

# **Анализ файловой структуры UNIX. Команды для работы с файлами и каталогами**

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# Цели и задачи работы

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## Цель лабораторной работы

Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

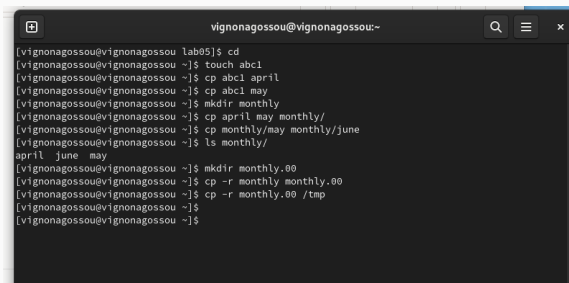
# Задачи лабораторной работы

- 1 Выполнить примеры
- 2 Выполнить действия по работе с каталогами и файлами
- 3 Выполнить действия с правами доступа
- 4 Получить дополнительные сведения при помощи справки по командам.

# **Процесс выполнения лабораторной работы**

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# Выполнение примеров



```
vignonagossou@vignonagossou:~$ cd
[vignonagossou@vignonagossou ~]$ touch abc1
[vignonagossou@vignonagossou ~]$ cp abc1 april
[vignonagossou@vignonagossou ~]$ cp abc1 may
[vignonagossou@vignonagossou ~]$ mkdir monthly
[vignonagossou@vignonagossou ~]$ cp april may monthly/
[vignonagossou@vignonagossou ~]$ cp monthly/may monthly/june
[vignonagossou@vignonagossou ~]$ ls monthly/
april  june  may
[vignonagossou@vignonagossou ~]$ mkdir monthly.00
[vignonagossou@vignonagossou ~]$ cp -r monthly monthly.00
[vignonagossou@vignonagossou ~]$ cp -r monthly.00 /tmp
[vignonagossou@vignonagossou ~]$
[vignonagossou@vignonagossou ~]$
```

Рис. 1: Выполнение примеров

# Выполнение примеров

```
[vignonagossou@vignonagossou ~]$  
[vignonagossou@vignonagossou ~]$ cd  
[vignonagossou@vignonagossou ~]$ mv april july  
[vignonagossou@vignonagossou ~]$ mv july monthly.00/  
[vignonagossou@vignonagossou ~]$ ls monthly.00/  
july  monthly  
[vignonagossou@vignonagossou ~]$ mv monthly.00/ monthly.01  
[vignonagossou@vignonagossou ~]$ mkdir reports  
[vignonagossou@vignonagossou ~]$ mv monthly.01/ reports/  
[vignonagossou@vignonagossou ~]$ mv reports/monthly.01/ reports/monthly  
[vignonagossou@vignonagossou ~]$
```

Рис. 2: Выполнение примеров

# Выполнение примеров

```
[vignonagossou@vignonagossou ~]$  
[vignonagossou@vignonagossou ~]$ cd  
[vignonagossou@vignonagossou ~]$ touch may  
[vignonagossou@vignonagossou ~]$ ls -l may  
-rw-r--r--. 1 vignonagossou vignonagossou 0 сен  6 14:21 may  
[vignonagossou@vignonagossou ~]$ chmod u+x may  
[vignonagossou@vignonagossou ~]$ ls -l may  
-rwxr--r--. 1 vignonagossou vignonagossou 0 сен  6 14:21 may  
[vignonagossou@vignonagossou ~]$ chmod u-x may  
[vignonagossou@vignonagossou ~]$ ls -l may  
-rw-r--r--. 1 vignonagossou vignonagossou 0 сен  6 14:21 may  
[vignonagossou@vignonagossou ~]$ cd  
[vignonagossou@vignonagossou ~]$ mkdir monthly  
mkdir: невозможно создать каталог «monthly»: Файл существует  
[vignonagossou@vignonagossou ~]$ chmod g-r,o-r monthly/  
[vignonagossou@vignonagossou ~]$ cd  
[vignonagossou@vignonagossou ~]$ touch abcl  
[vignonagossou@vignonagossou ~]$ chmod g+w abcl  
[vignonagossou@vignonagossou ~]$
```

