**Lab 2.1 Linux commands**

1. Execute the command \*wc words\*. The output is 3 numbers, what do they mean?

root@7a3c2be130d1:/home# wc words

479828 479828 4953680 words

root@7a3c2be130d1:/home#

aantal lijnen / aantal woorden / aantal karakters  
--It is used to find out **number of lines**, **word count**, **byte and characters count**

1. Use the command from exersize 2 to only show the amount of words, there are 2 possibilities

root@7a3c2be130d1:/home# wc words -w

479828 words

root@7a3c2be130d1:/home# wc words -words

wc: invalid option -- 'o'

Try 'wc --help' for more information.

root@7a3c2be130d1:/home# wc words --words

479828 words

root@7a3c2be130d1:/home#

1. Show the number of words that have the string \*special\*

root@7a3c2be130d1:/home# grep -w 'special' words

extra-**special**

**special**

**special**-delivery

**special**-process

root@7a3c2be130d1:/home# `

root@7a3c2be130d1:/home# grep 'special' words | wc -l

68

root@7a3c2be130d1:/home#

1. Show the number of usergroups (only the number) on the VM \*Note: look at words`/etc/group`

root@7a3c2be130d1:/home# wc -l /etc/group

39 /etc/group

root@7a3c2be130d1:/home#

5. Create a new file in the homedirectory with the name littles that have lall the words from words with the string \*little\*. \*Note: this is in 1 command\*

root@7a3c2be130d1:/home# grep 'little' words | cat > littles

root@7a3c2be130d1:/home# ls

grep littles **ubuntu** words **workFolder**

root@7a3c2be130d1:/home# ls littles

littles

root@7a3c2be130d1:/home# cat littles

belittle

belittled

belittlement

belittler

belittlers

belittles

do-little

dolittle

6.Show the directory listing in the long listing format

root@7a3c2be130d1:/home# ls -l

total 4852

-rw-r--r-- 1 root root 0 Oct 6 15:03 grep

-rw-r--r-- 1 root root 571 Oct 6 15:14 littles

drwxr-x--- 2 ubuntu ubuntu 4096 Sep 10 04:20 **ubuntu**

-rw-r--r-- 1 root root 4953680 Oct 6 15:03 words

drwxr-xr-x 2 root root 4096 Oct 6 13:55 **workFolder**

7. Show the directory listing of /etc in the long listing format

root@7a3c2be130d1:/home# ls -l /etc

total 464

drwxr-xr-x 1 root root 4096 Oct 6 13:54 **alternatives**

drwxr-xr-x 3 root root 4096 Oct 3 14:29 **apparmor.d**

drwxr-xr-x 1 root root 4096 Sep 10 04:14 **apt**

-rw-r--r-- 1 root root 2319 Mar 31 2024 bash.bashrc

-rw-r--r-- 1 root root 367 Aug 2 2022 bindresvport.blacklist

drwxr-xr-x 3 root root 4096 Oct 6 13:57 **ca-certificates**

-rw-r--r-- 1 root root 6288 Oct 6 13:57 ca-certificates.conf

drwxr-xr-x 2 root root 4096 Sep 10 04:20 **cloud**

8. The previous command has a lot of results, use a command to show this page by page. \*Note: use piping to do this!\*  
  
root@7a3c2be130d1:/home# ls -l /etc | more

total 464

drwxr-xr-x 1 root root 4096 Oct 6 13:54 alternatives

drwxr-xr-x 3 root root 4096 Oct 3 14:29 apparmor.d

drwxr-xr-x 1 root root 4096 Sep 10 04:14 apt

-rw-r--r-- 1 root root 2319 Mar 31 2024 bash.bashrc

-rw-r--r-- 1 root root 367 Aug 2 2022 bindresvport.blacklist

drwxr-xr-x 3 root root 4096 Oct 6 13:57 ca-certificates

-rw-r--r-- 1 root root 6288 Oct 6 13:57 ca-certificates.conf

drwxr-xr-x 2 root root 4096 Sep 10 04:20 cloud

drwxr-xr-x 1 root root 4096 Sep 23 19:53 cron.d

drwxr-xr-x 1 root root 4096 Oct 3 14:29 cron.daily

9. This command can also be used to show the content of a large file. Do this with the file /etc/sysctl.conf. Only use 1 command.

