

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

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Цели и задачи работы

Цель лабораторной работы

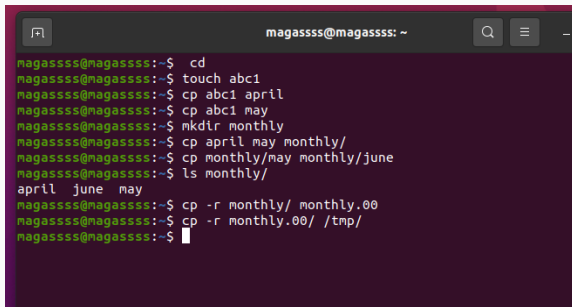
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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

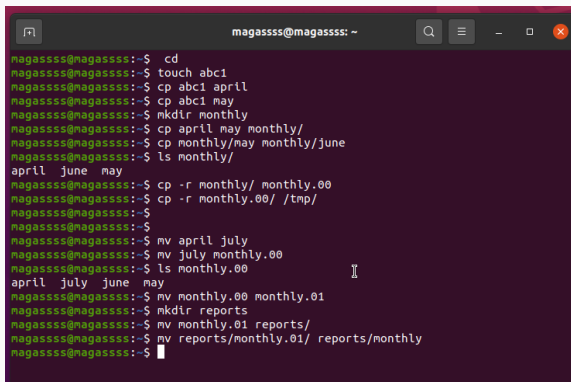
Выполнение примеров



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

Рис. 1: Выполнение примеров

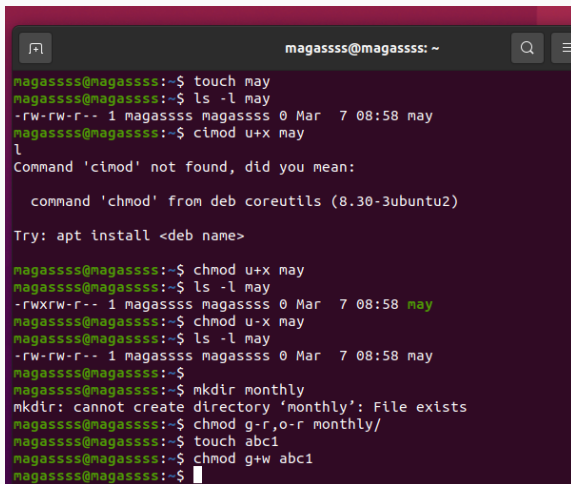
Выполнение примеров



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

Рис. 2: Выполнение примеров

Выполнение примеров

A terminal window with a dark purple background and light green text. The window title is 'magassss@magassss: ~'. It shows a series of commands and their outputs. The commands include 'touch may', 'ls -l may', 'chmod u+x may', 'ls -l may', 'chown magassss:may may', 'chown magassss:may may', 'chown magassss:may may', 'mkdir monthly', 'chown magassss:may monthly', 'touch abc1', and 'chown magassss:may abc1'. The outputs show file permissions, ownership, and directory creation status.

```
magassss@magassss:~$ touch may
magassss@magassss:~$ ls -l may
-rw-rw-r-- 1 magassss magassss 0 Mar  7 08:58 may
magassss@magassss:~$ chmod u+x may
ls
Command 'chmod' not found, did you mean:

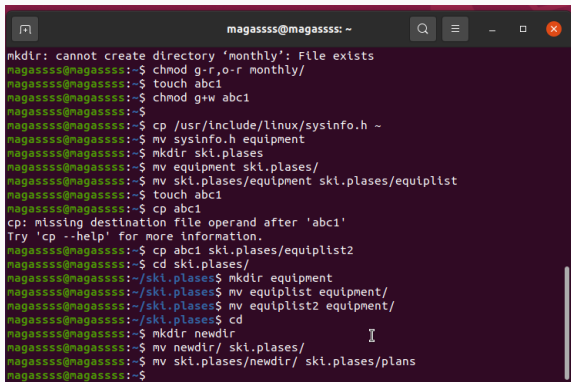
  command 'chown' from deb coreutils (8.30-3ubuntu2)

Try: apt install <deb name>

magassss@magassss:~$ chown magassss:may may
magassss@magassss:~$ ls -l may
-rwxrwx-r-- 1 magassss magassss 0 Mar  7 08:58 may
magassss@magassss:~$ chown magassss:may may
magassss@magassss:~$ ls -l may
-rw-rw-r-- 1 magassss magassss 0 Mar  7 08:58 may
magassss@magassss:~$ mkdir monthly
mkdir: cannot create directory 'monthly': File exists
magassss@magassss:~$ chown magassss:may monthly/
magassss@magassss:~$ touch abc1
magassss@magassss:~$ chown magassss:may abc1
magassss@magassss:~$
```

