

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

Кенан Гашимов НКАБд-02-23¹

8 марта, 2024, Москва, Россия

¹Российский Университет Дружбы Народов

Цели и задачи работы

Цель лабораторной работы

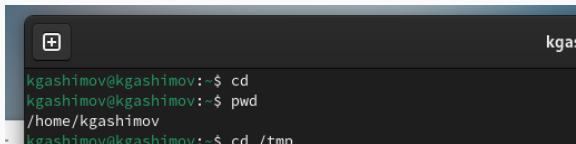
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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

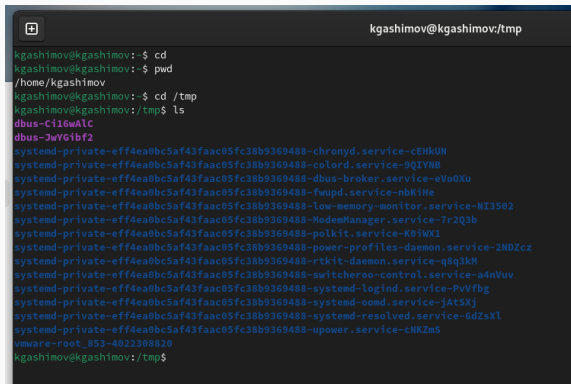
Имя и путь к домашнему каталогу

A terminal window with a dark background. The title bar shows a window icon on the left and the text 'kgashimov' on the right. The terminal content shows a user at a shell prompt navigating directories.

```
kgashimov@kgashimov:~$ cd
kgashimov@kgashimov:~$ pwd
/home/kgashimov
kgashimov@kgashimov:~$ cd /tmp
```

Рис. 1: Путь к домашнему каталогу

Опции команды ls



```
kgashimov@kgashimov:tmp
kgashimov@kgashimov:~$ cd
kgashimov@kgashimov:~$ pwd
/home/kgashimov
kgashimov@kgashimov:~$ cd /tmp
kgashimov@kgashimov:/tmp$ ls
dbus-Ci16wAlC
dbus-3wYGibf2
systemd-private-eff4ea0bc5af43faac05fc38b9369488-chrond.service-cEHkUN
systemd-private-eff4ea0bc5af43faac05fc38b9369488-colord.service-9QIYNB
systemd-private-eff4ea0bc5af43faac05fc38b9369488-dbus-broker.service-eVo0Xu
systemd-private-eff4ea0bc5af43faac05fc38b9369488-fwupd.service-nbKiHe
systemd-private-eff4ea0bc5af43faac05fc38b9369488-low-memory-monitor.service-NI3502
systemd-private-eff4ea0bc5af43faac05fc38b9369488-ModemManager.service-7r2Q3b
systemd-private-eff4ea0bc5af43faac05fc38b9369488-polkit.service-K0iWX1
systemd-private-eff4ea0bc5af43faac05fc38b9369488-power-profiles-daemon.service-2ND2cz
systemd-private-eff4ea0bc5af43faac05fc38b9369488-rtkit-daemon.service-q8q3kM
systemd-private-eff4ea0bc5af43faac05fc38b9369488-switcheroo-control.service-a4nVuv
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-logind.service-PvVfbg
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-oomd.service-jAtSXj
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-resolved.service-6dZsXl
systemd-private-eff4ea0bc5af43faac05fc38b9369488-upower.service-cNKZmS
vmware-root_853-4022308820
kgashimov@kgashimov:/tmp$
```

