

**РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ**

презентация **ПО ЛАБОРАТОРНОЙ РАБОТЕ № 5**

*дисциплина:      Операционные системы*

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**МОСКВА**

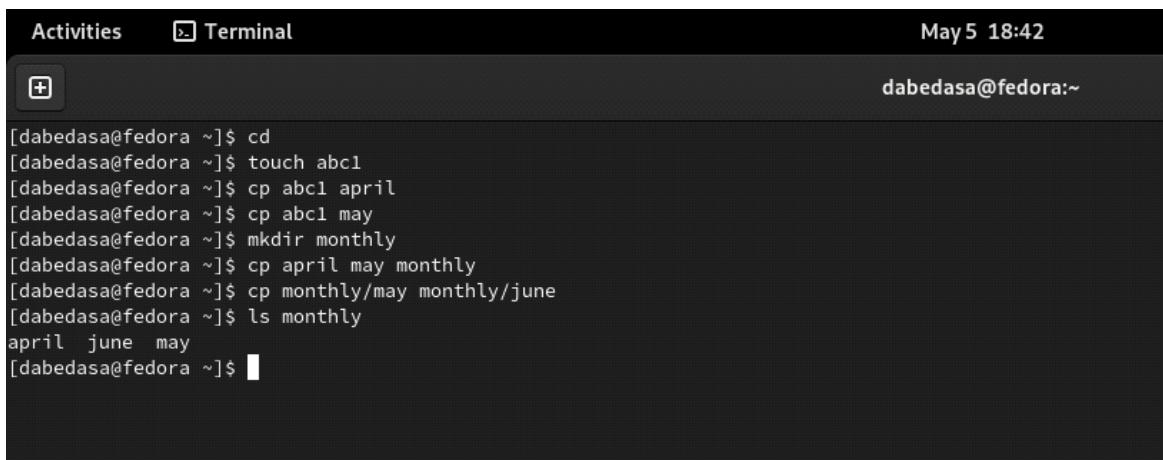
2022 г.

## **Цель работы:**

Ознакомиться с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобрести практические навыки по применению команд для работы с файлами и каталогами, по управлению процессами (и работами), по проверке использования диска и обслуживанию файловой системы.

## **Ход работы:**

- Выполнили все примеры, приведённые в первой части описания
- лабораторной работы.



The screenshot shows a terminal window with a dark background and light-colored text. At the top, there's a header bar with 'Activities' and 'Terminal' tabs, the date 'May 5 18:42', and the user 'dabedasa@fedora:~'. The terminal itself contains the following command history:

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ touch abc1
[dabedasa@fedora ~]$ cp abc1 april
[dabedasa@fedora ~]$ cp abc1 may
[dabedasa@fedora ~]$ mkdir monthly
[dabedasa@fedora ~]$ cp april may monthly
[dabedasa@fedora ~]$ cp monthly/may monthly/june
[dabedasa@fedora ~]$ ls monthly
april june may
[dabedasa@fedora ~]$
```

Activities Terminal May 5 18:46

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ mkdir monthly.00
[dabedasa@fedora ~]$ cp -r monthly monthly.00
[dabedasa@fedora ~]$ cp -r monthly.00 /tmp
[dabedasa@fedora ~]$
```

Activities Terminal May 5 19:01

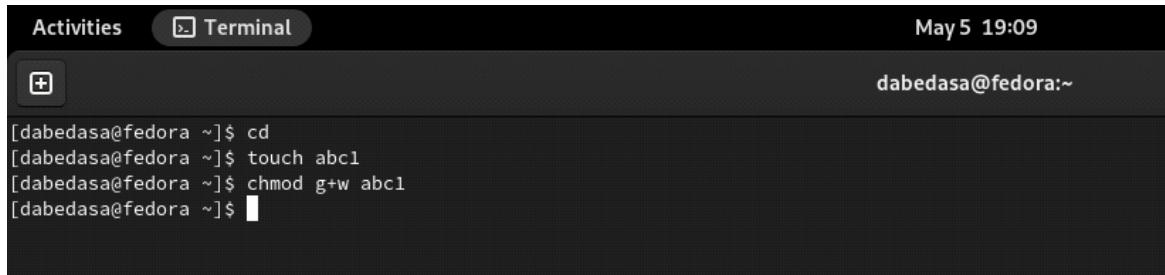
```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ mv april july
[dabedasa@fedora ~]$ mv july monthly.00
[dabedasa@fedora ~]$ ls monthly.00
july monthly
[dabedasa@fedora ~]$ ls monthly
april june may
[dabedasa@fedora ~]$ mv monthly.00 monthly.01
[dabedasa@fedora ~]$ mkdir reports
[dabedasa@fedora ~]$ mv monthly.01 reports
[dabedasa@fedora ~]$ mv reports/monthly.01 reports/monthly
[dabedasa@fedora ~]$
```

