# 1 Viewing file contents

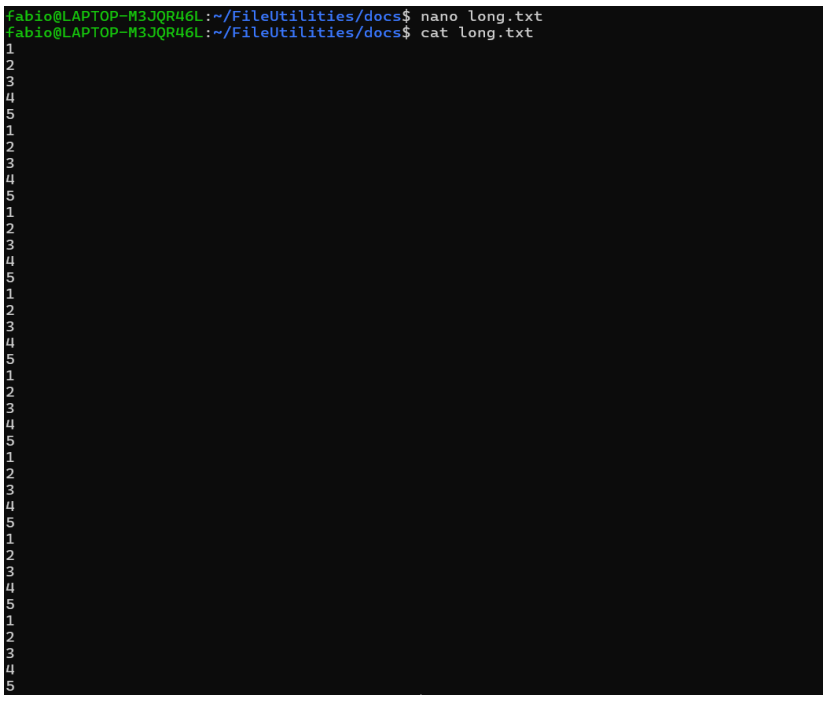
1- File helps us recognizing the type of data contained in a computer file

