

# 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.

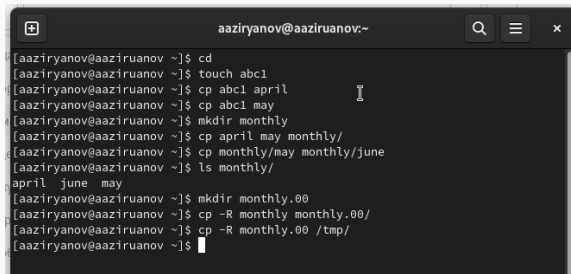
# Задачи лабораторной работы

- 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



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

Рис. 1: Выполнение примеров

# Выполнение примеров

```
[aaziryanov@aaziruanov ~]$ cp -r monthly.00 /tmp/
[aaziryanov@aaziruanov ~]$
[aaziryanov@aaziruanov ~]$
[aaziryanov@aaziruanov ~]$ mv april july
[aaziryanov@aaziruanov ~]$ mv july monthly.00/
[aaziryanov@aaziruanov ~]$ ls monthly.00/
july  monthly
[aaziryanov@aaziruanov ~]$ mv monthly.00 monthly.01
[aaziryanov@aaziruanov ~]$ mkdir reports
[aaziryanov@aaziruanov ~]$ mv monthly.01/ reports/
[aaziryanov@aaziruanov ~]$ mv reports/monthly.01/ reports/monthly
[aaziryanov@aaziruanov ~]$
```

Рис. 2: Выполнение примеров

# Выполнение примеров

```
[aaziryanov@aaziruanov ~]$  
[aaziryanov@aaziruanov ~]$ touch may  
[aaziryanov@aaziruanov ~]$ ls -l may  
-rw-r--r--. 1 aaziryanov aaziryanov 0 map 6 13:34 may  
[aaziryanov@aaziruanov ~]$ chmod u+x may  
[aaziryanov@aaziruanov ~]$ ls -l may  
-rwxr--r--. 1 aaziryanov aaziryanov 0 map 6 13:34 may  
[aaziryanov@aaziruanov ~]$ chmod u-x may  
[aaziryanov@aaziruanov ~]$ ls -l may  
-rw-r--r--. 1 aaziryanov aaziryanov 0 map 6 13:34 may  
[aaziryanov@aaziruanov ~]$ cd  
[aaziryanov@aaziruanov ~]$ mkdir monthly/  
mkdir: невозможно создать каталог «monthly/»: Файл существует  
[aaziryanov@aaziruanov ~]$ chmod g-r,o-r monthly/  
[aaziryanov@aaziruanov ~]$ cd  
[aaziryanov@aaziruanov ~]$ touch abc1  
[aaziryanov@aaziruanov ~]$ chmod g+w abc1  
[aaziryanov@aaziruanov ~]$
```

Рис. 3: Выполнение примеров



# Создание директорий и копирование файлов

```
[aaziryanov@aaziruanov ~]$  
[aaziryanov@aaziruanov ~]$ cp /usr/include/linux/sysinfo.h ~  
[aaziryanov@aaziruanov ~]$ mv sysinfo.h equipment  
[aaziryanov@aaziruanov ~]$ mkdir ski.places  
[aaziryanov@aaziruanov ~]$ mv equipment ski.places/  
[aaziryanov@aaziruanov ~]$ mv ski.places/equipment ski.places/equiplist  
[aaziryanov@aaziruanov ~]$ touch abc1  
[aaziryanov@aaziruanov ~]$ cp abc1 ski.places/equiplist2  
[aaziryanov@aaziruanov ~]$ cd ski.places/  
[aaziryanov@aaziruanov ski.places]$ mkdir equipment  
[aaziryanov@aaziruanov ski.places]$ mv equiplist equipment/  
[aaziryanov@aaziruanov ski.places]$ mv equiplist2 equipment/  
[aaziryanov@aaziruanov ski.places]$ cd  
[aaziryanov@aaziruanov ~]$ mkdir newdir  
[aaziryanov@aaziruanov ~]$ mv newdir/ ski.places/  
[aaziryanov@aaziruanov ~]$ mv ski.places/newdir/ ski.places/plans  
[aaziryanov@aaziruanov ~]$
```