Activities Terminal May 5 19:04

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ touch may
[dabedasa@fedora ~]$ ls -l may
-rw-rw-r--. 1 dabedasa dabedasa 0 May  5 19:02 may
[dabedasa@fedora ~]$ chmod u+x may
[dabedasa@fedora ~]$ ls -l may
-rwxrw-r--. 1 dabedasa dabedasa 0 May  5 19:02 may
[dabedasa@fedora ~]$ chmod u-x may
[dabedasa@fedora ~]$ ls -l may
-rw-rw-r--. 1 dabedasa dabedasa 0 May  5 19:02 may
[dabedasa@fedora ~]$
```

Activities Terminal May 5 19:08

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ mkdir Monthly
[dabedasa@fedora ~]$ chmod g-r,o-r Monthly
[dabedasa@fedora ~]$
```



A screenshot of a terminal window titled "Terminal". The window shows a command history with the following entries:

```
[dabedasa@fedora ~]$ cd  
[dabedasa@fedora ~]$ touch abc1  
[dabedasa@fedora ~]$ chmod g+w abc1  
[dabedasa@fedora ~]$
```

The terminal window has a dark background and light-colored text. The title bar includes "Activities" and the date/time "May 5 19:09". The prompt "dabedasa@fedora:~" is visible at the top right.

- Выполнили следующие действия:
  - Скопировали файл /usr/include/sys/io.h в домашний каталог и назвали его equipment.
  - В домашнем каталоге создали директорию ~/ski.plases.
  - Переместили файл equipment в каталог ~/ski.plases.
  - Переименовали файл ~/ski.plases/equipment в ~/ski.plases/equiplist.
  - Создали в домашнем каталоге файл abc1 и скопировали его в каталог ~/ski.plases, назвали его equiplist2.
  - Создали каталог с именем equipment в каталоге ~/ski.plases.
  - Переместили файлы ~/ski.plases/equiplist и equiplist2 в каталог ~/ski.plases/equipment.
  - Создали и переместили каталог ~/newdir в каталог ~/ski.plases и назвали его plans.

Activities Terminal May 5 19:22

```
dabedasa@fedora:~/ski.places
```

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ cp /usr/include/sys/io.h equipment
[dabedasa@fedora ~]$ ls
abc1      Documents  info    monthly  Pictures  Templates
ad.txt    Downloads  july.txt Monthly  Public   Videos
april.txt equipment junly   Music    refs
Desktop   hooks    may     objects  reports
[dabedasa@fedora ~]$ mkdir ski.places
[dabedasa@fedora ~]$ mv equipment ski.places
[dabedasa@fedora ~]$ mv ski.places/equipment ski.places/equiplist
[dabedasa@fedora ~]$ cp abc1 ski.places
[dabedasa@fedora ~]$ mv ski.places/abc1 ski.places/equiplist2
[dabedasa@fedora ~]$ cd ski.places
[dabedasa@fedora ski.places]$ mkdir equipment
[dabedasa@fedora ski.places]$ mv equiplist equipment
[dabedasa@fedora ski.places]$ mv equiplist2 equipment
[dabedasa@fedora ski.places]$ cd
[dabedasa@fedora ~]$ mkdir newdir
[dabedasa@fedora ~]$ mv newdir ski.places
[dabedasa@fedora ~]$ cd ski.places
[dabedasa@fedora ski.places]$ ls
equipment  newdir
[dabedasa@fedora ski.places]$ mv newdir plans
[dabedasa@fedora ski.places]$ ls
equipment  plans
[dabedasa@fedora ski.places]$
```

- Определили опции команды chmod, необходимые для того, чтобы присвоить файлам australia, play, my\_os и feathers следующие права доступа соответственно, считая, что в начале таких прав нет: drwxr--r--, drwxr-x—x, -r-xr--r--, -rw-rw-r--.

Activities Terminal May 5 19:37