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano dummy.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ file dummy.txt
dummy.txt: ASCII text
```

2- Renaming the file doesn't change its content or format. Even with a .pdf extension, the file's actual content remains as plain ASCII text

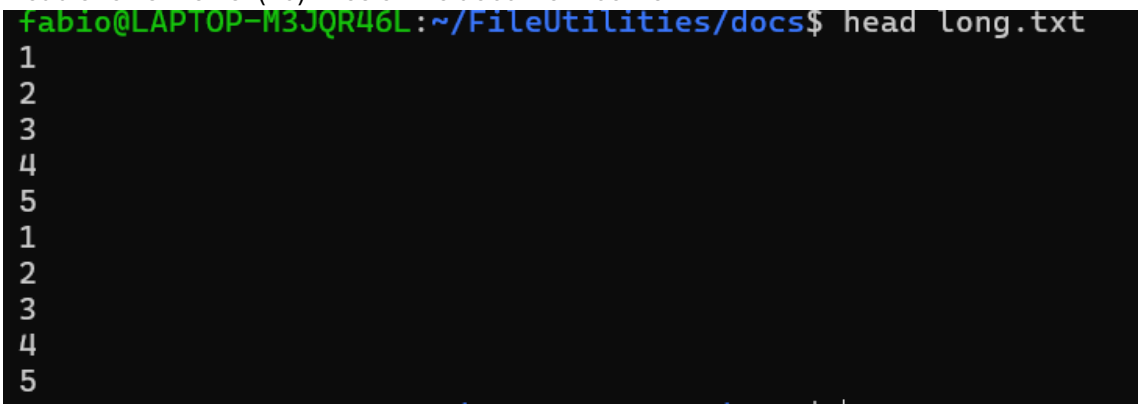
```
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ mv dummy.txt dummy.pdf
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ ls
dummy.pdf
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ file dummy.pdf
dummy.pdf: ASCII text
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$
```

3- No, it would be hard to read and track context

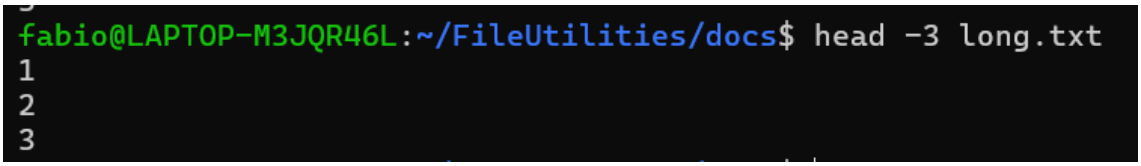


