

Анализ файловой структуры UNIX. Команды для работы с файлами и каталогами

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Цели и задачи работы

Цель лабораторной работы

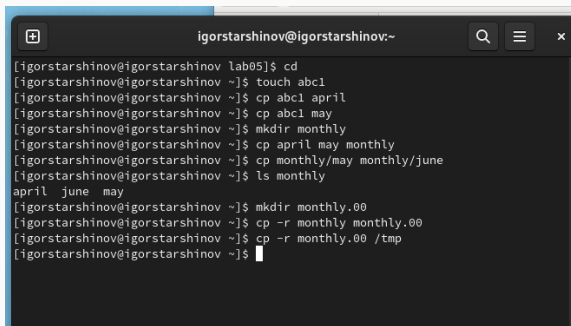
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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

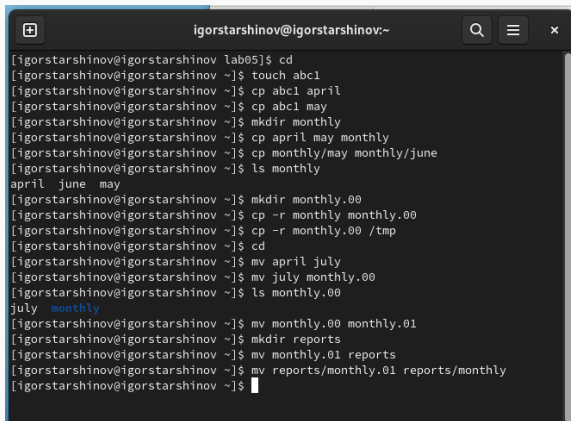
Выполнение примеров



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

Рис. 1: Выполнение примеров

Выполнение примеров



```
igorstarshinov@igorstarshinov:~  
[igorstarshinov@igorstarshinov lab05]$ cd  
[igorstarshinov@igorstarshinov ~]$ touch abc1  
[igorstarshinov@igorstarshinov ~]$ cp abc1 april  
[igorstarshinov@igorstarshinov ~]$ cp abc1 may  
[igorstarshinov@igorstarshinov ~]$ mkdir monthly  
[igorstarshinov@igorstarshinov ~]$ cp april may monthly  
[igorstarshinov@igorstarshinov ~]$ cp monthly/may monthly/june  
[igorstarshinov@igorstarshinov ~]$ ls monthly  
april  june  may  
[igorstarshinov@igorstarshinov ~]$ mkdir monthly.00  
[igorstarshinov@igorstarshinov ~]$ cp -r monthly monthly.00  
[igorstarshinov@igorstarshinov ~]$ cp -r monthly.00 /tmp  
[igorstarshinov@igorstarshinov ~]$ cd  
[igorstarshinov@igorstarshinov ~]$ mv april july  
[igorstarshinov@igorstarshinov ~]$ mv july monthly.00  
[igorstarshinov@igorstarshinov ~]$ ls monthly.00  
july  monthly  
[igorstarshinov@igorstarshinov ~]$ mv monthly.00 monthly.01  
[igorstarshinov@igorstarshinov ~]$ mkdir reports  
[igorstarshinov@igorstarshinov ~]$ mv monthly.01 reports  
[igorstarshinov@igorstarshinov ~]$ mv reports/monthly.01 reports/monthly  
[igorstarshinov@igorstarshinov ~]$
```

