

Access permissions and command find.

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- What information must the OS remember about every user?
 - user name
 - password
 - UID
 - primary GID and secondary GID's
 - home directory
 - login shell
- Where the previous information are stored?
 - in local files: `/etc/passwd` , `/etc/shadow`, `/etc/group`
 - on remote server (NIS, NIS+, LDAP)

Access permissions

- How to determine effective and real user identity of your shell?

```
ps -eo pid,user,ruser,comm | grep "^ *$$"
```

```
psched $$ # in Solaris
```

- How to determine effective and real group identity of your shell?

```
ps -eo pid,group,rgroup,comm | grep "^ *$$"
```

```
psched $$ # in Solaris
```

- How to determine the owner and owner group of the file /usr/bin/passwd?

```
ls -l /usr/bin/passwd
```

- How to print only access permissions of the directory /etc? What is the meaning of these permissions?

```
ls -ld /etc | cut -c2-10
```

- User has permissions: rwx.
- Group and other have permissions: r-x.

Access permissions

- Login to server `fray1.fit.cvut.cz`.
- What permissions has the directory `/bin` and what does it mean?

```
ls -ld /bin
```

- `/bin` is symbolik link → use one of the following commands

```
ls -ld /usr/bin
```

```
ls -lLd /bin
```

- Owner `root` has all permissions (read/write/execute).
- Owner group `bin` and other have not write permission. They cannot create/delete subdirectories/files below the directory `/bin` (`/usr/bin`).

Access permissions

- Create the following directory structure in the directory /tmp and setup the same permissions (files passwd and date are copies of /etc/passwd and /bin/date, respectively). You and your primary group will be the owner and owner group.

```
dr-x----- user group ps1
dr-x----- user group ps1/A
-r-x----- user group ps1/A/date
-r-x----- user group ps1/A/passwd
```

```
cd /tmp
mkdir -p ps1/A

cp /etc/passwd ps1/A
cp /bin/date ps1/A

chmod -R 500 ps1
```

Access permissions

- What minimal permissions (minimal sum of permission weights) must be set on files or directories, such that you can successfully execute the following commands?

- `ls -ld /tmp/ps1/A`

/tmp	rw	x	rw	t
/tmp/ps1	--	x	---	---
/tmp/ps1/A	---	---	---	---

- `ls /tmp/ps1/A`

/tmp	rw	x	rw	t
/tmp/ps1	--	x	---	---
/tmp/ps1/A	r--	---	---	---

- `ls -l /tmp/ps1/A`

/tmp	rw	x	rw	t
/tmp/ps1	--	x	---	---
/tmp/ps1/A	r-x	---	---	---

Access permissions

- `ls -l /tmp/ps1/A/passwd`

```
/tmp          rwx rwx rwt
/tmp/ps1      --x --- ---
/tmp/ps1/A    --x --- ---
/tmp/ps1/A/passwd --- --- ---
```

- `cat /tmp/ps1/A/passwd`

```
/tmp          rwx rwx rwt
/tmp/ps1      --x --- ---
/tmp/ps1/A    --x --- ---
/tmp/ps1/A/passwd r-- --- ---
```

- `echo "aaaaa" >> /tmp/ps1/A/passwd`

```
/tmp          rwx rwx rwt
/tmp/ps1      --x --- ---
/tmp/ps1/A    --x --- ---
/tmp/ps1/A/passwd -w- --- ---
```


Access permissions

- `echo "bbbbbb" > /tmp/ps1/A/passwd`

<code>/tmp</code>	<code>rwX</code>	<code>rwX</code>	<code>rwt</code>
<code>/tmp/ps1</code>	<code>--x</code>	<code>---</code>	<code>---</code>
<code>/tmp/ps1/A</code>	<code>--x</code>	<code>---</code>	<code>---</code>
<code>/tmp/ps1/A/passwd</code>	<code>-w-</code>	<code>---</code>	<code>---</code>

- `/tmp/ps1/A/date`

<code>/tmp</code>	<code>rwX</code>	<code>rwX</code>	<code>rwt</code>
<code>/tmp/ps1</code>	<code>--x</code>	<code>---</code>	<code>---</code>
<code>/tmp/ps1/A</code>	<code>--x</code>	<code>---</code>	<code>---</code>
<code>/tmp/ps1/A/date</code>	<code>--x</code>	<code>---</code>	<code>---</code>

