

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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8 сентября, 2023, Москва, Россия

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Цели и задачи работы

Цель лабораторной работы

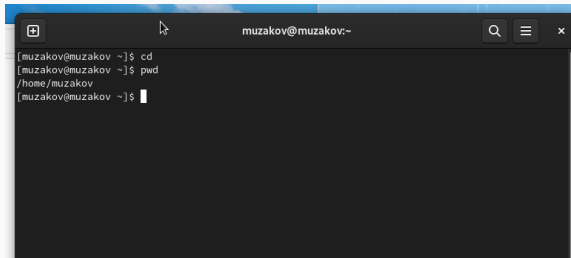
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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

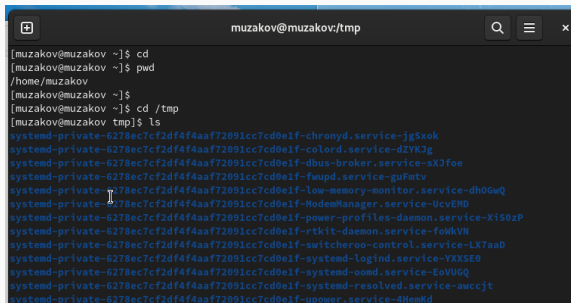
A terminal window titled 'muzakov@muzakov:~' with search, menu, and close buttons. The terminal shows the following commands and output:

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

The terminal window is dark-themed. The title bar shows the username and host 'muzakov@muzakov:~'. The prompt is '[muzakov@muzakov ~]'. The user enters 'cd' and then 'pwd', which returns the absolute path '/home/muzakov'.

Рис. 1: Путь к домашнему каталогу

Опции команды ls



```
muzakov@muzakov: tmp$ cd
muzakov@muzakov ~]$ pwd
/home/muzakov
muzakov@muzakov ~]$
muzakov@muzakov ~]$ cd /tmp
muzakov@muzakov tmp]$ ls
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-chrond.service-jg5xok
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-colord.service-dZYKJg
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-dbus-broker.service-sX3foe
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-fwupd.service-guFmfv
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-low-memory-monitor.service-dh0GwQ
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-ModemManager.service-UcvEND
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-power-profiles-daemon.service-XiS0zP
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-rtkit-daemon.service-f0kVn
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-switcheroo-control.service-LX7aaB
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-systemd-logind.service-YXXSE0
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-systemd-oomd.service-EoVUGQ
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-systemd-resolved.service-awccjt
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-upower.service-4HemKd
```

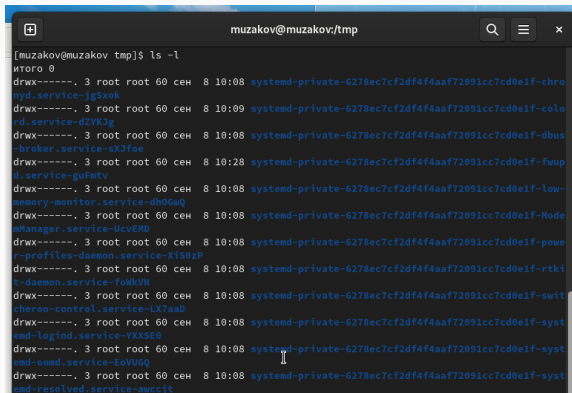
Рис. 2: Команда ls

Опции команды ls

```
vmware-root_776-2965448177  
[muzakov@muzakov tmp]$ ls -a  
.  
..  
font-unix  
ICE-unix  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-chronyd.service-jg5xok  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-color.service-dZYK3g  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-dbus-broker.service-sX3foe  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-fwupd.service-guFmTv  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-low-memory-monitor.service-dh0GwQ  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-ModemManager.service-UcvEMD  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-power-profiles-daemon.service-Xi50zP  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-rtkit-daemon.service-f0WkVN  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-switcheroo-control.service-LX7aaD  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-systemd-logind.service-YXXSE0  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-systemd-oond.service-EoVUGQ  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-systemd-resolved.service-awccjt  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0e1f-upower.service-4HemKd  
vmware-root_776-2965448177  
.X0-lock
```

Рис. 3: Команда ls -a

Опции команды ls



```
[muzakov@muzakov tmp]$ ls -l
иторо 0
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-chro
nyd.service-jg$xok
drwx-----, 3 root root 60 сен 8 10:09 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-colo
rd.service-dZYKJg
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-dbus
-broker.service-sXJfoe
drwx-----, 3 root root 60 сен 8 10:28 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-fwup
d.service-guFmTv
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-low
memory-monitor.service-dh0GwQ
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-Mode
mManager.service-UcvEND
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-powe
r-profiles-daemon.service-XiS0zP
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-rtki
t-daemon.service-foWkVN
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-swit
cheroo-control.service-LX7aad
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-syst
emd-logind.service-YXXSE0
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-syst
emd-oomd.service-EoVUGQ
drwx-----, 3 root root 60 сен 8 10:08 systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-syst
emd-resolved.service-awccjt
```