Рис. 2: Команда ls

Опции команды ls

```
kgashimov@kgashimov: /tmp$ ls -la
..
dbus-Ci16wAlC
dbus-JwYGibf2
.font-unix
.ICE-unix
systemd-private-eff4ea0bc5af43faac05fc38b9369488-chronyd.service-cEHkUN
systemd-private-eff4ea0bc5af43faac05fc38b9369488-colord.service-9QIYNB
systemd-private-eff4ea0bc5af43faac05fc38b9369488-dbus-broker.service-eVo0Xu
systemd-private-eff4ea0bc5af43faac05fc38b9369488-fwupd.service-nbKiHe
systemd-private-eff4ea0bc5af43faac05fc38b9369488-low-memory-monitor.service-NI3502
systemd-private-eff4ea0bc5af43faac05fc38b9369488-ModemManager.service-7r2Q3b
systemd-private-eff4ea0bc5af43faac05fc38b9369488-polkit.service-K0iWX1
systemd-private-eff4ea0bc5af43faac05fc38b9369488-power-profiles-daemon.service-2HDZcz
systemd-private-eff4ea0bc5af43faac05fc38b9369488-rtkit-daemon.service-q8q3kM
systemd-private-eff4ea0bc5af43faac05fc38b9369488-switcheroo-control.service-a4nVuv
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-logind.service-PvVFbg
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-oomd.service-jAtSXj
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-resolved.service-6dZsXl
systemd-private-eff4ea0bc5af43faac05fc38b9369488-upower.service-cNKZmS
vmware-root_853-4022308820
.X0-lock
.X1024-lock
.X1025-lock
.X11-unix
.X1-lock
.XIM-unix
kgashimov@kgashimov: /tmp$
```

Рис. 3: Команда ls -a

Опции команды ls

```
kgashimov@kgashimov:~$ ls -l
итого 0
srw-rw-rw-. 1 root root 0 мар 8 12:09 dbus-C16wA1C
srw-rw-rw-. 1 root root 0 мар 8 12:09 dbus-JwV61bf2
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-chromyd.service-cEMKUN
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-colord.service-Q0IYNB
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-dbus-broker.service-efv0Xu
drwx----- 3 root root 60 мар 8 12:10 system-private-ef4ea0bc5af43faac05fc38b369488-fwupd.service-nbK19e
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-low-memory-monitor.service-W13582
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-ModemManager.service-7r2Q3b
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-polkit.service-R01MK1
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-power-profiles-daemon.service-2NDZcz
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-rhlt-daemon.service-q0QdW
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-switcheroo-control.service-adeVuv
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-systemd-logind.service-PvVFbg
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-systemd-oomd.service-JA15XJ
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-systemd-resolved.service-6dZxL1
drwx----- 3 root root 60 мар 8 12:09 system-private-ef4ea0bc5af43faac05fc38b369488-upower.service-cNK2nS
drwx----- 2 root root 48 мар 8 12:09 vmware-root_853-4022368820
kgashimov@kgashimov:~$
```

Рис. 4: Команда ls -l

Опции команды ls

```
kgashimov@kgashimov: /tmp$ ls -f
..
systemd-private-eff4ea0bc5af43faac05fc38b9369488-fwupd.service-nbKiHe
.X1-lock
.X0-lock
systemd-private-eff4ea0bc5af43faac05fc38b9369488-colord.service-9QIYNB
.X1025-lock
.X1024-lock
dbus-JwYG1bf2
dbus-Ci16wAlC
systemd-private-eff4ea0bc5af43faac05fc38b9369488-ModemManager.service-7r2Q3b
vmware-root_853-4022308820
systemd-private-eff4ea0bc5af43faac05fc38b9369488-upower.service-cNKZmS
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-logind.service-PvVfbg
systemd-private-eff4ea0bc5af43faac05fc38b9369488-switcheroo-control.service-a4nVuv
systemd-private-eff4ea0bc5af43faac05fc38b9369488-rtkit-daemon.service-q8q3kM
systemd-private-eff4ea0bc5af43faac05fc38b9369488-power-profiles-daemon.service-2NDZcz
systemd-private-eff4ea0bc5af43faac05fc38b9369488-polkit.service-K0iWX1
systemd-private-eff4ea0bc5af43faac05fc38b9369488-low-memory-monitor.service-NI3502
systemd-private-eff4ea0bc5af43faac05fc38b9369488-chrond.service-cEHkUN
systemd-private-eff4ea0bc5af43faac05fc38b9369488-dbus-broker.service-eVo0Xu
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-resolved.service-6dZsXl
systemd-private-eff4ea0bc5af43faac05fc38b9369488-systemd-oemd.service-jAtSXj
.font-unix
.XIM-unix
.ICE-unix
.X11-unix
kgashimov@kgashimov: /tmp$
```