Рис. 3: Выполнение примеров



# Создание директорий и копирование файлов

```
[vignonagossou@vignonagossou ~]$  
[vignonagossou@vignonagossou ~]$  
[vignonagossou@vignonagossou ~]$ cp /usr/include/linux/sysinfo.h ~  
[vignonagossou@vignonagossou ~]$ mv sysinfo.h equipment  
[vignonagossou@vignonagossou ~]$ mkdir ski.plases  
[vignonagossou@vignonagossou ~]$ mv equipment ski.plases/  
[vignonagossou@vignonagossou ~]$ mv ski.plases/equipment ski.plases/equiplist  
[vignonagossou@vignonagossou ~]$ touch abcl  
[vignonagossou@vignonagossou ~]$ cp abcl ski.plases/equiplist2  
[vignonagossou@vignonagossou ~]$ cd ski.plases/  
[vignonagossou@vignonagossou ski.plases]$ mkdir equipment  
[vignonagossou@vignonagossou ski.plases]$ mv equiplist equipment/  
[vignonagossou@vignonagossou ski.plases]$ mv equiplist2 equipment/  
[vignonagossou@vignonagossou ski.plases]$ cd  
[vignonagossou@vignonagossou ~]$ mkdir newdir  
[vignonagossou@vignonagossou ~]$ mv newdir/ ski.plases/  
[vignonagossou@vignonagossou ~]$ mv ski.plases/newdir/ ski.plases/plans  
[vignonagossou@vignonagossou ~]$
```

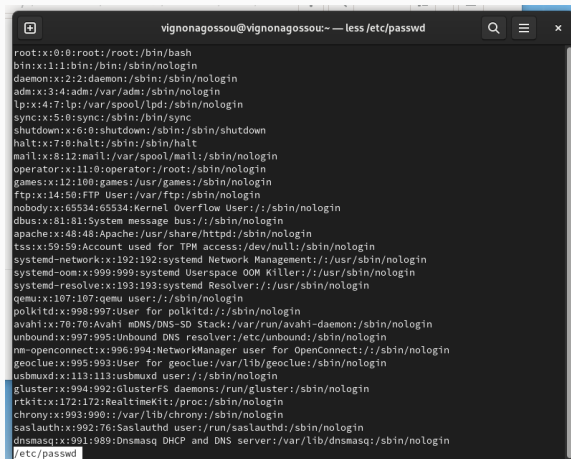
Рис. 4: Работа с каталогами

# Работа с командой chmod

```
[vignonagossou@vignonagossou ~]$  
[vignonagossou@vignonagossou ~]$ mkdir australia play  
[vignonagossou@vignonagossou ~]$ touch my_os feathers  
[vignonagossou@vignonagossou ~]$ chmod 744 australia/  
[vignonagossou@vignonagossou ~]$ chmod 711 play  
[vignonagossou@vignonagossou ~]$ chmod 544 my_os  
[vignonagossou@vignonagossou ~]$ chmod 664 feathers  
[vignonagossou@vignonagossou ~]$ ls -l  
итого 0  
-rw-rw-r--. 1 vignonagossou vignonagossou 0 сен 6 14:24 abc1  
drwxr--r--. 1 vignonagossou vignonagossou 0 сен 6 14:26 australia  
-rw-rw-r--. 1 vignonagossou vignonagossou 0 сен 6 14:26 feathers  
-rw-r--r--. 1 vignonagossou vignonagossou 0 сен 6 14:21 may  
drwx--x--x. 1 vignonagossou vignonagossou 24 сен 6 14:19 monthly  
-r-xr--r--. 1 vignonagossou vignonagossou 0 сен 6 14:26 my_os  
drwx--x--x. 1 vignonagossou vignonagossou 0 сен 6 14:26 play  
drwxr-xr-x. 1 vignonagossou vignonagossou 14 сен 6 14:21 reports  
drwxr-xr-x. 1 vignonagossou vignonagossou 28 сен 6 14:26 ski.places  
drwxr-xr-x. 1 vignonagossou vignonagossou 10 сен 6 13:11 work  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Видео  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Документы  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Загрузки  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Изображения  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Музыка  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Общедоступные  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 'Рабочий стол'  
drwxr-xr-x. 1 vignonagossou vignonagossou 0 сен 6 13:02 Шаблоны  
[vignonagossou@vignonagossou ~]$
```

