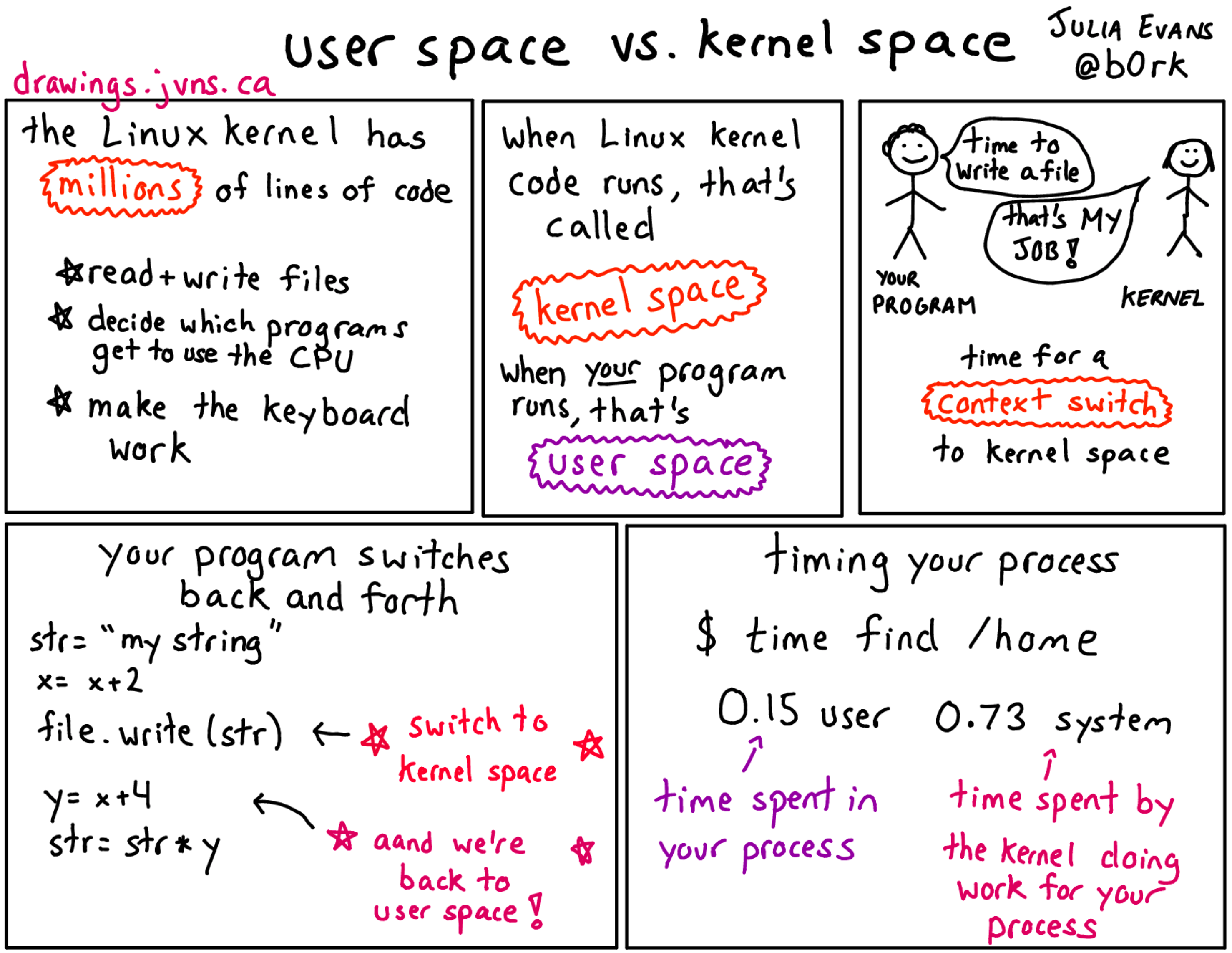
Process

“User space” VS “Kernel space”



user space vs. kernel space

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drawings.jvns.ca

the Linux kernel has millions of lines of code

- read + write files
- decide which programs get to use the CPU
- make the keyboard work

when Linux kernel code runs, that's called kernel space

when your program runs, that's user space

YOUR PROGRAM: time to write a file

KERNEL: that's MY JOB!

time for a context switch to kernel space

your program switches back and forth

```
str= "my string"
x= x+2
file.write (str)
y= x+4
str= str*y
```

← switch to kernel space

← aand we're back to user space!

