

# 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.

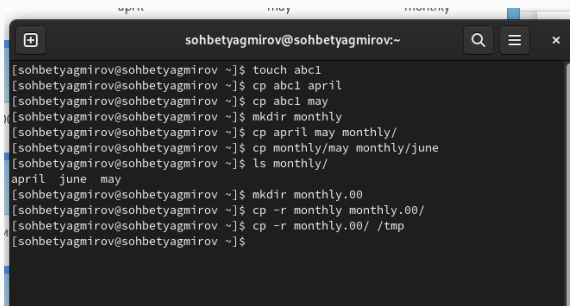
# Задачи лабораторной работы

- 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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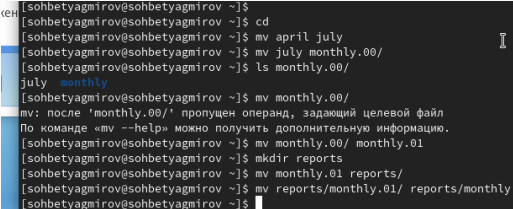
# Выполнение примеров



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

**Рис. 1:** Выполнение примеров

# Выполнение примеров



```
[sohbetyagmirov@sohbetyagmirov ~]$  
[sohbetyagmirov@sohbetyagmirov ~]$ cd  
[sohbetyagmirov@sohbetyagmirov ~]$ mv april july  
[sohbetyagmirov@sohbetyagmirov ~]$ mv july monthly.00/  
[sohbetyagmirov@sohbetyagmirov ~]$ ls monthly.00/  
july  monthly  
[sohbetyagmirov@sohbetyagmirov ~]$ mv monthly.00/  
mv: после 'monthly.00/' пропущен операнд, задающий целевой файл  
По команде «mv --help» можно получить дополнительную информацию.  
[sohbetyagmirov@sohbetyagmirov ~]$ mv monthly.00/ monthly.01  
[sohbetyagmirov@sohbetyagmirov ~]$ mkdir reports  
[sohbetyagmirov@sohbetyagmirov ~]$ mv monthly.01 reports/  
[sohbetyagmirov@sohbetyagmirov ~]$ mv reports/monthly.01/ reports/monthly  
[sohbetyagmirov@sohbetyagmirov ~]$
```

Рис. 2: Выполнение примеров

# Выполнение примеров

```
[sohbetyagmirov@sohbetyagmirov ~]$ cd
[sohbetyagmirov@sohbetyagmirov ~]$ touch may
[sohbetyagmirov@sohbetyagmirov ~]$ ls -l may
-rw-r--r--. 1 sohbetyagmirov sohbetyagmirov 0 map 11 13:27 may
[sohbetyagmirov@sohbetyagmirov ~]$ chmod u+x may
[sohbetyagmirov@sohbetyagmirov ~]$ ls -l may
-rwxr--r--. 1 sohbetyagmirov sohbetyagmirov 0 map 11 13:27 may
[sohbetyagmirov@sohbetyagmirov ~]$ chmod u-x may
[sohbetyagmirov@sohbetyagmirov ~]$ ls -l may
-rw-r--r--. 1 sohbetyagmirov sohbetyagmirov 0 map 11 13:27 may
[sohbetyagmirov@sohbetyagmirov ~]$ chmod g-r,o-r monthly/
[sohbetyagmirov@sohbetyagmirov ~]$ chmod g+w abc1
[sohbetyagmirov@sohbetyagmirov ~]$
```

