

# 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.

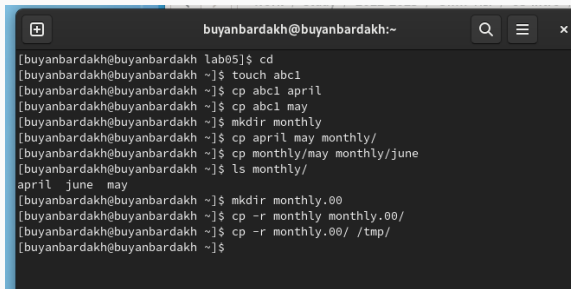
# Задачи лабораторной работы

- 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



```
buyanbardakh@buyanbardakh:~  
[buyanbardakh@buyanbardakh lab05]$ cd  
[buyanbardakh@buyanbardakh ~]$ touch abc1  
[buyanbardakh@buyanbardakh ~]$ cp abc1 april  
[buyanbardakh@buyanbardakh ~]$ cp abc1 may  
[buyanbardakh@buyanbardakh ~]$ mkdir monthly  
[buyanbardakh@buyanbardakh ~]$ cp april may monthly/  
[buyanbardakh@buyanbardakh ~]$ cp monthly/may monthly/june  
[buyanbardakh@buyanbardakh ~]$ ls monthly/  
april  june  may  
[buyanbardakh@buyanbardakh ~]$ mkdir monthly.00  
[buyanbardakh@buyanbardakh ~]$ cp -r monthly monthly.00/  
[buyanbardakh@buyanbardakh ~]$ cp -r monthly.00/ /tmp/  
[buyanbardakh@buyanbardakh ~]$
```

Рис. 1: Выполнение примеров

# Выполнение примеров

```
[buyanbardakh@buyanbardakh ~]$  
[buyanbardakh@buyanbardakh ~]$ ls  
abc1  monthly  Видео      Изображения  'Рабочий стол'  
april  monthly.00  Документы  Музыка        Шаблоны  
may    work       Загрузки   Общедоступные  
[buyanbardakh@buyanbardakh ~]$ mv april july  
[buyanbardakh@buyanbardakh ~]$ mv july monthly.00/  
[buyanbardakh@buyanbardakh ~]$ ls monthly.00/  
july  monthly  
[buyanbardakh@buyanbardakh ~]$ mv monthly.00/ monthly.01/  
[buyanbardakh@buyanbardakh ~]$ mkdir reports  
[buyanbardakh@buyanbardakh ~]$ mv monthly.01/ reports/  
[buyanbardakh@buyanbardakh ~]$ mv reports/monthly.01/ reports/monthly  
[buyanbardakh@buyanbardakh ~]$
```

Рис. 2: Выполнение примеров

# Выполнение примеров

```
[buyanbardakh@buyanbardakh ~]$ ls -l may
-rw-r--r--. 1 buyanbardakh buyanbardakh 0 map  3 12:00 may
[buyanbardakh@buyanbardakh ~]$ chmod u+x may
[buyanbardakh@buyanbardakh ~]$ ls -l may
-rwxr--r--. 1 buyanbardakh buyanbardakh 0 map  3 12:00 may
[buyanbardakh@buyanbardakh ~]$ chmod u-x may
[buyanbardakh@buyanbardakh ~]$ ls -l may
-rw-r--r--. 1 buyanbardakh buyanbardakh 0 map  3 12:00 may
[buyanbardakh@buyanbardakh ~]$ mkdir monthly
mkdir: невозможно создать каталог «monthly»: Файл существует
[buyanbardakh@buyanbardakh ~]$ chmod g-r,o-r monthly/
[buyanbardakh@buyanbardakh ~]$ cd
[buyanbardakh@buyanbardakh ~]$ touch abc1
[buyanbardakh@buyanbardakh ~]$ chmod g+w abc1
[buyanbardakh@buyanbardakh ~]$
```