```
dabedasa@fedora:~
```

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ touch australia
[dabedasa@fedora ~]$ touch play
[dabedasa@fedora ~]$ touch my_os
[dabedasa@fedora ~]$ touch feathers
[dabedasa@fedora ~]$ chmod u+r,u+w,u+x australia
[dabedasa@fedora ~]$ chmod g+r,g-w,g-x australia
[dabedasa@fedora ~]$ chmod o+r,o-w,o-x australia
[dabedasa@fedora ~]$ chmod u+r,u+w,u+xx play
[dabedasa@fedora ~]$ chmod g-r,g-w,g+x play
[dabedasa@fedora ~]$ chmod o-r,o-w,o+x play
[dabedasa@fedora ~]$ chmod u+r,u+w,u+xx my_os
[dabedasa@fedora ~]$ chmod g+r,g-w,g-x my_os
[dabedasa@fedora ~]$ chmod o+r,o-w,o-x my_os
[dabedasa@fedora ~]$ chmod u+r,u+w,u+xx feathers
[dabedasa@fedora ~]$ chmod o+r,o-w,o-x feathers
[dabedasa@fedora ~]$ chmod g+r,g+w,g-x feathers
[dabedasa@fedora ~]$
```

- Проделали следующие упражнения:

- Просмотрели содержимое файла /etc/password.

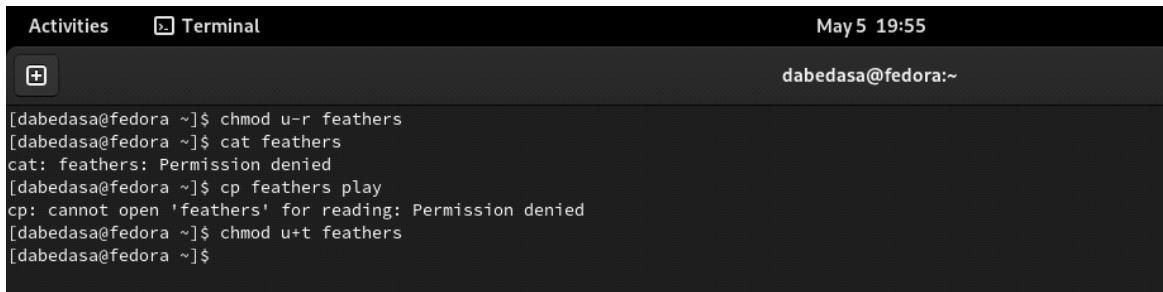
```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
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
apache:x:48:48:Apache:/usr/share/httpd:/sbin/nologin
dbus:x:81:81:System message bus://:/sbin/nologin
systemd-networkd: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
systemd-timesync:x:998:998:systemd Time Synchronization://:/usr/sbin/nologin
systemd-coredump:x:997:997:systemd Core Dumper://:/usr/sbin/nologin
tss:x:59:59:Account used for TPM access:/dev/null:/sbin/nologin
qemu:x:107:107:qemu user://:/sbin/nologin
polkitd:x:996:996:User for polkitd://:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
unbound:x:995:994:Unbound DNS resolver:/etc/unbound:/sbin/nologin
dnsmasq:x:994:993:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/sbin/nologin
nm-openconnect:x:993:991:NetworkManager user for OpenConnect://:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user://:/sbin/nologin
gluster:x:992:990:GlusterFS daemons:/run/gluster:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
```

- Скопировали файл ~/feathers в файл ~/file.old.
- Переместили файл ~/file.old в каталог ~/play.
- Скопировали каталог ~/play в каталог ~/fun.
- Переместили каталог ~/fun в каталог ~/play и назвали его games.

```
[dabedasa@fedora ~]$ cp feathers file.old
[dabedasa@fedora ~]$ mv file.old play
[dabedasa@fedora ~]$ cp -r play fun
[dabedasa@fedora ~]$ ls fun
fun
[dabedasa@fedora ~]$ mv fun play
[dabedasa@fedora ~]$ mv play games
[dabedasa@fedora ~]$ mv games play
[dabedasa@fedora ~]$ mv play/fun play/games
mv: cannot stat 'play/fun': No such file or directory
l[dabedasa@fedora ~]$ ls play
play
[dabedasa@fedora ~]$
```

- Лишили владельца файла ~/feathers права на чтение.

