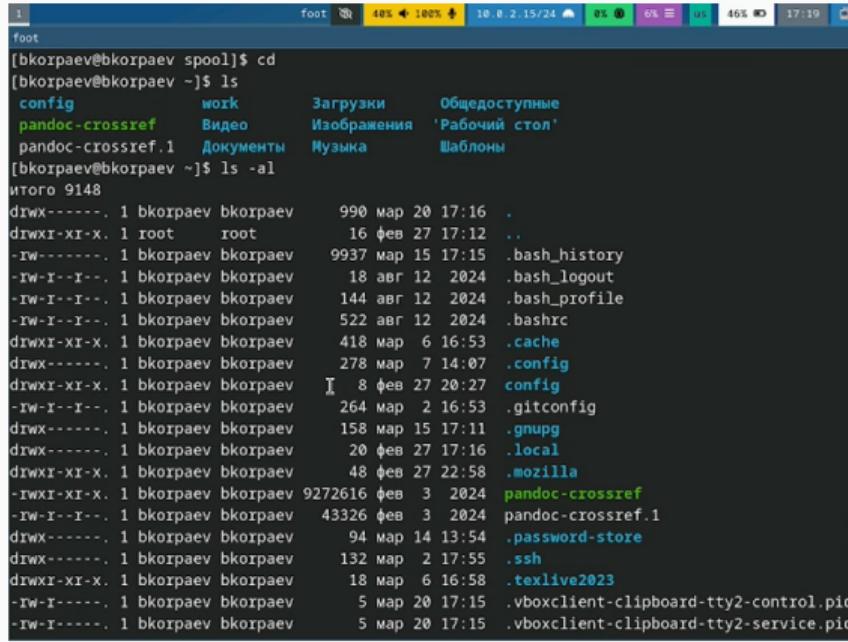
Рис. 5: Команда ls -f

Каталог /var/spool

```
[bkorpaev@bkorpaev tmp]$ cd /var/spool/
[bkorpaev@bkorpaev spool]$ ls -al
итого 0
drwxr-xr-x. 1 root root 94 окт 24 17:50 .
drwxr-xr-x. 1 root root 194 окт 24 17:53 ..
drwxr-x--x. 1 root abrt 70 мар 15 17:15 abrt
drwx----- 1 abrt abrt 0 ноя 20 03:00 abrt-upload
drwxr-xr-x. 1 root root 66 окт 24 17:49 anacron
drwx----- 1 root root 18 окт 24 17:50 at
drwx----- 1 root root 0 июл 17 2024 cron
drwxr-x--- 1 root lp 6 янв 7 03:00 cups
drwxr-xr-x. 1 root root 0 июл 17 2024 lpd
drwxrwxr-x. 1 root mail 22 фев 27 17:12 mail
drwxr-xr-x. 1 root root 0 сен 21 03:00 plymouth
[bkorpaev@bkorpaev spool]$
```