4- More shows the entire document content in the same terminal
Less shows the entire document content int a “running” terminal will only show contente of that document and nothig else


5- Head shows the 1st (10) lines of the document content

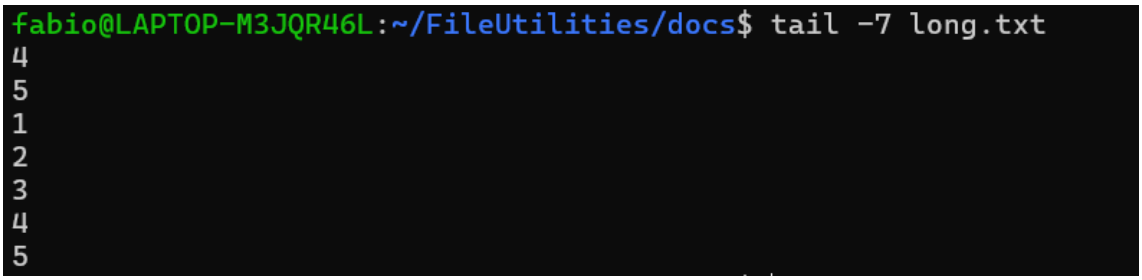


6-



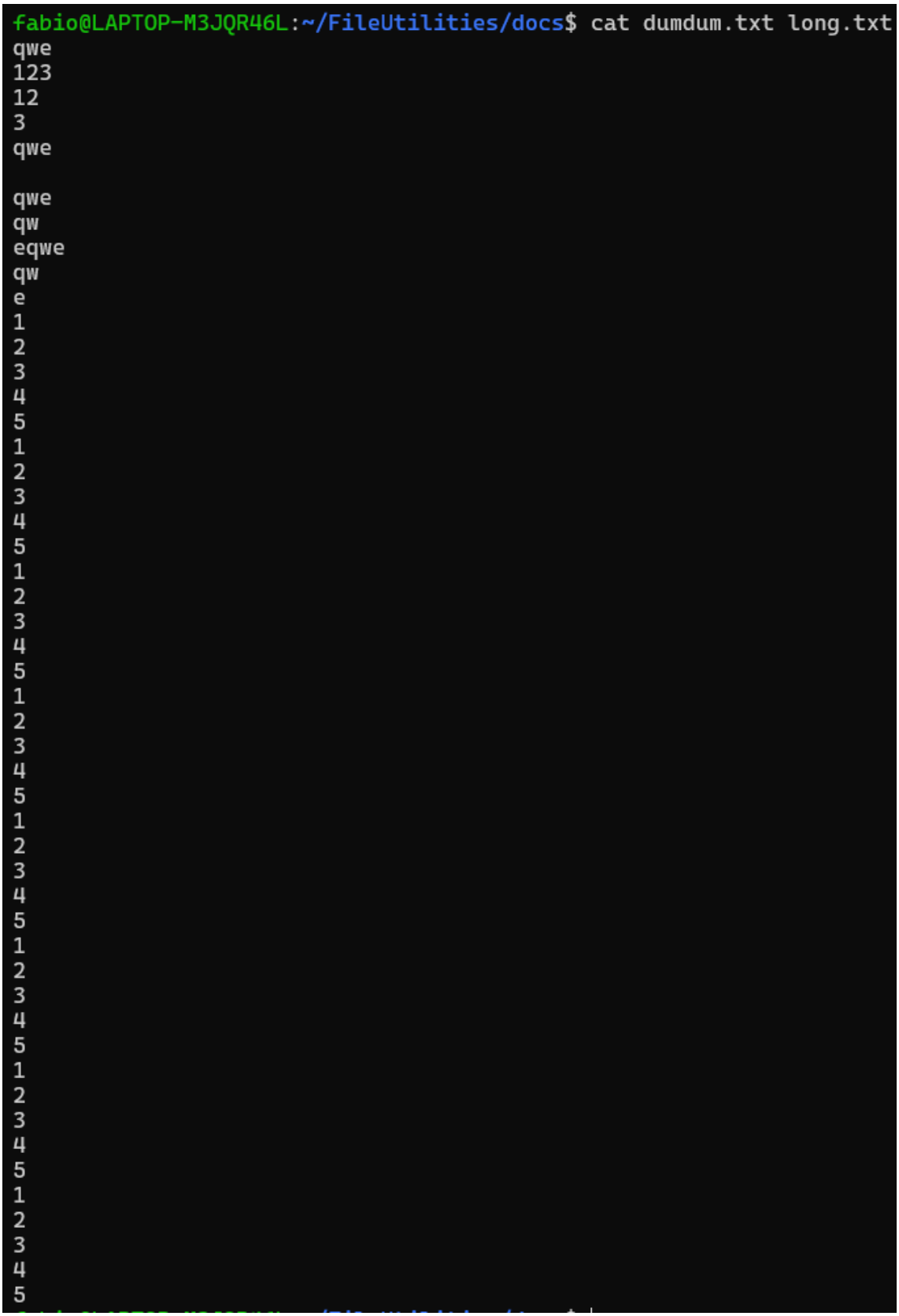

7- Tail shows last 10 lines of document


8-



9- Here, cat shows long.txt contente followed by dumdum.txt content

10- Now dumdum.txt contente is displayed 1st followed by long.txt content



# 2 Redirecting IO

11-

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ man ls > man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ ls
dumdum.txt  dummy.pdf  long.txt  man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano man_ls.txt
```

