High Performance Programming
SIMD Intro – MMX/SSE/AVX
FISE2-INFO2

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Why having HPP lectures in FISE2? Why HPP?

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A large part of optimizations can not be treated automatically

- $\Rightarrow$ impossible to rely on tools written by others
- $\Rightarrow$ as (future) engineers in CS: mandatory knowledge

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- Multi-Cores, Multi-Threading...

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- *Who has already used/programmed a processor $\neq$ Intel?*

"Ça dépend" ("ça dépasse"?)

Designer
Micro-Architecture

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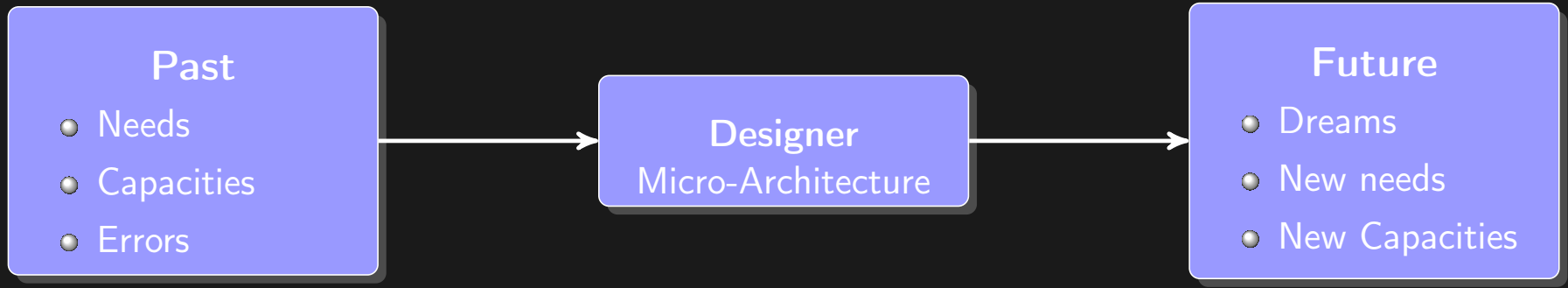

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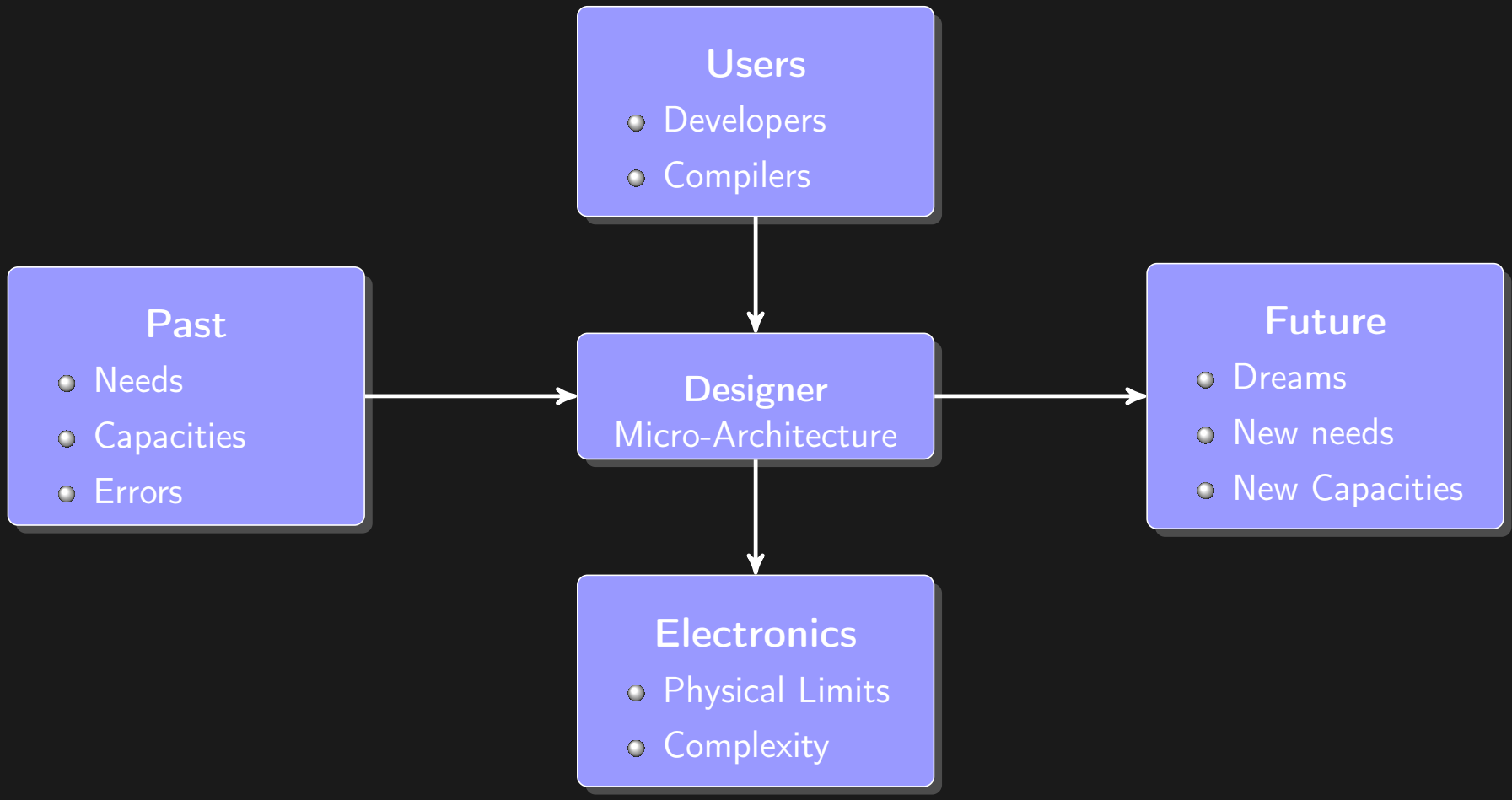