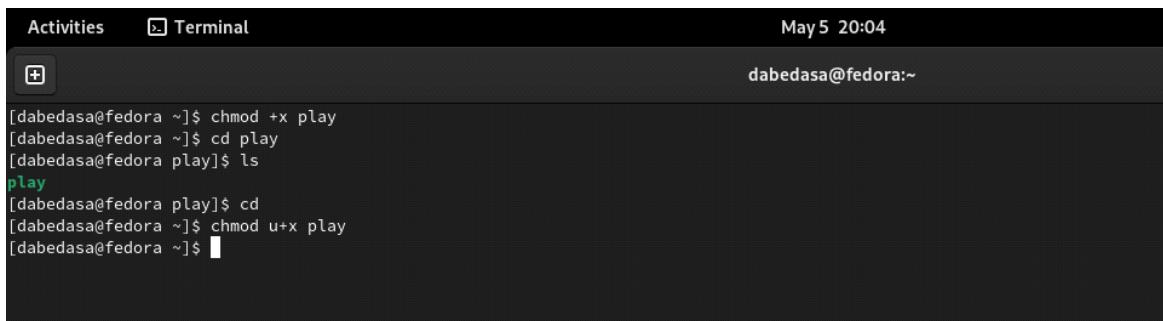
- Попытались просмотреть файл ~/feathers командой cat. Из-за лишения права на чтение, сделать этого не получилось.
- Попытались скопировать файл ~/feathers. Из-за лишения права на чтение, сделать этого не получилось.
- Дали владельцу файла ~/feathers право на чтение.



A screenshot of a terminal window titled "Terminal". The window shows a command-line session with the user "dabedasa" on a Fedora system. The session starts with changing permissions on a file named "feathers" (chmod u-r feathers), attempting to read it (cat feathers), and then copying it (cp feathers play). Both operations fail due to permission denied errors. Finally, the permissions are changed back (chmod u+t feathers).

```
[dabedasa@fedora ~]$ chmod u-r feathers
[dabedasa@fedora ~]$ cat feathers
cat: feathers: Permission denied
[dabedasa@fedora ~]$ cp feathers play
cp: cannot open 'feathers' for reading: Permission denied
[dabedasa@fedora ~]$ chmod u+t feathers
[dabedasa@fedora ~]$
```

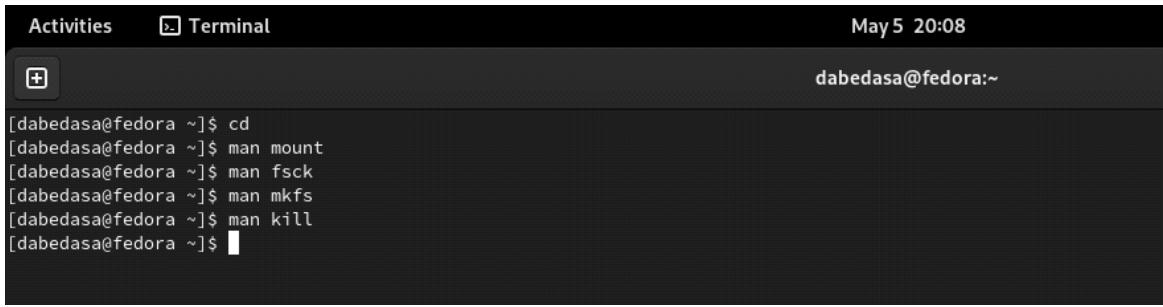
- Лишили владельца каталога ~/play права на выполнение.
- Перешли в каталог ~/play. Ничего не изменилось, так как мы не запускали каталог, а перешли в него, однако сама иконка каталога изменилась.
- Дали владельцу каталога ~/play право на выполнение.