12-

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ man ls > man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ ls
dumdum.txt  dummy.pdf  long.txt  man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ man echo
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ echo one > file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ ls
dumdum.txt  dummy.pdf  file.tmp  long.txt  man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ echo "one" > file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ ls
dumdum.txt  dummy.pdf  file.tmp  long.txt  man_ls.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ echo two > file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ echo one > file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ echo two >> file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$ nano file.tmp
fabio@LAPTOP-M3JQR46L:~/FileUtilities/docs$
```

a)

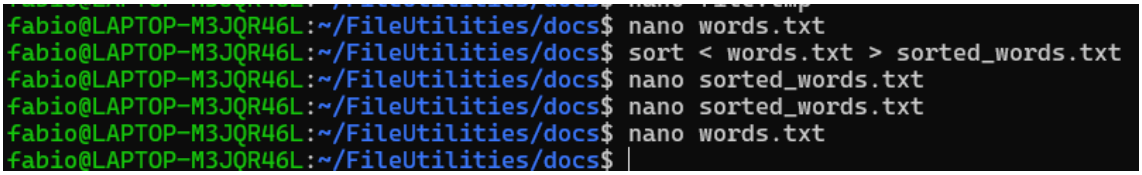
```
  GNU nano 6.2                                  file.tmp *

two
```

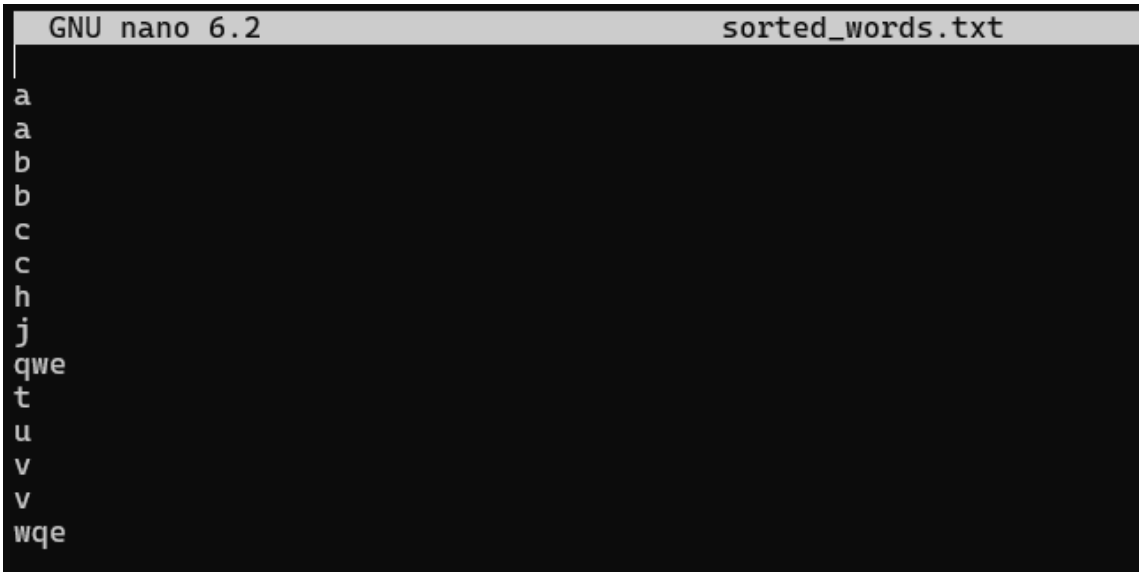
b)

```
  GNU nano 6.2                                        file.tmp
one
two
```

13- A)

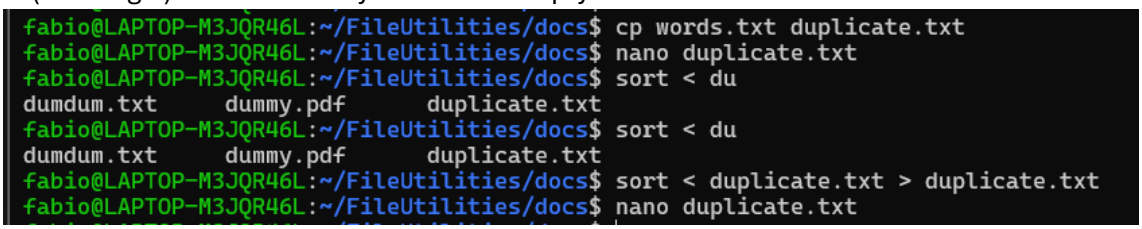

b)




Sorted_words now contains words.txt contente sorted alphabetically

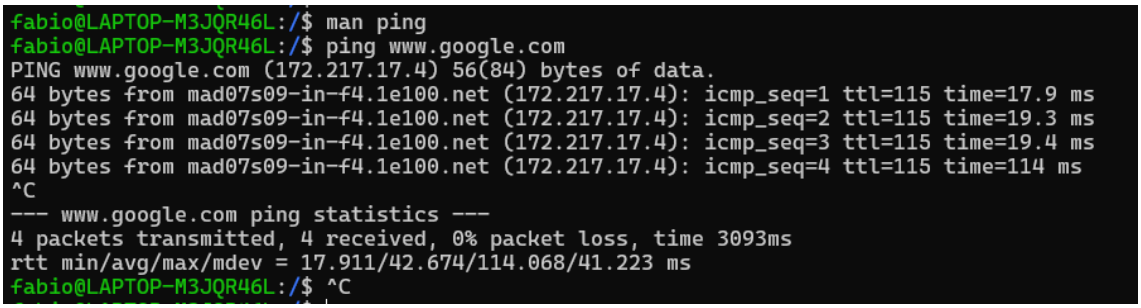
c) Duplicate.txt becomes an empty file since we open duplicate to write on it (clearing it) and then we try to sort the empty document



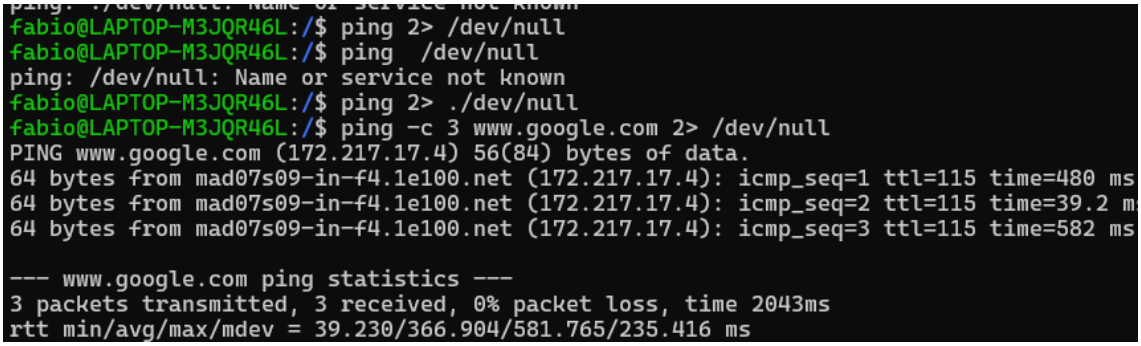
14-

a) As expected nothing is displayed, everything sent there is supposed to be discarded not displayed or saved


b) Only second command displays content since ping expects a destination address.




c) There was no diference since only errors messages would be discarded to /dev/null and there were no error messages



# 3Tipes

15-