timing your process

```
$ time find /home
0.15 user    0.73 system
```

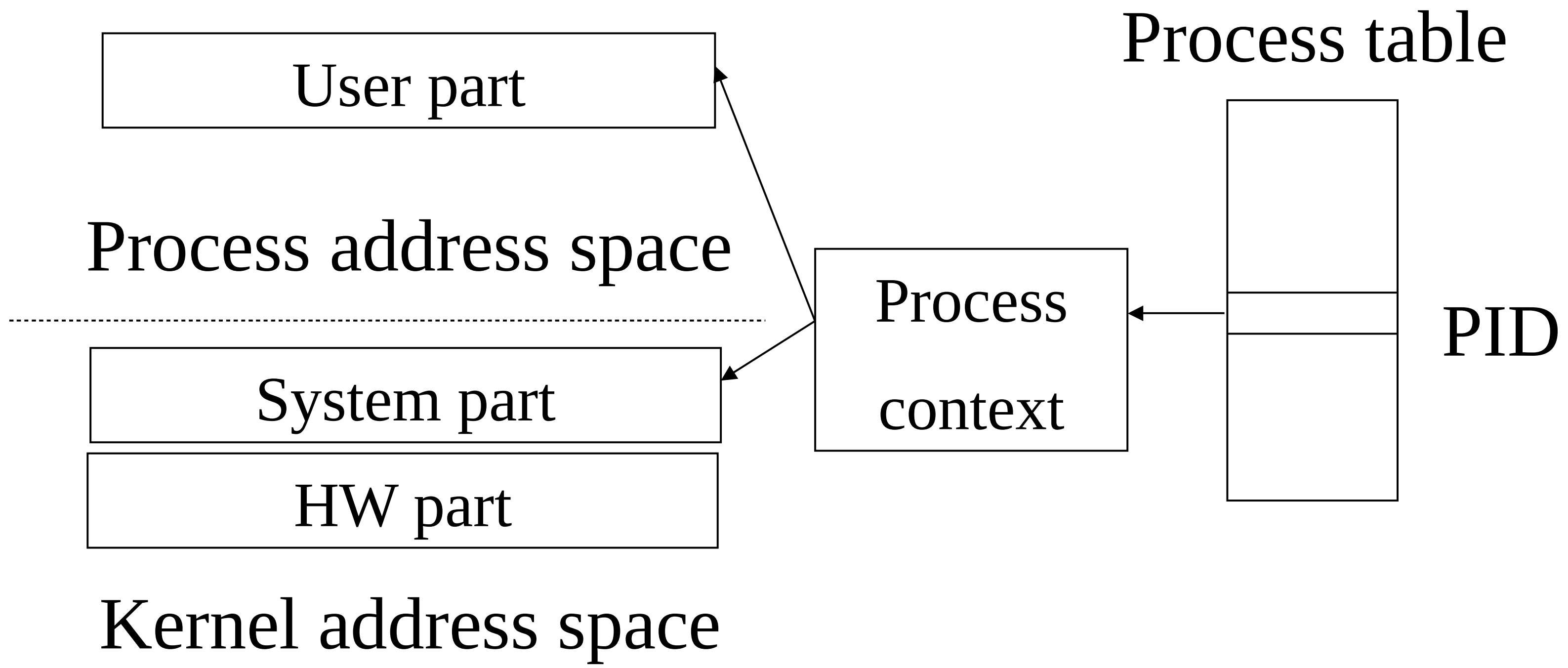
0.15 user ↑ time spent in your process