A screenshot of a terminal window titled "Terminal". The window shows a command-line session with the user "dabedasa" on a Fedora system. The session starts by changing the execution permission on a file named "play" (chmod +x play). Then, the user changes into the "play" directory (cd play) and lists its contents (ls). Inside the directory, there is a single file named "play". Finally, the user changes back to the parent directory (~) and changes the execution permission back on "play" (chmod u+x play).

```
[dabedasa@fedora ~]$ chmod +x play
[dabedasa@fedora ~]$ cd play
[dabedasa@fedora play]$ ls
play
[dabedasa@fedora play]$ cd ..
[dabedasa@fedora ~]$ chmod u+x play
[dabedasa@fedora ~]$
```

- Прочитали man по командам mount, fsck, mkfs, kill.



A screenshot of a terminal window titled "Terminal". The window shows a command history starting with "[dabedasa@fedora ~]\$ cd", followed by "[dabedasa@fedora ~]\$ man mount", "[dabedasa@fedora ~]\$ man fsck", "[dabedasa@fedora ~]\$ man mkfs", "[dabedasa@fedora ~]\$ man kill", and "[dabedasa@fedora ~]\$". The window has a dark background and light-colored text. The title bar also displays "Activities" and the date/time "May 5 20:08".

```
[dabedasa@fedora ~]$ cd
[dabedasa@fedora ~]$ man mount
[dabedasa@fedora ~]$ man fsck
[dabedasa@fedora ~]$ man mkfs
[dabedasa@fedora ~]$ man kill
[dabedasa@fedora ~]$
```

- *mount* - нужна для просмотра смонтированных файловых систем, а также для монтирования любых локальных или удаленных файловых систем. Например, при вызове команды «*mount /dev/cdrom /mnt/cdrom*» устройство */dev/cdrom* монтируется в каталог */mnt/cdrom*, если он существует. Начиная от момента монтирования и пока пользователь не отмонтирует файловую систему (или туда не будет смонтировано что-то иное) в каталоге */mnt/cdrom* будет содержаться дерево каталогов устройства */dev/cdrom*; те файлы, и подкаталоги, которые раньше находились в */mnt/cdrom*, сохранятся, но будут недоступны до размонтирования устройства */dev/cdrom*. Для размонтирования достаточно указать точку монтирования или имя устройства, команда «*umount /dev/cdrom*». При запуске команды *mount* без параметров выводится список смонтированных файловых систем.

Activities Terminal May 5 20:05

dabedasa@fedora:~ — man mount

```
MOUNT(8)           System Administration          MOUNT(8)

NAME
  mount — mount a filesystem

SYNOPSIS
  mount [-h|-V]
  mount [-l] [-t fstype]
  mount -a [-fFnrvw] [-t fstype] [-O optlist]
  mount [-fFnrvw] [-o options] device|mountpoint
  mount [-fFnrvw] [-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.

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

- **fsck** - fsck [ -sAVRTNP ] [ -C [ fd ] ] [ -t fstype ] [filesys ... ] [--] [ fs-specific-options ] - проверяет и устраняет ошибки в файловой системе. Например, fsck -fy -t ext4 /dev/sda1. Опция -f (force) используется для принудительного выполнения проверки. Опция -y (yes) позволяет программе автоматически отвечать "да" на все вопросы в ходе работы.

Activities Terminal May 5 20:07

dabedasa@fedora:~ — 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-bfc24057fbd 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)
```