```
fabio@LAPTOP-M3JQR46L:~$ man ping | sort > manual_ls_sorted.txt
```

```
                Request IPv4 addresses on other interfaces.
                Request IPv6 addresses on other interfaces.
                Request IPv6 global-scope addresses.
                Request IPv6 link-local addresses.
                Request IPv6 site-local addresses.
            IPv4 subject address.
            IPv6 subject address.
            Queries for IPv4 Addresses. There is one IPv4 specific flag.
            Queries for IPv6 Addresses. There are several IPv6 specific flags.
            Queries for Node Names.
            Show help for NI support.
            Subject name. Fully-qualified domain name is always assumed.
            Subject name. If it contains more than one dot, fully-qualified domain
            ipv4-all
            ipv6-all
            ipv6-global
            ipv6-linklocal
            ipv6-sitelocal
            name is assumed.
         [-I interface] [-l preload] [-m mark] [-M pmtudisc_option]
         [-N nodeinfo_option] [-w deadline] [-W timeout] [-p pattern] [-Q tos]
         [-s packetsize] [-S sndbuf] [-t ttl] [-T timestamp option] [hop...]
         {destination}
        (DS), consisting of: bits 0-1 (2 lowest bits) of separate data, and bits 2-7
        (highest 6 bits) of Differentiated Services Codepoint (DSCP). In RFC2481 and
        (only timestamps), tsandaddr (timestamps and addresses) or tsprespec host1
        (ping only) or hex number.
        (prohibit fragmentation, even local one), want (do PMTU discovery, fragment
        0 (lowest bit) for reserved (currently being redefined as congestion
        Adaptive ping. Interpacket interval adapts to round-trip time, so that
        Allow pinging a broadcast address.
        Audible ping.
```

16-

```
fabio@LAPTOP-M3JQR46L:~$ man chmod | wc
    128     911    6508
```

17- a/b)

```
fabio@LAPTOP-M3JQR46L:~$ cat tr.txt | tr 'a-z' 'A-Z'
123
QWE
QW
E
Q
QD
Q2
13
124
5
5

6
6
```

c)