Рис. 5: Команда ls -f

```
kgashimov@kgashimov:/tmp$  
kgashimov@kgashimov:/tmp$ cd /var/spool/  
kgashimov@kgashimov:/var/spool$ ls -l  
итого 0  
drwxr-x--x. 1 root abrt 1510 мар  8 12:08 abrt  
drwx-----. 1 abrt abrt   0 июл 19 2023 abrt-upload  
drwx--x---. 1 root lp     6 ноя  1 04:09 cups  
drwxr-xr-x. 1 root root   0 июл 21 2023 lpd  
drwxrwxr-x. 1 root mail 1178 мар  6 14:27 mail  
drwxr-xr-x. 1 root root   0 июл 21 2023 plymouth  
kgashimov@kgashimov:/var/spool$
```

Рис. 6: Каталог /var/spool

Домашний каталог

```
kgashimov@kgashimov: /var/spool$ cd
kgashimov@kgashimov: $ ls
git-extended work Видео Документы Загрузки Изображения Музыка Общедоступные 'Рабочий стол' Шаблоны
kgashimov@kgashimov: $ ls -al
итого 28
drwx-----, 1 kgashimov kgashimov 498 мар 2 14:55 .
drwxr-xr-x, 1 root root 1172 мар 6 14:27 ..
-rw-----, 1 kgashimov kgashimov 1548 мар 2 15:03 .bash_history
-rw-r--r--, 1 kgashimov kgashimov 18 июл 19 2023 .bash_logout
-rw-r--r--, 1 kgashimov kgashimov 144 июл 19 2023 .bash_profile
-rw-r--r--, 1 kgashimov kgashimov 679 мар 2 14:54 .bashrc
drwx-----, 1 kgashimov kgashimov 418 мар 2 14:56 .cache
drwx-----, 1 kgashimov kgashimov 424 мар 2 14:56 .config
-rw-r--r--, 1 kgashimov kgashimov 237 фев 27 09:44 .gitconfig
drwxr-xr-x, 1 kgashimov kgashimov 74 мар 2 14:59 git-extended
drwx-----, 1 kgashimov kgashimov 136 фев 18 12:35 .gnupg
drwx-----, 1 kgashimov kgashimov 20 фев 18 12:25 .local
drwxr-xr-x, 1 kgashimov kgashimov 48 фев 18 12:25 .mozilla
drwx-----, 1 kgashimov kgashimov 132 фев 18 12:38 .ssh
drwxr-xr-x, 1 kgashimov kgashimov 10 фев 18 12:37 work
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Видео
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Документы
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Загрузки
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Изображения
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Музыка
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Общедоступные
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 'Рабочий стол'
drwxr-xr-x, 1 kgashimov kgashimov 0 фев 18 12:25 Шаблоны
kgashimov@kgashimov: $
```

