

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

Хассан Факи Абакар¹

2 марта, 2023, Москва, Россия

¹Российский Университет Дружбы Народов

Цели и задачи работы

Цель лабораторной работы

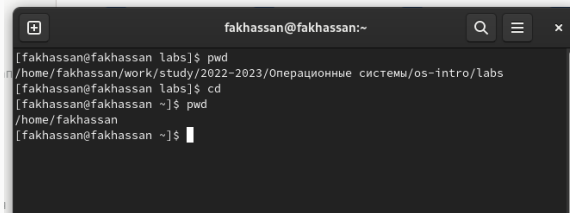
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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

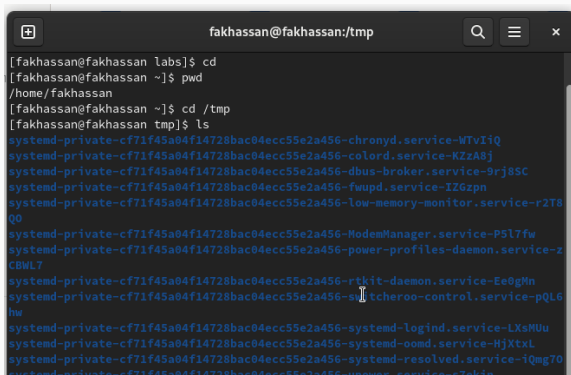
Имя и путь к домашнему каталогу



```
fakhassan@fakhassan:~  
[fakhassan@fakhassan labs]$ pwd  
/home/fakhassan/work/study/2022-2023/Операционные системы/os-intro/labs  
[fakhassan@fakhassan labs]$ cd  
[fakhassan@fakhassan ~]$ pwd  
/home/fakhassan  
[fakhassan@fakhassan ~]$
```

Рис. 1: Путь к домашнему каталогу

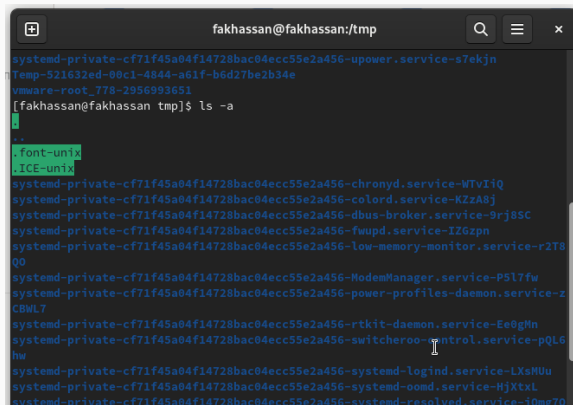
Опции команды ls



```
fakhassan@fakhassan:/tmp
[fakhassan@fakhassan labs]$ cd
[fakhassan@fakhassan ~]$ pwd
/home/fakhassan
[fakhassan@fakhassan ~]$ cd /tmp
[fakhassan@fakhassan tmp]$ ls
systemd-private-cf71f45a04f14728bac04ecc55e2a456-chrond.service-WTvIiQ
systemd-private-cf71f45a04f14728bac04ecc55e2a456-colord.service-KZzA8j
systemd-private-cf71f45a04f14728bac04ecc55e2a456-dbus-broker.service-9rj8SC
systemd-private-cf71f45a04f14728bac04ecc55e2a456-fwupd.service-IZGzpn
systemd-private-cf71f45a04f14728bac04ecc55e2a456-low-memory-monitor.service-r2T8
QQ
systemd-private-cf71f45a04f14728bac04ecc55e2a456-ModemManager.service-P5l7fw
systemd-private-cf71f45a04f14728bac04ecc55e2a456-power-profiles-daemon.service-Z
CBWL7
systemd-private-cf71f45a04f14728bac04ecc55e2a456-rtkit-daemon.service-Ee0gMn
systemd-private-cf71f45a04f14728bac04ecc55e2a456-sudo.service-pQL6
hw
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-logind.service-LXsMUu
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-oomd.service-HjXtXL
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-resolved.service-iQmg70
systemd-private-cf71f45a04f14728bac04ecc55e2a456-unpower.service-s7ekin
```

