

Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

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Цели и задачи работы

Цель лабораторной работы

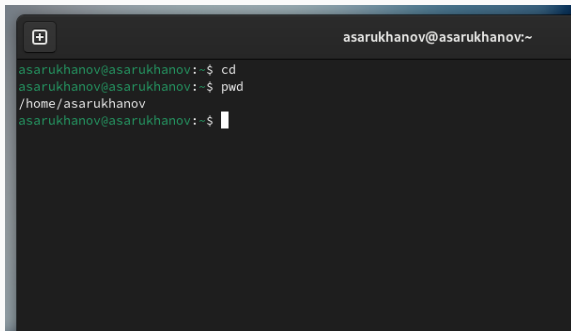
Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

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



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

The image shows a terminal window with a dark background. The title bar at the top indicates the user is 'asarukhanov' and the current directory is '~'. The terminal text shows a sequence of commands: 'cd' is entered, followed by 'pwd', which outputs '/home/asarukhanov'. The prompt returns to '\$' after each command.

Рис. 1: Путь к домашнему каталогу

Опции команды ls

```
asarukhanov@asarukhanov: ~$  
asarukhanov@asarukhanov:~$ cd /tmp  
asarukhanov@asarukhanov:/tmp$ ls  
dbus-ViP77Th3  
dbus-wIaDnrJH  
hsperfdata_asarukhanov  
systemd-private-f535fdf369874776862ebbb2b78cc757-chrond.service-divnBG  
systemd-private-f535fdf369874776862ebbb2b78cc757-colord.service-X1WVp0  
systemd-private-f535fdf369874776862ebbb2b78cc757-dbus-broker.service-C5rybw  
systemd-private-f535fdf369874776862ebbb2b78cc757-low-memory-monitor.service-AabsGM  
systemd-private-f535fdf369874776862ebbb2b78cc757-ModemManager.service-j8ME3w  
systemd-private-f535fdf369874776862ebbb2b78cc757-polkit.service-Af6qTL  
systemd-private-f535fdf369874776862ebbb2b78cc757-power-profiles-daemon.service-8f6Aof  
systemd-private-f535fdf369874776862ebbb2b78cc757-rtkit-daemon.service-GBQveV  
systemd-private-f535fdf369874776862ebbb2b78cc757-switcheroo-control.service-429LcQ  
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-logind.service-tikzGL  
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-oomd.service-qwA77f  
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-resolved.service-BWV0m  
systemd-private-f535fdf369874776862ebbb2b78cc757-upower.service-42ZMhJ  
VMwareDnD  
vmware-root_912-2697663791  
asarukhanov@asarukhanov:/tmp$
```

Рис. 2: Команда ls

Опции команды ls

```
vmware-root_912-2697663791
asarukhanov@asarukhanov:/tmp$ ls -la
.
..
dbus-ViP77Th3
dbus-wIaDNRJH
. font-unix
hsperfdata_asarukhanov
. ICE-unix
systemd-private-f535fdf369874776862ebbb2b78cc757-chronyd.service-divn8G
systemd-private-f535fdf369874776862ebbb2b78cc757-colord.service-X1WVp0
systemd-private-f535fdf369874776862ebbb2b78cc757-dbus-broker.service-CSrybw
systemd-private-f535fdf369874776862ebbb2b78cc757-low-memory-monitor.service-AabsGM
systemd-private-f535fdf369874776862ebbb2b78cc757-ModemManager.service-j8ME3w
systemd-private-f535fdf369874776862ebbb2b78cc757-polkit.service-Af6qTl
systemd-private-f535fdf369874776862ebbb2b78cc757-power-profiles-daemon.service-8fGAof
systemd-private-f535fdf369874776862ebbb2b78cc757-rtkit-daemon.service-GBQveV
systemd-private-f535fdf369874776862ebbb2b78cc757-switcheroo-control.service-429LcQ
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-logind.service-tikzGL
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-oomd.service-qwA77f
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-resolved.service-BWeV0m
systemd-private-f535fdf369874776862ebbb2b78cc757-upower.service-42ZHhJ
VMwareDnD
vmware-root_912-2697663791
.X0-lock
.X1024-lock
.X1025-lock
. X11-unix
.X1-lock
. XIM-unix
asarukhanov@asarukhanov:/tmp$
```