```
fabio@LAPTOP-M3JQR46L:~$ cat tr.txt | tr 'a-z' 'A-Z' | tr -d '[aeiouAEIOU]'  > result2.txt
fabio@LAPTOP-M3JQR46L:~$ cat result2.txt
123
QW
QW

Q
QD
Q2
13
124
5
5

6
6
```

18-

```
fabio@LAPTOP-M3JQR46L:~$ ls -l /bin
lrwxrwxrwx 1 root root 7 Sep 27 22:35 /bin -> usr/bin
fabio@LAPTOP-M3JQR46L:~$ ls -l /bin
lrwxrwxrwx 1 root root 7 Sep 27 22:35 /bin -> usr/bin
fabio@LAPTOP-M3JQR46L:~$ ls -l /bin | tr -s ' ' | cut -d ' ' -f 1,3,9 | tail -n 10
lrwxrwxrwx root /bin
fabio@LAPTOP-M3JQR46L:~$ ls -l /usr/bin | tr -s ' ' | cut -d ' ' -f 1,3,9 | tail -n 10
-rwxr-xr-x root zdiff
-rwxr-xr-x root zdump
-rwxr-xr-x root zegrep
-rwxr-xr-x root zfgrep
-rwxr-xr-x root zforce
-rwxr-xr-x root zgrep
-rwxr-xr-x root zipdetails
-rwxr-xr-x root zless
-rwxr-xr-x root zmore
-rwxr-xr-x root znew
fabio@LAPTOP-M3JQR46L:~$
```

# 4 Environment variables

19- A)

```
fabio@LAPTOP-M3JQR46L:~$ echo $HOME
/home/fabio
fabio@LAPTOP-M3JQR46L:~$ printenv HOME
/home/fabio
```

b)

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ printenv PWD
/home/fabio/FileUtilities
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ printenv HOME
/home/fabio
fabio@LAPTOP-M3JQR46L:~/FileUtilities$
```

c)

pwd makes it “print working directory”

```
fabio@LAPTOP-M3JQR46L:/usr/bin$ printenv PWD
/usr/bin
```

d)

```
fabio@LAPTOP-M3JQR46L:/usr/bin$ printenv HOME
/home/fabio
```

“Home” always refers to my /home directory/main directory.

e)

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ ls
docs  ficheiro1.txt  ficheiro2.txt  table.csv
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ ls $HOME
FileUtilities  manual_ls_sorted.txt  result2.txt  tr.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities$
```

f)

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ cd $HOME
fabio@LAPTOP-M3JQR46L:~$
```

20-


```
BASH=/bin/bash
BASHOPTS=checkwinsize:cmdhist:complete_fullquote:expand_aliases:extglob:extq
uote:force_fignore:globasciiranges:histappend:interactive_comments:login_she
ll:progcomp:promptvars:sourcepath
BASH_ALIASES=()
BASH_ARGC=([0]="0")
BASH_ARGV=()
BASH_CMDS=()
BASH_COMPLETION_VERSINFO=([0]="2" [1]="11")
BASH_LINENO=()
BASH_REMATCH=()
BASH_SOURCE=()
BASH_VERSINFO=([0]="5" [1]="1" [2]="16" [3]="1" [4]="release" [5]="x86_64-pc
-linux-gnu")
BASH_VERSION='5.1.16(1)-release'
COLUMNS=76
COMP_WORDBREAKS=$' \t\n"\'><=;|&(:'
DBUS_SESSION_BUS_ADDRESS=unix:path=/run/user/1000/bus
DIRSTACK=()
DISPLAY=:0
EUID=1000
GROUPS=()
HISTCONTROL=ignoreboth
HISTFILE=/home/fabio/.bash_history
HISTFILESIZE=2000
HISTSIZE=1000
HOME=/home/fabio
HOSTNAME=LAPTOP-M3JQR46L
HOSTTYPE=x86_64
IFS=$' \t\n'
LANG=C.UTF-8
LESSCLOSE='/usr/bin/lesspipe %s %s'
LESSOPEN='| /usr/bin/lesspipe %s'
LINES=43
LOGNAME=fabio
LS_COLORS='rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;
01:cd=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;4
2:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01
;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31
:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.z=01;31:*.dz=01;31:*.gz=01;31:*.lrz=0
1;31:*.lz=01;31:*.lzo=01;31:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:
*.bz=01;31:*.tbz=01;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar
:
```