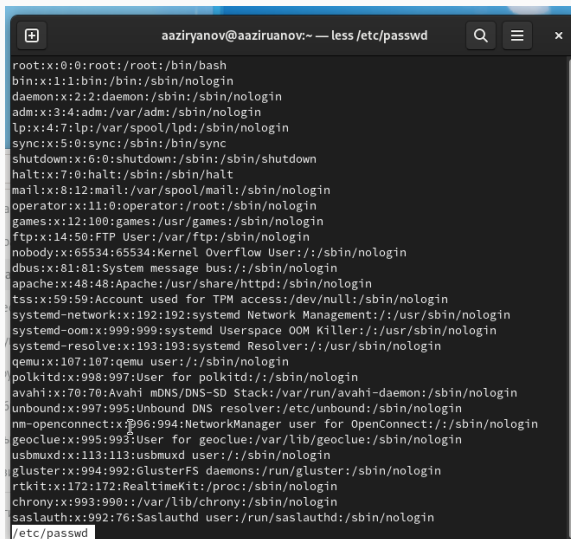
Рис. 4: Работа с каталогами

# Работа с командой chmod

```
[aaziryanov@aaziruanov ~]$  
[aaziryanov@aaziruanov ~]$ mkdir australia play  
[aaziryanov@aaziruanov ~]$ touch my_os feathers  
[aaziryanov@aaziruanov ~]$ chmod 744 australia/  
[aaziryanov@aaziruanov ~]$ chmod 711 play/  
[aaziryanov@aaziruanov ~]$ chmod 544 my_os  
[aaziryanov@aaziruanov ~]$ chmod 664 feathers  
[aaziryanov@aaziruanov ~]$ ls -l  
итого 0  
-rw-rw-r--. 1 aaziryanov aaziryanov 0 map 6 13:42 abc1  
drwxr--r--. 1 aaziryanov aaziryanov 0 map 6 13:45 australia  
-rw-rw-r--. 1 aaziryanov aaziryanov 0 map 6 13:45 feathers  
-rw-r--r--. 1 aaziryanov aaziryanov 0 map 6 13:34 may  
drwx--x--x. 1 aaziryanov aaziryanov 24 map 6 13:32 monthly  
-r-xr--r--. 1 aaziryanov aaziryanov 0 map 6 13:45 my_os  
drwx--x--x. 1 aaziryanov aaziryanov 0 map 6 13:45 play  
drwxr-xr-x. 1 aaziryanov aaziryanov 14 map 6 13:34 reports  
drwxr-xr-x. 1 aaziryanov aaziryanov 28 map 6 13:44 ski.places  
drwxr-xr-x. 1 aaziryanov aaziryanov 10 окт 15 12:20 work  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 Видео  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 Документы  
drwxr-xr-x. 1 aaziryanov aaziryanov 304 фев 27 12:15 Загрузки  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 Изображения  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 Музыка  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 Общедоступные  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 'Рабочий стол'  
drwxr-xr-x. 1 aaziryanov aaziryanov 0 окт 8 12:11 Таблицы  
[aaziryanov@aaziruanov ~]$
```

Рис. 5: Настройка прав доступа

# Файл /etc/passwd



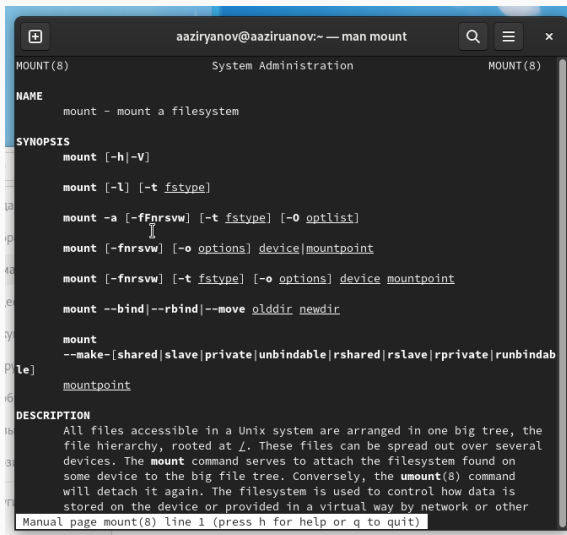
```
aaziryanov@aaziruanov:~ — less /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
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
saslauth:x:992:76:Saslauthd user:/run/saslauthd:/sbin/nologin
/etc/passwd
```