root@7a3c2be130d1:/home# cat /etc/sysctl.conf | more

#

# /etc/sysctl.conf - Configuration file for setting system variables

# See /etc/sysctl.d/ for additional system variables.

# See sysctl.conf (5) for information.

#

#kernel.domainname = example.com

# Uncomment the following to stop low-level messages on console

#kernel.printk = 3 4 1 3

###################################################################

# Functions previously found in netbase

#

# Uncomment the next two lines to enable Spoof protection (reverse-path filter)

# Turn on Source Address Verification in all interfaces to

# prevent some spoofing attacks

#net.ipv4.conf.default.rp\_filter=1

#net.ipv4.conf.all.rp\_filter=1

# Uncomment the next line to enable TCP/IP SYN cookies

# See http://lwn.net/Articles/277146/

# Note: This may impact IPv6 TCP sessions too

#net.ipv4.tcp\_syncookies=1

# Uncomment the next line to enable packet forwarding for IPv4

#net.ipv4.ip\_forward=1

# Uncomment the next line to enable packet forwarding for IPv6

# Enabling this option disables Stateless Address Autoconfiguration

# based on Router Advertisements for this host

#net.ipv6.conf.all.forwarding=1

###################################################################

# Additional settings - these settings can improve the network

# security of the host and prevent against some network attacks

# including spoofing attacks and man in the middle attacks through

# redirection. Some network environments, however, require that these

# settings are disabled so review and enable them as needed.

#

# Do not accept ICMP redirects (prevent MITM attacks)

#net.ipv4.conf.all.accept\_redirects = 0

#net.ipv4.conf.default.accept\_redirects = 0

# \_or\_

# Accept ICMP redirects only for gateways listed in our default

# gateway list (enabled by default)

# net.ipv4.conf.all.secure\_redirects = 1

#

# Do not send ICMP redirects (we are not a router)

#net.ipv4.conf.all.send\_redirects = 0

#

# Log Martian Packets

#net.ipv4.conf.all.log\_martians = 1

#

###################################################################

# Magic system request Key

# 0=disable, 1=enable all, >1 bitmask of sysrq functions

# See https://www.kernel.org/doc/html/latest/admin-guide/sysrq.html

# for what other values do

#kernel.sysrq=438

root@7a3c2be130d1:/home#

10. Show the directory listing of a directory but also the subdirectories of that directory and the subdirectories of that and ... Do this on the /etc folder with the long listing format and page by page.

root@7a3c2be130d1:/home# ls -lR /etc | less

bash: less: command not found

root@7a3c2be130d1:/home# ls -lR /etc | more

/etc:

total 464

drwxr-xr-x 1 root root 4096 Oct 6 13:54 alternatives

drwxr-xr-x 3 root root 4096 Oct 3 14:29 apparmor.d

drwxr-xr-x 1 root root 4096 Sep 10 04:14 apt

-rw-r--r-- 1 root root 2319 Mar 31 2024 bash.bashrc

-rw-r--r-- 1 root root 367 Aug 2 2022 bindresvport.blacklist

drwxr-xr-x 3 root root 4096 Oct 6 13:57 ca-certificates

-rw-r--r-- 1 root root 6288 Oct 6 13:57 ca-certificates.conf

drwxr-xr-x 2 root root 4096 Sep 10 04:20 cloud

drwxr-xr-x 1 root root 4096 Sep 23 19:53 cron.d

drwxr-xr-x 1 root root 4096 Oct 3 14:29 cron.daily

drwxr-xr-x 2 root root 4096 Oct 3 14:29 cron.weekly

-rw-r--r-- 1 root root 2967 Apr 12 2024 debconf.conf

11. Create a text file in the root of the homedirectory with the following  
content. Use the same command twice.  
'First line from Linux'  
'Second line from Linux'  
\*Note: this is with the echo command\*

root@7a3c2be130d1:/home# echo 'First line from Linux' > ~/mytextfile.txt

root@7a3c2be130d1:/home# echo 'Second line from Linux' >> ~/mytextfile.txt

root@7a3c2be130d1:/home# cat ~/mytextfile.txt

First line from Linux

Second line from Linux

root@7a3c2be130d1:/home#

12. Edit this document with a texteditor, use nano.

root@7a3c2be130d1:/home# nano ~/mytextfile.txt

bash: nano: command not found

root@7a3c2be130d1:/home# vim ~/mytextfile.txt

root@7a3c2be130d1:/home#

13. There is also another one called \*vi\*. Open a new file in vi and add some text. \*Note: to insert text the letter i has to be pressed first to get in insert mode. Escape closes the insert mode.\*.

