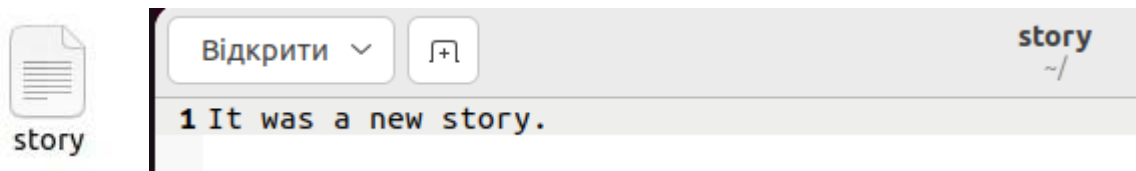5. **Розгляньте наведені нижче приклади та поясніть, що виконують дані команди та який тип перенаправлення потоків вони використовують:

I decided not to work in the form of a table to make it easier to add screenshots of the example and the result
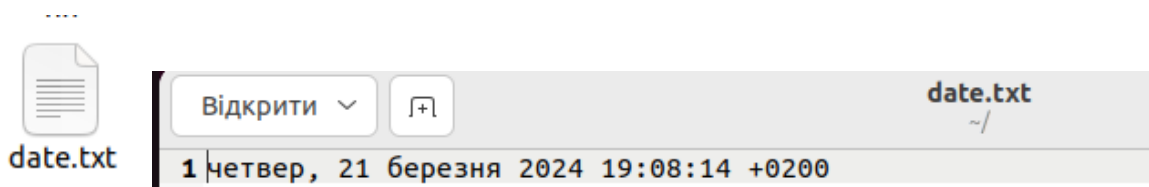
- **$echo "It is a new story." > story**

```
foxas@foxas-VirtualBox:~$ echo "It was a new story." > story
```

The command creates a file named "story" and writes the line "This is a new story." to it. The > output redirection is used to write the contents to the file.

- **$ date > date.txt**

The command prints the current date and time and writes this data to a file named "date.txt" or creates such a file if it does not exist. Use the output redirection > to write the contents to a file.

- **$ sort < file1_unsorted > file2_sorted**

This command merges the contents of files "file1", "file2", and "file3" and writes the combined contents to a file named "bigfile" (if there is no file with this name, the command creates one). The > output redirection is used to write the content to the file.

```
foxas@foxas-VirtualBox:~$ cat file1 file2 file 3 > bigfile
cat: file1: Немає такого файла або каталогу
cat: file2: Немає такого файла або каталогу
cat: file: Немає такого файла або каталогу
cat: 3: Немає такого файла або каталогу
foxas@foxas-VirtualBox:~$ touch file1.txt
foxas@foxas-VirtualBox:~$ touch file2.txt
foxas@foxas-VirtualBox:~$ touch file3.txt
```

I didn't have such files, so I created them in the first one, put the word Laba in the second OS in the third #6. And repeated the command.

| bigfile |
| ~/ |

```
1 Loba
2 OS
3 #6
```

- **$ls -l >> directory**

The command prints a list of files and directories in the current directory with detailed information and appends this output to the end of the "directory" file. Use the >> output redirection to append the contents to the end of the file.

```
foxas@foxas-VirtualBox:~$ ls -l >> directory
```

