5.4 Text processing in Linux: Homework

Tasks should be executed on educational Sandbox server ***.

1. Create a text file named “hello-world” which contains 3 lines:
   Hello
   Wonderful
   World
   Specify how you created it.
2. Create a new file with the following content, based on the content of “hello-world”:
   World
   Wonderful
   Hello
   Is should be created **without** using echo, text editors, cat > new_file and so on, including script languages like AWK or Python. To do this, remind all recently learned text processing tools learned. The file can be created by using multiple commands.
3. Suggest a new way to accomplish p.2, i.e. with new commands compared to p.2
4. Solve the same task in a new way compared to p.2 and p.3, without using egrep (grep, fgrep), tail, head. Write the result into a new output file. Note: if some commands not shown in the course were used to accomplish p.2-4, please describe their logic.
5. Concatenate the content of /etc/passwd, /etc/group, /etc/hosts, /etc/resolv.conf, then (every subtask below requires its own solution):
    1. Write the result into a file
    2. Count the number of lines in this file
    3. Without writing the result into a file, find there all lines containing “server”, then print them to the terminal
6. In directory /apps/logs and all included subdirectories do the following:
    1. Find all files containing “fail” (case-insensitive) in their content (only in their content, not in their names). Only file names should be printed to the terminal.
    2. Find and print all lines containing “ERROR” (case-sensitive). These lines should be written to an output file. Then ensure this resulting file is not empty.
7. Find all files in /etc (and all included subdirectories) containing your username. Only file names should be handled (not matching lines). Do the following with them - each subtask requires its own solution:
    1. Place the result and errors into 2 separate files
    2. Place the result and errors into the same files, without using temporary files
    3. Count the number of lines in p.a and p.b above
8. In directory /apps/logs and all included subdirectories find and print all lines from all files containing the following patterns: “error”, or “fail”, or “bug”. This search should be case-insensitive. Write the result into an output file. Notes: a) one line may contain more than 1 pattern b) the task can be solved via either “egrep -e” or regular expressions.
9. Find all lines from /etc/passwd containing “/bin/bash”, but not containing “root”. Write the results into an output file.

10. Find all lines from /etc/passwd containing "/home". Write the results into another output file.
11. Compare files from p.9 and p.10 - at least, print their size and numbers of lines.

1. **Create a text file named "hello-world" which contains 3 lines:**
   Hello
   Wonderful
   World
   Specify how you created it.

   Creation a file hello-world.txt:

   cat > hello-world.txt (pressed enter)

   Hello (pressed enter)

   Wonderful (pressed enter)

   World (pressed enter)

   Pressed Ctrl + D 2 times.

   Then checked that a file hello-world.txt have been created.

   Result:

```
[nkhaytovich@c7-sandbox ~]$ cat hello-world.txt
Hello
Wonderful
World
```

2. **Create a new file with the following content, based on the content of "hello-world":**
   World
   Wonderful
   Hello
   Is should be created without **using echo, text editors, cat > new_file and so on, including script languages like AWK or Python. To do this, remind all recently learned text processing tools learned. The file can be created by using multiple commands.**

   sort -r hello-world.txt >> reversed_hello-world.txt

   Result:

```
[nkhaytovich@c7-sandbox ~]$ sort -r hello-world.txt >> reversed_hello-world.txt
[nkhaytovich@c7-sandbox ~]$ ls
hello-world  hello-world.txt  reversed_hello-world.txt
[nkhaytovich@c7-sandbox ~]$ cat reversed_hello-world.txt
World
Wonderful
Hello
[nkhaytovich@c7-sandbox ~]$
```

3. **Suggest a new way to accomplish p.2, i.e. with new commands compared to p.2**

   head -n 3 hello-world.txt | sort -r >> reversed2_hello_world.txt

   Result:

```
[nkhaytovich@c7-sandbox ~]$ cat reversed2_hello_world.txt
World
Wonderful
Hello
[nkhaytovich@c7-sandbox ~]$
```

4. **Solve the same task in a new way compared to p.2 and p.3, without using egrep (grep, fgrep), tail, head. Write the result into a new output file. Note: if some commands not shown in the course were used to accomplish p.2-4, please describe their logic.**

   I will use the command **tac**, the logic described in –help:

```
[nkhaytovich@c7-sandbox ~]$ tac --help
Usage: tac [OPTION]... [FILE]...
Write each FILE to standard output, last line first.
```

tac hello-world.txt >> reversed1_hello-world.txt

Result:

```
[nkhaytovich@c7-sandbox ~]$ tac hello-world.txt >> reversed1_hello-world.txt
[nkhaytovich@c7-sandbox ~]$ ls -l
total 16
-rw-r--r--. 1 nkhaytovich qa 22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa 22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa 22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa 22 Nov 29 22:45 reversed_hello-world.txt
[nkhaytovich@c7-sandbox ~]$ cat reversed1_hello-world.txt
World
Wonderful
Hello
```