14. Close and save the textfile. \*Note: with : you'll enter the command mode, with w and q you save and close vi.\*

root@7a3c2be130d1:/# vi ~/newfile.txt

root@7a3c2be130d1:/# cat ~/newfile.txt

dit is een tekst in vi geschreven !!!

root@7a3c2be130d1:/#

15. Create a new file called textfile2 with the following content.  
Hello this is a text file created for the labs Linux.  
This is the second line of this text file, note the lack of inspiration.  
This lab is all about files on our Docker container.  
These Linux-labs are made on a Docker container with the Operating System  
Ubuntu. Ubuntu is a Linux distribution based on Debian. Linux is mostly used on servers.

root@7a3c2be130d1:/# cat > ~/textfile2 <<EOF

Hello this is a text file created for the labs Linux.

This is the second line of this text file, note the lack of inspiration.

This lab is all about files on our Docker container.

These Linux-labs are made on a Docker container with the Operating System

Ubuntu. Ubuntu is a Linux distribution based on Debian. Linux is mostly used on servers.

EOF

root@7a3c2be130d1:/# cat ~/textfile2

Hello this is a text file created for the labs Linux.

This is the second line of this text file, note the lack of inspiration.

This lab is all about files on our Docker container.

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root@7a3c2be130d1:/#

16. Use a command to show only the first part of the new textfile

root@7a3c2be130d1:/# head -n 1 ~/textfile2

Hello this is a text file created for the labs Linux.

root@7a3c2be130d1:/#

17. Use this command to only show the first 3 lines

root@7a3c2be130d1:/# head -n 3 ~/textfile2

Hello this is a text file created for the labs Linux.

This is the second line of this text file, note the lack of inspiration.

This lab is all about files on our Docker container.

root@7a3c2be130d1:/#

18. Use a command to show only the last part of the new textfile

root@7a3c2be130d1:/# tail -n 1 ~/textfile2

Ubuntu. Ubuntu is a Linux distribution based on Debian. Linux is mostly used on servers.

root@7a3c2be130d1:/#

19. Show only the forth line of the textfile

root@7a3c2be130d1:/# sed -n '4p' ~/textfile2

These Linux-labs are made on a Docker container with the Operating System

root@7a3c2be130d1:/#

20. Show only the unique lines of textfile2

root@7a3c2be130d1:/# uniq ~/textfile2

Hello this is a text file created for the labs Linux.

This is the second line of this text file, note the lack of inspiration.

This lab is all about files on our Docker container.

These Linux-labs are made on a Docker container with the Operating System

Ubuntu. Ubuntu is a Linux distribution based on Debian. Linux is mostly used on servers.

root@7a3c2be130d1:/# sort ~/textfile2 | uniq

Hello this is a text file created for the labs Linux.

These Linux-labs are made on a Docker container with the Operating System

This is the second line of this text file, note the lack of inspiration.

This lab is all about files on our Docker container.

Ubuntu. Ubuntu is a Linux distribution based on Debian. Linux is mostly used on servers.

root@7a3c2be130d1:/#

21. Show only the repeated lines of textfile2

root@7a3c2be130d1:/# uniq -d ~/textfile2

root@7a3c2be130d1:/#

22. Show the 5 last edited files in the /etc directory in the long listing format. \*Note: the tail command might help\*

root@7a3c2be130d1:/# ls -lt /etc | head -n 5

total 476

-rw-r--r-- 1 root root 172 Oct 6 21:12 hosts

-rw-r--r-- 1 root root 222 Oct 6 21:12 resolv.conf

-rw-r--r-- 1 root root 13 Oct 6 21:12 hostname

drwxr-xr-x 1 root root 4096 Oct 6 21:08 alternatives

root@7a3c2be130d1:/#

23. Show all lines in the textfile with the word \*Linux\*

root@7a3c2be130d1:/# grep 'Linux' ~/textfile2

Hello this is a text file created for the labs **Linux**.

These **Linux**-labs are made on a Docker container with the Operating System

Ubuntu. Ubuntu is a **Linux** distribution based on Debian. **Linux** is mostly used on servers.

root@7a3c2be130d1:/#

24. Show all lines in the textfile with the string \*Linux\*

root@7a3c2be130d1:/# grep 'Linux' ~/textfile2

Hello this is a text file created for the labs **Linux**.