Рис. 3: Выполнение примеров

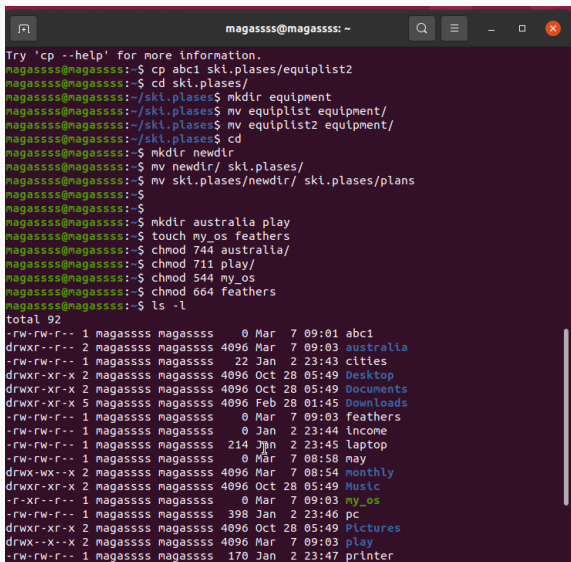
Создание директорий и копирование файлов



```
magassss@magassss: ~  
mkdir: cannot create directory 'monthly': File exists  
magassss@magassss:~$ chmod g-r,o-r monthly/  
magassss@magassss:~$ touch abc1  
magassss@magassss:~$ chmod g+w abc1  
magassss@magassss:~$  
magassss@magassss:~$ cp /usr/include/linux/sysinfo.h ~  
magassss@magassss:~$ mv sysinfo.h equipment  
magassss@magassss:~$ mkdir ski.plases  
magassss@magassss:~$ mv equipment ski.plases/  
magassss@magassss:~$ mv ski.plases/equipment ski.plases/equiplist  
magassss@magassss:~$ touch abc1  
magassss@magassss:~$ cp abc1  
cp: missing destination file operand after 'abc1'  
Try 'cp --help' for more information.  
magassss@magassss:~$ cp abc1 ski.plases/equiplist2  
magassss@magassss:~$ cd ski.plases/  
magassss@magassss:~/ski.plases$ mkdir equipment  
magassss@magassss:~/ski.plases$ mv equiplist equipment/  
magassss@magassss:~/ski.plases$ mv equiplist2 equipment/  
magassss@magassss:~/ski.plases$ cd  
magassss@magassss:~$ mkdir newdir  
magassss@magassss:~$ mv newdir/ ski.plases/  
magassss@magassss:~$ mv ski.plases/newdir/ ski.plases/plans  
magassss@magassss:~$
```

