

# 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.

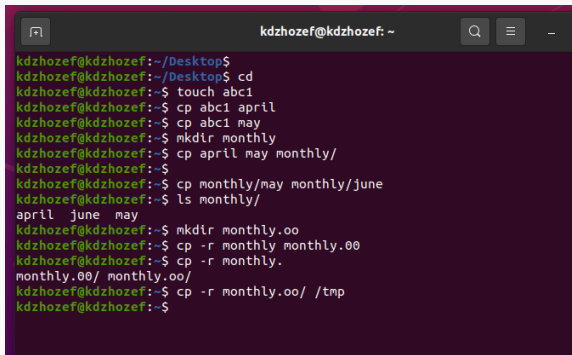
# Задачи лабораторной работы

- 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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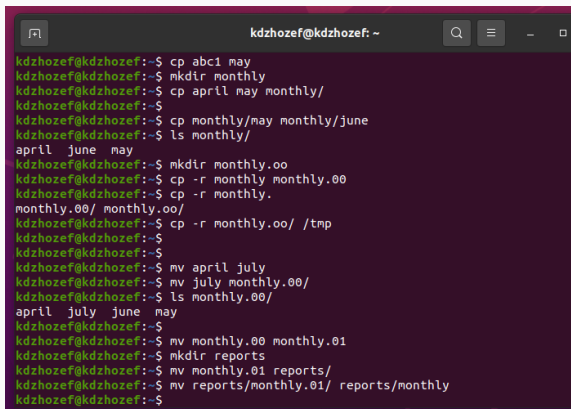
# Выполнение примеров



```
kdzhozef@kdzhozef: ~  
kdzhozef@kdzhozef:~/Desktop$  
kdzhozef@kdzhozef:~/Desktop$ cd  
kdzhozef@kdzhozef:~$ touch abc1  
kdzhozef@kdzhozef:~$ cp abc1 april  
kdzhozef@kdzhozef:~$ cp abc1 may  
kdzhozef@kdzhozef:~$ mkdir monthly  
kdzhozef@kdzhozef:~$ cp april may monthly/  
kdzhozef@kdzhozef:~$  
kdzhozef@kdzhozef:~$ cp monthly/may monthly/june  
kdzhozef@kdzhozef:~$ ls monthly/  
april  june  may  
kdzhozef@kdzhozef:~$ mkdir monthly.oo  
kdzhozef@kdzhozef:~$ cp -r monthly monthly.oo  
kdzhozef@kdzhozef:~$ cp -r monthly.  
monthly.oo/ monthly.oo/  
kdzhozef@kdzhozef:~$ cp -r monthly.oo/ /tmp  
kdzhozef@kdzhozef:~$
```

Рис. 1: Выполнение примеров

# Выполнение примеров



```
kdzhofef@kdzhofef: ~  
kdzhofef@kdzhofef:~$ cp abc1 may  
kdzhofef@kdzhofef:~$ mkdir monthly  
kdzhofef@kdzhofef:~$ cp april may monthly/  
kdzhofef@kdzhofef:~$  
kdzhofef@kdzhofef:~$ cp monthly/may monthly/june  
kdzhofef@kdzhofef:~$ ls monthly/  
april  june  may  
kdzhofef@kdzhofef:~$ mkdir monthly.oo  
kdzhofef@kdzhofef:~$ cp -r monthly monthly.oo  
kdzhofef@kdzhofef:~$ cp -r monthly.  
monthly.oo/ monthly.oo/  
kdzhofef@kdzhofef:~$ cp -r monthly.oo/ /tmp  
kdzhofef@kdzhofef:~$  
kdzhofef@kdzhofef:~$ mv april july  
kdzhofef@kdzhofef:~$ mv july monthly.oo/  
kdzhofef@kdzhofef:~$ ls monthly.oo/  
april  july  june  may  
kdzhofef@kdzhofef:~$  
kdzhofef@kdzhofef:~$ mv monthly.oo monthly.01  
kdzhofef@kdzhofef:~$ mkdir reports  
kdzhofef@kdzhofef:~$ mv monthly.01 reports/  
kdzhofef@kdzhofef:~$ mv reports/monthly.01/ reports/monthly  
kdzhofef@kdzhofef:~$
```

Рис. 2: Выполнение примеров

# Выполнение примеров

```
kdzhofef@kdzhofef:~$  
kdzhofef@kdzhofef:~$ touch may  
kdzhofef@kdzhofef:~$ ls -l may  
-rw-rw-r-- 1 kdzhofef kdzhofef 0 Mar  7 09:55 may  
kdzhofef@kdzhofef:~$ chmod +x may  
kdzhofef@kdzhofef:~$ ls -l may  
-rwxrwxr-x 1 kdzhofef kdzhofef 0 Mar  7 09:55 may  
kdzhofef@kdzhofef:~$ chmod -x may  
kdzhofef@kdzhofef:~$ cd  
kdzhofef@kdzhofef:~$ mkdir monthly  
mkdir: cannot create directory 'monthly': File exists  
kdzhofef@kdzhofef:~$ chmod g-r,o-r monthly  
kdzhofef@kdzhofef:~$ cd  
kdzhofef@kdzhofef:~$ touch abc1  
kdzhofef@kdzhofef:~$ chmod g+w abc1  
kdzhofef@kdzhofef:~$
```

