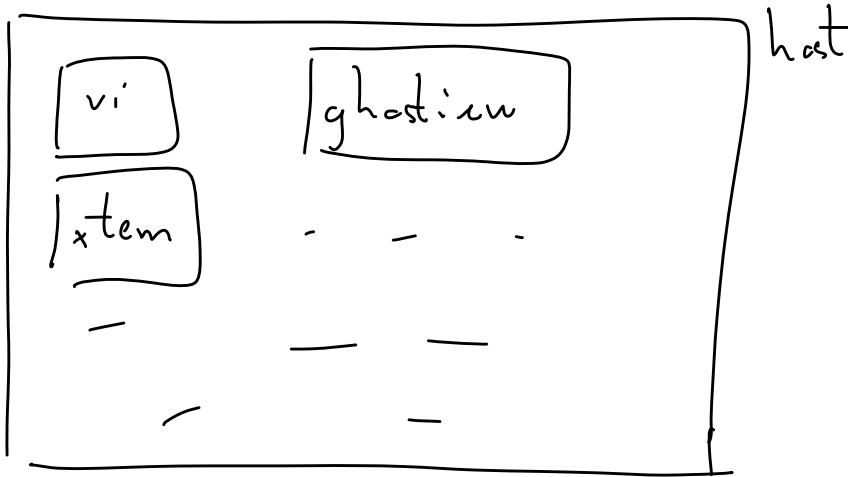


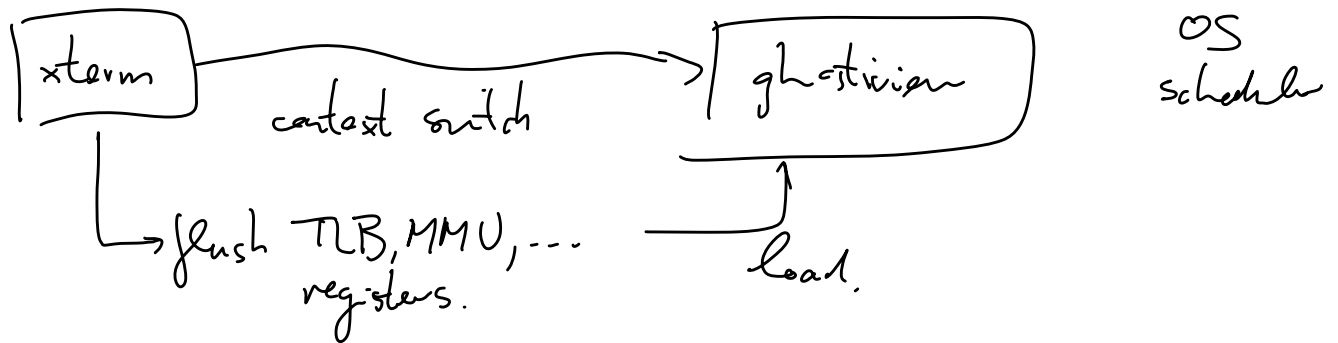
Lecture 5

Processes. \approx running application, "virtual" execution environment.



Process context: CPU context, memory mapping, permissions, ...

More than one process \Rightarrow process scheduling \Rightarrow preemption + context switch



fork: copy memory, etc. \Rightarrow expensive.

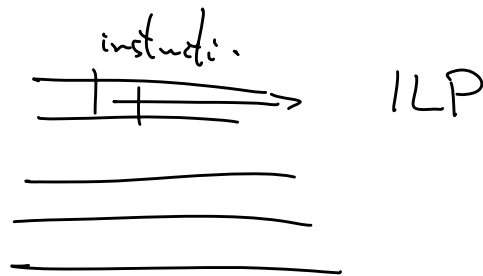
Allows multiple threads of control. — Threads

Advantages of multiple threads of control:

- Blocking I/O

- Explicit parallelism

- multi-processor
- multicore
- parallel pipe



- Inter thread communication

Threads: multiple threads of control w/in single process
(avoid context switching overhead, fork overhead)

Use same address space \Rightarrow "shared memory"

Implementation:

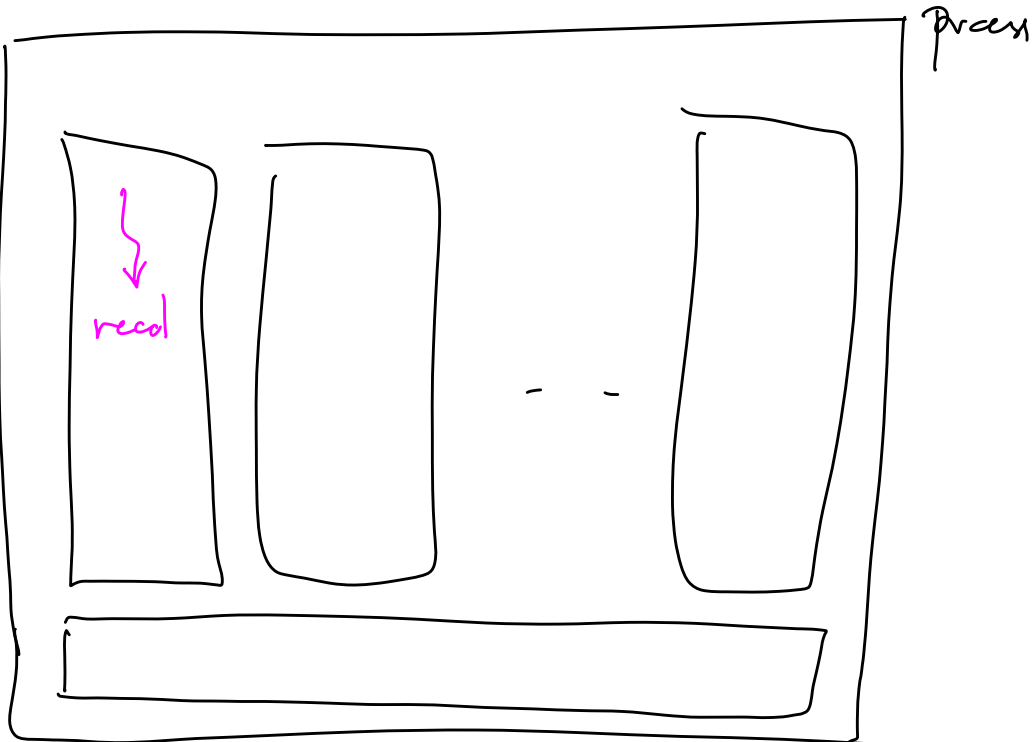
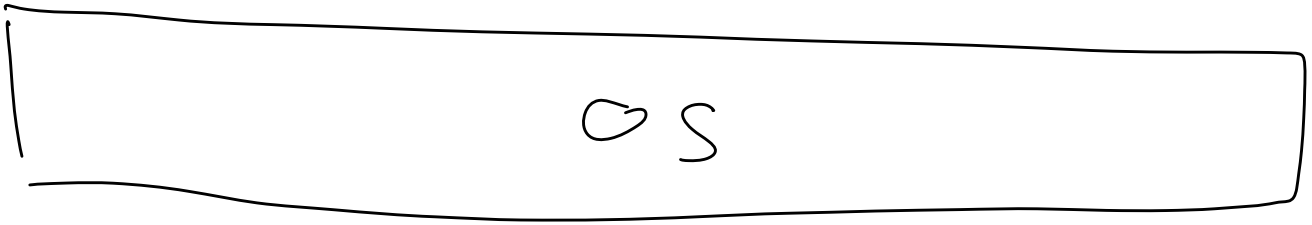
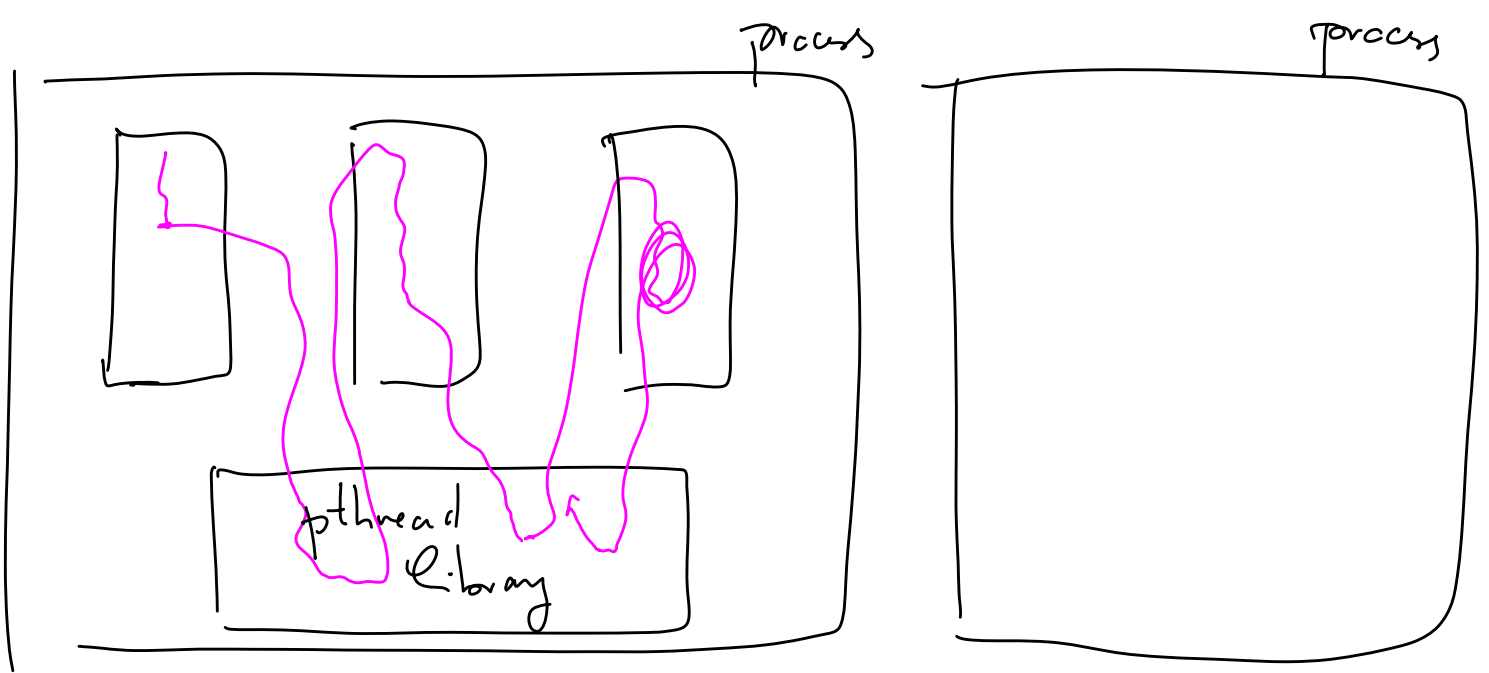
- Kernel-based