Рис. 4: Работа с каталогами

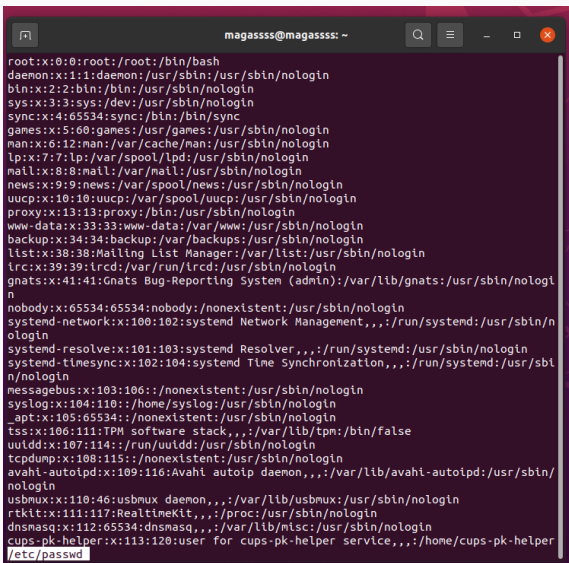
Работа с командой chmod



```
magassss@magassss: ~  
Try 'cp --help' for more information.  
magassss@magassss:~$ cp abc1 ski.plases/equiplist2  
magassss@magassss:~$ cd ski.plases/  
magassss@magassss:~/ski.plases$ mkdir equipment  
magassss@magassss:~/ski.plases$ mv equiplist equipment/  
magassss@magassss:~/ski.plases$ mv equiplist2 equipment/  
magassss@magassss:~/ski.plases$ cd  
magassss@magassss:~$ mkdir newdir  
magassss@magassss:~$ mv newdir/ ski.plases/  
magassss@magassss:~$ mv ski.plases/newdir/ ski.plases/plans  
magassss@magassss:~$  
magassss@magassss:~$ mkdir australia play  
magassss@magassss:~$ touch my_os feathers  
magassss@magassss:~$ chmod 744 australia/  
magassss@magassss:~$ chmod 711 play/  
magassss@magassss:~$ chmod 544 my_os  
magassss@magassss:~$ chmod 664 feathers  
magassss@magassss:~$ ls -l  
total 92  
-rw-rw-r-- 1 magassss magassss  0 Mar  7 09:01 abc1  
drwxr--r-- 2 magassss magassss 4096 Mar  7 09:03 australia  
-rw-rw-r-- 1 magassss magassss  22 Jan  2 23:43 cities  
drwxr-xr-x 2 magassss magassss 4096 Oct 28 05:49 Desktop  
drwxr-xr-x 2 magassss magassss 4096 Oct 28 05:49 Documents  
drwxr-xr-x 5 magassss magassss 4096 Feb 28 01:45 Downloads  
-rw-rw-r-- 1 magassss magassss  0 Mar  7 09:03 feathers  
-rw-rw-r-- 1 magassss magassss  0 Jan  2 23:44 income  
-rw-rw-r-- 1 magassss magassss 214 Jan  2 23:45 laptop  
-rw-rw-r-- 1 magassss magassss  0 Mar  7 08:58 may  
drwx-wx--x 2 magassss magassss 4096 Mar  7 08:54 monthly  
drwxr-xr-x 2 magassss magassss 4096 Oct 28 05:49 Music  
-r-xr--r-- 1 magassss magassss  0 Mar  7 09:03 my_os  
-rw-rw-r-- 1 magassss magassss 398 Jan  2 23:46 pc  
drwxr-xr-x 2 magassss magassss 4096 Oct 28 05:49 Pictures  
drwx--x--x 2 magassss magassss 4096 Mar  7 09:03 play  
-rw-rw-r-- 1 magassss magassss 170 Jan  2 23:47 printer
```

Рис. 5: Настройка прав доступа

Файл /etc/passwd

A terminal window with a dark background and light text. The title bar shows the username 'magassss@magassss: ~'. The terminal displays the output of the 'cat /etc/passwd' command, listing system and user accounts with their UID, GID, name, home directory, and shell. The accounts listed are root, daemon, bin, sys, sync, games, man, lp, mail, news, uucp, proxy, www-data, backup, list, irc, gnats, nobody, systemd-network, systemd-resolve, systemd-timesync, messagebus, syslog, _apt, tss, uuuid, tcpdump, avahi-autoipd, usbmux, rtkit, dnsmasq, and cups-pk-helper. The file path '/etc/passwd' is highlighted in blue at the bottom of the terminal output.