- `rm /tmp/ps1/A/passwd`

<code>/tmp</code>	<code>rwX</code>	<code>rwX</code>	<code>rwt</code>
<code>/tmp/ps1</code>	<code>--x</code>	<code>---</code>	<code>---</code>
<code>/tmp/ps1/A</code>	<code>-wX</code>	<code>---</code>	<code>---</code>
<code>/tmp/ps1/A/passwd</code>	<code>---</code>	<code>---</code>	<code>---</code>

Default access permissions

- What access permissions will have new created directory and file?
Why?

```
umask -S
```

```
umask
```

- What must be done to newly created files/directories should have automatically the following access rights (don't use command `chmod`)?

- `directory: rwx --- ---` `file: rw- --- ---`

```
umask -S u=rwx,g=,o=
```

```
umask 077
```

- `directory: rw- -w- r--` `file: rw- -w- r--`

```
umask -S u=rw,g=w,o=r
```

```
umask 153
```

Command find

- How to print only the number of regular files, which are in the directory /usr/bin (recursively) on the standard output?

```
find /usr/bin -type f 2>/dev/null | wc -l
```

- How to print only the number of symbolic links, which are in the directory /usr/bin (recursively) on the standard output?

```
find /usr/bin -type l 2>/dev/null | wc -l
```

- How to print only the number of regular files and symbolic links, which are in the directory /usr/bin (recursively) on the standard output?

```
find /usr/bin \( -type f -o -type l \) \  
2>/dev/null | wc -l
```

Command find

- Create files and directory by the following commands.

```
mkdir -p A/B/C
```

```
touch {A,A/B,A/B/C}/\  
{,a,b,c}{,k,l,m}{,x,y,z}.{c,cpp,tar,gz,txt}
```

- 1 How to print names of regular files, which have a suffix of length 3. (eg. abc.txt or xz.cpp)?

```
find . -type f -name "*.???"
```

- 2 How to print names of regular files, which consist of a prefix of length 2 and the suffix .c or .cpp (eg. ab.c or xz.cpp)?

```
find . -type f \( -name '??.' -o -name '?.cpp' \)
```

- 3 How to remove files found in question 1?

```
find . -type f -name "*.???" -ok rm {} \;
```

```
find . -type f -name "*.???" -exec rm {} \;
```

Command find

- How to print names of regular files from your home directory (recursively), that were modified during today, and how to verify the result by the command stat?

```
find . -type f -mtime 0 \  
-exec stat --printf="%n\t%y\n" {} \;
```

- How to print names of regular files from your home directory (recursively), that were modified during last 3 days, and how to verify the result by the command stat?

```
find ~ -type f -mtime -2 \  
-exec stat --printf="%y %n\n" {} \;
```

- How to print only names of all regular files, which have set write permission for owner or exec permission for other and are located in the directory /etc (recursively)? For every such file run command `ls -l` to verify the permissions.

```
find /etc -type f \( -perm -200 -o -perm -001 \) \  
-exec ls -l {} \; 2>/dev/null
```

Command find

- How to print only names of regular files, which are shell scripts and are located in the directory /usr/bin (recursively), on the standard output?

- ① Hint: The script is the file with the following first line

```
#!/bin/sh
```

```
find /usr/bin -type f \  
-exec grep -n "^#! */bin/*.sh" {} /dev/null \; | \  
grep "[^:]*:1:" | cut -d: -f1
```

- ② Hint: Use the command file.

```
find /usr/bin -type f -exec file {} \; 2>/dev/null | \  
grep script
```

- How to print all hard links of the file /etc/init.d/pppd in directory /etc (recursively) on the serve fray1.fit.cvut.cz.

```
find /etc \  
-inum $(ls -i /etc/init.d/pppd | awk '{print $1}')
```

```
-ls 2>/dev/null
```

Homework

- How to print names of regular files from your home directory, that have size bigger then 2 megabytes, and how to verify the result by the command `stat`?
- How to print names of all files from your home directory, that were accessed 7 days ago, and how to verify the result by the command `stat`?
- How to print names of regular files from the directory `/tmp`, that you can read, and how to verify the result by the command `ls`?