Рис. 5: Настройка прав доступа

# Файл /etc/passwd



The image shows a terminal window with the title bar "vignonagossou@vignonagossou:~ — less /etc/passwd". The terminal displays the contents of the /etc/passwd file, which lists system and user accounts. Each line represents an entry in the format: username:x:UID:GID:full\_name:home\_directory:shell. The entries include root, bin, daemon, adm, lp, sync, shutdown, halt, mail, operator, games, ftp, nobody, dbus, apache, tss, systemd-network, systemd-oom, systemd-resolve, qemu, polkitd, avahi, unbound, nm-openconnect, geoclue, usbmuxd, gluster, rtkit, chrony, saslauthd, and dnsmasq. The last line of the output is "/etc/passwd", indicating the end of the file.

```
vignonagossou@vignonagossou:~ — less /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
apache:x:48:48:Apache:/usr/share/httpd:/sbin/nologin
tss:x:59:59:Account used for TPM access:/dev/null:/sbin/nologin
systemd-network:x:192:192:systemd Network Management:/usr/sbin/nologin
systemd-oom:x:999:999:systemd Userspace OOM Killer:/usr/sbin/nologin
systemd-resolve:x:193:193:systemd Resolver:/usr/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
polkitd:x:998:997:User for polkitd:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
unbound:x:997:995:Unbound DNS resolver:/etc/unbound:/sbin/nologin
nm-openconnect:x:996:994:NetworkManager user for OpenConnect:/:/sbin/nologin
geoclue:x:995:993:User for geoclue:/var/lib/geoclue:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
gluster:x:994:992:GlusterFS daemons:/run/gluster:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
chrony:x:993:990:/var/lib/chrony:/sbin/nologin
saslauthd:x:992:76:Saslauthd user:/run/saslauthd:/sbin/nologin
dnsmasq:x:991:989:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/sbin/nologin
/etc/passwd
```

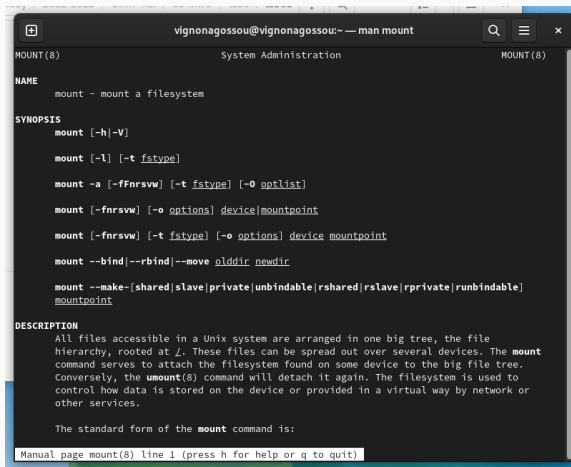
Рис. 6: Файл /etc/passwd

# Работа с файлами и правами доступа

```
[vignonagossou@vignonagossou ~]$  
[vignonagossou@vignonagossou ~]$ cp feathers file.old  
[vignonagossou@vignonagossou ~]$ mv file.old play/  
[vignonagossou@vignonagossou ~]$ mkdir fun  
[vignonagossou@vignonagossou ~]$ cp -R play/ fun/  
[vignonagossou@vignonagossou ~]$ mv fun/ play/games  
[vignonagossou@vignonagossou ~]$ chmod u-r feathers  
[vignonagossou@vignonagossou ~]$ cat feathers  
cat: feathers: Отказано в доступе  
[vignonagossou@vignonagossou ~]$ cp feathers feathers2  
cp: невозможно открыть 'feathers' для чтения: Отказано в доступе  
[vignonagossou@vignonagossou ~]$ chmod u+r feathers  
[vignonagossou@vignonagossou ~]$ chmod u-x play/  
[vignonagossou@vignonagossou ~]$ cd play/  
bash: cd: play/: Отказано в доступе  
[vignonagossou@vignonagossou ~]$ chmod u+x play/  
[vignonagossou@vignonagossou ~]$
```

