N11 - teme lab01
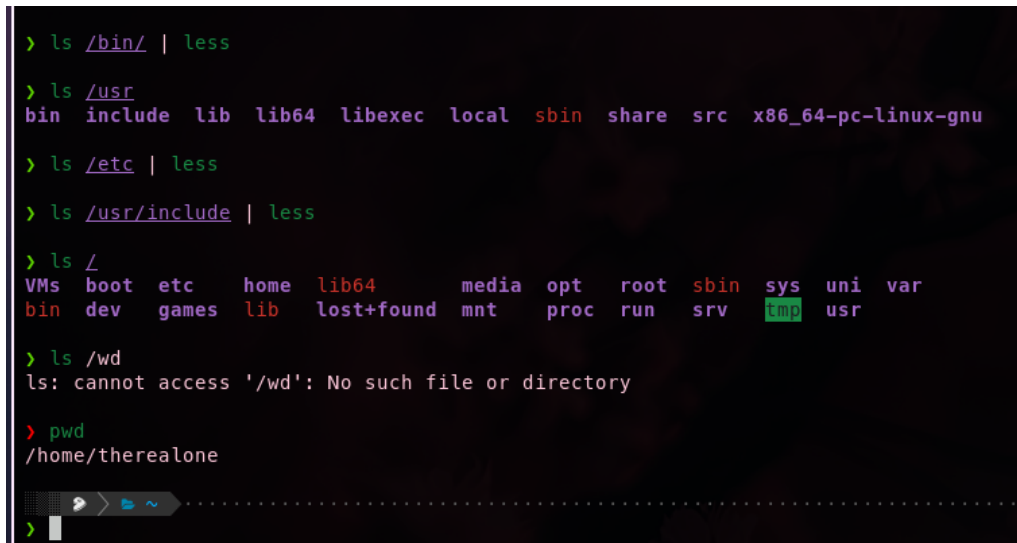
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1 Listati continutul directoarelor /, /bin, /usr, /etc, /usr/include. Acolo unde este cazul, paginati listarea (ls | less). cautati, in fisierul /usr/include/stdio.h, textul printf.

1.1 List

```
ls /
ls /bin | less
ls /usr
ls /etc | less
ls /usr/include | less
```


1.2 Concat

```
cat /usr/include/stdio.h | grep " printf "
```

```
> pwd
/home/therealone

> cat /usr/include/stdio.h | grep " printf "
/* Maximum length of printf output for a NaN.  */
extern int printf (const char *__restrict __format, ...);

>
```

2   Creati, in directorul personal, urmatoarea structura de directoare si fisiere:

```
(dir. personal)
|
+-- abc
| +-- x (fisier)
| +-- y (fisier)
| +-- t1 (fisier)
| +-- t2 (fisier)
| +-- t3 (fisier)
| +-- t (director)
| +-- a (fisier)
| +-- b (fisier)
|
+-- zz (director)
| +-- x (fisier)
|
+-- tt (director)

mkdir -p abc/t zz/x tt

cd ./abc; touch x y t{1..3} a b; cd ..
```

```
> pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

> mkdir -p abc/t zz/x tt

cd ./abc; touch x y t{1..3} a b; cd ..

> find .
.
./tt
./abc
./abc/b
./abc/x
./abc/t2
./abc/t
./abc/t1
./abc/a
./abc/y
./abc/t3
./zz
./zz/x
```
  ▓▓ 🐍 > 📁 9999_labs/1/env > on 🌿 main ?
> ▌

3 Copiati directorul abc cu tot continutul sau (recursiv) ca subdirector al lui zz (va rezulta un subdirector abc in zz)

```
cp -r ./abc ./zz
```

```
> cp -r ./abc ./zz

> ls zz
abc   x
```
  ▓▓ 🐍 > 📁 9999_labs/1/env > on 🌿 main ?
> ▌

4 Copiati continutul lui abc in directorul zz fara a suprascrie fisierele cu acelasi nume (x, in cazul nostru)

```
cp --update=none -r ./abc/* ./zz
```

```
> cp --update=none -r ./abc/* ./zz


> tree zz
zz
├── a
├── abc
│   ├── a
│   ├── b
│   ├── t
│   ├── t1
│   ├── t2
│   ├── t3
│   ├── x
│   └── y
├── b
├── t
├── t1
├── t2
├── t3
├── x
└── y

5 directories, 13 files
```

5   copiati fisierele t1 si t2 din abc in tt (folosind specificator generic)

```
cp ./abc/t{1..2} tt
```

```
> cp ./abc/t{1..2} tt


> tree tt

tt
├── t1
└── t2

1 directory, 2 files

>

    > ▸ 9999_labs/1/env > on ⑂ main ?  ▸ · · · ·
>
```

6 Creati un director pe care sa va dati dreptul x fara a avea dreptul r. Creati in el un fisier. Ce observati? Dati-va apoi dreptul r si luati-va dreptul x. Ce observati ?