Рис. 4: Команда ls -l

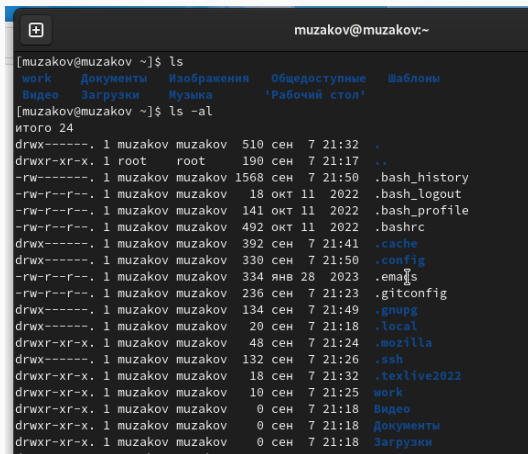
Опции команды ls

```
[muzakov@muzakov tmp]$  
.[muzakov@muzakov tmp]$ ls -f  
..  
..  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-fwupd.service-guFmtv  
.X1-lock  
.X0-lock  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-colord.service-dZYKJg  
.X1025-lock  
.X1024-lock  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-ModemManager.service-UcvEMD  
vmware-root_776-2965448177  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-chronyd.service-jgSxok  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-dbus-broker.service-sXJfoe  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-upower.service-4HemKd  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-systemd-logind.service-YXXSE0  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-switcheroo-control.service-LX7aad  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-rtkit-daemon.service-fowkVN  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-power-profiles-daemon.service-XiS0zP  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-low-memory-monitor.service-dhOGwQ  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-systemd-resolved.service-awccjt  
systemd-private-6278ec7cf2df4f4aaf72091cc7cd0elf-systemd-oomd.service-EoVUGQ  
.font-unix
```

Рис. 5: Команда ls -f

```
[muzakov@muzakov tmp]$  
[muzakov@muzakov tmp]$ cd /var/spool/  
[muzakov@muzakov spool]$ ls -l  
итого 0  
drwxr-x--x. 1 root abrt 578 июн 22 11:07 abrt  
drwx----- 1 abrt abrt  0 мар 11 2022 abrt-upload  
drwx--x--- 1 root lp    6 окт  3 2022 cups  
drwxr-xr-x. 1 root root  0 авг  9 2022 lpd  
drwxrwxr-x. 1 root mail 196 сен  7 21:17 mail  
drwxr-xr-x. 1 root root  0 мар  7 2022 plymouth  
[muzakov@muzakov spool]$
```

Рис. 6: Каталог /var/spool



A terminal window titled 'muzakov@muzakov:~' showing the output of the 'ls' and 'ls -al' commands. The 'ls' command shows a directory view with icons and labels for 'work', 'Документы', 'Изображения', 'Общедоступные', 'Шаблоны', 'Видео', 'Загрузки', 'Музыка', and 'Рабочий стол'. The 'ls -al' command shows a detailed listing of files and directories, including hidden files like '.bash_history', '.bash_logout', '.bash_profile', '.bashrc', '.cache', '.config', '.emacs', '.gitconfig', '.gnupg', '.local', '.mozilla', '.ssh', '.texlive2022', 'work', 'Видео', 'Документы', and 'Загрузки'.

```
[muzakov@muzakov ~]$ ls
work      Документы  Изображения  Общедоступные  Шаблоны
Видео     Загрузки   Музыка       'Рабочий стол'

[muzakov@muzakov ~]$ ls -al
итого 24
drwx-----, 1 muzakov muzakov 510 сен 7 21:32 .
drwxr-xr-x, 1 root    root    190 сен 7 21:17 ..
-rw-----, 1 muzakov muzakov 1568 сен 7 21:50 .bash_history
-rw-r--r--, 1 muzakov muzakov 18 окт 11 2022 .bash_logout
-rw-r--r--, 1 muzakov muzakov 141 окт 11 2022 .bash_profile
-rw-r--r--, 1 muzakov muzakov 492 окт 11 2022 .bashrc
drwx-----, 1 muzakov muzakov 392 сен 7 21:41 .cache
drwx-----, 1 muzakov muzakov 330 сен 7 21:50 .config
-rw-r--r--, 1 muzakov muzakov 334 янв 28 2023 .emacs
-rw-r--r--, 1 muzakov muzakov 236 сен 7 21:23 .gitconfig
drwx-----, 1 muzakov muzakov 134 сен 7 21:49 .gnupg
drwx-----, 1 muzakov muzakov 20 сен 7 21:18 .local
drwxr-xr-x, 1 muzakov muzakov 48 сен 7 21:24 .mozilla
drwx-----, 1 muzakov muzakov 132 сен 7 21:26 .ssh
drwxr-xr-x, 1 muzakov muzakov 18 сен 7 21:32 .texlive2022
drwxr-xr-x, 1 muzakov muzakov 10 сен 7 21:25 work
drwxr-xr-x, 1 muzakov muzakov 0 сен 7 21:18 Видео
drwxr-xr-x, 1 muzakov muzakov 0 сен 7 21:18 Документы
drwxr-xr-x, 1 muzakov muzakov 0 сен 7 21:18 Загрузки
```