Рис. 7: Файлы в домашнем каталоге

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

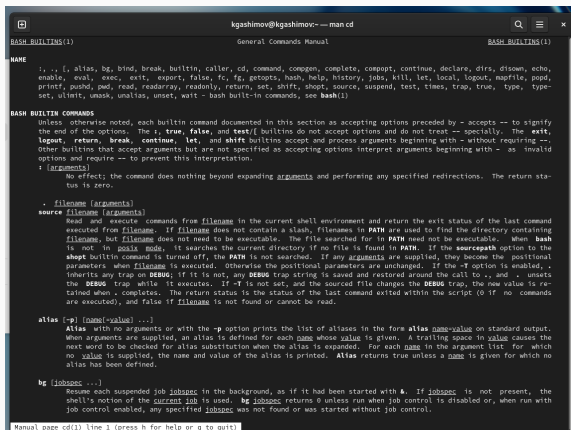
Рис. 8: Действия с каталогами

Опции команды ls

```
core.py __init__.py main.py pandocattributes.py
'/work/study/2023-2024/Операционные системы/os-intro/template/report/scripts':
ls -R -l --color --no-dir-sort --sort=name --group-directories-first
ls -R -l --color --no-dir-sort --sort=name --group-directories-first
./Видео:
./Документы:
./Загрузки:
./Изображения:
./Музыка:
./Общедоступные:
'/Рабочий стол':
./Шаблоны:
kgashnikov@kgashinov:~$ ls -t
git-extended work Видео Документы Изображения Музыка Общедоступные Загрузки 'Рабочий стол' Шаблоны
kgashnikov@kgashinov:~$
```

Рис. 9: Команда ls -R и ls -t

Справка по командам



```
kgashimov@kgashimov:~ — man cd
BASH BUILTINS(1)                                General Commands Manual                                BASH BUILTINS(1)

NAME
: ... [, alias, bg, bind, break, builtin, caller, cd, command, compgen, complete, copypost, 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, type-
set, ulimit, unset, 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 set, true, false, and test builtins do not accept options and do not treat -- specially. 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 beginning with - as invalid
options and require -- to prevent this interpretation.
+ [arguments]
    No effect; the command does nothing beyond expanding arguments and performing any specified redirections. The return statu-
    s is zero.

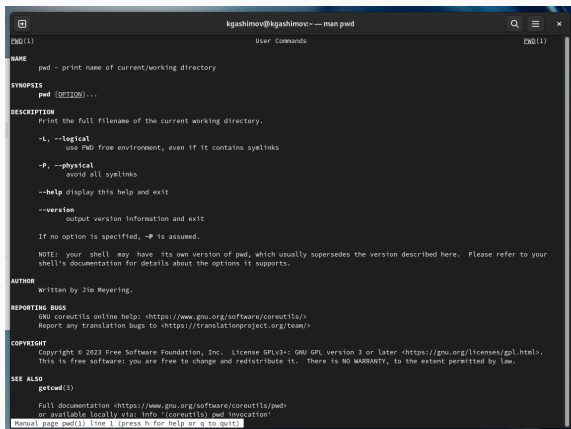
. filename [arguments]
source filename [arguments]
    Read and execute commands from filename in the current shell environment and return the exit status of the last command
    executed from filename. If filename does not contain a slash, filenames in PATH are used to find the directory containing
    filename, but filename does not need to be executable. The file searched for in PATH need not be executable. When Bash
    is not in posix mode, it searches the current directory if no file is found in PATH. If the sourcepath option to the
    shopt builtin command is turned off, the PATH is not searched. If any arguments are supplied, they become the positional
    parameters when filename is executed. Otherwise the positional parameters are unchanged. If the -f option is enabled, .
    inherits any trap on DEBUG; if it is not, any DEBUG trap string is saved and restored around the call to ., and . unsets
    the DEBUG trap while it executes. If -f is not set, and the sourced file changes the DEBUG trap, the new value is re-
    tained when . completes. The return status is the status of the last command exited within the script (0 if no commands
    are executed), and false if filename is not found or cannot be read.

alias [-p] [name=value] ...]
    Alias with no arguments or with the -p option prints the list of aliases in the form alias name=value on standard output.
    When arguments are supplied, an alias is defined for each name whose value is given. A trailing space in value causes the
    next word to be checked for alias substitution when the alias is expanded. For each name in the argument list for which no
    value is supplied, the name and value of the alias is printed. Alias returns true unless a name is given for which no
    alias has been defined.

bg [jobspec ...]
    Resume each suspended job jobspec in the background, as if it had been started with &. If jobspec is not present, the
    shell's notion of the current job is used. bg jobspec returns 0 unless run when job control is disabled or, when run with
    job control enabled, any specified jobspec was not found or was started without job control.
```

Manual page cd(1) line 3 (press h for help or q to quit)