Рис. 2: Выполнение примеров

Выполнение примеров

```
[igorstarshinov@igorstarshinov ~]$  
[igorstarshinov@igorstarshinov ~]$ touch may  
[igorstarshinov@igorstarshinov ~]$ ls -l may  
-rw-r--r--. 1 igorstarshinov igorstarshinov 0 map 6 11:19 may  
[igorstarshinov@igorstarshinov ~]$ chmod u+x may  
[igorstarshinov@igorstarshinov ~]$ ls -l may  
-rwxr--r--. 1 igorstarshinov igorstarshinov 0 map 6 11:19 may  
[igorstarshinov@igorstarshinov ~]$ chmod u-x may  
[igorstarshinov@igorstarshinov ~]$ ls -l may  
-rw-r--r--. 1 igorstarshinov igorstarshinov 0 map 6 11:19 may  
[igorstarshinov@igorstarshinov ~]$ mkdir monthly  
mkdir: невозможно создать каталог «monthly»: Файл существует  
[igorstarshinov@igorstarshinov ~]$ chmod g-r,o-r monthly  
[igorstarshinov@igorstarshinov ~]$ touch abc1  
[igorstarshinov@igorstarshinov ~]$ chmod g+w abc1  
[igorstarshinov@igorstarshinov ~]$
```

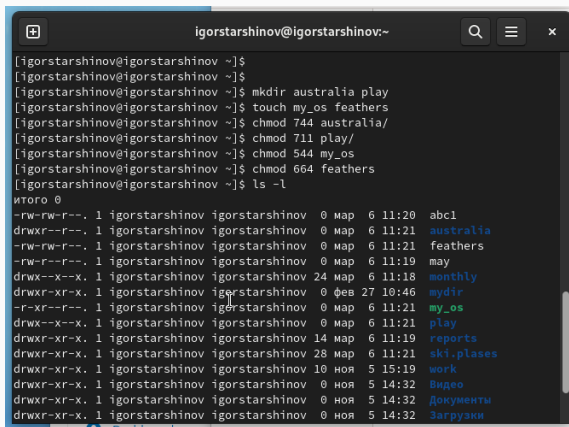
Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

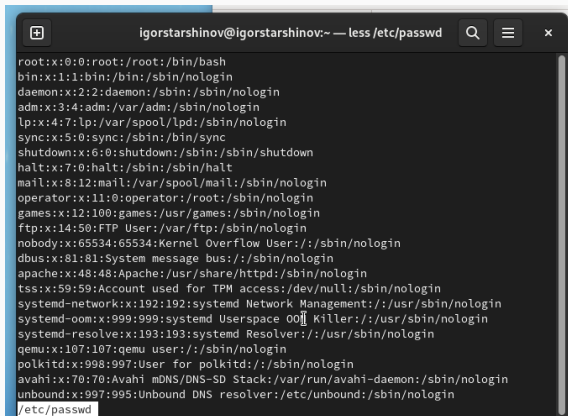
Работа с командой chmod



```
igorstarshinov@igorstarshinov:~$  
igorstarshinov@igorstarshinov ~]$  
igorstarshinov@igorstarshinov ~]$ mkdir australia play  
igorstarshinov@igorstarshinov ~]$ touch my_os feathers  
igorstarshinov@igorstarshinov ~]$ chmod 744 australia/  
igorstarshinov@igorstarshinov ~]$ chmod 711 play/  
igorstarshinov@igorstarshinov ~]$ chmod 544 my_os  
igorstarshinov@igorstarshinov ~]$ chmod 664 feathers  
igorstarshinov@igorstarshinov ~]$ ls -l  
итого 0  
-rw-rw-r--. 1 igorstarshinov igorstarshinov 0 map 6 11:20 abc1  
drwxr--r--. 1 igorstarshinov igorstarshinov 0 map 6 11:21 australia  
-rw-rw-r--. 1 igorstarshinov igorstarshinov 0 map 6 11:21 feathers  
-rw-r--r--. 1 igorstarshinov igorstarshinov 0 map 6 11:19 may  
drwx--x--x. 1 igorstarshinov igorstarshinov 24 map 6 11:18 monthly  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 фев 27 10:46 mydir  
-r-xr--r--. 1 igorstarshinov igorstarshinov 0 map 6 11:21 my_os  
drwx--x--x. 1 igorstarshinov igorstarshinov 0 map 6 11:21 play  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 14 map 6 11:19 reports  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 28 map 6 11:21 ski.places  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 10 ноя 5 15:19 work  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 ноя 5 14:32 Видео  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 ноя 5 14:32 Документы  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 ноя 5 14:32 Загрузки
```