Рис. 6: Файл /etc/passwd

# Работа с файлами и правами доступа

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

Рис. 7: Работа с файлами и правами доступа



```
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

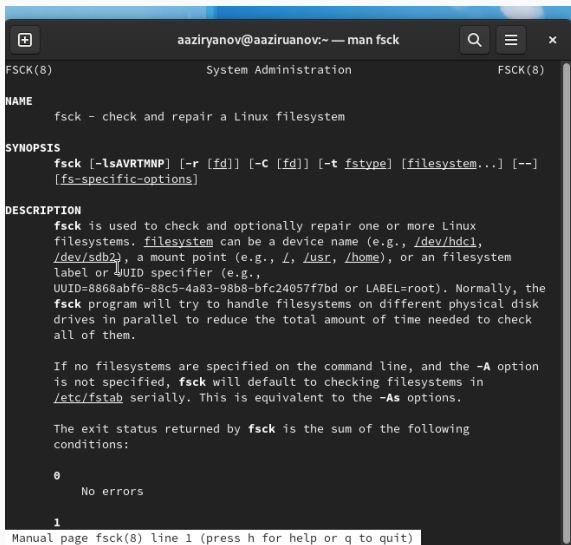
    mount --bind|--rbind|--move olddir newdir

    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

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

Рис. 8: Команда mount



```
aaziryanov@aaziruanov:~ — 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.

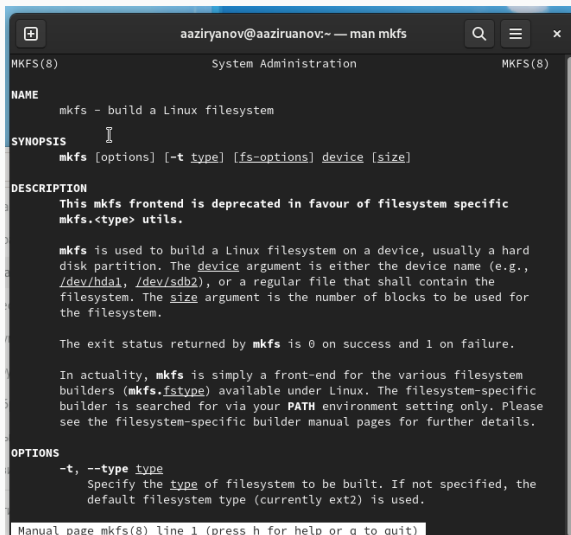
    If no filesystems are specified on the command line, and the -A option
    is not specified, fsck will default to checking filesystems in
    /etc/fstab serially. This is equivalent to the -As options.

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

    0
        No errors

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

Рис. 9: Команда fsck



```
aaziryanov@aaziruanov:~ — 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.

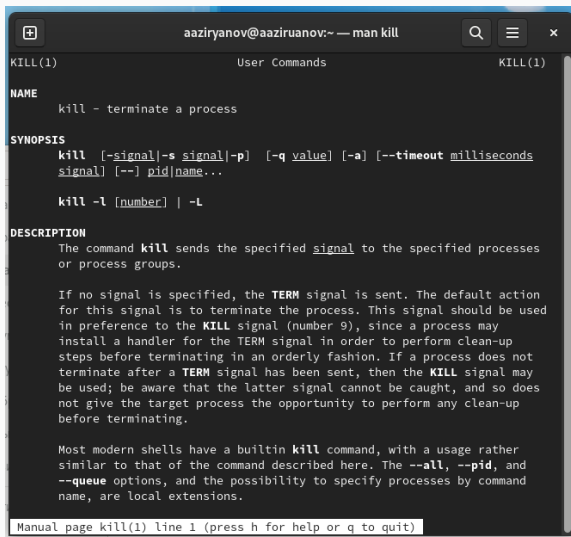
    The exit status returned by mkfs is 0 on success and 1 on failure.

    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.

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

Рис. 10: Команда mkfs



```
aaziryanov@aaziruanov:~ — 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.

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.