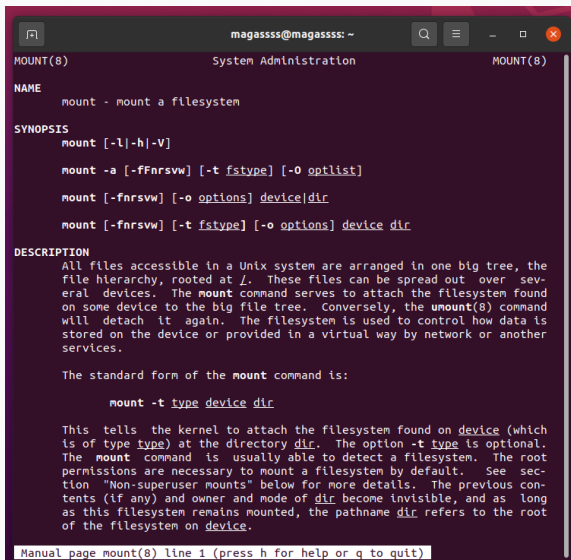
```
magassss@magassss: ~  
root:x:0:0:root:/root:/bin/bash  
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin  
bin:x:2:2:bin:/bin:/usr/sbin/nologin  
sys:x:3:3:sys:/dev:/usr/sbin/nologin  
sync:x:4:65534:sync:/bin:/bin/sync  
games:x:5:60:games:/usr/games:/usr/sbin/nologin  
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin  
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:Mailing 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  
messagebus:x:103:106:,:/nonexistent:/usr/sbin/nologin  
syslog:x:104:110:,:/home/syslog:/usr/sbin/nologin  
_apt:x:105:65534:,:/nonexistent:/usr/sbin/nologin  
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false  
uuuid:x:107:114:,:/run/uuid:/usr/sbin/nologin  
tcpdump:x:108:115:,:/nonexistent:/usr/sbin/nologin  
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin  
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin  
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin  
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin  
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helper  
/etc/passwd
```

Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа

```
magassss@magassss:~$  
magassss@magassss:~$ cp feathers file.old  
magassss@magassss:~$ mv file.old play/  
magassss@magassss:~$ mkdir fun  
magassss@magassss:~$ vp -R play/ fun/  
  
Command 'vp' not found, but can be installed with:  
  
apt install atfs  
Please ask your administrator.  
  
magassss@magassss:~$ mv fun/ play/games  
magassss@magassss:~$ chmod u-r feathers  
magassss@magassss:~$ cat feathers  
cat: feathers: Permission denied  
magassss@magassss:~$ cp feathers feathers2  
cp: cannot open 'feathers' for reading: Permission denied  
magassss@magassss:~$ chmod u+r feathers  
magassss@magassss:~$ chmod u-x play/  
magassss@magassss:~$ cd play/  
bash: cd: play/: Permission denied  
magassss@magassss:~$ chmod +x play/  
magassss@magassss:~$
```

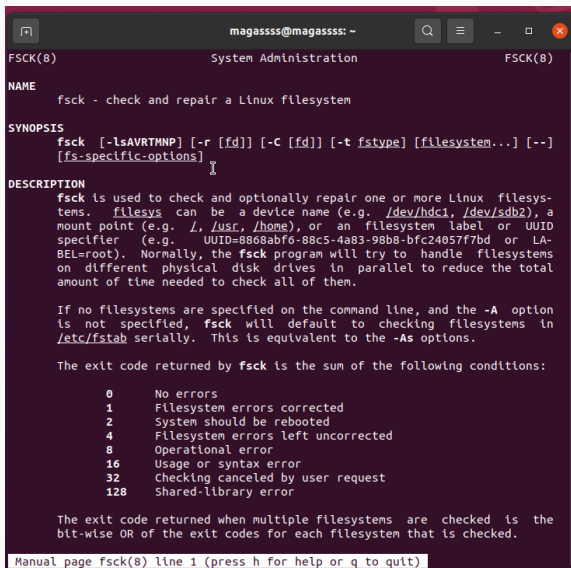
Рис. 7: Работа с файлами и правами доступа



```
magassss@magassss: ~  
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.  
  
    The standard form of the mount command is:  
  
        mount -t type device dir  
  
    This tells the kernel to attach the filesystem found on device (which  
    is of type type) at the directory dir. The option -t type is optional.  
    The mount command is usually able to detect a filesystem. The root  
    permissions are necessary to mount a filesystem by default. See sec-  
    tion "Non-superuser mounts" below for more details. The previous con-  
    tents (if any) and owner and mode of dir become invisible, and as long  
    as this filesystem remains mounted, the pathname dir refers to the root  
    of the filesystem on device.  
  
Manual page mount(8) line 1 (press h for help or q to quit)
```