a)

```
{
    [ -z "$AWKPATH" ] && AWKPATH=`gawk 'BEGIN {print ENVIRON["AWKPATH"]}'`;
    export AWKPATH="$AWKPATH:$*"
}
gawkpath_default ()
{
    unset AWKPATH;
    export AWKPATH=`gawk 'BEGIN {print ENVIRON["AWKPATH"]}'`
}
gawkpath_prepend ()
{
    [ -z "$AWKPATH" ] && AWKPATH=`gawk 'BEGIN {print ENVIRON["AWKPATH"]}'`;
    export AWKPATH="$*:$AWKPATH"
}
quote ()
{
    local quoted=${1//\'/\'\\\'\'};
    printf "'%s'" "$quoted"
}
quote_readline ()
{
    local ret;
    _quote_readline_by_ref "$1" ret;
    printf %s "$ret"
}
fabio@LAPTOP-M3JQR46L:~$ echo "Screen size: $COLUMNS x $LINES"
Screen size: 76 x 43
fabio@LAPTOP-M3JQR46L:~$ echo "Screen size: $COLUMNS x $LINES"
Screen size: 76 x 25
```

b) Random generates a random number between [0, 32767] , 32767 is because it uses 15bits.

This range is chosen because internally, the algorithm generating the pseudorandom number uses this data type for computational efficiency.

```
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
12992
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
24076
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
15704
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
16216
fabio@LAPTOP-M3JQR46L:~$
```

c)

```
fabio@LAPTOP-M3JQR46L:~$ RANDOM=1
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
16807
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
10791
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
19566
fabio@LAPTOP-M3JQR46L:~$ RANDOM=1
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
16807
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
10791
fabio@LAPTOP-M3JQR46L:~$ echo $RANDOM
19566
fabio@LAPTOP-M3JQR46L:~$
```

21- A) b)

```
fabio@LAPTOP-M3JQR46L:~$ site1=www.google.com
fabio@LAPTOP-M3JQR46L:~$ site2=www.not.a.website.com
fabio@LAPTOP-M3JQR46L:~$ ping -c 1 $site1
PING www.google.com (216.58.215.132) 56(84) bytes of data.
64 bytes from mad41s04-in-f4.1e100.net (216.58.215.132): icmp_seq=1 ttl=115
time=31.5 ms

--- www.google.com ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 31.542/31.542/31.542/0.000 ms
```

c) Site did not replied

```
fabio@LAPTOP-M3JQR46L:~$ ping -c 1 $site2
ping: www.not.a.website.com: Name or service not known
```

d)

```
fabio@LAPTOP-M3JQR46L:~$ ping -c 1 "$site1" && echo "Ping to $site1 successf
ul" || echo "Ping to $site1 failed"
PING www.google.com (216.58.215.132) 56(84) bytes of data.
64 bytes from mad41s04-in-f4.1e100.net (216.58.215.132): icmp_seq=1 ttl=115
time=1057 ms

--- www.google.com ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 1056.983/1056.983/1056.983/0.000 ms
Ping to www.google.com successful
fabio@LAPTOP-M3JQR46L:~$
```

```
fabio@LAPTOP-M3JQR46L:~$ ping -c 1 "$site2" && echo "Ping to $site2 successf
ul" || echo "Ping to $site2 failed"
ping: www.not.a.website.com: Name or service not known
Ping to www.not.a.website.com failed
```

e)

```
fabio@LAPTOP-M3JQR46L:~$ unset site1
fabio@LAPTOP-M3JQR46L:~$ unset site2
fabio@LAPTOP-M3JQR46L:~$ echo $site1 $site2

fabio@LAPTOP-M3JQR46L:~$ echo $site1

fabio@LAPTOP-M3JQR46L:~$
```