Рис. 7: Работа с файлами и правами доступа

# Справка по командам



```
vignonagossou@vignonagossou:~ — man mount
MOUNT(8)                                System Administration                                MOUNT(8)

NAME
    mount - mount a filesystem

SYNOPSIS
    mount [-h|-V]

    mount [-l] [-t fstype]

    mount -a [-fFnrsvw] [-t fstype] [-O optlist]

    mount [-fnrsvw] [-o options] device | mountpoint

    mount [-fnrsvw] [-t fstype] [-o options] device mountpoint

    mount --bind|--rbind|--move olddir newdir

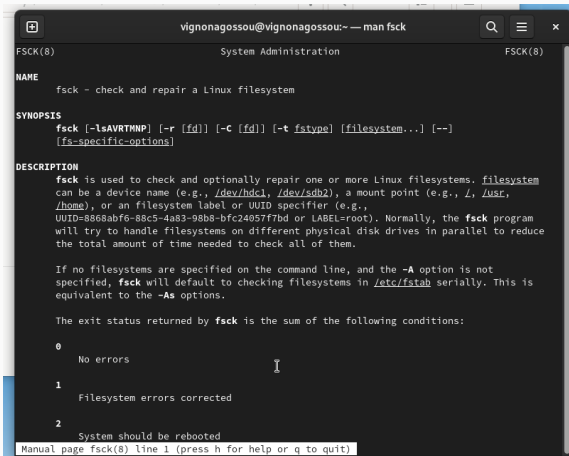
    mount --make-[shared|slave|private|unbindable|rshared|rslave|rprivate|runbindable]
mountpoint

DESCRIPTION
    All files accessible in a Unix system are arranged in one big tree, the file
    hierarchy, rooted at /. These files can be spread out over several devices. The mount
    command serves to attach the filesystem found on some device to the big file tree.
    Conversely, the umount(8) command will detach it again. The filesystem is used to
    control how data is stored on the device or provided in a virtual way by network or
    other services.

    The standard form of the mount command is:

Manual page mount(8) line 1 (press h for help or q to quit)
```

Рис. 8: Команда mount



```
vignonagossou@vignonagossou:~ — man fsck
FSCK(8)                                System Administration                                FSCK(8)

NAME
    fsck - check and repair a Linux filesystem

SYNOPSIS
    fsck [-lsAVRTMNP] [-r [fd]] [-C [fd]] [-t fstype] [filesystem...] [--]
    [fs-specific-options]

DESCRIPTION
    fsck is used to check and optionally repair one or more Linux filesystems. filesystem
    can be a device name (e.g., /dev/hdc1, /dev/sdb2), a mount point (e.g., /, /usr,
    /home), or an filesystem label or UUID specifier (e.g.,
    UUID=8868abf6-88c5-4a83-98b8-bfc24057f7bd or LABEL=root). Normally, the fsck program
    will try to handle filesystems on different physical disk drives in parallel to reduce
    the total amount of time needed to check all of them.

    If no filesystems are specified on the command line, and the -A option is not
    specified, fsck will default to checking filesystems in /etc/fstab serially. This is
    equivalent to the -As options.

    The exit status returned by fsck is the sum of the following conditions:

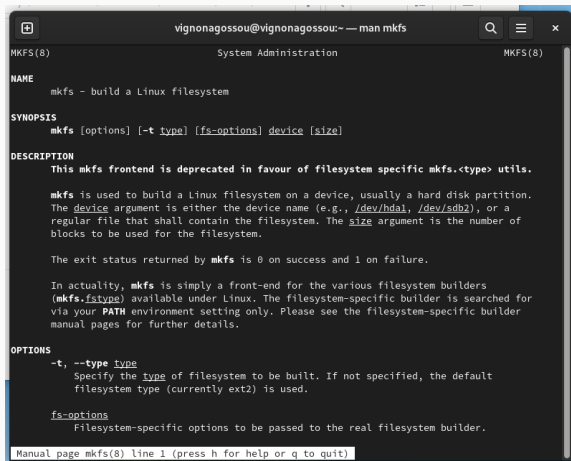
    0
      No errors

    1
      Filesystem errors corrected

    2
      System should be rebooted

Manual page fsck(8) line 1 (press h for help or q to quit)
```