0.73 system ↑ time spent by the kernel doing work for your process

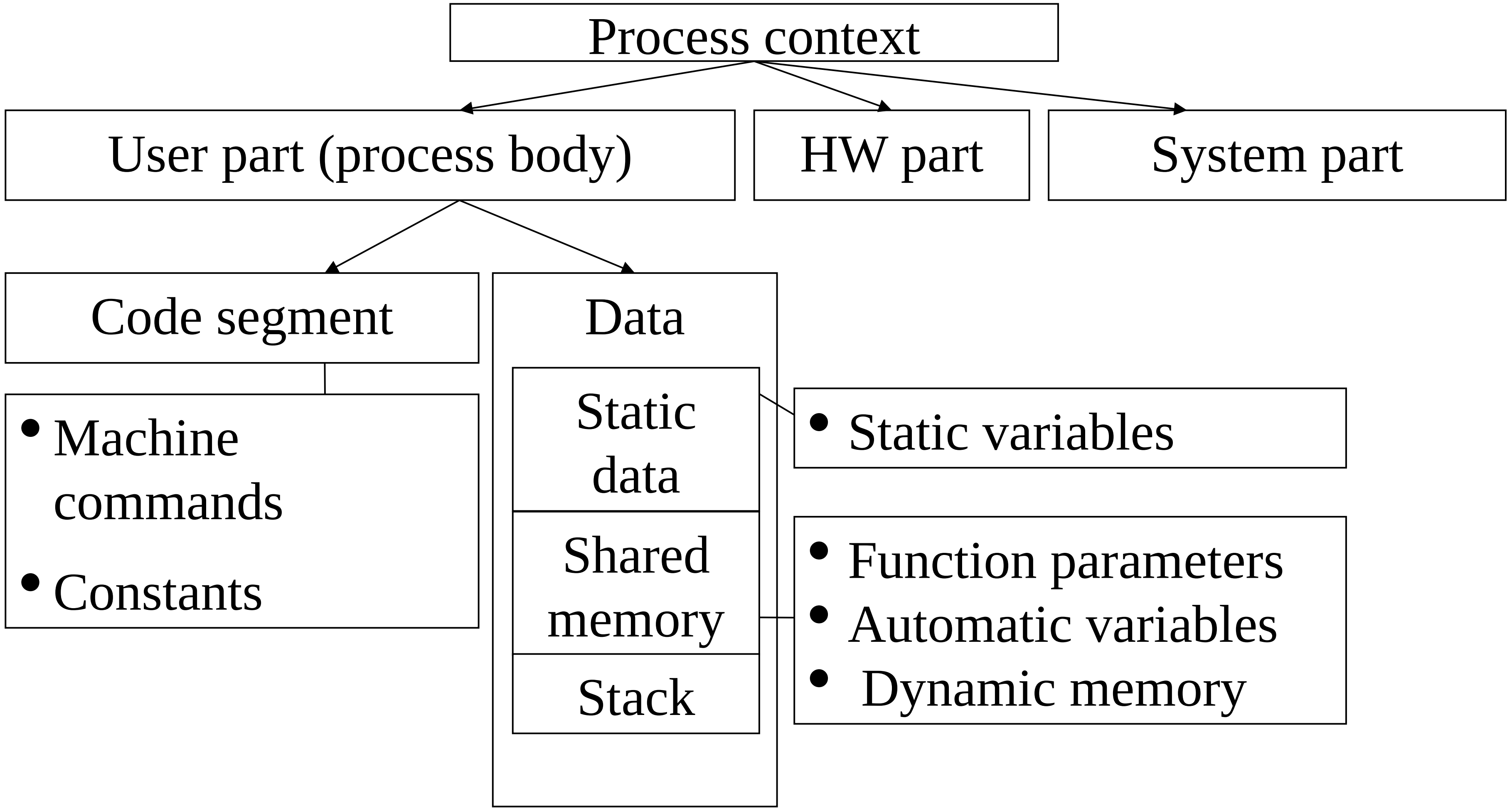