Рис. 2: Команда ls

Опции команды ls

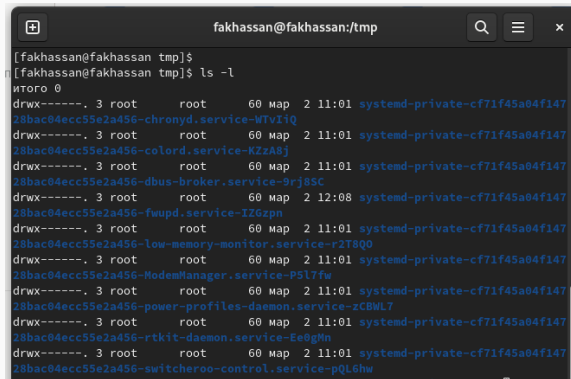


A terminal window titled 'fakhassan@fakhassan:/tmp' with search, menu, and close icons. The command '[fakhassan@fakhassan tmp]\$ ls -a' has been executed. The output lists hidden files and system services. Two files, '.font-unix' and '.ICE-unix', are highlighted with a green selection box. A vertical scrollbar is visible on the right side of the terminal output.

```
fakhassan@fakhassan:/tmp
systemd-private-cf71f45a04f14728bac04ecc55e2a456-upower.service-s7ekjn
Temp-521632ed-00c1-4844-a61f-b6d27be2b34e
vmware-root_778-2956993651
[fakhassan@fakhassan tmp]$ ls -a
.
..
.font-unix
.ICE-unix
systemd-private-cf71f45a04f14728bac04ecc55e2a456-chrond.service-WtVIiQ
systemd-private-cf71f45a04f14728bac04ecc55e2a456-colord.service-KZzA8j
systemd-private-cf71f45a04f14728bac04ecc55e2a456-dbus-broker.service-9rj8SC
systemd-private-cf71f45a04f14728bac04ecc55e2a456-fwupd.service-IZGzpn
systemd-private-cf71f45a04f14728bac04ecc55e2a456-low-memory-monitor.service-r2T8
Q0
systemd-private-cf71f45a04f14728bac04ecc55e2a456-ModemManager.service-P5l7fw
systemd-private-cf71f45a04f14728bac04ecc55e2a456-power-profiles-daemon.service-z
CBWL7
systemd-private-cf71f45a04f14728bac04ecc55e2a456-rtkit-daemon.service-Ee0gMn
systemd-private-cf71f45a04f14728bac04ecc55e2a456-switcheroo-control.service-pQL6
hw
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-logind.service-LXsMUu
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-oomd.service-HjXtxL
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-resolved.service-i0me70
```

Рис. 3: Команда ls -a

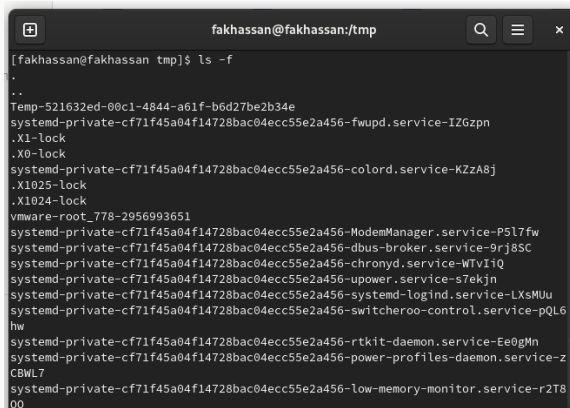
Опции команды ls



```
fakhassan@fakhassan:/tmp$ ls -l
итого 0
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-chronyd.service-WTviiQ
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-colord.service-KZzA8j
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-dbus-broker.service-9rj8SC
drwx-----, 3 root    root    60 map  2 12:08 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-fwupd.service-IZGzpn
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-low-memory-monitor.service-r2T8Q0
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-ModemManager.service-P5l7fw
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-power-profiles-daemon.service-zCBWL7
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-rtkit-daemon.service-Ee0gMn
drwx-----, 3 root    root    60 map  2 11:01 systemd-private-cf71f45a04f147
28bac04ecc55e2a456-switcheroo-control.service-pQL6hw
```