| directory |
| ~/ |

```
 1 загалом 60
 2 drwxr-xr-x 2 foxas foxas 4096 бер 14 20:30 Відео
 3 drwxr-xr-x 2 foxas foxas 4096 бер 14 20:30 Документи
 4 drwxr-xr-x 2 foxas foxas 4096 бер 21 10:41 Завантаження
 5 drwxr-xr-x 2 foxas foxas 4096 бер 14 20:30 Загальнодоступні
 6 drwxr-xr-x 3 foxas foxas 4096 бер 21 10:29 Зображення
 7 drwxr-xr-x 2 foxas foxas 4096 бер 14 20:30 Музика
 8 drwxr-xr-x 2 foxas foxas 4096 бер 14 20:30 Стільниця
 9 drwxr-xr-x 2 foxas foxas 4096 бер 14 20:30 Шаблони
10 -rw-rw-r-- 1 foxas foxas   11 бер 21 19:26 bigfile
11 -rw-rw-r-- 1 foxas foxas   52 бер 21 19:08 date.txt
12 -rw-rw-r-- 1 foxas foxas    0 бер 21 19:30 directory
13 -rw-rw-r-- 1 foxas foxas    5 бер 21 19:19 file1.txt
14 -rw-rw-r-- 1 foxas foxas    3 бер 21 19:19 file2.txt
15 -rw-rw-r-- 1 foxas foxas    3 бер 21 19:19 file3.txt
16 drwx------ 5 foxas foxas 4096 бер 21 10:36 snap
17 -rw-rw-r-- 1 foxas foxas   20 бер 21 19:05 story
```

- **$ sort < file1_unsorted > file2_sorted**

The command takes the contents of the file "file1_unsorted", sorts it, and writes the sorted result to the file "file2_sorted". The input redirection < and output redirection > is used.

```
foxas@foxas-VirtualBox:~$ sort < file1_unsorted.txt > file2_sorted
```

Відкрити ⌄ ⊞   **file1_unsorted.txt**
                                           ~/

```
 1 C
 2 d
 3 e
 4 f
 5 a  b
 6 h
 7 j
 8 k
 9 u
10 m
```

Відкрити ⌄ ⊞   **file2_sorted**
                                           ~/

```
 1 a  b
 2 C
 3 d
 4 e
 5 f
 6 h
 7 j
 8 k
 9 m
10 u
```

- **$ find -name '*.txt' > file.txt 2> /dev/null**

The command finds all files with the extension ".txt" and writes their names to the file "file.txt". If an error occurs during the execution of the find command, it will be redirected to a special file /dev/null, which means that errors will be hidden. The output redirection > and error redirection 2> are used.

```
foxas@foxas-VirtualBox:~$ find -name '*.txt' > file.txt 2> /dev/null
```

- **$ cat file1_unsorted | sort > file2_sorted**

The command reads the contents of the file "file1_unsorted", sorts it, and writes the sorted result to the file "file2_sorted". The | pipeline construct is used to pass the output of one command as input to another command, as well as to redirect the output of >.
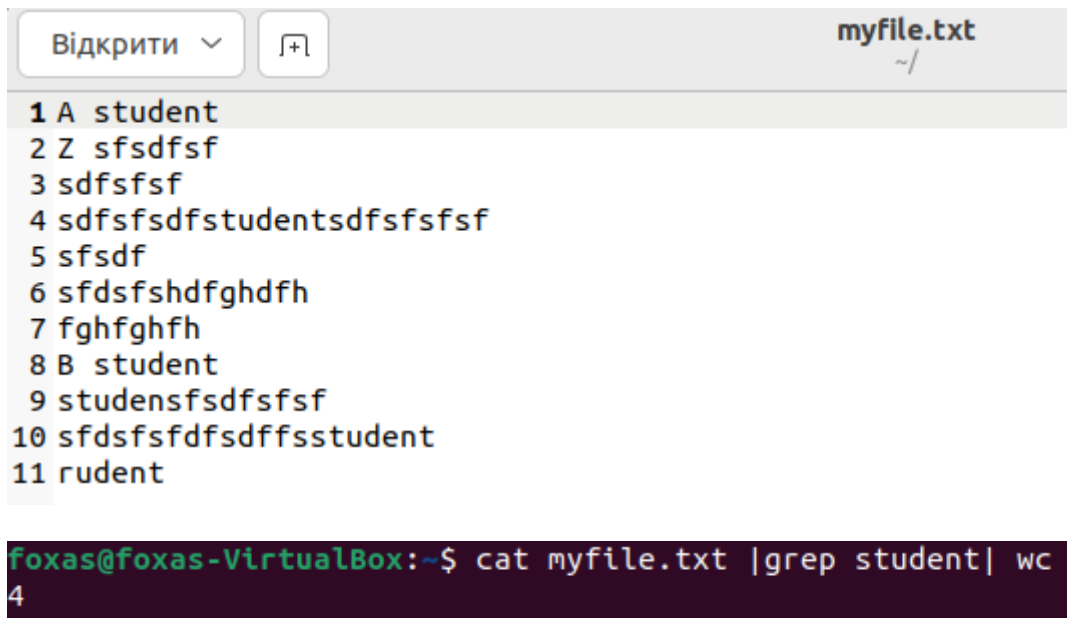
```
foxas@foxas-VirtualBox:~$ cat file1_unsorted.txt |sort > file2_sorted
```

```
Відкрити  ▾   [+]                    file2_sorted
                                       ~/
  1 a  b
  2 c
  3 d
  4 e
  5 f
  6 h
  7 j
  8 k
  9 m
 10 u
```