Рис. 3: Выполнение примеров

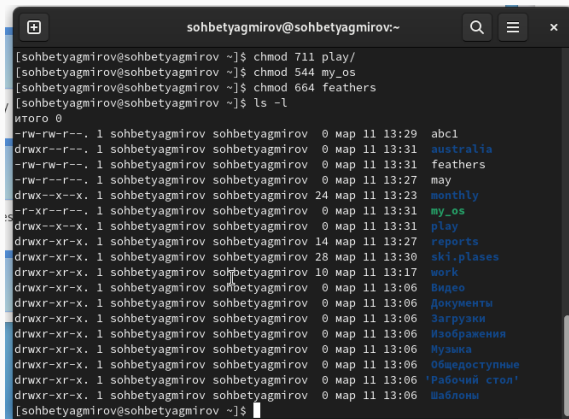


# Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

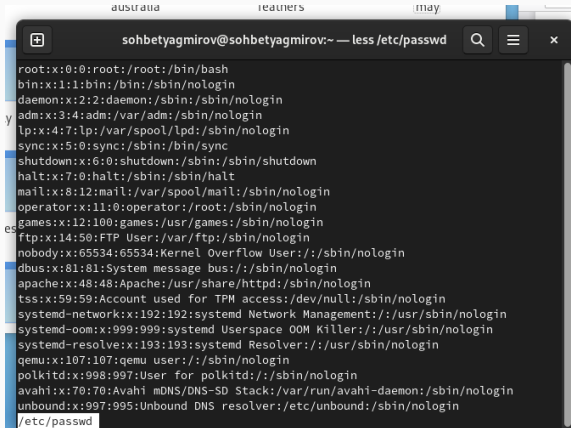
# Работа с командой chmod



```
sohbetyagmirov@sohbetyagmirov:~  
[sohbetyagmirov@sohbetyagmirov ~]$ chmod 711 play/  
[sohbetyagmirov@sohbetyagmirov ~]$ chmod 544 my_os  
[sohbetyagmirov@sohbetyagmirov ~]$ chmod 664 feathers  
[sohbetyagmirov@sohbetyagmirov ~]$ ls -l  
итого 0  
-rw-rw-r--. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:29 abc1  
drwxr--r--. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:31 australia  
-rw-rw-r--. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:31 feathers  
-rw-r--r--. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:27 may  
drwx--x--x. 1 sohbetyagmirov sohbetyagmirov 24 мар 11 13:23 monthly  
-r-xr--r--. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:31 my_os  
drwx--x--x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:31 play  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 14 мар 11 13:27 reports  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 28 мар 11 13:30 ski.places  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 10 мар 11 13:17 work  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Видео  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Документы  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Загрузки  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Изображения  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Музыка  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Общедоступные  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 'Рабочий стол'  
drwxr-xr-x. 1 sohbetyagmirov sohbetyagmirov 0 мар 11 13:06 Шаблоны  
[sohbetyagmirov@sohbetyagmirov ~]$
```

Рис. 5: Настройка прав доступа

# Файл /etc/passwd

A screenshot of a terminal window with a dark background. The window title bar shows three tabs: 'australia', 'learners', and 'may'. The active tab is 'may'. The terminal prompt is 'sohbetyagmirov@sohbetyagmirov:~ — less /etc/passwd'. The terminal displays the contents of the /etc/passwd file, showing system users and regular users. The entries are: 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. The file path '/etc/passwd' is highlighted at the bottom of the terminal output.

```
sohbetyagmirov@sohbetyagmirov:~ — 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
/etc/passwd
```