5. **Concatenate the content of /etc/passwd, /etc/group, /etc/hosts, /etc/resolv.conf, then (every subtask below requires its own solution):**

   Concatenation:

   cat /etc/passwd /etc/group /etc/hosts /etc/resolv.conf

   5.1. Write the result into a file

   cat /etc/passwd /etc/group /etc/hosts /etc/resolv.conf > resultfile.txt

```
[nkhaytovich@c7-sandbox ~]$ ls -l
total 28
-rw-r--r--. 1 nkhaytovich qa   22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa 8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa   22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa   22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa   22 Nov 29 22:45 reversed_hello-world.txt
```

5.2. Count the number of lines in this file

cat ~/resultfile.txt | wc -l

```
[nkhaytovich@c7-sandbox ~]$ cat ~/resultfile.txt | wc -l
203
```

5.3. Without writing the result into a file, find there all lines containing "server", then print them to the terminal

egrep server ~/resultfile.txt

```
[nkhaytovich@c7-sandbox ~]$ egrep server ~/resultfile.txt
rabbitmq:x:994:988:RabbitMQ messaging server:/var/lib/rabbitmq:/sbin/nologin
[redacted]  dbserver
nameserver 8.8.8.8
nameserver 8.8.4.4
```

6. In directory /apps/logs and all included subdirectories do the following:

6.1. Find all files containing "fail" (case-insensitive) in their content (only in their content, not in their names). Only file names should be printed to the terminal.

egrep -ilr fail /apps/logs

```
[nkhaytovich@c7-sandbox ~]$ egrep -ilr fail /apps/logs
/apps/logs/nodejs-auth.st00.log
/apps/logs/java-ftb.st00.log
/apps/logs/auth/java-auth.st00.log
```

6.2. Find and print all lines containing "ERROR" (case-sensitive). These lines should be written to an output file. Then ensure this resulting file is not empty.

egrep -r ERROR /apps/logs >> ~/result6.txt

Result file not empty:

```
[nkhaytovich@c7-sandbox ~]$ ls -l
total 44
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa 13423 Nov 30 00:04 result6.txt
-rw-r--r--. 1 nkhaytovich qa  8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:45 reversed_hello-world.txt
```

7. **Find all files in /etc (and all included subdirectories) containing your username. Only file names should be handled (not matching lines). Do the following with them - each subtask requires its own solution:**

   7.1. Place the result and errors into 2 separate files

   egrep -rl $USER /etc > ~/new.out 2> ~/new.err

   Result:
   2 files were created, first with the result and second with errors:

```
[nkhaytovich@c7-sandbox ~]$ egrep -rl  $USER /etc > ~/new.out 2> ~/new.err
[nkhaytovich@c7-sandbox ~]$ pwd
/home/nkhaytovich
[nkhaytovich@c7-sandbox ~]$ ls -l
total 120
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa  2395 Nov 30 11:08 merged.out
-rw-r--r--. 1 nkhaytovich qa  2297 Nov 30 23:46 new.err
-rw-r--r--. 1 nkhaytovich qa    98 Nov 30 23:46 new.out
-rw-r--r--. 1 nkhaytovich qa 13423 Nov 30 23:44 result6.txt
-rw-r--r--. 1 nkhaytovich qa  5333 Nov 30 23:16 result_10.txt
-rw-r--r--. 1 nkhaytovich qa  5381 Nov 30 23:21 result_home.txt
-rw-r--r--. 1 nkhaytovich qa 45736 Nov 30 22:45 result_of_3.txt
-rw-r--r--. 1 nkhaytovich qa  8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:45 reversed_hello-world.txt
```

   7.2. Place the result and errors into the same files, without using temporary files

   egrep -rl $USER /etc > ~/merged.out 2>&1

   Result:
   The result and errors in the same file:

```
[nkhaytovich@c7-sandbox ~]$ ls -l
total 120
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa  2395 Nov 30 23:48 merged.out
-rw-r--r--. 1 nkhaytovich qa  2297 Nov 30 23:46 new.err
-rw-r--r--. 1 nkhaytovich qa    98 Nov 30 23:46 new.out
-rw-r--r--. 1 nkhaytovich qa 13423 Nov 30 23:44 result6.txt
-rw-r--r--. 1 nkhaytovich qa  5333 Nov 30 23:16 result_10.txt
-rw-r--r--. 1 nkhaytovich qa  5381 Nov 30 23:21 result_home.txt
-rw-r--r--. 1 nkhaytovich qa 45736 Nov 30 22:45 result_of_3.txt
-rw-r--r--. 1 nkhaytovich qa  8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:45 reversed_hello-world.txt
```