Рис. 3: Команда ls -a

Опции команды ls

```
asariukhanov@asariukhanov: /tmp$  
asariukhanov@asariukhanov: /tmp$ ls -l  
total 8  
-rw-rw-rw- 1 root root 0 1000 23 10:58 dbus-VIP77Th3  
-rw-rw-rw- 1 root root 0 1000 23 10:58 dbus-wi00w3H  
drwxr-xr-x 2 asariukhanov asariukhanov 40 1000 23 11:12 superdata_asariukhanov  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-chrompd.service-dfyn8G  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-calded.service-X1Wp6  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-dbus-broker.service-C9ryb  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-lux-memory-monitor.service-Aub40N  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-mobefanager.service-f0R2w  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-pa1k4t.service-AFqT1  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-power-profiles-daemon.service-Bf6aof  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-r1k1t-daemon.service-GDp4v  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-wi0therow-control.service-429LcQ  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-systemd-logind.service-t1k2o  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-systemd-sound.service-pa477f  
drwx----- 3 root root 60 1000 23 10:58 systemd-private-F535fdF3608747760624bbb2b78cc757-system-resolved.service-BW6V0u  
drwxrwxrwt 2 asariukhanov asariukhanov 200 1000 23 11:30 tmpp0000  
drwx----- 2 root root 40 1000 23 10:58 vmware-root_912-2497643791  
asariukhanov@asariukhanov: /tmp$
```

Рис. 4: Команда ls -l

Опции команды ls

```
asarukhanov@asarukhanov: /tmp$  
asarukhanov@asarukhanov: /tmp$ ls -f  
.  
..  
.X11-unix  
.ICE-unix  
.XIM-unix  
.font-unix  
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-oomd.service-qwA77f  
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-resolved.service-8WeVom  
systemd-private-f535fdf369874776862ebbb2b78cc757-dbus-broker.service-CSrybw  
systemd-private-f535fdf369874776862ebbb2b78cc757-chronyd.service-divnBG  
systemd-private-f535fdf369874776862ebbb2b78cc757-low-memory-monitor.service-AabsGM  
systemd-private-f535fdf369874776862ebbb2b78cc757-polkit.service-Af6qTl  
systemd-private-f535fdf369874776862ebbb2b78cc757-power-profiles-daemon.service-8f6Aof  
systemd-private-f535fdf369874776862ebbb2b78cc757-rtkit-daemon.service-G8QveV  
systemd-private-f535fdf369874776862ebbb2b78cc757-switcheroo-control.service-4Z9LcQ  
systemd-private-f535fdf369874776862ebbb2b78cc757-systemd-logind.service-tikzGL  
systemd-private-f535fdf369874776862ebbb2b78cc757-upower.service-42ZMhJ  
vmware-root_912-2697663791  
systemd-private-f535fdf369874776862ebbb2b78cc757-ModemManager.service-j8ME3w  
dbus-wIADNrJH  
dbus-ViP77Th3  
.X1024-lock  
.X1025-lock  
systemd-private-f535fdf369874776862ebbb2b78cc757-colord.service-X1Wvp0  
.X0-lock  
.X1-lock  
hspdfdata_asarukhanov  
VMwareDnD  
asarukhanov@asarukhanov: /tmp$
```

Рис. 5: Команда ls -f

```
asarukhanov@asarukhanov:~/tmp$ cd /var/spool/
asarukhanov@asarukhanov:/var/spool$ ls
abrt  abrt-upload  cups  lpd  mail  plymouth
asarukhanov@asarukhanov:/var/spool$ ls -al
итого 0
drwxr-xr-x. 1 root root  68 ноя  1  2023 .
drwxr-xr-x. 1 root root 200 ноя  1  2023 ..
drwxr-x--x. 1 root abrt 1510 июн 10 10:47 abrt
drwx-----. 1 abrt abrt   0 июл 19  2023 abrt-upload
drwx--x---. 1 root lp   6 фев 16 03:00 cups
drwxr-xr-x. 1 root root   0 июл 21  2023 lpd
drwxrwxr-x. 1 root mail 1150 июн 23 10:58 mail
drwxr-xr-x. 1 root root   0 июл 21  2023 plymouth
asarukhanov@asarukhanov:/var/spool$
```