- **mkfs** - действие заключается в создании указанной файловой системы на выбранном диске или разделе. Например, команда «**mkfs-text2 /dev/hda1**» создает файловую систему ext2 на разделе hda1.

```
dabedasa@fedora:~ — 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.

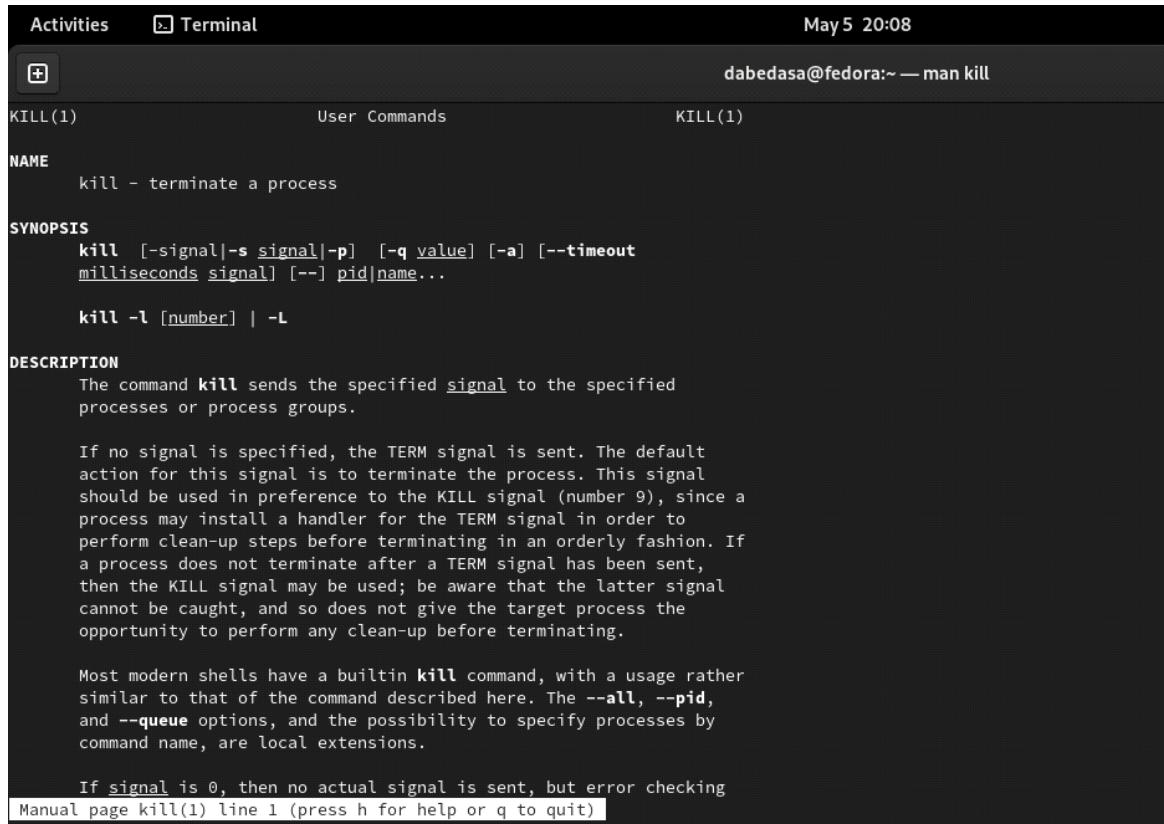
       The exit status returned by mkfs is 0 on success and 1 on failure.

       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)
```

- *kill* - *kill* [ -s *сигнал* | -р ] [ -а ] *pid* - *kill* -l [ *сигнал* ] - завершает некорректно работающее приложение. Например, чтобы послать сигнал SIGKILL (он имеет номер 9) процессу 2811, необходимо вызвать команду «*kill -9 2811*».



The screenshot shows a terminal window titled "Terminal" with the command "man kill" running. The output is the man page for the KILL(1) command. The page includes sections for NAME, SYNOPSIS, DESCRIPTION, and examples. The NAME section says "kill - terminate a process". The SYNOPSIS section shows the command syntax: "kill [-signal|-s signal|-p] [-q value] [-a] [--timeout milliseconds signal] [-- pid|name...]" and "kill -l [number] | -L". The DESCRIPTION section explains that the command sends a specified signal to processes or groups, with a note about the TERM signal being the default. It also mentions local extensions like --all, --pid, and --queue. The examples section shows how to use the command with different signals and process specifications.

```
Activities Terminal May 5 20:08
dabedasa@fedora:~ — 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
    Manual page kill(1) line 1 (press h for help or q to quit) |
```

## Вывод:

В ходе работы мы ознакомились с файловой системой Linux, а также приобрели практические навыки по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.