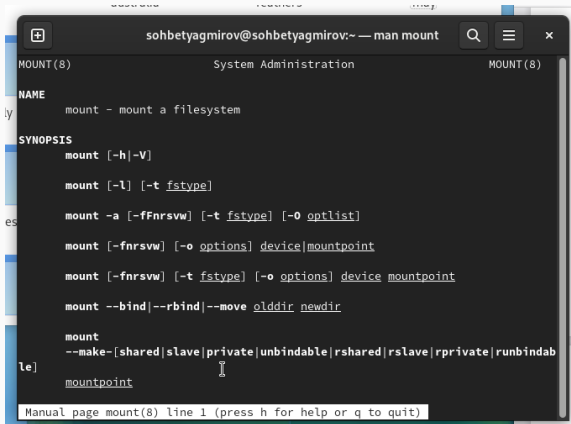
Рис. 6: Файл /etc/passwd

# Работа с файлами и правами доступа

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

**Рис. 7:** Работа с файлами и правами доступа

# Справка по командам



The screenshot shows a terminal window with the title bar "sohbetyagmirov@sohbetyagmirov:~ — man mount". The window displays the manual page for the 'mount' command (mount(8)). The content is as follows:

```
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

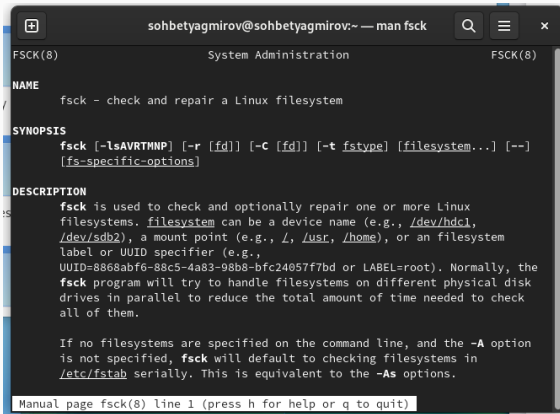
    mount [-fnrsvw] [-t fstype] [-o options] device mountpoint

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

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

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

Рис. 8: Команда mount



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

NAME
    fsck - check and repair a Linux filesystem

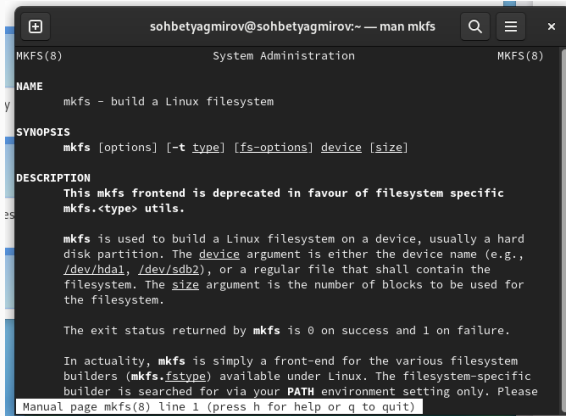
SYNOPSIS
    fsck [-lsAVRTMNP] [-r [fd]] [-C [fd]] [-t fstype] [filesystem...] [--]
    [fs-specific-options]

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.

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

Рис. 9: Команда fsck



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

NAME
    mkfs - build a Linux filesystem

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

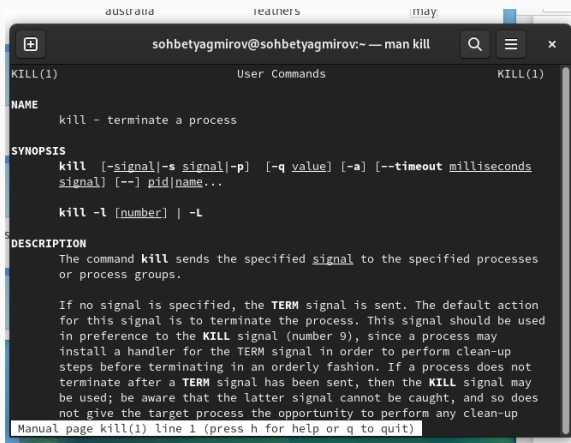
DESCRIPTION
    This mkfs frontend is deprecated in favour of filesystem specific
    mkfs.<type> utils.

    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.fs<type>) available under Linux. The filesystem-specific
    builder is searched for via your PATH environment setting only. Please
    Manual page mkfs(8) line 1 (press h for help or q to quit)
```

Рис. 10: Команда mkfs



The screenshot shows a terminal window with the title bar 'sohbetyagmirov@sohbetyagmirov:~ — man kill'. The window displays the manual page for the 'kill' command. The content is as follows:

```
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

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.