Рис. 4: Команда ls -l

Опции команды ls

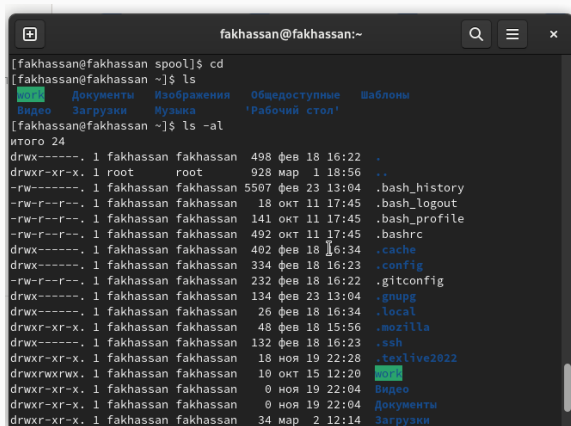
A terminal window with a dark background and light text. The title bar shows the user 'fakhassan' at host 'fakhassan' in directory '/tmp'. The prompt is '[fakhassan@fakhassan tmp]\$'. The command entered is 'ls -f'. The output lists various files and directories, including system services, locks, and hardware-related files.

```
fakhassan@fakhassan:/tmp$ ls -f
.
..
Temp-521632ed-00c1-4844-a61f-b6d27be2b34e
systemd-private-cf71f45a04f14728bac04ecc55e2a456-fwupd.service-IZGzpn
.X1-lock
.X0-lock
systemd-private-cf71f45a04f14728bac04ecc55e2a456-colord.service-KZzA8j
.X1025-lock
.X1024-lock
vmware-root_778-2956993651
systemd-private-cf71f45a04f14728bac04ecc55e2a456-ModemManager.service-P5l7fw
systemd-private-cf71f45a04f14728bac04ecc55e2a456-dbus-broker.service-9rj8SC
systemd-private-cf71f45a04f14728bac04ecc55e2a456-chronyd.service-WTvIiQ
systemd-private-cf71f45a04f14728bac04ecc55e2a456-upower.service-s7ekjn
systemd-private-cf71f45a04f14728bac04ecc55e2a456-systemd-logind.service-LXsMUu
systemd-private-cf71f45a04f14728bac04ecc55e2a456-switcheroo-control.service-pQL6
hw
systemd-private-cf71f45a04f14728bac04ecc55e2a456-rtkit-daemon.service-Ee0gMn
systemd-private-cf71f45a04f14728bac04ecc55e2a456-power-profiles-daemon.service-z
CBWL7
systemd-private-cf71f45a04f14728bac04ecc55e2a456-low-memory-monitor.service-r2T8
Q0
```

Рис. 5: Команда ls -f

```
[fakhassan@fakhassan tmp]$  
[fakhassan@fakhassan tmp]$  
[fakhassan@fakhassan tmp]$ cd /var/spool/  
[fakhassan@fakhassan spool]$ ls  
abrt abrt-upload cups lpd mail plymouth  
[fakhassan@fakhassan spool]$ ls -al  
итого 0  
drwxr-xr-x. 1 root root 68 авг 9 2022 .  
drwxr-xr-x. 1 root root 200 окт 1 11:36 ..  
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 934 мар 1 18:56 mail  
drwxr-xr-x. 1 root root 0 мар 7 2022 plymouth  
[fakhassan@fakhassan spool]$
```

Рис. 6: Каталог /var/spool



A terminal window titled 'fakhassan@fakhassan:~' showing the execution of 'ls' and 'ls -al' commands. The 'ls' command output shows a directory view with icons for 'work', 'Документы', 'Изображения', 'Общедоступные', and 'Шаблоны', as well as 'Видео', 'Загрузки', 'Музыка', and 'Рабочий стол'. The 'ls -al' command output shows a detailed listing of files and directories in the home directory.