Рис. 3: Выполнение примеров

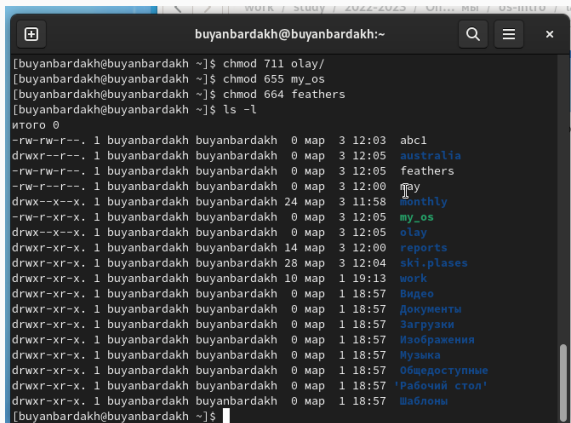


# Создание директорий и копирование файлов

```
[buyanbardakh@buyanbardakh ~]$  
[buyanbardakh@buyanbardakh ~]$  
[buyanbardakh@buyanbardakh ~]$ cp /usr/include/li  
libgen.h libintl.h limits.h link.h linux/  
[buyanbardakh@buyanbardakh ~]$ cp /usr/include/linux/sysinfo.h ~  
[buyanbardakh@buyanbardakh ~]$ mv sysinfo.h equipment  
[buyanbardakh@buyanbardakh ~]$ mkdir ski.places  
[buyanbardakh@buyanbardakh ~]$ mv equipment ski.places/  
[buyanbardakh@buyanbardakh ~]$ mv ski.places/equipment ski.places/equiplist  
[buyanbardakh@buyanbardakh ~]$ touch abc1  
[buyanbardakh@buyanbardakh ~]$ cp abc1 ski.places/equiplist2  
[buyanbardakh@buyanbardakh ~]$ cd ski.places/  
[buyanbardakh@buyanbardakh ski.places]$ mkdir equipment  
[buyanbardakh@buyanbardakh ski.places]$ mv equiplist equipment/  
[buyanbardakh@buyanbardakh ski.places]$ mv equiplist2 equipment/  
[buyanbardakh@buyanbardakh ski.places]$ cd  
[buyanbardakh@buyanbardakh ~]$ mkdir newdir  
[buyanbardakh@buyanbardakh ~]$ mv newdir/ ski.places/  
[buyanbardakh@buyanbardakh ~]$ mv ski.places/newdir/ ski.places/plans  
[buyanbardakh@buyanbardakh ~]$  
[buyanbardakh@buyanbardakh ~]$
```

Рис. 4: Работа с каталогами

# Работа с командой chmod

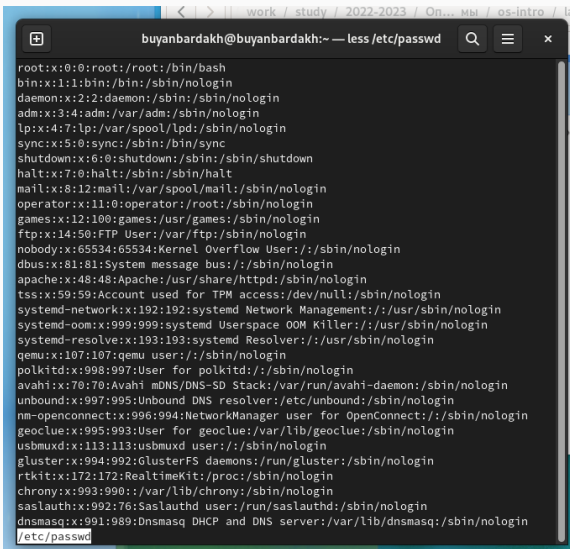


A terminal window titled 'buyanbardakh@buyanbardakh:~' with search, menu, and close buttons. The terminal shows the following commands and output:

```
[buyanbardakh@buyanbardakh ~]$ chmod 711 olay/
[buyanbardakh@buyanbardakh ~]$ chmod 655 my_os
[buyanbardakh@buyanbardakh ~]$ chmod 664 feathers
[buyanbardakh@buyanbardakh ~]$ ls -l
итого 0
-rw-rw-r--. 1 buyanbardakh buyanbardakh 0 map 3 12:03 abc1
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 3 12:05 australia
-rw-rw-r--. 1 buyanbardakh buyanbardakh 0 map 3 12:05 feathers
-rw-r--r--. 1 buyanbardakh buyanbardakh 0 map 3 12:00 day
drwx--x--x. 1 buyanbardakh buyanbardakh 24 map 3 11:58 monthly
-rw-r--r--. 1 buyanbardakh buyanbardakh 0 map 3 12:05 my_os
drwx--x--x. 1 buyanbardakh buyanbardakh 0 map 3 12:05 olay
drwxr--r--. 1 buyanbardakh buyanbardakh 14 map 3 12:00 reports
drwxr--r--. 1 buyanbardakh buyanbardakh 28 map 3 12:04 ski.places
drwxr--r--. 1 buyanbardakh buyanbardakh 10 map 1 19:13 work
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Видео
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Документы
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Загрузки
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Изображения
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Музыка
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Общедоступные
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 'Рабочий стол'
drwxr--r--. 1 buyanbardakh buyanbardakh 0 map 1 18:57 Шаблоны
[buyanbardakh@buyanbardakh ~]$
```

Рис. 5: Настройка прав доступа

# Файл /etc/passwd



The image shows a terminal window with a dark background. The title bar at the top reads "buyanbardakh@buyanbardakh:~ — less /etc/passwd". The terminal displays the contents of the /etc/passwd file, which lists system and regular users. Each line follows the format "username:x:UID:GID:full\_name:home\_directory:shell". The users listed are 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.