Process in Unix

Process in UNIX — registered object in the process table

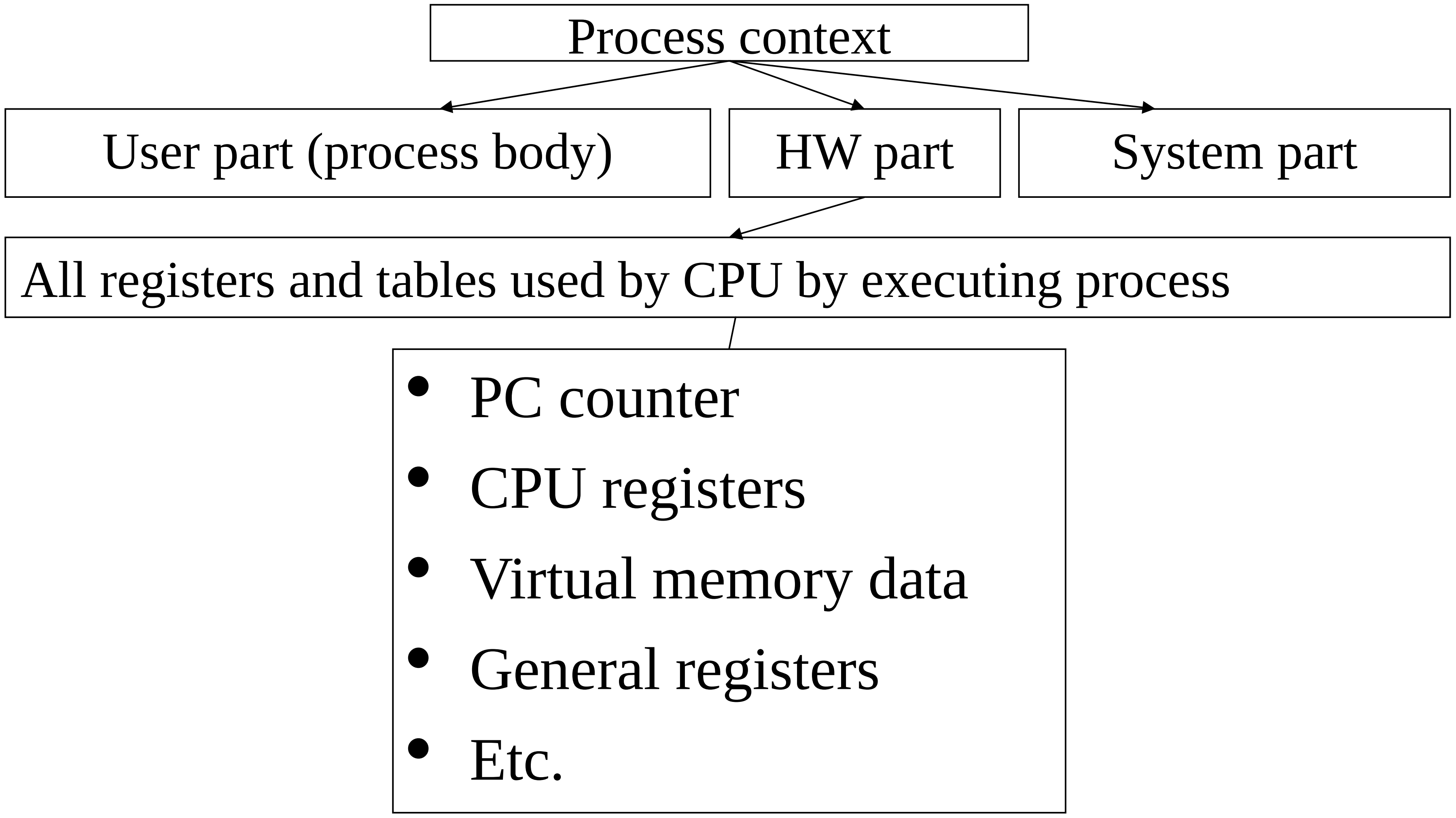
Process identifier (PID)