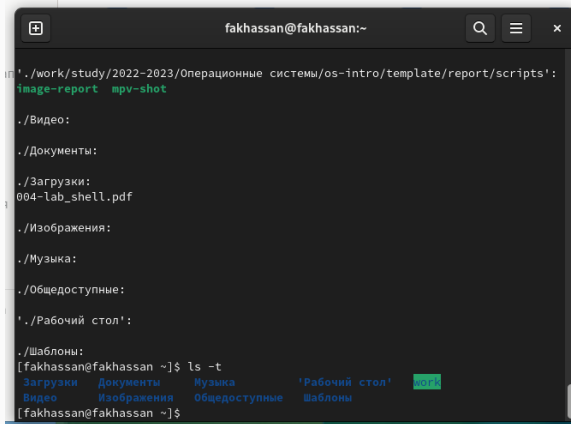
```
fakhassan@fakhassan:~$ cd
fakhassan@fakhassan ~$ ls
work  Документы  Изображения  Общедоступные  Шаблоны
Видео  Загрузки  Музыка  'Рабочий стол'
fakhassan@fakhassan ~$ ls -al
итого 24
drwx----- 1 fakhassan fakhassan 498 фев 18 16:22 .
drwxr-xr-x 1 root root 928 мар 1 18:56 ..
-rw----- 1 fakhassan fakhassan 5507 фев 23 13:04 .bash_history
-rw-r--r-- 1 fakhassan fakhassan 18 окт 11 17:45 .bash_logout
-rw-r--r-- 1 fakhassan fakhassan 141 окт 11 17:45 .bash_profile
-rw-r--r-- 1 fakhassan fakhassan 492 окт 11 17:45 .bashrc
drwx----- 1 fakhassan fakhassan 402 фев 18 16:34 .cache
drwx----- 1 fakhassan fakhassan 334 фев 18 16:23 .config
-rw-r--r-- 1 fakhassan fakhassan 232 фев 18 16:22 .gitconfig
drwx----- 1 fakhassan fakhassan 134 фев 23 13:04 .gnupg
drwx----- 1 fakhassan fakhassan 26 фев 18 16:34 .local
drwxr-xr-x 1 fakhassan fakhassan 48 фев 18 15:56 .mozilla
drwx----- 1 fakhassan fakhassan 132 фев 18 16:23 .ssh
drwxr-xr-x 1 fakhassan fakhassan 18 ноя 19 22:28 .texlive2022
drwxrwxrwx 1 fakhassan fakhassan 10 окт 15 12:20 work
drwxr-xr-x 1 fakhassan fakhassan 0 ноя 19 22:04 Видео
drwxr-xr-x 1 fakhassan fakhassan 0 ноя 19 22:04 Документы
drwxr-xr-x 1 fakhassan fakhassan 34 мар 2 12:14 Загрузки
```

Рис. 7: Файлы в домашнем каталоге

```
[fakhassan@fakhassan ~]$  
[fakhassan@fakhassan ~]$  
[fakhassan@fakhassan ~]$ mkdir newdir  
[fakhassan@fakhassan ~]$ mkdir newdir/morefun  
[fakhassan@fakhassan ~]$ mkdir letters memos misk  
[fakhassan@fakhassan ~]$ ls  
letters  misk  work  Документы  Изображения  Общедоступные  Шаблоны  
memos    newdir Видео  Загрузки  Музыка      'Рабочий стол'  
[fakhassan@fakhassan ~]$ rm letters/ memos/ misk/  
rm: невозможно удалить 'letters/': Это каталог  
rm: невозможно удалить 'memos/': Это каталог  
rm: невозможно удалить 'misk/': Это каталог  
[fakhassan@fakhassan ~]$ rm -r letters/ memos/ misk/  
[fakhassan@fakhassan ~]$ rm -r newdir/  
[fakhassan@fakhassan ~]$ sl  
bash: sl: команда не найдена...  
Аналогичная команда: 'ls'  
[fakhassan@fakhassan ~]$ ls  
work  Документы  Изображения  Общедоступные  Шаблоны  
Видео  Загрузки  Музыка      'Рабочий стол'  
[fakhassan@fakhassan ~]$
```