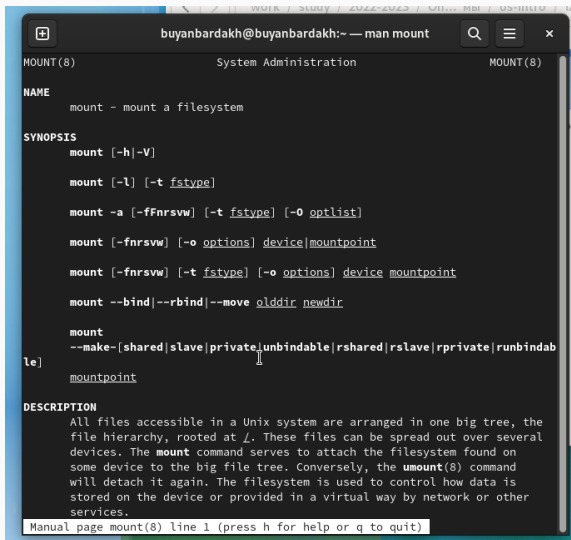
```
buyanbardakh@buyanbardakh:~ — less /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
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

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

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



```
buyanbardakh@buyanbardakh:~ — 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

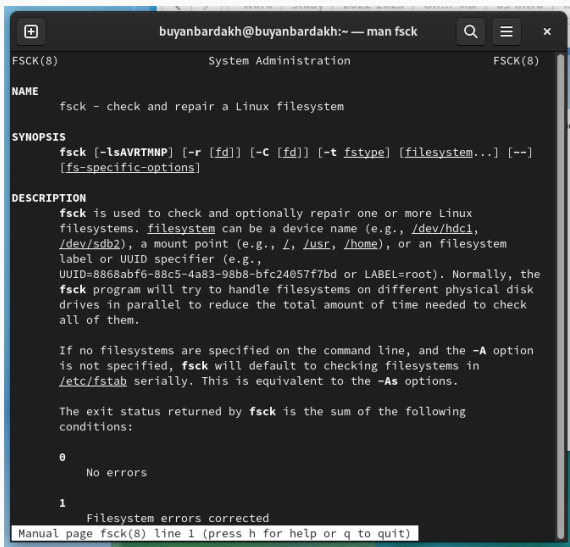
    mount --bind|--rbind|--move olddir newdir

    mount
    --make-[shared|slave|private|unbindable|rshared|rslave|rprivate|runbindab
le]
    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.

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

Рис. 8: Команда mount



```
buyanbardakh@buyanbardakh:~ — 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.

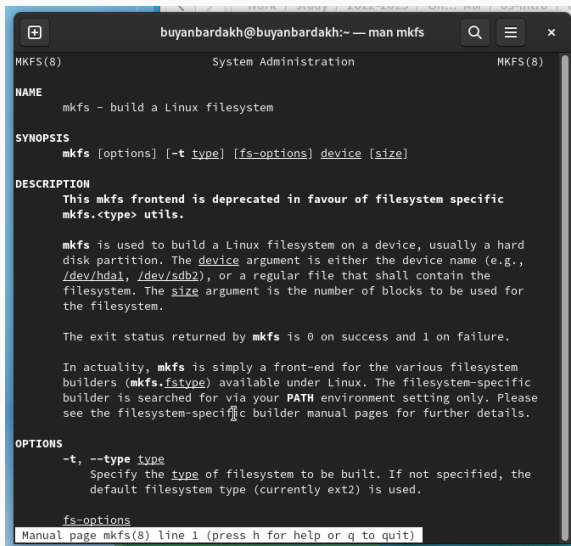
    The exit status returned by fsck is the sum of the following
    conditions:

    0
        No errors

    1
        Filesystem errors corrected

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

Рис. 9: Команда fsck



```
buyanbardakh@buyanbardakh:~ — 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.

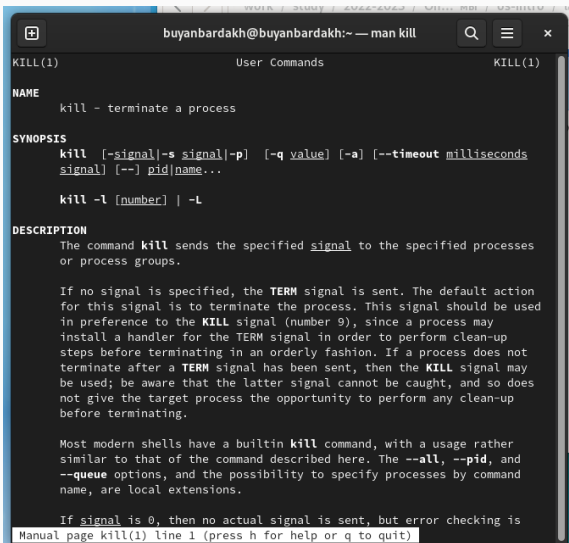
    mkfs is used to build a Linux filesystem on a device, usually a hard
    disk partition. The device argument is either the device name (e.g.,
    /dev/hda1, /dev/sdb2), or a regular file that shall contain the
    filesystem. The size argument is the number of blocks to be used for
    the filesystem.

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



```
buyanbardakh@buyanbardakh:~ — 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
    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.