6.1 Execute, no read

```
mkdir -m 300 foo
touch foo/bar
```

Pot crea fișiere în directorul respectiv (deoarece în acest caz, mi-am dat și permisiunea de scriere [write]), însă nu pot lista fișierele.

```
› # +x-r

› mkdir -m 300 foo
touch foo/bar


› ls
abc  foo  tt  zz

› cd foo

› ls
ls: cannot open directory '.': Permission denied

› echo foo
foo

› cat foo
cat: foo: No such file or directory

› cat bar

› echo idk > bar

› cat bar
idk

› stat bar
  File: bar
  Size: 4            Blocks: 8          IO Block: 4096   regular file
Device: 259,3   Inode: 5243153    Links: 1
Access: (0644/-rw-r--r--)  Uid: ( 1000/therealone)   Gid: ( 1000/therealone)
Access: 2026-02-26 20:25:44.395988550 +0200
Modify: 2026-02-26 20:25:40.779988589 +0200
Change: 2026-02-26 20:25:40.779988589 +0200
 Birth: 2026-02-26 20:25:00.829989029 +0200

› stat .
  File: .
  Size: 4096         Blocks: 8          IO Block: 4096   directory
Device: 259,3   Inode: 5243152    Links: 2
Access: (0300/d-wx------)  Uid: ( 1000/therealone)   Gid: ( 1000/therealone)
Access: 2026-02-26 20:25:00.829989029 +0200
Modify: 2026-02-26 20:25:00.831501857 +0200
Change: 2026-02-26 20:25:00.831501857 +0200
 Birth: 2026-02-26 20:25:00.829989029 +0200

› pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env/foo
```

6.2   Read, no execute

```
chmod 600 foo
```

Acum nu mai am cum să schimb directorul în "$(pwd)/foo", și nu am cum sa creez conținut în el, deoarece drepturile de execuție în directorul respectiv îmi sunt blocate.

```
> # -x+r

> ..

> ls
abc   foo   tt   zz

> pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

> chmod 600 foo

> cd foo
cd: permission denied: foo

> stat foo
  File: foo
  Size: 4096            Blocks: 8          IO Block: 4096    directory
Device: 259,3   Inode: 5243152     Links: 2
Access: (0600/drw-------)  Uid: ( 1000/therealone)   Gid: ( 1000/therealone)
Access: 2026-02-26 20:26:31.093988035 +0200
Modify: 2026-02-26 20:25:00.831501857 +0200
Change: 2026-02-26 20:26:31.068988035 +0200
 Birth: 2026-02-26 20:25:00.829989029 +0200

> touch foo/somefile
touch: cannot touch 'foo/somefile': Permission denied

> cat foo/bar
cat: foo/bar: Permission denied

> pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

    > 9999_labs/1/env > on ൴ main ?  ........................
>
```