   7.3. Count the number of lines in p.a and p.b above

cat new.out | wc -l (if I am in the directory)

or

cat ~/new.out | wc -l

Result:

```
[nkhaytovich@c7-sandbox ~]$ cat new.out | wc -l
8
```

cat new.err | wc -l (if I am in the directory)

or

cat ~/new.err | wc -l

Result:

```
[nkhaytovich@c7-sandbox ~]$ cat new.err | wc -l
50
```

cat merged.out | wc -l (if I am in the directory)

or

cat ~/merged.out | wc -l

Result:

```
[nkhaytovich@c7-sandbox ~]$ cat merged.out | wc -l
58
```

8. **In directory /apps/logs and all included subdirectories find and print all lines from all files containing the following patterns: “error”, or “fail”, or “bug”. This search should be case-insensitive. Write the result into an output file. Notes: a) one line may contain more than 1 pattern b) the task can be solved via either “egrep -e” or regular expressions.**

grep -ir 'bug\|fail\|error' /apps/logs > ~/result_of_3.txt

9. **Find all lines from /etc/passwd containing “/bin/bash”, but not containing “root”. Write the results into an output file.**

egrep /bin/bash /etc/passwd | egrep -v root > ~/result_10.txt

Result file not empty:

```
[nkhaytovich@c7-sandbox home]$ egrep /bin/bash /etc/passwd | egrep -v root > ~/result_10.txt
[nkhaytovich@c7-sandbox home]$ cd
[nkhaytovich@c7-sandbox ~]$ ls -l
total 112
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa  2395 Nov 30 11:08 merged.out
-rw-r--r--. 1 nkhaytovich qa  2297 Nov 30 11:14 new.err
-rw-r--r--. 1 nkhaytovich qa    98 Nov 30 11:14 new.out
-rw-r--r--. 1 nkhaytovich qa 13423 Nov 30 00:04 result6.txt
-rw-r--r--. 1 nkhaytovich qa  5333 Nov 30 23:16 result_10.txt
-rw-r--r--. 1 nkhaytovich qa 45736 Nov 30 22:45 result_of_3.txt
-rw-r--r--. 1 nkhaytovich qa  8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:45 reversed_hello-world.txt
```

10. Find all lines from /etc/passwd containing "/home". Write the results into another output file.

egrep /home /etc/passwd > ~/result_home.txt

Result file not empty:

```
[nkhaytovich@c7-sandbox ~]$ cd
[nkhaytovich@c7-sandbox ~]$ ls -l
total 120
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa  2395 Nov 30 11:08 merged.out
-rw-r--r--. 1 nkhaytovich qa  2297 Nov 30 11:14 new.err
-rw-r--r--. 1 nkhaytovich qa    98 Nov 30 11:14 new.out
-rw-r--r--. 1 nkhaytovich qa 13423 Nov 30 00:04 result6.txt
-rw-r--r--. 1 nkhaytovich qa  5333 Nov 30 23:16 result_10.txt
-rw-r--r--. 1 nkhaytovich qa  5381 Nov 30 23:21 result_home.txt
-rw-r--r--. 1 nkhaytovich qa 45736 Nov 30 22:45 result_of_3.txt
-rw-r--r--. 1 nkhaytovich qa  8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:45 reversed_hello-world.txt
```

11. Compare files from p.9 and p.10 - at least, print their size and numbers of lines.

I have 2 files:

p.9 - result_10.txt: size = 5333, 110 lines

cat ~/result_10.txt | wc -l

```
[nkhaytovich@c7-sandbox ~]$ cat ~/result_10.txt | wc -l
110
```

p.10 - result_home.txt: size = 5381, 111 lines

cat ~/result_home.txt | wc -l

```
[nkhaytovich@c7-sandbox ~]$ cat ~/result_home.txt | wc -l
111
```

```
[nkhaytovich@c7-sandbox ~]$ ls -l
total 120
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:20 hello-world.txt
-rw-r--r--. 1 nkhaytovich qa  2395 Nov 30 11:08 merged.out
-rw-r--r--. 1 nkhaytovich qa  2297 Nov 30 11:14 new.err
-rw-r--r--. 1 nkhaytovich qa    98 Nov 30 11:14 new.out
-rw-r--r--. 1 nkhaytovich qa 13423 Nov 30 00:04 result6.txt
-rw-r--r--. 1 nkhaytovich qa  5333 Nov 30 23:16 result_10.txt
-rw-r--r--. 1 nkhaytovich qa  5381 Nov 30 23:21 result_home.txt
-rw-r--r--. 1 nkhaytovich qa 45736 Nov 30 22:45 result_of_3.txt
-rw-r--r--. 1 nkhaytovich qa  8984 Nov 29 23:43 resultfile.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 23:31 reversed1_hello-world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:58 reversed2_hello_world.txt
-rw-r--r--. 1 nkhaytovich qa    22 Nov 29 22:45 reversed_hello-world.txt
```