- **$ cat myfile | grep student | wc -l**

The command reads the contents of the file "myfile", filters the lines containing the word "student" using the grep command, and then counts the number of filtered lines using the wc -l command. The | pipeline construct is used to pass the output of one command as input to another command.

```
foxas@foxas-VirtualBox:~$ cat myfile.txt |grep student| wc -l
4
```

Відповіді на контрольні запитання:

1. Надайте порівняльну характеристику процесам стискання та архівування.

- Compression is the process of reducing the size of files or data by removing duplicate or redundant information. Compressing files reduces the amount of disk space they occupy.
- Archiving is the process of packing files and directories into an archive file for the purpose of storing, transporting, or protecting this data.

2. Які програми, окрім наведених в роботі, можуть використовуватись для стискання та архівування файлів та каталогів в ОС Linux? Наведіть приклади та їх короткий опис.

Archiving only: GNU tar, libarchiv, ar, cpio, DAR

Compression only: bzip2, bzip3, lzip, LZ4, xz, lzop, zstd

Archiving and compression: p7zip, RAR, tariz, ZPAQ

3. Порівняйте алгоритми стискання, що використовуються в командах (програмах), використовуваних в Linux. Які з алгоритмів можна вважати найшвидшим та найефективнішим?

Fastest: lz4 because of its compression and decompression speed.

The most efficient: xz or bzip2, as they usually give better compression by using more complex algorithms.

4. Опишіть програмні засоби для стискання та архівування, що можуть бути використані у вашому мобільному телефоні.

On mobile devices, third-party applications such as ZArchiver, RAR, 7-Zip are commonly used.

5. Опишіть та порівняйте програмні засоби для стискання та (де)архівування даних у ОС сімейства Windows.

The most popular programs for windows:

- File Explorer (Windows Explorer):
- WinRAR:
- 7-Zip:
- WinZip:

That's why we will compare them

- Price: File Explorer is free, WinRAR has a trial period and requires payment after that, 7-Zip is free and open source, and WinZip is paid software.
- Formats: WinRAR, 7-Zip and WinZip support more compression formats than File Explorer.
- Functionality: WinRAR and WinZip have advanced protection, encryption, and compression features, which can be useful for users who need additional features.

6. Поясніть яким чином стиснення та архівування даних може бути використано для резервування даних. В яких ще задачах системного адміністрування воно може бути використано.

- Backup: Compressing data before saving it to backup media reduces the amount of storage space that backups will take up.
- Data transportation: Archiving and compression makes it easy to transfer large amounts of data over a network or to external storage.
- Protection from damage: Archiving can help protect data from damage or loss due to errors or deletion.

7. Яке призначення директорії файлу /dev/null?

Is a special file that represents a "black hole" in the system. Everything that is written to /dev/null is effectively deleted. This is used to remove unnecessary output or redirect unused program output.