Рис. 3: Выполнение примеров

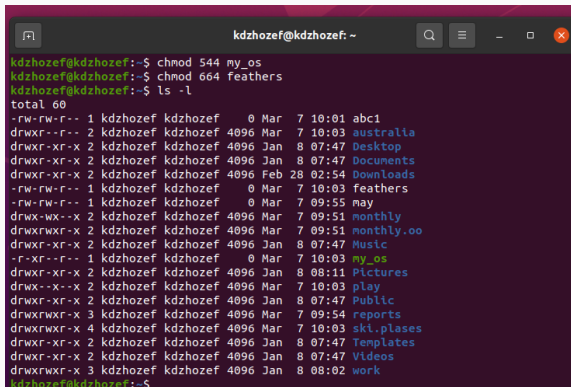


# Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

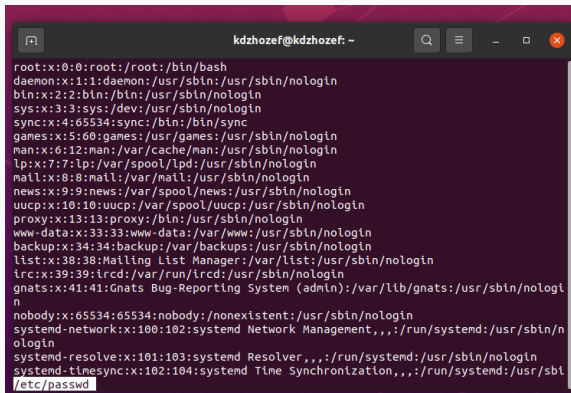
# Работа с командой chmod



```
kdzhofef@kdzhofef: ~  
kdzhofef@kdzhofef:~$ chmod 544 my_os  
kdzhofef@kdzhofef:~$ chmod 664 feathers  
kdzhofef@kdzhofef:~$ ls -l  
total 60  
-rw-rw-r-- 1 kdzhofef kdzhofef  0 Mar  7 10:01 abc1  
drwxr--r-- 2 kdzhofef kdzhofef 4096 Mar  7 10:03 australia  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 07:47 Desktop  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 07:47 Documents  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Feb 28 02:54 Downloads  
-rw-rw-r-- 1 kdzhofef kdzhofef  0 Mar  7 10:03 feathers  
-rw-rw-r-- 1 kdzhofef kdzhofef  0 Mar  7 09:55 may  
drwx-wx--x 2 kdzhofef kdzhofef 4096 Mar  7 09:51 monthly  
drwxrwxr-x 2 kdzhofef kdzhofef 4096 Mar  7 09:51 monthly.oo  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 07:47 Music  
-r-xr--r-- 1 kdzhofef kdzhofef  0 Mar  7 10:03 my_os  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 08:11 Pictures  
drwx--x--x 2 kdzhofef kdzhofef 4096 Mar  7 10:03 play  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 07:47 Public  
drwxrwxr-x 3 kdzhofef kdzhofef 4096 Mar  7 09:54 reports  
drwxrwxr-x 4 kdzhofef kdzhofef 4096 Mar  7 10:03 ski.plases  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 07:47 Templates  
drwxr-xr-x 2 kdzhofef kdzhofef 4096 Jan  8 07:47 Videos  
drwxrwxr-x 3 kdzhofef kdzhofef 4096 Jan  8 08:02 work  
kdzhofef@kdzhofef:~$
```

Рис. 5: Настройка прав доступа

# Файл /etc/passwd

A terminal window with a dark background and light text. The window title is 'kdzhofef@kdzhofef: ~'. The terminal displays the contents of the /etc/passwd file, showing system users and regular users. The text is as follows:

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailng List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
```

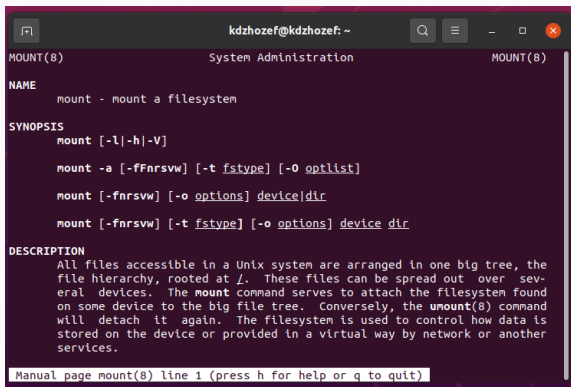
The last line, `/etc/passwd`, is highlighted with a light blue background.

Рис. 6: Файл /etc/passwd

# Работа с файлами и правами доступа

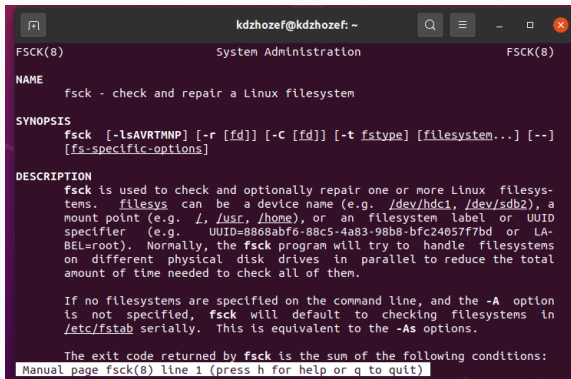
```
kdzhofef@kdzhofef:~$  
kdzhofef@kdzhofef:~$ cp feathers file.old  
kdzhofef@kdzhofef:~$ mv file.old play/  
kdzhofef@kdzhofef:~$ mkdir fun  
kdzhofef@kdzhofef:~$ cp -R play/ fun/  
kdzhofef@kdzhofef:~$ mv fun/ play/games  
kdzhofef@kdzhofef:~$ chmod u-r feathers  
kdzhofef@kdzhofef:~$ cat feathers  
cat: feathers: Permission denied  
kdzhofef@kdzhofef:~$ cp feathers feathers2  
cp: cannot open 'feathers' for reading: Permission denied  
kdzhofef@kdzhofef:~$ chmod +r feathers  
kdzhofef@kdzhofef:~$ chmod -x play  
kdzhofef@kdzhofef:~$ cd play/  
bash: cd: play/: Permission denied  
kdzhofef@kdzhofef:~$ chmod +x play/  
kdzhofef@kdzhofef:~$
```

Рис. 7: Работа с файлами и правами доступа



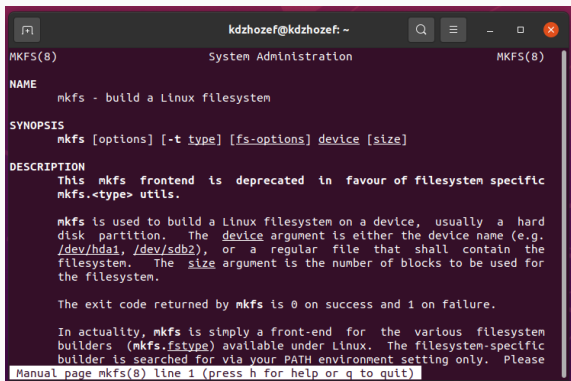
```
kdzhozef@kdzhozef: ~  
MOUNT(8) System Administration MOUNT(8)  
  
NAME  
    mount - mount a filesystem  
  
SYNOPSIS  
    mount [-l|-h|-V]  
  
    mount -a [-ffnrsvw] [-t fstype] [-O optlist]  
  
    mount [-fnrsvw] [-o options] device|dir  
  
    mount [-fnrsvw] [-t fstype] [-o options] device dir  
  
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 sev-  
    eral 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 another  
    services.  
  
Manual page mount(8) line 1 (press h for help or q to quit)
```

Рис. 8: Команда mount



```
kdzhofef@kdzhofef: ~  
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.  
    filesystems 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 code returned by fsck is the sum of the following conditions:  
Manual page fsck(8) line 1 (press h for help or q to quit)
```

Рис. 9: Команда fsck



```
kdzhozef@kdzhozef: ~
MKFS(8)                                System Administration                                MKFS(8)

NAME
    mkfs - build a Linux filesystem

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

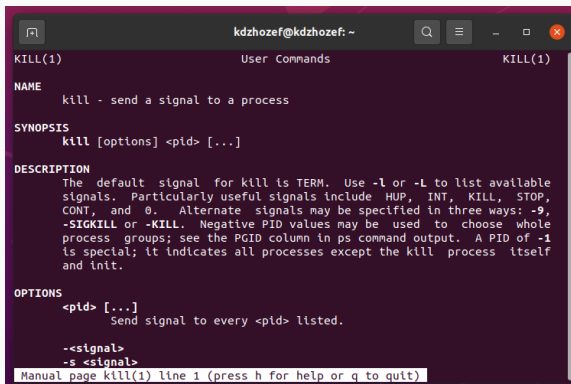
DESCRIPTION
    This mkfs frontend is deprecated in favour of filesystem specific
    mkfs.<type> utils.

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

Рис. 10: Команда mkfs



```
kdzhofef@kdzhofef: ~  
KILL(1) User Commands KILL(1)  
  
NAME  
    kill - send a signal to a process  
  
SYNOPSIS  
    kill [options] <pid> [...]  
  
DESCRIPTION  
    The default signal for kill is TERM. Use -l or -L to list available  
    signals. Particularly useful signals include HUP, INT, KILL, STOP,  
    CONT, and 0. Alternate signals may be specified in three ways: -9,  
    -SIGKILL or -KILL. Negative PID values may be used to choose whole  
    process groups; see the PGID column in ps command output. A PID of -1  
    is special; it indicates all processes except the kill process itself  
    and init.  
  
OPTIONS  
    <pid> [...]  
        Send signal to every <pid> listed.  
  
    -<signal>  
    -s <signal>  
  
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.