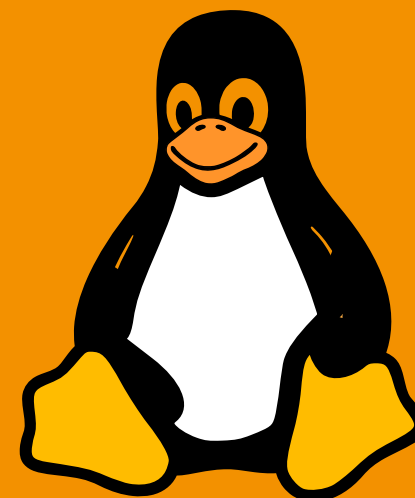




Prof. Dr. Florian Künzner

Technical University of Applied Sciences Rosenheim, Computer Science

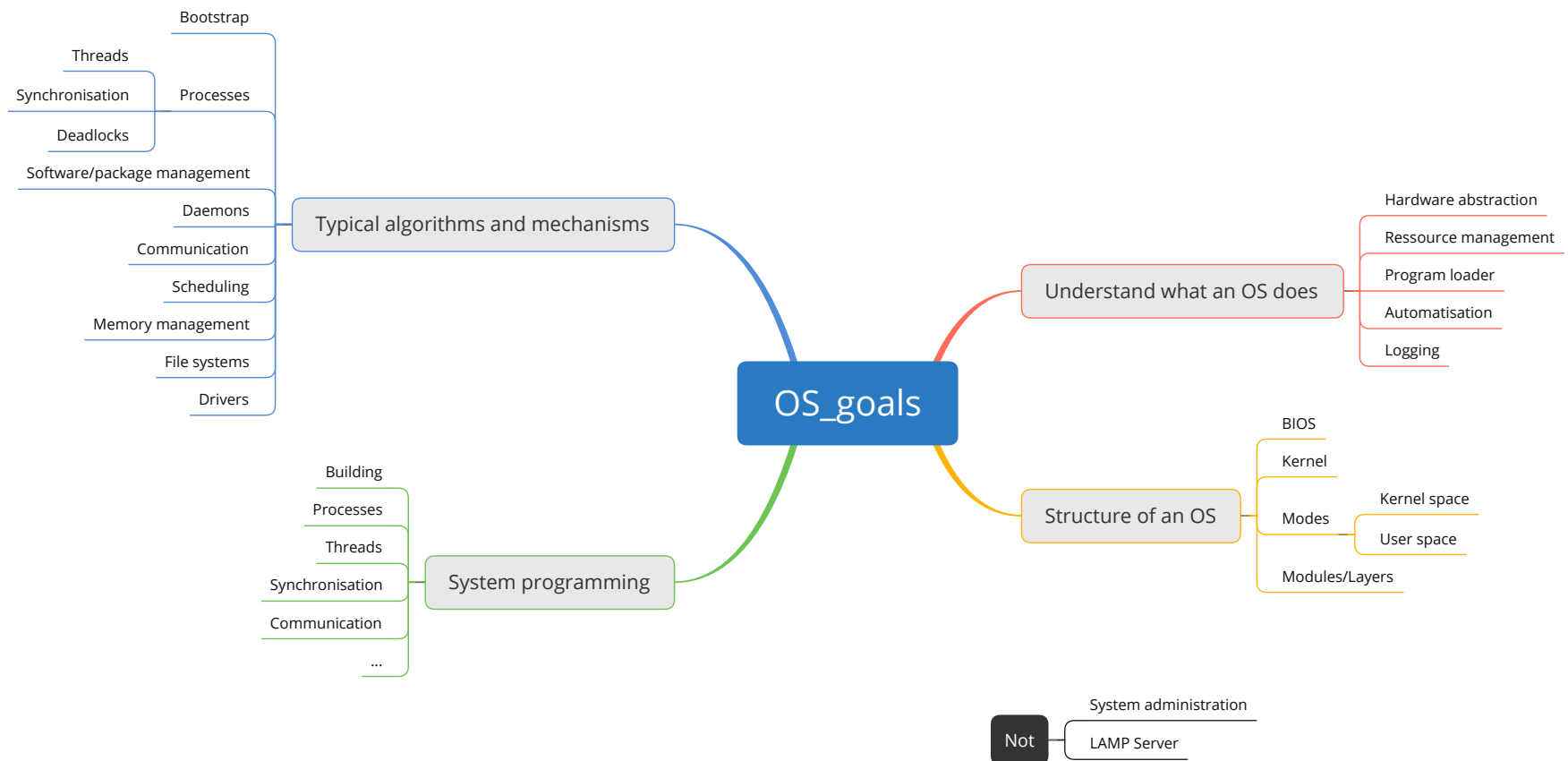
OS 13 – Shared Libraries



source: icons.png.com

The lecture is based on the work and the documents of Prof. Dr. Ludwig Frank

Goal



Goal

OS::Shared Libraries

- Static library
- Shared library

Intro

A lot of programs use the same
libraries.