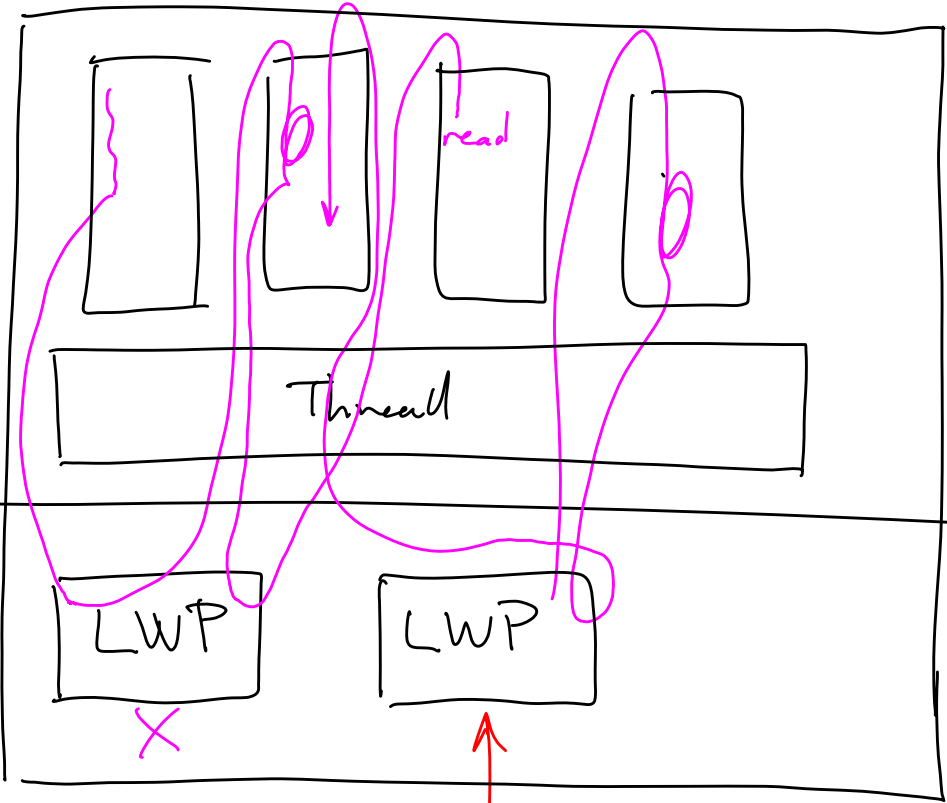
- User-level

Kernel schedules processes

Library implements thread

- header (pthread.h)
- object file





User

Kernel

LWP =
Lightweight processes

Client

server