Рис. 6: Каталог /var/spool

Домашний каталог

```
asarukhanov@asarukhanov: /var/spool$
asarukhanov@asarukhanov: /var/spool$ cd
asarukhanov@asarukhanov: ~$ ls
git-extended  Видео      Загрузки   Музыка     'Рабочий стол'
work          Документы  Изображения  Общедоступные  Шаблоны
asarukhanov@asarukhanov: ~$ ls -al
итого 24
drwx-----. 1 asarukhanov asarukhanov 510 июн 23 11:28 .
drwxr-xr-x. 1 root        root        1144 июн 23 10:58 ..
-rw-----. 1 asarukhanov asarukhanov 2614 июн 23 11:44 .bash_history
-rw-r--r--. 1 asarukhanov asarukhanov 18 янв 22 03:00 .bash_logout
-rw-r--r--. 1 asarukhanov asarukhanov 144 янв 22 03:00 .bash_profile
-rw-r--r--. 1 asarukhanov asarukhanov 681 июн 23 11:26 .bashrc
drwx-----. 1 asarukhanov asarukhanov 452 июн 23 11:30 .cache
drwx-----. 1 asarukhanov asarukhanov 398 июн 23 11:30 .config
-rw-r--r--. 1 asarukhanov asarukhanov 334 мар 25 03:00 .emacs
-rw-r--r--. 1 asarukhanov asarukhanov 239 июн 23 11:05 .gitconfig
drwxr-xr-x. 1 asarukhanov asarukhanov 74 июн 23 11:33 git-extended
drwx-----. 1 asarukhanov asarukhanov 136 июн 23 11:04 .gnupg
drwx-----. 1 asarukhanov asarukhanov 20 июн 23 10:59 .local
drwxr-xr-x. 1 asarukhanov asarukhanov 48 июн 23 10:59 .mozilla
drwx-----. 1 asarukhanov asarukhanov 132 июн 23 11:07 .ssh
drwxr-xr-x. 1 asarukhanov asarukhanov 10 июн 23 11:07 work
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Видео
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Документы
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Загрузки
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Изображения
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Музыка
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Общедоступные
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 'Рабочий стол'
drwxr-xr-x. 1 asarukhanov asarukhanov 0 июн 23 10:59 Шаблоны
asarukhanov@asarukhanov: ~$
```

Рис. 7: Файлы в домашнем каталоге

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

Рис. 8: Действия с каталогами

Опции команды ls

```
./work/study/2023-2024/Операционные системы/os-intro/template/report/scripts':  
image-report mpv-shot  
  
./Видео:  
./Документы:  
./Загрузки:  
./Изображения:  
./Музыка:  
./Общедоступные:  
  
'./Рабочий стол':  
  
./Шаблоны:  
asarukhanov@asarukhanov:~$ ls -t  
git-extended Видео Изображения Общедоступные Загрузки  
work Документы Музыка Шаблоны 'Рабочий стол'  
asarukhanov@asarukhanov:~$
```

Рис. 9: Команда ls -R и ls -t

```
asarukhanov@asarukhanov:~$ help cd
cd: cd [-L|[-P [-e]] [-@]] [directory]
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

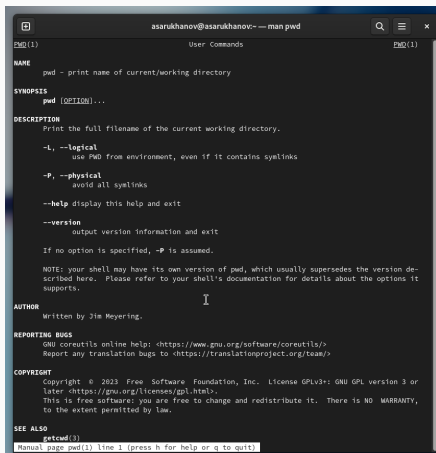
The default is to follow symbolic links, as if '-L' were specified.
'..' is processed by removing the immediately previous pathname component
back to a slash or the beginning of DIR.

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

asarukhanov@asarukhanov:~\$

Рис. 10: Справка по команде cd

Справка по командам



```
asarukhanov@asarukhanov:~$ 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 de-
scribed here. Please refer to your shell's documentation for details about the options it
supports.