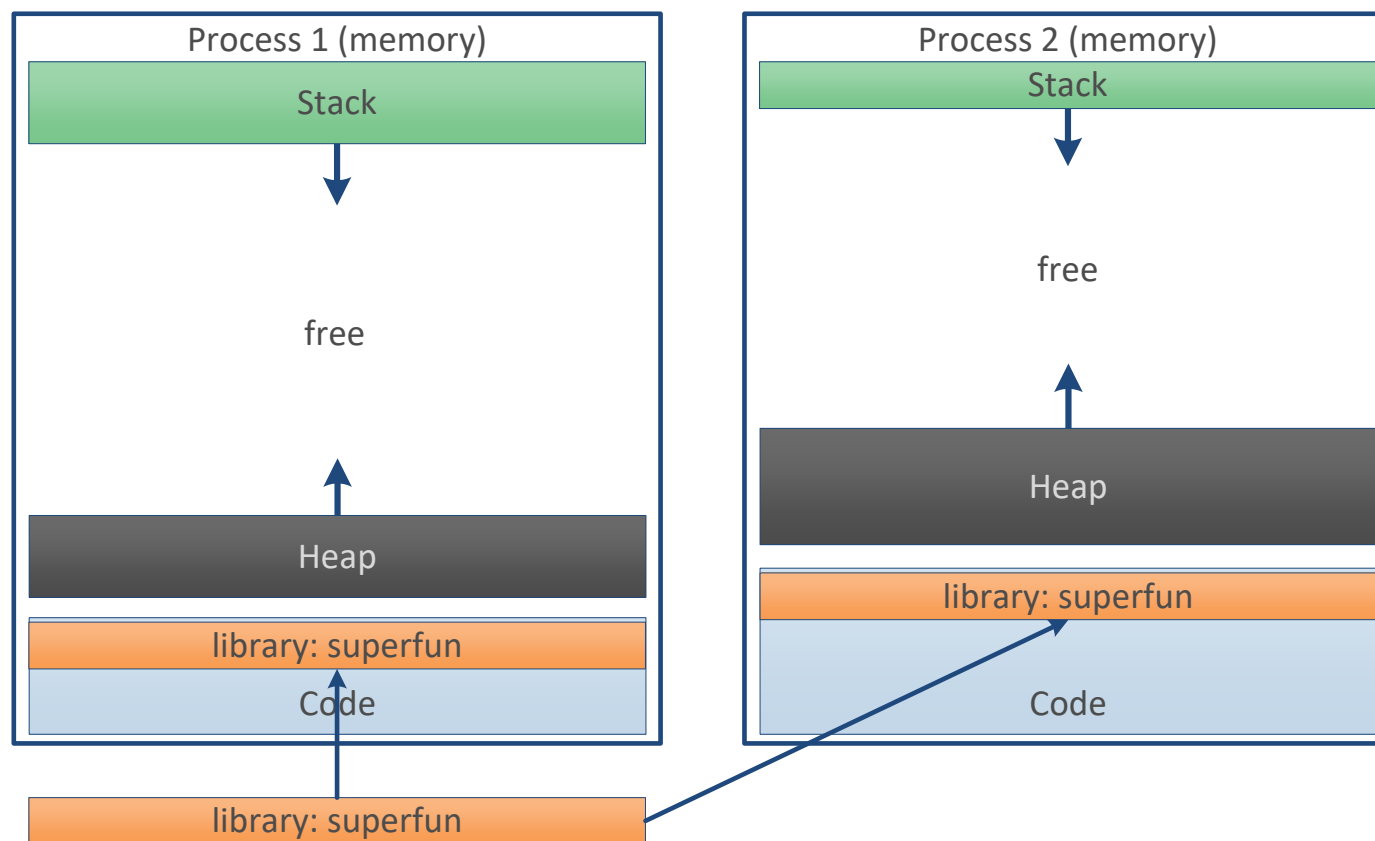
Is there a problem with that?

Static library

Intro into static libraries (*.a)



Visualisation of static library usage.



Everyone has the same code in its ELF: waste of memory!

Static library

Compile sources of library superfun (dir: <sources>/lib):

```
1 gcc -c -o functions.o functions.c
```

Create static library (*.a = archive):

```
1 ar rcs libsuperfun.a functions.o
```

Link against static library (dir: <sources>):

```
1 gcc -o program main.c -I./lib -L./lib -lsuperfun
```

```
2
```

```
3 #-I -> include directory for headers
```

```
4 #-L -> include directory for non system libraries
```

```
5 #-l -> link against library (without preceding lib*)
```

Execute program:

```
1 ./program
```

Questions?