Рис. 7: Файлы в домашнем каталоге

Работа с каталогами

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

Рис. 8: Действия с каталогами

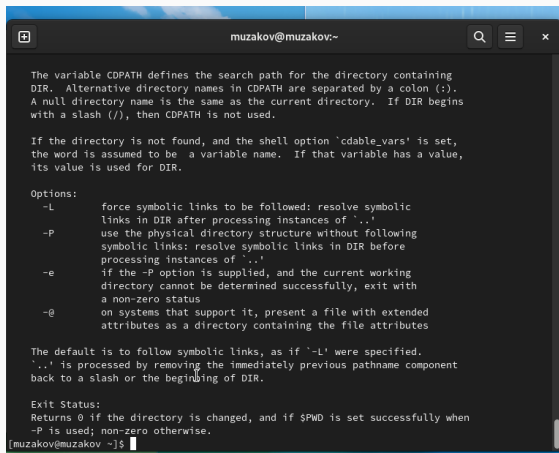
Опции команды ls

```
./work/study/2022-2023/Операционные системы/os-intro/template/report/scripts':
image-report mpv-shot

./Видео:
./Документы:
./Загрузки:
./Изображения:
./Музыка:
./Общедоступные:
'./Рабочий стол':

./Шаблоны:
[muzakov@muzakov ~]$ ls -t
work   Изображения  Документы  Общедоступные  Шаблоны
Видео  Музыка       Загрузки   'Рабочий стол'
```

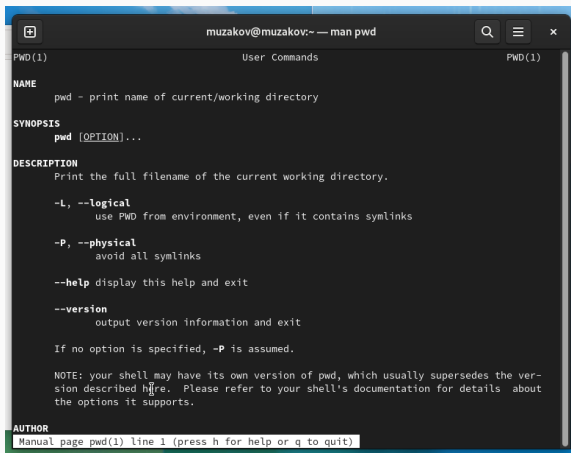
Рис. 9: Команда ls -R и ls -t



```
muzakov@muzakov:~  
  
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 $PWD is set successfully when  
-P is used; non-zero otherwise.  
[muzakov@muzakov ~]$
```

Рис. 10: Справка по команде cd

Справка по командам



```
muzakov@muzakov:~ — 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

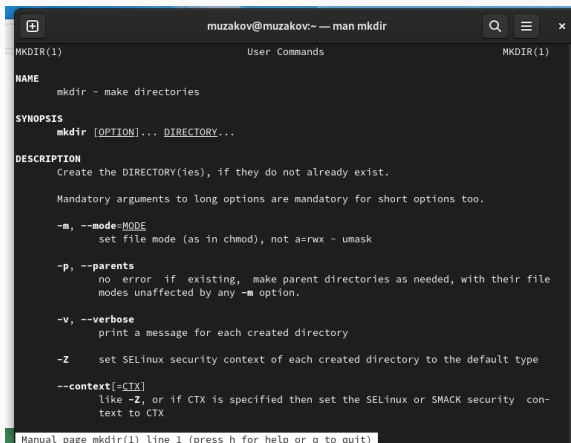
    If no option is specified, -P is assumed.

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

Рис. 11: Справка по команде pwd

Справка по командам



```
muzakov@muzakov:~ — 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.