Рис. 6: Каталог /var/spool

Домашний каталог

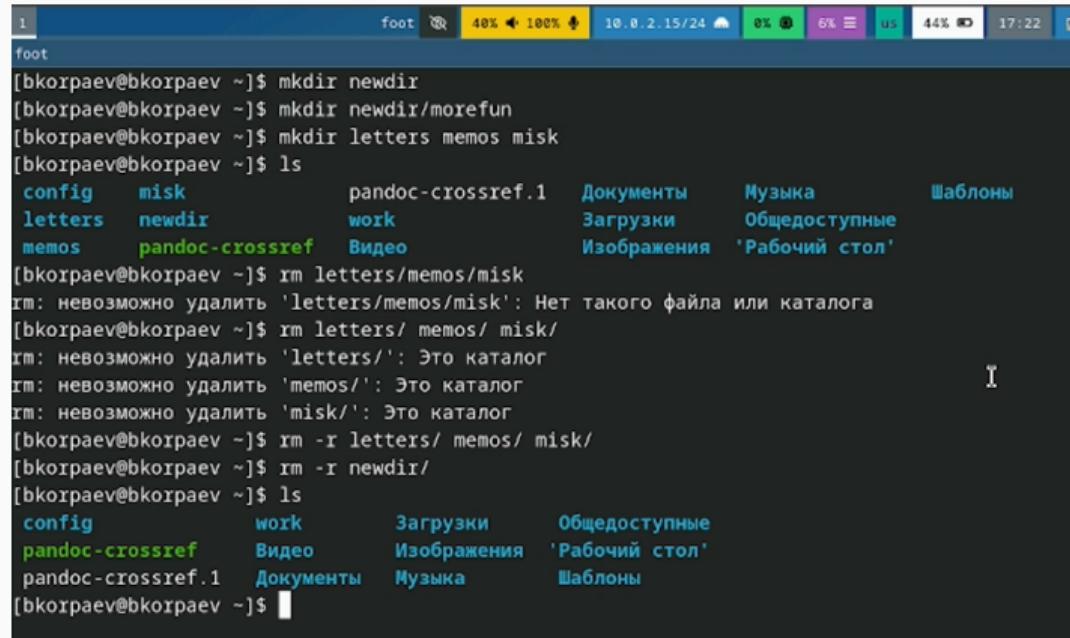


The screenshot shows a terminal window with the following command history and file listing:

```
[bkorraev@bkorraev spool]$ cd
[bkorraev@bkorraev ~]$ ls
config          work      Загрузки    Общедоступные
pandoc-crossref   Видео     Изображения 'Рабочий стол'
pandoc-crossref.1 Документы Музыка      Шаблоны
[bkorraev@bkorraev ~]$ ls -al
итого 9148
drwx----- 1 bkorraev bkorraev  990 мар 20 17:16 .
drwxr-xr-x  1 root      root      16 фев 27 17:12 ..
-rw----- 1 bkorraev bkorraev 9937 мар 15 17:15 .bash_history
-rw-r--r-- 1 bkorraev bkorraev 18 авг 12 2024 .bash_logout
-rw-r--r-- 1 bkorraev bkorraev 144 авг 12 2024 .bash_profile
-rw-r--r-- 1 bkorraev bkorraev 522 авг 12 2024 .bashrc
drwxr-xr-x  1 bkorraev bkorraev 418 мар 6 16:53 .cache
drwx----- 1 bkorraev bkorraev 278 мар 7 14:07 .config
drwxr-xr-x  1 bkorraev bkorraev  8 фев 27 20:27 config
-rw-r--r-- 1 bkorraev bkorraev 264 мар 2 16:53 .gitconfig
drwx----- 1 bkorraev bkorraev 158 мар 15 17:11 .gnupg
drwx----- 1 bkorraev bkorraev 20 фев 27 17:16 .local
drwxr-xr-x  1 bkorraev bkorraev 48 фев 27 22:58 .mozilla
-rwxr-xr-x  1 bkorraev bkorraev 9272616 фев 3 2024 pandoc-crossref
-rw-r--r-- 1 bkorraev bkorraev 43326 фев 3 2024 pandoc-crossref.1
drwx----- 1 bkorraev bkorraev 94 мар 14 13:54 .password-store
drwx----- 1 bkorraev bkorraev 132 мар 2 17:55 .ssh
drwxr-xr-x  1 bkorraev bkorraev 18 мар 6 16:58 .texlive2023
-rw-r----- 1 bkorraev bkorraev 5 мар 20 17:15 .vboxclient-clipboard-tty2-control.pid
-rw-r----- 1 bkorraev bkorraev 5 мар 20 17:15 .vboxclient-clipboard-tty2-service.pid
```