These **Linux**-labs are made on a Docker container with the Operating System

Ubuntu. Ubuntu is a **Linux** distribution based on Debian. **Linux** is mostly used on servers.

root@7a3c2be130d1:/#

25. Show all lines in the textfile without the word \*OS\*

root@7a3c2be130d1:/# grep -v 'OS' ~/textfile2

Hello this is a text file created for the labs Linux.

This is the second line of this text file, note the lack of inspiration.

This lab is all about files on our Docker container.

These Linux-labs are made on a Docker container with the Operating System

Ubuntu. Ubuntu is a Linux distribution based on Debian. Linux is mostly used on servers.

root@7a3c2be130d1:/#

26. Show the number of lines with the string \*Linux\*

root@7a3c2be130d1:/# grep 'Linux' ~/textfile2 | wc -l

3

root@7a3c2be130d1:/#

27. Show in the /bin directory all files and folders where the name had at most 2 characters

root@7a3c2be130d1:/# ls -d /bin/?? /bin/? 2>/dev/null

**'/bin/['** **/bin/cp** **/bin/dd** **/bin/df** **/bin/du** **/bin/ex** **/bin/hd** **/bin/id** **/bin/ln** **/bin/ls** **/bin/mv** **/bin/nl** **/bin/od** **/bin/pr** **/bin/ps** **/bin/rm** **/bin/sg** **/bin/sh** /bin/su **/bin/tr** **/bin/ul** **/bin/vi** **/bin/w** **/bin/wc**

root@7a3c2be130d1:/#

28. Show the number of files in the directory /etc (without subdirectories) where  
the name starts with the letter v or w

root@7a3c2be130d1:/# find /etc -maxdepth 1 -type f \( -name 'v\*' -o -name 'w\*' \) | wc -l

1

root@7a3c2be130d1:/#

29. Create a file with the directory listing of the /var/log folder

root@7a3c2be130d1:/# ls /var/log > ~/varlog\_list.txt

root@7a3c2be130d1:/# cat ~/varlog\_list.txt

alternatives.log

apt

bootstrap.log

btmp

dpkg.log

faillog

lastlog

wtmp

root@7a3c2be130d1:/#

30. Create a file with the directory listing of the /var/log folder and the  
/var/tmp/koenk folder redirect any errors to /dev/null

root@7a3c2be130d1:/# ls /var/log /var/tmp/koenk > ~/var\_list.txt 2>/dev/null

root@7a3c2be130d1:/#

31. Create an alias for that command

root@7a3c2be130d1:/# alias varlist='ls /var/log /var/tmp/koenk > ~/var\_list.txt 2>/dev/null'

root@7a3c2be130d1:/#

32. Remove that alias

root@7a3c2be130d1:/# unalias varlist

root@7a3c2be130d1:/#

33. Show the last 25 commands of the history

root@7a3c2be130d1:/# history | tail -n 25

40 uniq -d ~/textfile2

41 clear

42 ls -lt /etc | head -n 5

43 clear

44 grep 'Linux' ~/textfile2

45 clear

46 grep 'Linux' ~/textfile2

47 clear

48 grep -v 'OS' ~/textfile2

49 clear

50 grep 'Linux' ~/textfile2 | wc -l

51 clear

52 ls -d /bin/?? /bin/? 2>/dev/null

53 clear

54 find /etc -maxdepth 1 -type f \( -name 'v\*' -o -name 'w\*' \) | wc -l

55 clear

56 ls /var/log > ~/varlog\_list.txt

57 cat ~/varlog\_list.txt

58 clear

59 ls /var/log /var/tmp/koenk > ~/var\_list.txt 2>/dev/null

60 clear

61 alias varlist='ls /var/log /var/tmp/koenk > ~/var\_list.txt 2>/dev/null'

62 clear

63 unalias varlist

64 history | tail -n 25

root@7a3c2be130d1:/#

########################################

Validating lab 2.1 questions

Q1

Answer to question 1: LordKoenK

## CORRECT - KEY ## - 67ce8f49

Q2

Answer to question 2: 5

## CORRECT - KEY ## - fdd6e1f4

Q3 - autochecking

## CORRECT - KEY ## - 9f7c701e

Q4

Answer to question 4: 420

Q5 - autochecking

## CORRECT - KEY ## - 5f189fdd

root@5f49c850c768:/#