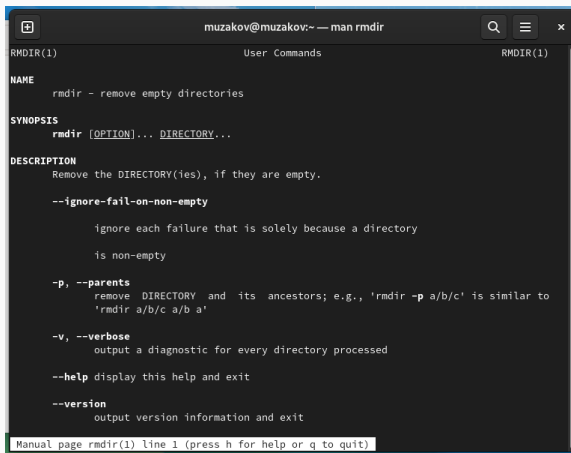
    -v, --verbose
        print a message for each created directory

    -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

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

Рис. 12: Справка по команде mkdir



A terminal window titled "muzakov@muzakov:~ — man rmdir" displays the manual page for the `rmdir` command. The window has a dark background with light-colored text. The terminal output 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'

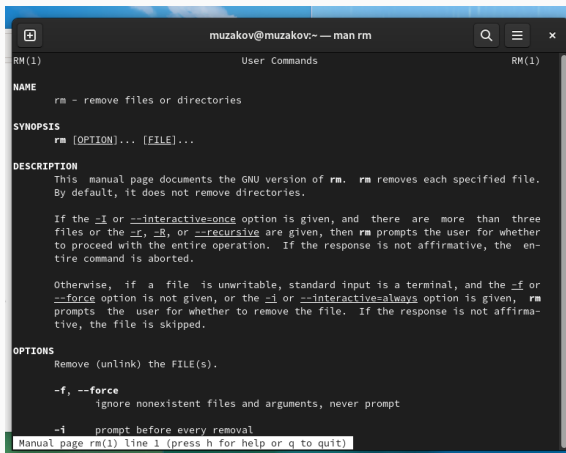
    -v, --verbose
        output a diagnostic for every directory processed

    --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`



```
muzakov@muzakov:~ -- 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 en-
tire 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 affirma-
tive, the file is skipped.

OPTIONS
Remove (unlink) the FILE(s).

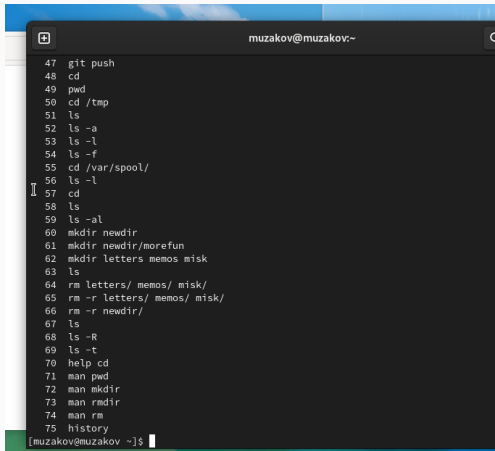
-f, --force
    ignore nonexistent files and arguments, never prompt

-i
    prompt before every removal

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 'muzakov@muzakov:~' with a search icon in the top right corner. The terminal displays a list of 15 commands, each preceded by a line number from 47 to 75. The commands are: 47 git push, 48 cd, 49 pwd, 50 cd /tmp, 51 ls, 52 ls -a, 53 ls -l, 54 ls -f, 55 cd /var/spool/, 56 ls -l, 57 cd, 58 ls, 59 ls -al, 60 mkdir newdir, 61 mkdir newdir/morefun, 62 mkdir letters memos misk, 63 ls, 64 rm letters/ memos/ misk/, 65 rm -r letters/ memos/ misk/, 66 rm -r newdir/, 67 ls, 68 ls -R, 69 ls -t, 70 help cd, 71 man pwd, 72 man mkdir, 73 man rmdir, 74 man rm, and 75 history. The prompt '[muzakov@muzakov ~]\$' is visible at the bottom left of the terminal window.

```
47 git push
48 cd
49 pwd
50 cd /tmp
51 ls
52 ls -a
53 ls -l
54 ls -f
55 cd /var/spool/
56 ls -l
57 cd
58 ls
59 ls -al
60 mkdir newdir
61 mkdir newdir/morefun
62 mkdir letters memos misk
63 ls
64 rm letters/ memos/ misk/
65 rm -r letters/ memos/ misk/
66 rm -r newdir/
67 ls
68 ls -R
69 ls -t
70 help cd
71 man pwd
72 man mkdir
73 man rmdir
74 man rm
75 history
```

[muzakov@muzakov ~]\$

Рис. 15: Команда history

Выводы по проделанной работе

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