22-

a)

```
fabio@LAPTOP-M3JQR46L:~$ sleep 5
fabio@LAPTOP-M3JQR46L:~$ sleep 1000
```

b)

```
fabio@LAPTOP-M3JQR46L:~$ sleep 5
fabio@LAPTOP-M3JQR46L:~$ sleep 1000
^C
```

c)running

```
fabio@LAPTOP-M3JQR46L:~$ sleep 1000 &
[2] 1109
fabio@LAPTOP-M3JQR46L:~$ jobs
[1]+  Stopped                 man env
[2]-  Running                 sleep 1000 &
```

d)

```
fabio@LAPTOP-M3JQR46L:~$ sleep 1000
^A^A^Z
[4]+  Stopped                 sleep 1000
fabio@LAPTOP-M3JQR46L:~$ bg %2
-bash: bg: job 2 already in background
fabio@LAPTOP-M3JQR46L:~$ bg %4
[4]+ sleep 1000 &
fabio@LAPTOP-M3JQR46L:~$ jobs
[1]+  Stopped                 man env
[2]   Running                 sleep 1000 &
[3]   Running                 sleep 1000 &
[4]-  Running                 sleep 1000 &
```

e) i “killed job 4 by pressing ctrl C when he was in foreground.

```
fabio@LAPTOP-M3JQR46L:~$ fg %4
sleep 1000
^C
fabio@LAPTOP-M3JQR46L:~$ bg %4
-bash: bg: %4: no such job
fabio@LAPTOP-M3JQR46L:~$ jobs
[1]+  Stopped                 man env
[2]   Running                 sleep 1000 &
[3]-  Running                 sleep 1000 &
```

23- A)

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ curl -s -XGET https://www.gutenberg.o
rg/cache/epub/100/pg100.txt
```

b)No. Because here curl makes text to appear in console

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ curl -s -XGET https://www.gutenberg.o
rg/cache/epub/100/pg100.txt &
```

c)

```
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ curl -s -XGET https://www.gutenberg.o
rg/cache/epub/100/pg100.txt -o WorksOfShakespeare.txt &
[2] 1129
```

this way shell remains free to use  since text is being saved and not shown

24- A) b)

```
epub/100/pg100.txt  0 worksofShakespeare.txt
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ sleep 500 &
[4] 1132
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ sleep 500 &
[5] 1133
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ sleep 500 &
[6] 1134
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ ps -u $(whoami) | grep sleep
   1131 pts/0    00:00:00 sleep
   1132 pts/0    00:00:00 sleep
   1133 pts/0    00:00:00 sleep
   1134 pts/0    00:00:00 sleep
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ kill 12345
kill 12346
kill 12347
-bash: kill: (12345) - No such process
-bash: kill: (12346) - No such process
-bash: kill: (12347) - No such process
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ kill 12345
kill 12346
kill 12347
-bash: kill: (12345) - No such process
-bash: kill: (12346) - No such process
-bash: kill: (12347) - No such process
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ kill 1131
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ kill 1131
-bash: kill: (1131) - No such process
[3]   Terminated              sleep 500
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ kill 1131 kill 1132 kill 1133 kill 11
34
-bash: kill: (1131) - No such process
-bash: kill: kill: arguments must be process or job IDs
-bash: kill: kill: arguments must be process or job IDs
-bash: kill: kill: arguments must be process or job IDs
fabio@LAPTOP-M3JQR46L:~/FileUtilities$ ps -u $(whoami) | grep sleep
[4]   Terminated              sleep 500
[5]   Terminated              sleep 500
[6]-  Terminated              sleep 500
fabio@LAPTOP-M3JQR46L:~/FileUtilities$
```