Рис. 7: Файлы в домашнем каталоге

Работа с каталогами



The screenshot shows a terminal window titled 'foot' with a blue header bar containing various icons and status information. The main area of the terminal displays a series of commands being run by the user [bkorpaev@bkorpaev ~]. The commands include creating new directories ('mkdir newdir', 'mkdir newdir/morefun', 'mkdir letters memos misk'), listing files ('ls'), and attempting to remove specific files and directories ('rm letters/memos/misk', 'rm letters/ memos/ misk/'). The terminal also shows the results of these operations, including error messages for the removal attempts. The background of the terminal window is dark, and the text is white or light-colored.

```
[bkorpaev@bkorpaev ~]$ mkdir newdir
[bkorpaev@bkorpaev ~]$ mkdir newdir/morefun
[bkorpaev@bkorpaev ~]$ mkdir letters memos misk
[bkorpaev@bkorpaev ~]$ ls
config      misk          pandoc-crossref.1    Документы     Музыка       Шаблоны
letters     newdir        work              Загрузки     Общедоступные
memos       pandoc-crossref  Видео            Изображения 'Рабочий стол'
[bkorpaev@bkorpaev ~]$ rm letters/memos/misk
rm: невозможно удалить 'letters/memos/misk': Нет такого файла или каталога
[bkorpaev@bkorpaev ~]$ rm letters/ memos/ misk/
rm: невозможно удалить 'letters/': Это каталог
rm: невозможно удалить 'memos/': Это каталог
rm: невозможно удалить 'misk/': Это каталог
[bkorpaev@bkorpaev ~]$ rm -r letters/ memos/ misk/
[bkorpaev@bkorpaev ~]$ rm -r newdir/
[bkorpaev@bkorpaev ~]$ ls
config      work          Загрузки     Общедоступные
pandoc-crossref  Видео        Изображения 'Рабочий стол'
pandoc-crossref.1  Документы   Музыка       Шаблоны
[bkorpaev@bkorpaev ~]$
```

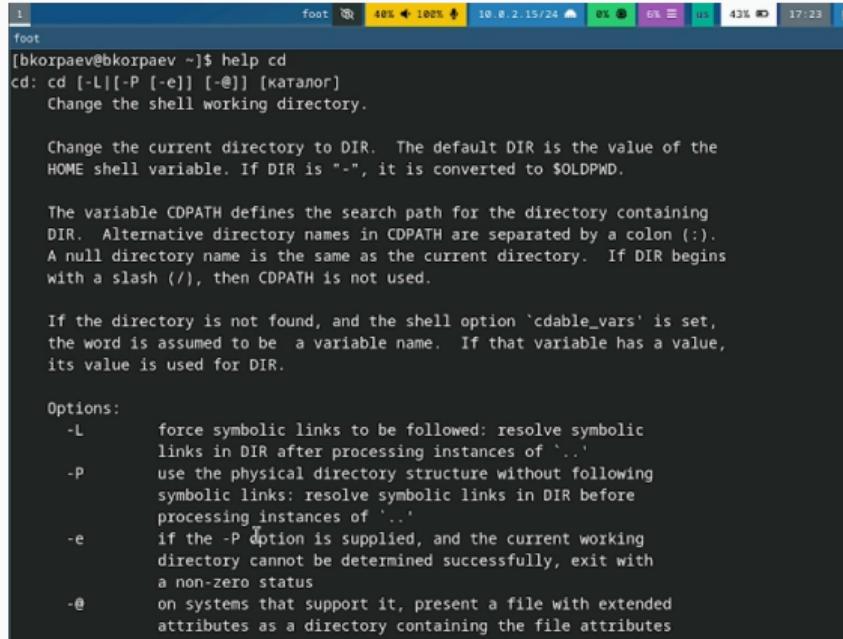
Рис. 8: Действия с каталогами

Опции команды ls

```
[bkorpaev@bkorpaev ~]$ ls -t
Загрузки    Изображения    Видео        Музыка        Шаблоны      pandoc-crossref
work        config          Документы    Общедоступные  'Рабочий стол'  pandoc-crossref.1
[bkorpaev@bkorpaev ~]$ █
```