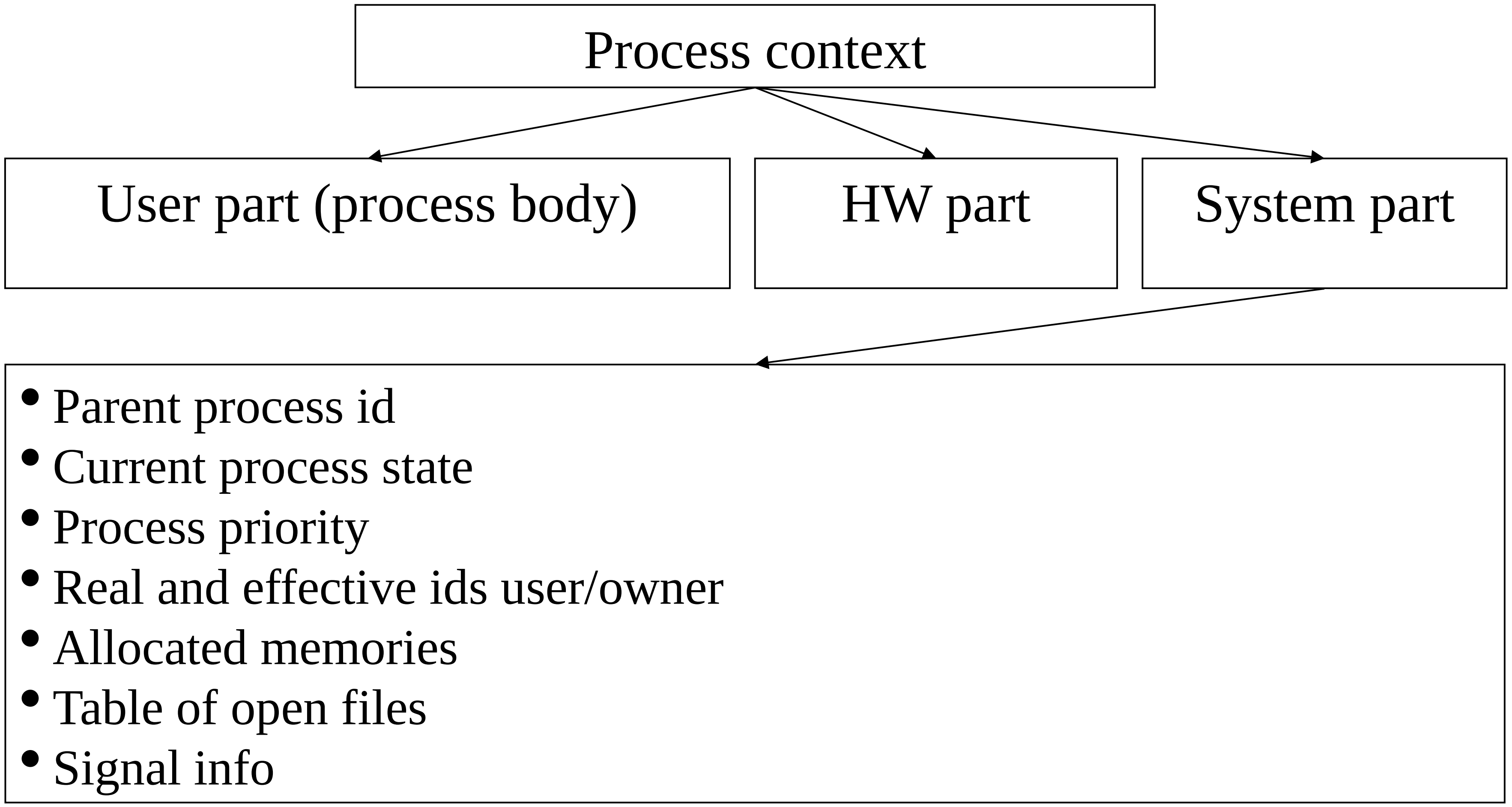
Process in Unix



Process in Unix



Process in Unix



- Parent process id
- Current process state
- Process priority
- Real and effective ids user/owner
- Allocated memories
- Table of open files
- Signal info