Рис. 10: Справка по команде cd



```
kgashimov@kgashimov: ~ — 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.

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/>

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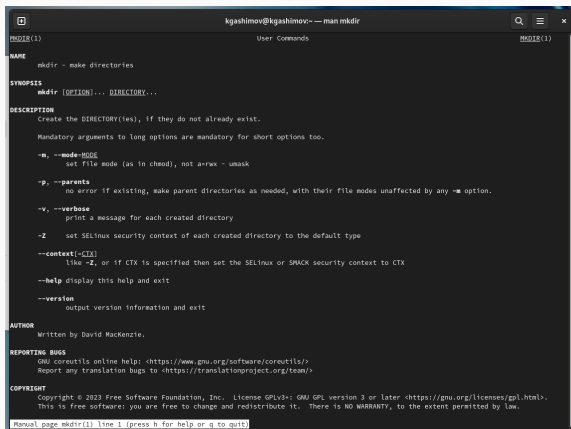
SEE ALSO
  getcwd(3)

  Full documentation <https://www.gnu.org/software/coreutils/pwd>
  or available locally via: info '(coreutils) pwd invocation'

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

Рис. 11: Справка по команде pwd

Справка по командам



```
kgashimov@kgashimov:~$ 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.

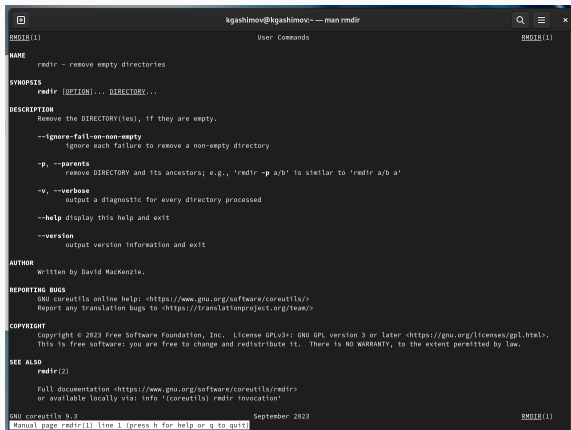
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Manual page mkdir(1) line 1 [press h for help or q to quit]
```

Рис. 12: Справка по команде mkdir

Справка по командам



```
kgashimov@kgashimov:~ — 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/>
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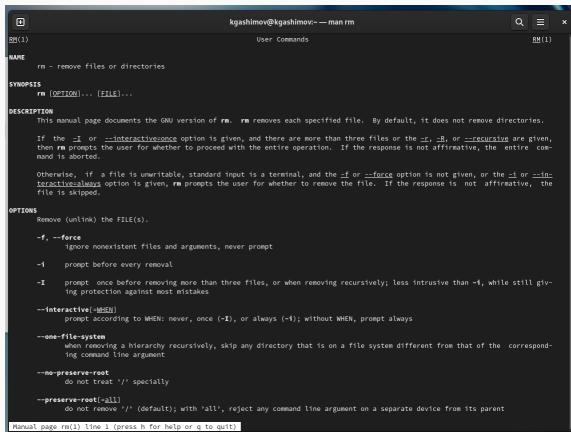
SEE ALSO
  rmdir(2)

  Full documentation <https://www.gnu.org/software/coreutils/rmdir>
  or available locally via: info '(coreutils) rmdir invocation'

GNU coreutils 9.3 September 2023
Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir

Справка по командам



```
kgashimov@kgashimov:~ -- 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
    do not treat '/' specially

--preserve-root[=all]
    do not remove '/' (default); with 'all', reject any command line argument on a separate device from its parent

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

Рис. 14: Справка по команде rm

История командной строки

```
82 ls
83 ls -al
84 mkdir newdir
85 mkdir newdir/morefun
86 mkdir letters memos misk
87 ls
88 rm letters/ memos/ misk/
89 rm -r letters/ memos/ misk/
90 rm -r newdir/
91 ls
92 ls -R
93 ls -t
94 man cd
95 man pwd
96 man mkdir
97 man rmdir
98 man rm
99 history
kgashimov@kgashimov:~$
```

Рис. 15: Команда history

Выводы по проделанной работе

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