Рис. 9: Команда ls -R и ls -t

Справка по командам



foot 48% 100% 10.8.2.15/24 0% 6% us 43% 17:23

```
[bkorpaev@bkorpaev ~]$ help cd
cd: cd [-L][-P [-e]] [-@] [каталог]
      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.

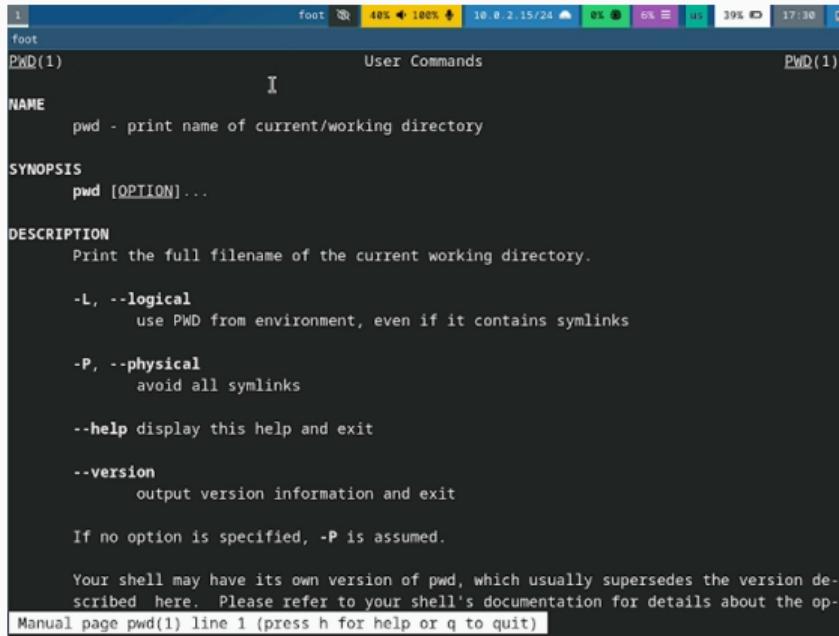
The variable CDPATH defines the search path for the directory containing
DIR. Alternative directory names in CDPATH are separated by a colon (:).
A null directory name is the same as the current directory. If DIR begins
with a slash (/), then CDPATH is not used.

If the directory is not found, and the shell option 'cable_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
```

Рис. 10: Справка по команде cd

Справка по командам



The screenshot shows a terminal window with the following content:

```
1          foot 48% 100% 10.0.2.15/24 0% 6% 0% 39% 17:30
foot
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

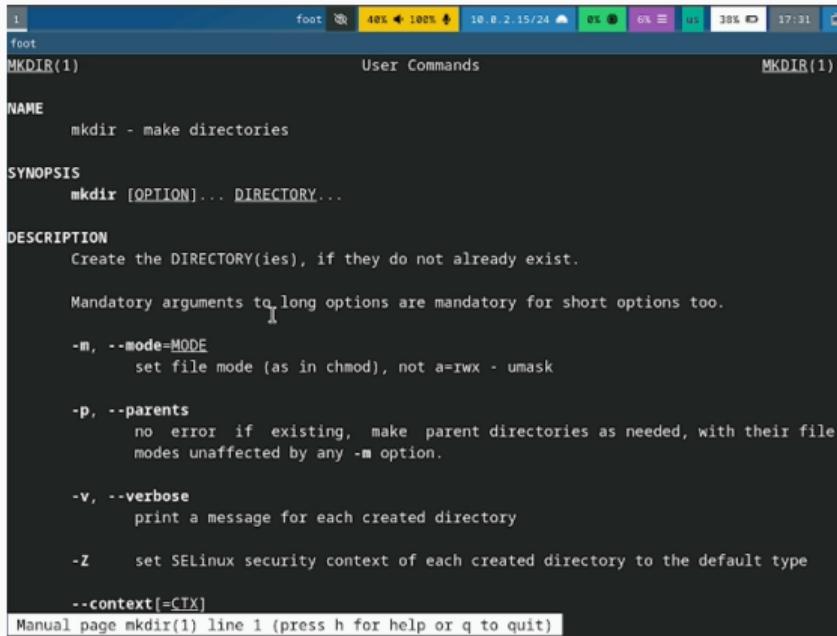
    --version
        output version information and exit

    If no option is specified, -P is assumed.

    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 op-
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 "foot" with a blue header bar containing various icons. The main area displays the man page for the "mkdir" command. The page is titled "MKDIR(1)" and includes sections for "NAME", "SYNOPSIS", "DESCRIPTION", and "OPTIONS". The "DESCRIPTION" section explains that "mkdir" creates directories. The "OPTIONS" section lists several flags: "-m", "--mode=MODE", "-p", "--parents", "-v", "--verbose", "-Z", and "--context[=CTX]". A note states that mandatory arguments to long options are also mandatory for short options. The bottom of the terminal window shows a status bar with the text "Manual page mkdir(1) line 1 (press h for help or q to quit)".