AUTHOR
  Written by Jim Meyering.

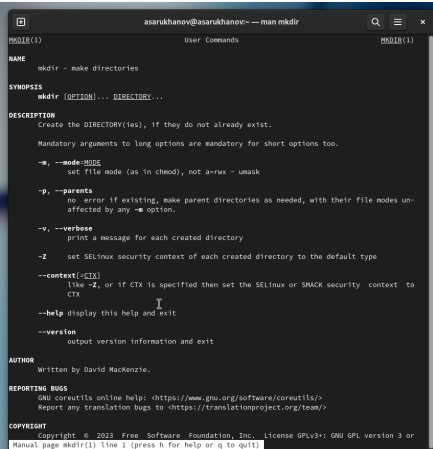
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SEE ALSO
  getcwd(3)

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

Рис. 11: Справка по команде pwd



```
asarukhanov@asarukhanov:~$ 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

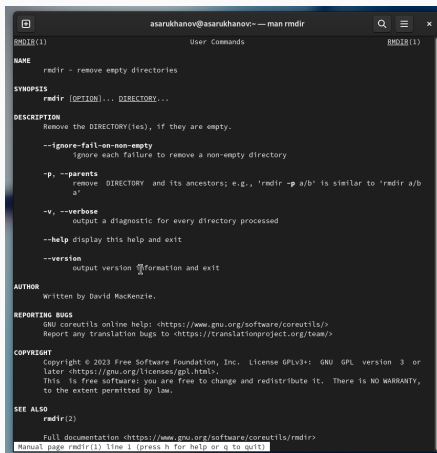
--version
    output version information and exit

AUTHOR
Written by David MacKenzie.

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GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
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Manual page mkdir(1) line 1 (press h for help or q to quit)
```

Рис. 12: Справка по команде mkdir



```
asarukhanov@asarukhanov:~$ 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.

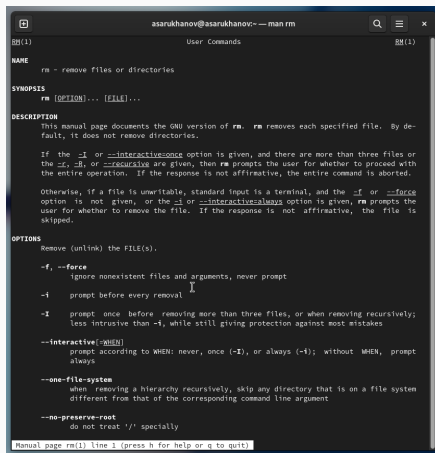
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    GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
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    to the extent permitted by law.

SEE ALSO
    rmdir(2)

    Full documentation <https://www.gnu.org/software/coreutils/rmdir>
    Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir



```
asarukhanov@asarukhanov:~ — 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 --interactiveonce option is given, and there are more than three files or the -f, -B, 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 --interactivealways 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

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

Рис. 14: Справка по команде rm

История командной строки

```
112 ls
113 ls -al
114 mkdir newdir
115 mkdir newdir/morefun
116 mkdir letters memos misk
117 ls
118 rm letters/ memos/ misk/
119 rm -r letters/ memos/ misk/
120 rm -r newdir/
121 ls
122 ls -r
123 ls -R
124 ls -t
125 help cd
126 man pwd
127 man mkdir
128 man rmdir
129 man rm
130 history
asarukhanov@asarukhanov:~$
```

Рис. 15: Команда history

Выводы по проделанной работе

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