7 Dati drepturile potrivite astfel incat oricine sa poata vizualiza continutul directoarelor abc si abc/t, sa poata adauga fisiere in abc/t, sa poata citi fisierele x, y, t1, t2, t3 din abc dar sa nu poata citi fisierele a si b din abc/t

```
chmod a+rx abc abc/t
chmod a+w abc/t

for f in x y t{1..3}; do
    chmod a+r "abc/${f}"
done

for f in a b; do
    chmod a-r "abc/t/${f}"
done
```

```
❯ pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

❯ ls
abc  foo  tt  zz

❯ chmod a+rx abc abc/t
chmod a+w abc/t

for f in x y t{1..3}; do
    chmod a+r "abc/${f}"
done

for f in a b; do
    chmod a-r "abc/t/${f}"
done


❯ ls
abc  foo  tt  zz

❯ stat abc
  File: abc
  Size: 4096            Blocks: 8          IO Block: 4096   directory
Device: 259,3   Inode: 5243125    Links: 3
Access: (0755/drwxr-xr-x)  Uid: ( 1000/therealone)   Gid: ( 1000/therealone)
Access: 2026-02-26 21:22:23.954951100 +0200
Modify: 2026-02-26 20:22:29.000000000 +0200
Change: 2026-02-26 21:22:23.924951100 +0200
 Birth: 2026-02-26 20:56:33.582968179 +0200

❯ stat abc/t
  File: abc/t
  Size: 4096            Blocks: 8          IO Block: 4096   directory
Device: 259,3   Inode: 5243129    Links: 2
Access: (0777/drwxrwxrwx)  Uid: ( 1000/therealone)   Gid: ( 1000/therealone)
Access: 2026-02-26 21:22:23.954951100 +0200
Modify: 2026-02-26 20:28:51.000000000 +0200
Change: 2026-02-26 21:22:23.926461818 +0200
 Birth: 2026-02-26 20:56:33.582968179 +0200

❯ pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

❯ ls
abc  foo  tt  zz
```
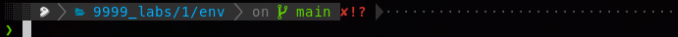
 9999_labs/1/env on main x!?   at 21:22:54

```
> ls -lsa
total 24
4 drwxr-xr-x 6 therealone therealone 4096 Feb 26 20:25 .
4 drwxr-xr-x 3 therealone therealone 4096 Feb 26 20:22 ..
4 drwxr-xr-x 3 therealone therealone 4096 Feb 26 20:22 abc
4 drw------- 2 therealone therealone 4096 Feb 26 20:25 foo
4 drwxr-xr-x 2 therealone therealone 4096 Feb 26 20:24 tt
4 drwxr-xr-x 5 therealone therealone 4096 Feb 26 20:23 zz

> ls -lsa abc
total 12
4 drwxr-xr-x 3 therealone therealone 4096 Feb 26 20:22 .
4 drwxr-xr-x 6 therealone therealone 4096 Feb 26 20:25 ..
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 a
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 b
4 drwxrwxrwx 2 therealone therealone 4096 Feb 26 20:28 t
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 t1
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 t2
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 t3
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 x
0 -rw-r--r-- 1 therealone therealone    0 Feb 26 20:22 y

> ls -lsa abc/t
total 8
4 drwxrwxrwx 2 therealone therealone 4096 Feb 26 20:28 .
4 drwxr-xr-x 3 therealone therealone 4096 Feb 26 20:22 ..
0 --w------- 1 therealone therealone    0 Feb 26 20:28 a
0 --w------- 1 therealone therealone    0 Feb 26 20:28 b

> pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

> # POZA 2

    > ⬢ 9999_labs/1/env > on ⑂ main ?
>
```

8 Listati in format lung fisierele t, t1, t2, t3 din abc (sa se vada drepturile de acces asupra lui t, nu asupra fisierelor din el

```
ls -l "abc/t"
ls -l "abc/t{1..3}"
```

```
> # Listati in format lung fisierele t, t1, t2, t3 din abc (sa se vada drepturile de acces asupra lui t, nu asupra
  fisierelor din el

> pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env

> for f in t t{1..3}; do
    ls -l "abc/${f}"
done

total 0
--w------- 1 therealone therealone 0 Feb 26 20:28 a
--w------- 1 therealone therealone 0 Feb 26 20:28 b
-rw-r--r-- 1 therealone therealone 0 Feb 26 20:22 abc/t1
-rw-r--r-- 1 therealone therealone 0 Feb 26 20:22 abc/t2
-rw-r--r-- 1 therealone therealone 0 Feb 26 20:22 abc/t3

> ls -l abc/t
total 0
--w------- 1 therealone therealone 0 Feb 26 20:28 a
--w------- 1 therealone therealone 0 Feb 26 20:28 b

> ls -l abc/t{1..3}
-rw-r--r-- 1 therealone therealone 0 Feb 26 20:22 abc/t1
-rw-r--r-- 1 therealone therealone 0 Feb 26 20:22 abc/t2
-rw-r--r-- 1 therealone therealone 0 Feb 26 20:22 abc/t3

> pwd
/home/therealone/git/UNITBV/3rd_year/2nd_semester/SO/9999_labs/1/env
```

9 Comanda copy /dev/zero /dev/null este un fel de 'ciclu infinit' (nu se termina). Lansati-o, mutati-o in background, listati procesele active, terminati comanda (in ambele variante: mutata in foreground si oprita cu ^C, sau cu kill).

```
cp /dev/zero /dev/null &
ps -aux | grep "cp /dev/zero /dev/null"

# First variant
fg
#C c

# Re-run
cp /dev/zero /dev/null &
kill $! # Kill last process ID
```



```
> # Comanda copy /dev/zero /dev/null este un fel de 'ciclu infinit' (nu se termina). Lansati-o, mutati-o in backgr
ound, listati procesele active, terminati comanda (in ambele variante: mutata in foreground si oprita cu ^C, sau c
u kill).

> cp /dev/zero /dev/null &
ps -aux | grep "cp /dev/zero /dev/null"

[1] 34144
thereal+  34144  0.0  0.0  6264  2444 pts/0    RN   20:35   0:00 cp /dev/zero /dev/null
thereal+  34146  0.0  0.0  6844  2416 pts/0    S+   20:35   0:00 grep cp /dev/zero /dev/null

> fg
[1]  + running    cp /dev/zero /dev/null
^C

> cp /dev/zero /dev/null &
[1] 34506

> kill 34506
[1]  + terminated  cp /dev/zero /dev/null

> fg
fg: no current job
```