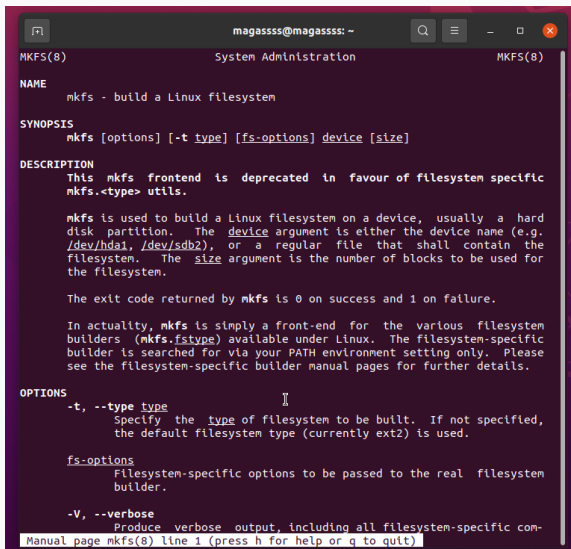
Рис. 8: Команда mount

Справка по командам



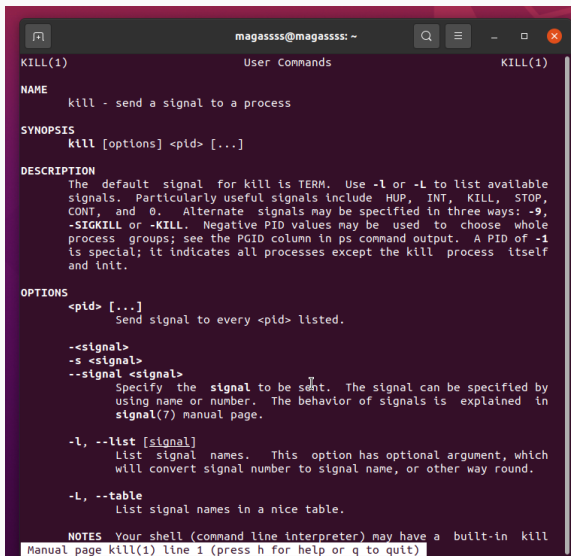
```
magasssss@magasssss: ~  
FSCK(8) System Administration FSCK(8)  
  
NAME  
    fsck - check and repair a Linux filesystem  
  
SYNOPSIS  
    fsck [-lsAVRTMNP] [-r [fd]] [-C [fd]] [-t fstype] [filesystem...] [--]  
    [fs-specific-options]  
  
DESCRIPTION  
    fsck is used to check and optionally 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 code returned by fsck is the sum of the following conditions:  
  
    0      No errors  
    1      Filesystem errors corrected  
    2      System should be rebooted  
    4      Filesystem errors left uncorrected  
    8      Operational error  
    16     Usage or syntax error  
    32     Checking canceled by user request  
    128    Shared-library error  
  
    The exit code returned when multiple filesystems are checked is the  
    bit-wise OR of the exit codes for each filesystem that is checked.  
  
Manual page fsck(8) line 1 (press h for help or q to quit)
```

Рис. 9: Команда fsck



```
magasssss@magasssss: ~  
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  
    see the filesystem-specific builder manual pages for further details.  
  
OPTIONS  
    -t, --type type I  
        Specify the type of filesystem to be built. If not specified,  
        the default filesystem type (currently ext2) is used.  
  
    fs-options  
        Filesystem-specific options to be passed to the real filesystem  
        builder.  
  
    -V, --verbose  
        Produce verbose output, including all filesystem-specific com-  
Manual page mkfs(8) line 1 (press h for help or q to quit)
```

Рис. 10: Команда mkfs



```
magassss@magassss: ~  
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>  
    --signal <signal>  
        Specify the signal to be sent. The signal can be specified by  
        using name or number. The behavior of signals is explained in  
        signal(7) manual page.  
  
    -l, --list [signal]  
        List signal names. This option has optional argument, which  
        will convert signal number to signal name, or other way round.  
  
    -L, --table  
        List signal names in a nice table.  
  
NOTES Your shell (command line interpreter) may have a built-in kill  
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.