Рис. 9: Команда fsck



```
vignonagossou@vignonagossou:~ — man mkfs
MKFS(8)                                System Administration                                MKFS(8)

NAME
    mkfs - build a Linux filesystem

SYNOPSIS
    mkfs [options] [-t type] [fs-options] device [size]

DESCRIPTION
    This mkfs frontend is deprecated in favour of filesystem specific mkfs.<type> utils.

    mkfs is used to build a Linux filesystem on a device, usually a hard disk partition.
    The device argument is either the device name (e.g., /dev/hda1, /dev/sdb2), or a
    regular file that shall contain the filesystem. The size argument is the number of
    blocks to be used for the filesystem.

    The exit status returned by mkfs is 0 on success and 1 on failure.

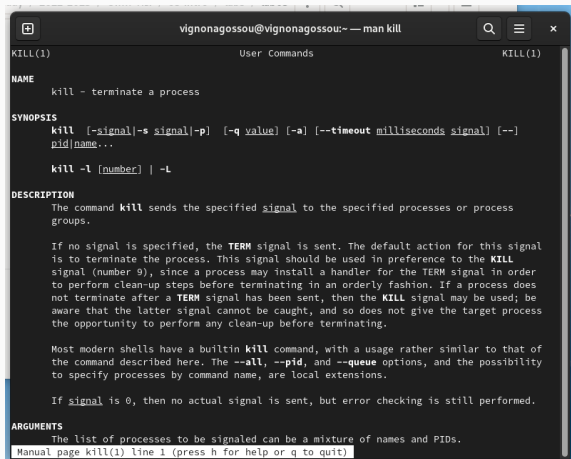
    In actuality, mkfs is simply a front-end for the various filesystem builders
    (mkfs.fstype) available under Linux. The filesystem-specific builder is searched for
    via your PATH environment setting only. Please see the filesystem-specific builder
    manual pages for further details.

OPTIONS
    -t, --type type
        Specify the type of filesystem to be built. If not specified, the default
        filesystem type (currently ext2) is used.

    fs-options
        Filesystem-specific options to be passed to the real filesystem builder.

Manual page mkfs(8) line 1 (press h for help or q to quit)
```

Рис. 10: Команда mkfs



```
vignonagossou@vignonagossou:~ — man kill
KILL(1)                                User Commands                                KILL(1)

NAME
    kill - terminate a process

SYNOPSIS
    kill [-signal|-s signal|-p] [-q value] [-a] [--timeout milliseconds signal] [--]
    pid|name...

    kill -l [number] | -L

DESCRIPTION
    The command kill sends the specified signal to the specified processes or process
    groups.

    If no signal is specified, the TERM signal is sent. The default action for this signal
    is to terminate the process. This signal should be used in preference to the KILL
    signal (number 9), since a process may install a handler for the TERM signal in order
    to perform clean-up steps before terminating in an orderly fashion. If a process does
    not terminate after a TERM signal has been sent, then the KILL signal may be used; be
    aware that the latter signal cannot be caught, and so does not give the target process
    the opportunity to perform any clean-up before terminating.

    Most modern shells have a builtin kill command, with a usage rather similar to that of
    the command described here. The --all, --pid, and --queue options, and the possibility
    to specify processes by command name, are local extensions.

    If signal is 0, then no actual signal is sent, but error checking is still performed.

ARGUMENTS
    The list of processes to be signaled can be a mixture of names and PIDs.
    Manual page kill(1) line 1 (press h for help or q to quit)
```

Рис. 11: Команда kill



## **Выводы по проделанной работе**

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В ходе данной работы мы ознакомились с файловой системой Linux, её структурой, именами и содержанием каталогов. Научились совершать базовые операции с файлами, управлять правами их доступа для пользователя и групп. Ознакомились с Анализом файловой системы. А также получили базовые навыки по проверке использования диска и обслуживанию файловой системы.