Рис. 5: Настройка прав доступа

Файл /etc/passwd



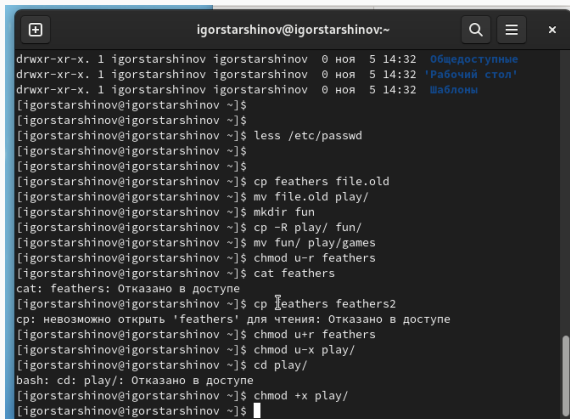
The screenshot shows a terminal window with the title bar "igorstarshinov@igorstarshinov:~ — less /etc/passwd". The terminal displays the contents of the /etc/passwd file, which lists system and regular users. The entries are as follows:

```
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 000 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 cursor is positioned at the end of the last line, and the prompt "/etc/passwd" is visible at the bottom of the terminal window.

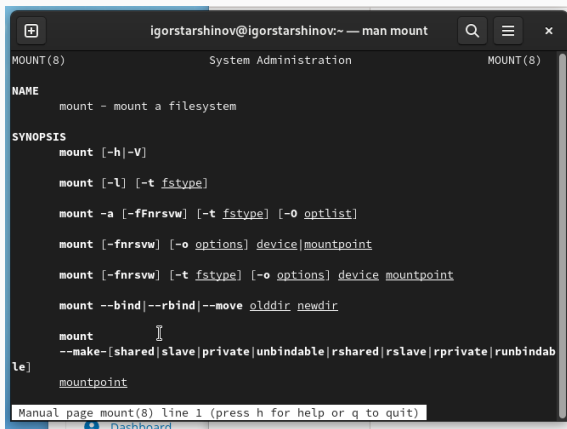
Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа



```
igorstarshinov@igorstarshinov:~  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 ноя 5 14:32 Общедоступные  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 ноя 5 14:32 'Рабочий стол'  
drwxr-xr-x. 1 igorstarshinov igorstarshinov 0 ноя 5 14:32 Шаблоны  
[igorstarshinov@igorstarshinov ~]$  
[igorstarshinov@igorstarshinov ~]$  
[igorstarshinov@igorstarshinov ~]$ less /etc/passwd  
[igorstarshinov@igorstarshinov ~]$  
[igorstarshinov@igorstarshinov ~]$  
[igorstarshinov@igorstarshinov ~]$ cp feathers file.old  
[igorstarshinov@igorstarshinov ~]$ mv file.old play/  
[igorstarshinov@igorstarshinov ~]$ mkdir fun  
[igorstarshinov@igorstarshinov ~]$ cp -R play/ fun/  
[igorstarshinov@igorstarshinov ~]$ mv fun/ play/games  
[igorstarshinov@igorstarshinov ~]$ chmod u-r feathers  
[igorstarshinov@igorstarshinov ~]$ cat feathers  
cat: feathers: Отказано в доступе  
[igorstarshinov@igorstarshinov ~]$ cp feathers feathers2  
cp: невозможно открыть 'feathers' для чтения: Отказано в доступе  
[igorstarshinov@igorstarshinov ~]$ chmod u+r feathers  
[igorstarshinov@igorstarshinov ~]$ chmod u-x play/  
[igorstarshinov@igorstarshinov ~]$ cd play/  
bash: cd: play/: Отказано в доступе  
[igorstarshinov@igorstarshinov ~]$ chmod +x play/  
[igorstarshinov@igorstarshinov ~]$
```

Рис. 7: Работа с файлами и правами доступа



The screenshot shows a terminal window titled "igorstarshinov@igorstarshinov:~ — man mount". The window displays the manual page for the 'mount' command. 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

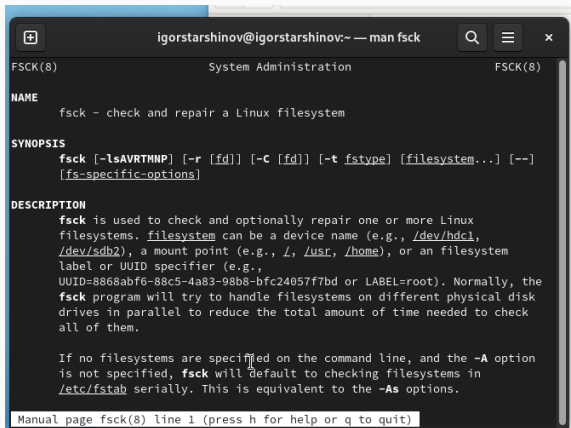
    mount
    --make-[shared|slave|private|unbindable|rshared|rslave|rprivate|runbindab
le]

    mountpoint

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

At the bottom of the terminal window, there is a blue button labeled "Dashboard".

Рис. 8: Команда mount



The screenshot shows a terminal window with the title bar "igorstarshinov@igorstarshinov:~ — man fsck". The window displays the manual page for the `fsck` command. The content is as follows:

```
FSCK(8)                                System Administration                                FSCK(8)

NAME
    fsck - check and repair a Linux filesystem

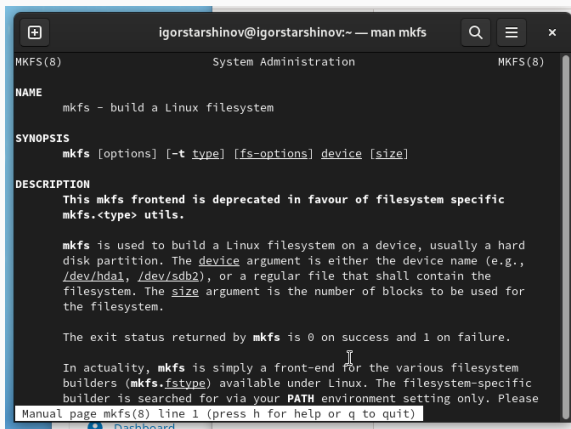
SYNOPSIS
    fsck [-lsAVRTMNP] [-r [fd]] [-C [fd]] [-t fstype] [filesystem...] [--]
    [fs-specific-options]

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



```
igorstarshinov@igorstarshinov:~ — 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.

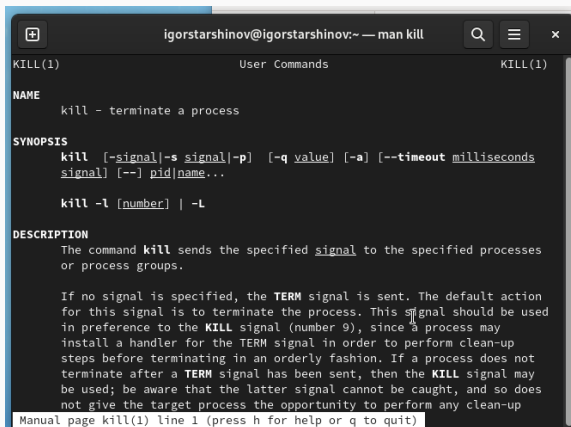
    mkfs is used to build a Linux filesystem on a device, usually a hard
    disk partition. The device argument is either the device name (e.g.,
    /dev/hda1, /dev/sdb2), or a regular file that shall contain the
    filesystem. The size argument is the number of blocks to be used for
    the filesystem.

    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

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

Рис. 10: Команда mkfs



```
igorstarshinov@igorstarshinov:~ — 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

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

Рис. 11: Команда kill

Выводы по проделанной работе

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.