Рис. 8: Действия с каталогами

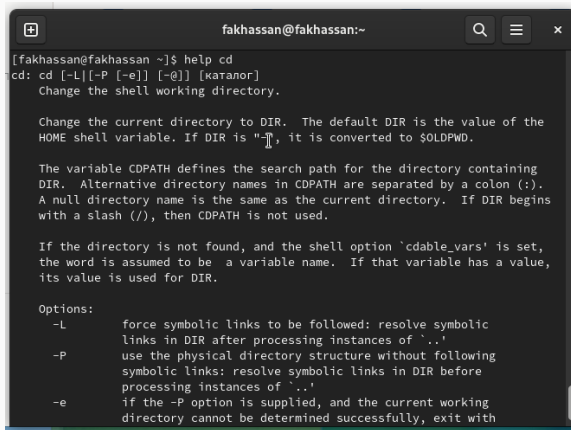
Опции команды ls



A terminal window titled 'fakhassan@fakhassan:~' showing a directory listing. The user has run 'ls -t' in the directory '/work/study/2022-2023/Операционные системы/os-intro/template/report/scripts/'. The output shows a list of directories and files sorted by modification time. The 'work' directory is highlighted in green.

```
fakhassan@fakhassan:~/work/study/2022-2023/Операционные системы/os-intro/template/report/scripts$ ls -t
Загрузки  Документы  Музыка  'Рабочий стол'  work
Видео     Изображения  Общедоступные  Шаблоны
004-lab_shell.pdf
```

Рис. 9: Команда ls -R и ls -t



```
fakhassan@fakhassan:~$ help cd
cd: cd [-L|[-P [-e]] [-@]] [катанор]
    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.

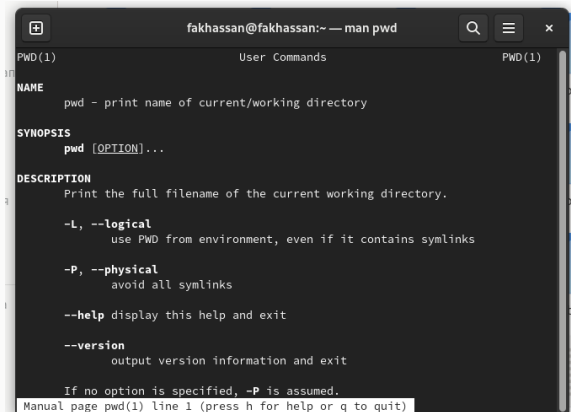
    The variable CDPATH defines the search path for the directory containing
    DIR.  Alternative directory names in CDPATH are separated by a colon (:).
    A null directory name is the same as the current directory.  If DIR begins
    with a slash (/), then CDPATH is not used.

    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
```

Рис. 10: Справка по команде cd

Справка по командам



The image shows a terminal window with a dark background. The title bar at the top reads 'fakhassan@fakhassan:~ — man pwd'. Below the title bar, the text 'PWD(1)' appears on both the left and right sides. The main content of the window is the manual page for the 'pwd' command, which is organized into sections: NAME, SYNOPSIS, and DESCRIPTION. The NAME section states 'pwd - print name of current/working directory'. The SYNOPSIS section shows 'pwd [OPTION]...'. The DESCRIPTION section explains that 'Print the full filename of the current working directory.' and lists several options: '-L, --logical' (use PWD from environment, even if it contains symlinks), '-P, --physical' (avoid all symlinks), '--help' (display this help and exit), and '--version' (output version information and exit). A note at the bottom of the description states 'If no option is specified, -P is assumed.' The bottom of the window shows a status bar that reads 'Manual page pwd(1) line 1 (press h for help or q to quit)'.

```
fakhassan@fakhassan:~ — 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

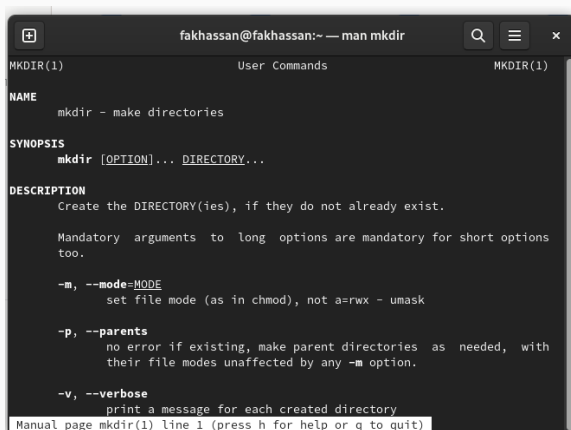
    --version
        output version information and exit

    If no option is specified, -P is assumed.

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

Рис. 11: Справка по команде pwd

Справка по командам



```
fakhassan@fakhassan:~ — 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.