```
1                               foot 48% 100% 10.0.2.15/24 8% 8% 38% 17:31
foot
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]
Manual page mkdir(1) line 1 (press h for help or q to quit)
```

Рис. 12: Справка по команде mkdir

Справка по командам

```
1          foot 48% 100% 10.8.2.15/24 0% 6% 0% 38% 17:31
foot
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

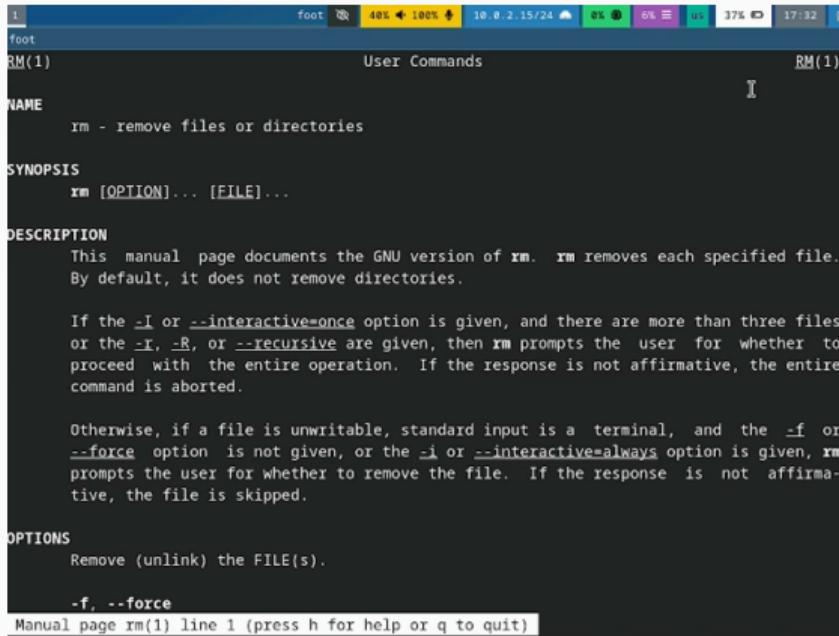
    --help display this help and exit

    --version
        output version information and exit

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

Рис. 13: Справка по команде rmdir

Справка по командам



The screenshot shows a terminal window with the following details:

- Terminal title: foot
- Terminal status bar: 40% 100% 10.0.2.15/24 0% 6% 37% 17:32
- Content:
 - 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**

Рис. 14: Справка по команде rm

История командной строки

```
133 ls -al
134 mkdir newdir
135 mkdir newdir/morefun
136 mkdir letters memos misk
137 ls
138 rm letters/ memos/ misk/
139 rm -r letters/ memos/ misk/
140 rm -r newdir/
141 ls
142 ls -R
143 ls -t
144 help cd
145 man pwd
146 man mkdir
147 man rmdir
148 man rm
149 history
```

Рис. 15: Команда history

Выводы по проделанной работе

Вывод

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