10 Arhivati structura de directoare folosind utilitarul zip sau utilitarele tar si gz.
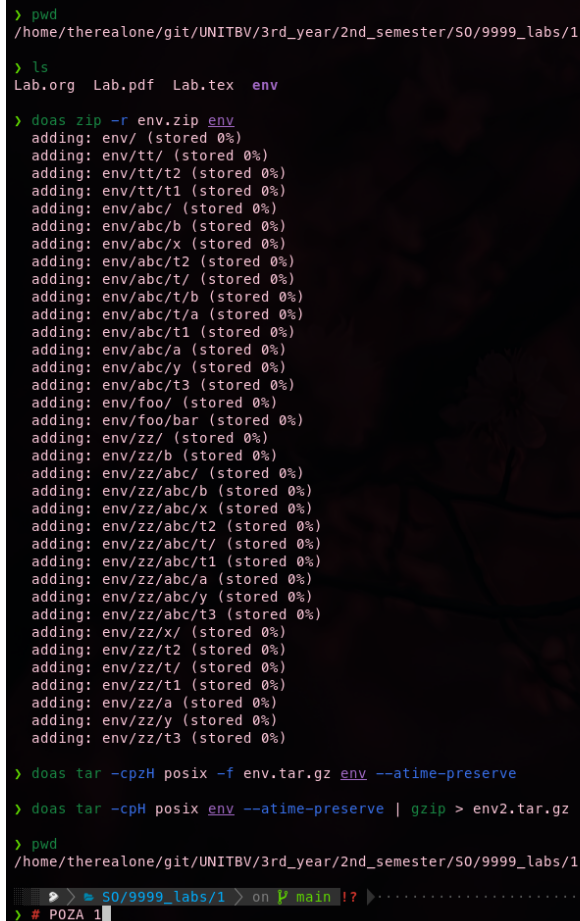
10.1 Zip

```
zip -r structure.zip src
```

10.2 GNU Tar + GNU Zip

```
tar -cpzH posix -f structure.tar.gz src  --atime-preserve

# Or pipe
tar -cpH posix src --atime-preserve | gzip > structure2.tar.gz
```

10.3 Screenshot

11 Stergeti directoarele si refaceti structura pornind de la arhiva. Verificati conservarea datei creerii si drepturilor de acces.

11.1 Remove dirs

```
for f in $(find src); do
    stat "${f}" >> old.txt
done

rm -rf src
```

11.2 Unarchive

11.2.1 ZIP

```
unzip structure.zip
```

11.2.2 GNU Tar + GNU Zip

```
tar -xzf structure.tar.gz

# Or pipe
gunzip -c structure.tar.gz | tar -xf -
```

11.3 Verify

```
for f in $(find src); do
    stat "${f}" >> new.txt
done

diff new.txt old.txt
```

11.4   Screenshot

```
) ls
Lab.org  Lab.pdf  Lab.tex  env  env.tar.gz  env.zip  env2.tar.gz

) for f in $(find env); do
    doas stat "${f}" >> old.txt
done


) tar -xzf structure.tar.gz
tar (child): structure.tar.gz: Cannot open: No such file or directory
tar (child): Error is not recoverable: exiting now
tar: Child returned status 2
tar: Error is not recoverable: exiting now

) tar -xzf env.tar.gz
tar: env/foo/bar: Cannot open: Permission denied
tar: Exiting with failure status due to previous errors

) doas tar -xzf env.tar.gz

) ls
Lab.org  Lab.pdf  Lab.tex  env  env.tar.gz  env.zip  env2.tar.gz  old.txt

) stat env
  File: env
  Size: 4096          Blocks: 8          IO Block: 4096    directory
Device: 259,3   Inode: 5242905     Links: 6
Access: (0755/drwxr-xr-x)  Uid: ( 1000/therealone)   Gid: ( 1000/therealone)
Access: 2026-02-26 21:05:19.546962385 +0200
Modify: 2026-02-26 20:25:00.000000000 +0200
Change: 2026-02-26 21:05:19.522962385 +0200
 Birth: 2026-02-26 20:56:33.582968179 +0200

) for f in $(find env); do
 doas stat "${f}" >> new.txt
done



)

) diff new.txt old.txt

5c5
< Access: 2026-02-26 21:05:19.546962385 +0200
---
> Access: 2026-02-26 20:56:33.609968179 +0200
7c7
< Change: 2026-02-26 21:05:19.522962385 +0200
---
> Change: 2026-02-26 20:56:33.584215949 +0200
13c13
< Access: 2026-02-26 21:05:19.546962385 +0200
---
> Access: 2026-02-26 20:56:33.609968179 +0200
15c15
```