Exercise sheet 13 – Libraries, user management, and file systems

Goals:

- Shared libraries
- User management
- File systems

Exercise 13.1: Shared libraries

(a) Update the `OS_exercises` repository with `git pull`.

(b) Change into the `OS_exercises/sheet_13_libs_user_fs/library` directory.

(c) Compile the `supermath.c` into a shared library with the name `libsupermath.so` .

(d) Copy the header to `/usr/local/include` . Check the permissions after copying.

(e) Copy the shared library to `/usr/lib`. You may also update the shared library cache with `ldconfig`. Check the permissions after copying.

(f) Change into the `OS_exercises/sheet_13_libs_user_fs/main_program` directory.

(g) Compile the `math` program by linking to the `supermath`.

(h) Use the `math` program with `./math 1 + 2`.

Exercise 13.2: User management

(a) Which users exist on your system?

(b) Which groups exist on your system?

(c) Create a new user `test`.

(d) In which group is your new user?

(e) Create a new group `dev_data`.

(f) Add the user `test` to the group `dev_data`.

(g) Inspect the `passwd` and `group` files again, on your system.

Exercise 13.3: File systems questions

(a) Visualise the directory inodes of `/home/dev`, similar to the slide 20 on „OS 15 – File systems“

(b) Consider a `file` that is moved with:
`mv ./file subdir/`
Why is it not required to copy the `file` content into the `subdir` and remove the content from the current directory?

(c) What is faster? Explain your answer.

a) `mv ~/file ~/subdir/`

b) `mv ~/file /mnt/USB_STICK`

(d) What is a journaling file system? You may do some research to answer that.

(e) Are EXT4, BTRFS, FAT32, or NTFS journaling file systems? You may do some research to answer that.

(f) Do your own research for the following file system properties

- Case sensitive
- Hard links
- Online grow
- Snapshotting
- Max file size

and check which of the file systems EXT4, BTRFS, FAT32, or NTFS supports these properties.

Exercise 13.4: File system handling

(a) Switch your Linux VM off.

(b) Add a new hard disk to your VM:

```
Settings -> Storage -> Adds hard disk ->
    Create new disk -> VMDK -> Dynamically allocated -> 1 GB
```

(c) Start your Linux VM.

(d) Use `gparted`: to create a GPT partition table on your new hard disk.

(e) Use `gparted`: to create a partition with the `ext4` file system.

(f) Mount your newly created file system to `/mnt`.

(g) Create a new `file` on your mounted file system.

(h) Unmount the mounted file system.

(i) List the content of `/mnt`