All right? \Rightarrow 

Question? \Rightarrow  and use **chat**

or

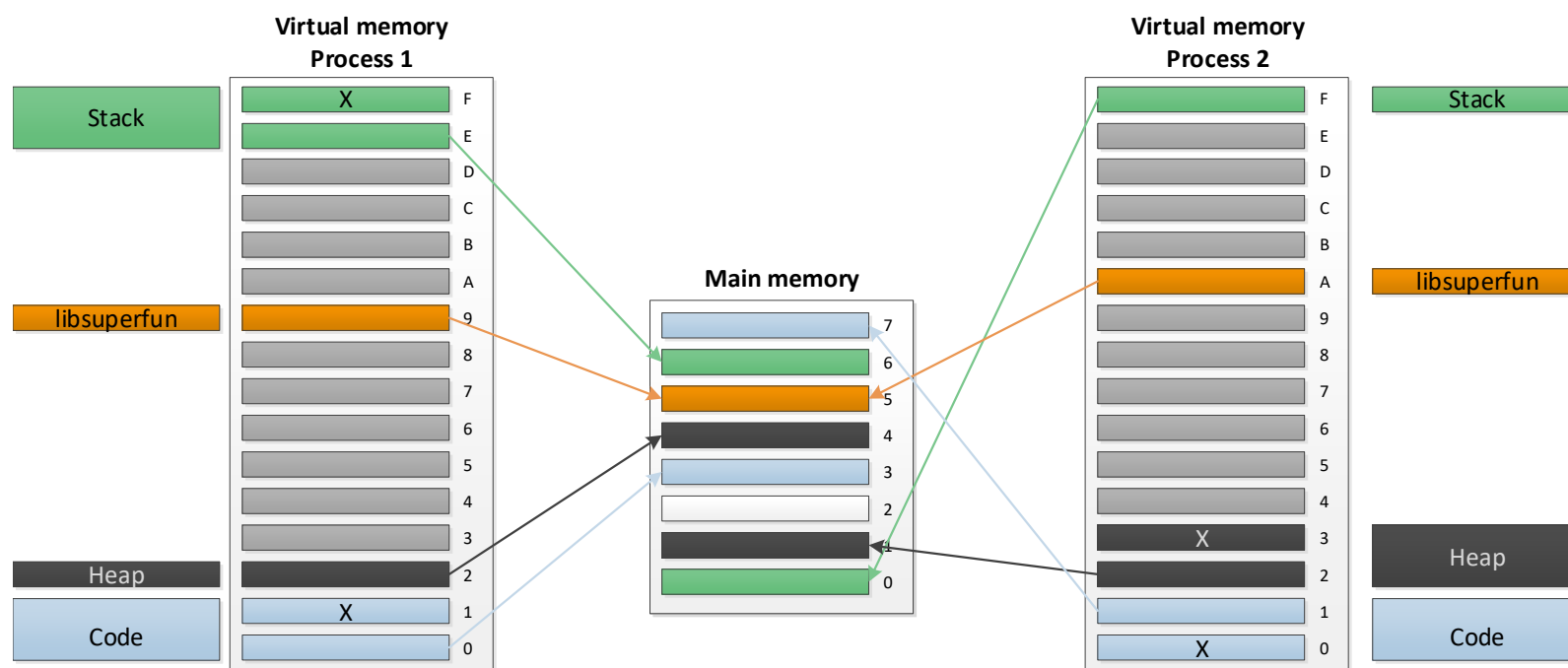
speak *after* I
ask you to

Shared library

Intro into shared libraries (*.so)



Visualisation of shared library usage.



Everyone loads the same code but on a different location in its virtual memory. **The library is only once in the main memory.**

Shared library

Compile sources and create shared library superfun

(dir: <sources>/lib):

```
1 gcc -fPIC -shared -o libsuperfun.so functions.c
```

```
2
```

```
3 #-fPIC    -> create position independent code
```

```
4 #-shared -> create a shared object (usual. linked by executables)
```

Link against shared library (dir: <sources>):

```
1 gcc -o program main.c -I./lib -L./lib -lsuperfun
```

```
2
```

```
3 #-I -> include directory for headers
```

```
4 #-L -> include directory for non system libraries
```

```
5 #-l -> link against library (without preceding lib*)
```

Execute program:

```
1 LD_LIBRARY_PATH=$(pwd)/lib ./program
```

```
2
```

```
3 #LD_LIBRARY_PATH -> additional path for non system shared libs
```

Questions?

All right?



Question?



and use **chat**

or

speak *after* I
ask you to

Summary and outlook

Summary

- Static library
- Shared library

Outlook

- User management