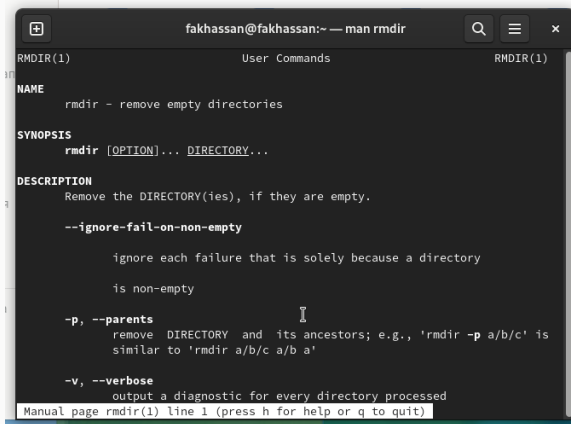
    Mandatory arguments to long options are mandatory for short options
    too.

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

Рис. 12: Справка по команде mkdir



```
fakhassan@fakhassan:~ — 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 that is solely because a directory
        is non-empty

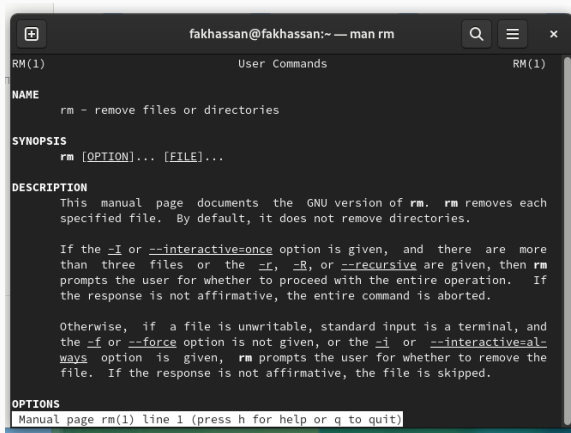
    -p, --parents
        remove DIRECTORY and its ancestors; e.g., 'rmdir -p a/b/c' is
        similar to 'rmdir a/b/c a/b a'

    -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

Справка по командам



```
fakhassan@fakhassan:~ — 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.

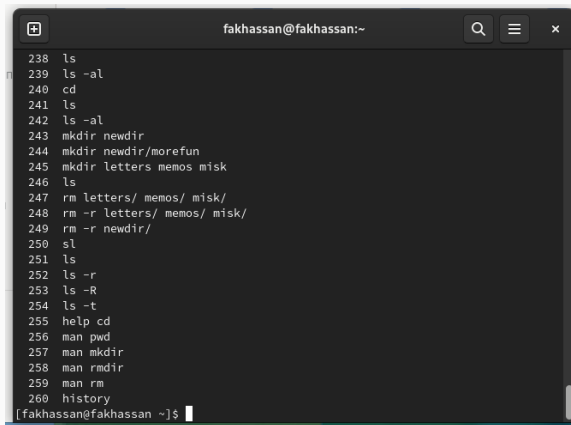
    If the -I or --interactive=once option is given, and there are more
    than three files or the -r, -R, or --recursive are given, then rm
    prompts the user for whether to proceed with the entire operation. If
    the response is not affirmative, the entire command is aborted.

    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 'fakhassan@fakhassan:~' with search, menu, and close buttons in the title bar. The terminal displays a list of 26 commands, each preceded by a line number from 238 to 260. The commands include file listing, directory creation, file removal, directory switching, and manual page viewing. The last line shows the 'history' command being executed, with the prompt '[fakhassan@fakhassan ~]\$' and a cursor.

```
238 ls
239 ls -al
240 cd
241 ls
242 ls -al
243 mkdir newdir
244 mkdir newdir/morefun
245 mkdir letters memos misk
246 ls
247 rm letters/ memos/ misk/
248 rm -r letters/ memos/ misk/
249 rm -r newdir/
250 sl
251 ls
252 ls -r
253 ls -R
254 ls -t
255 help cd
256 man pwd
257 man mkdir
258 man rmdir
259 man rm
260 history
[fakhassan@fakhassan ~]$
```

Рис. 15: Команда history

Выводы по проделанной работе

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