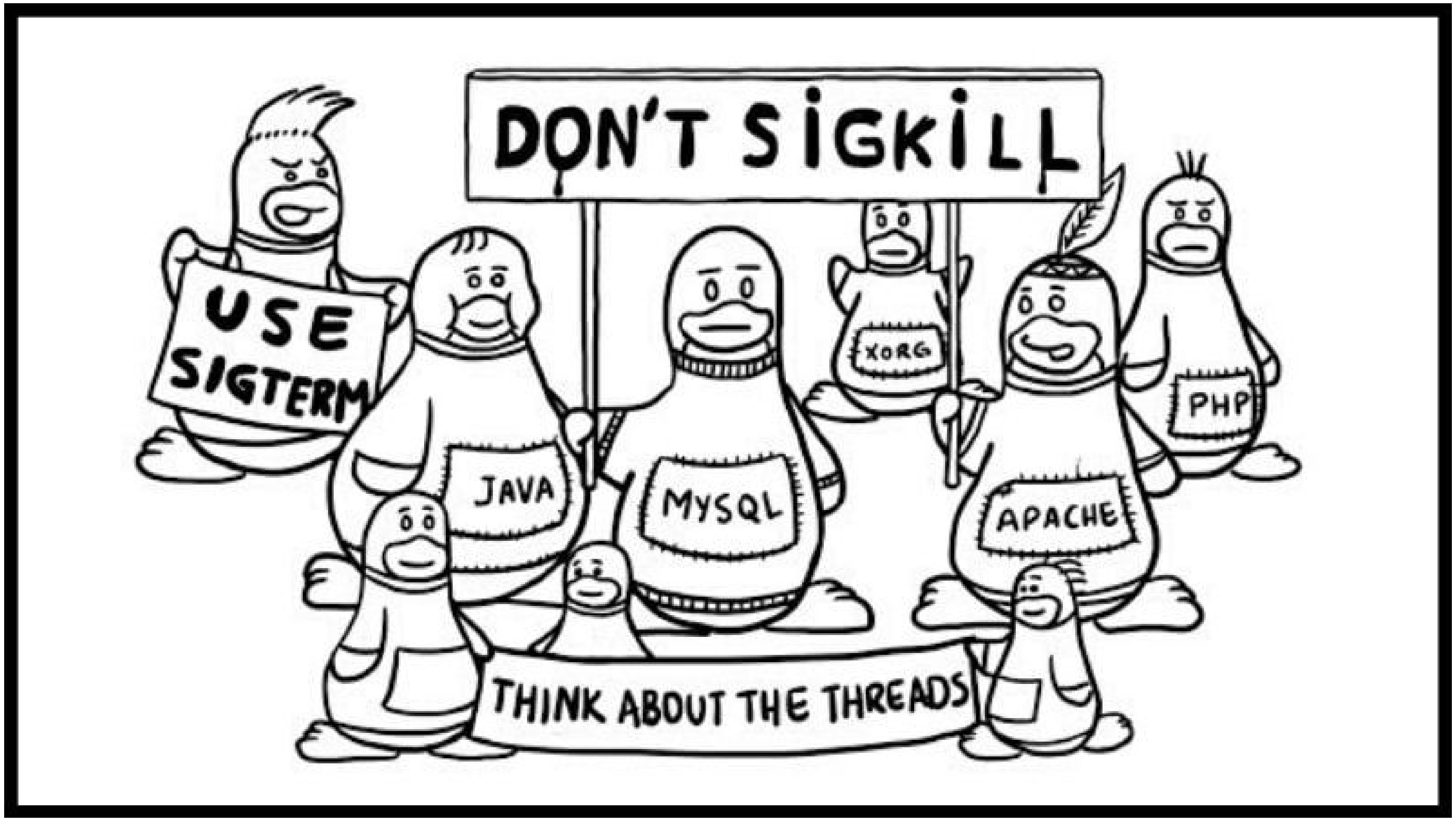
Fork , Exec & CoW

- Fork is the only way to get a process
  syscall “fork” copies entire process, including memory state,and PC
- Exec is the way to run some app
  syscall ”exec” wipes the memory, load another code and resets the state
- “Copy on Write” - a performance improvement
- “Clone” is a parametrised “Fork”, **used by Fork**
- **Example !!**

Signals and Handlers

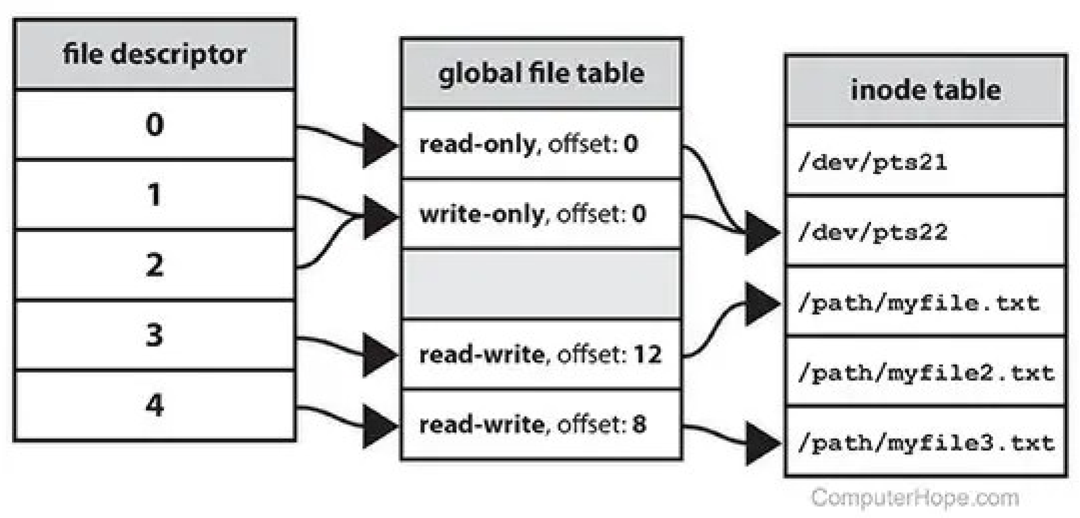
- “Signaling” it’s a mechanism no notify another process on some event. **No payload**
- “Kill - l “ to list the signals
- SIGKILL(9) and SIGSTOP(19) can not be ignored or handled
- SIGUSR1(10) and SIGUSR2(12) will not be sended by Kernel

SigTerm VS SigKill



https://linuxhandbook.com/content/images/2020/06/dont_sigkill_use_sigterm.jpg

File Descriptor



- F.D 0/1/2 used to be
  STD-IN / STD-OUT / STD-ERR
- Dup2 (oldFD, newFD)
  used to redirect the input /output