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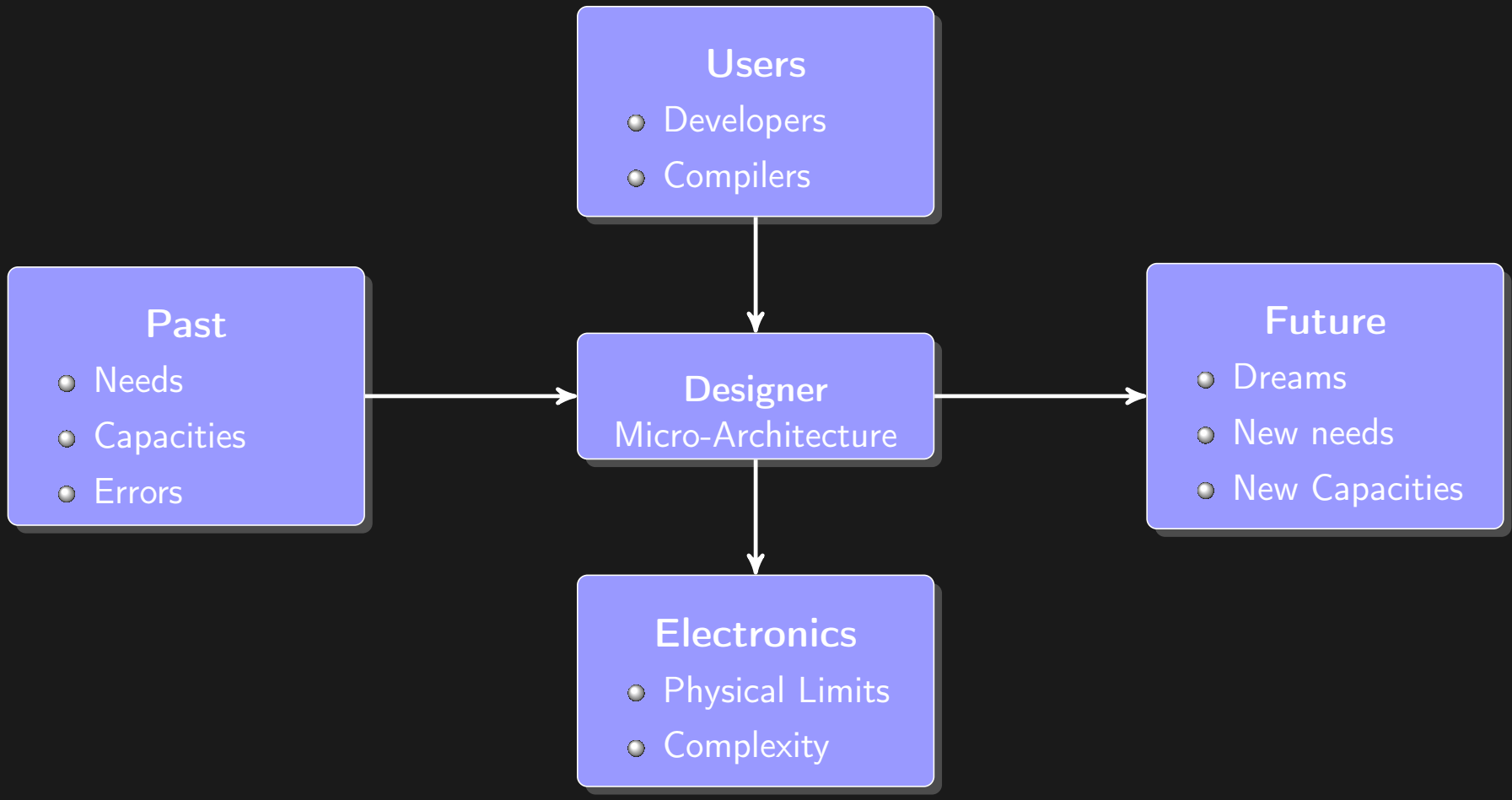
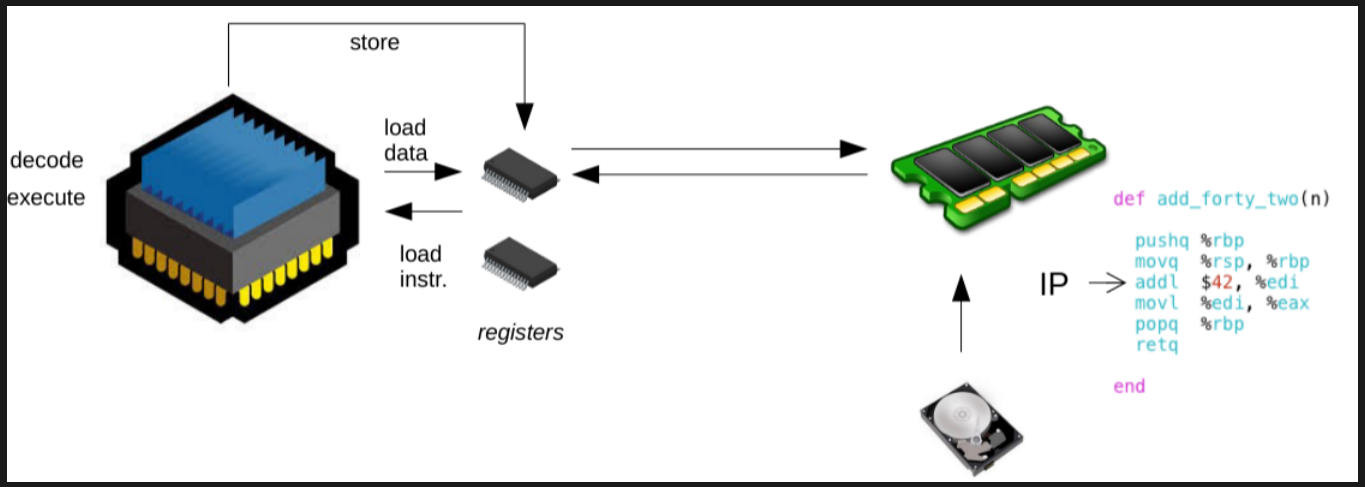


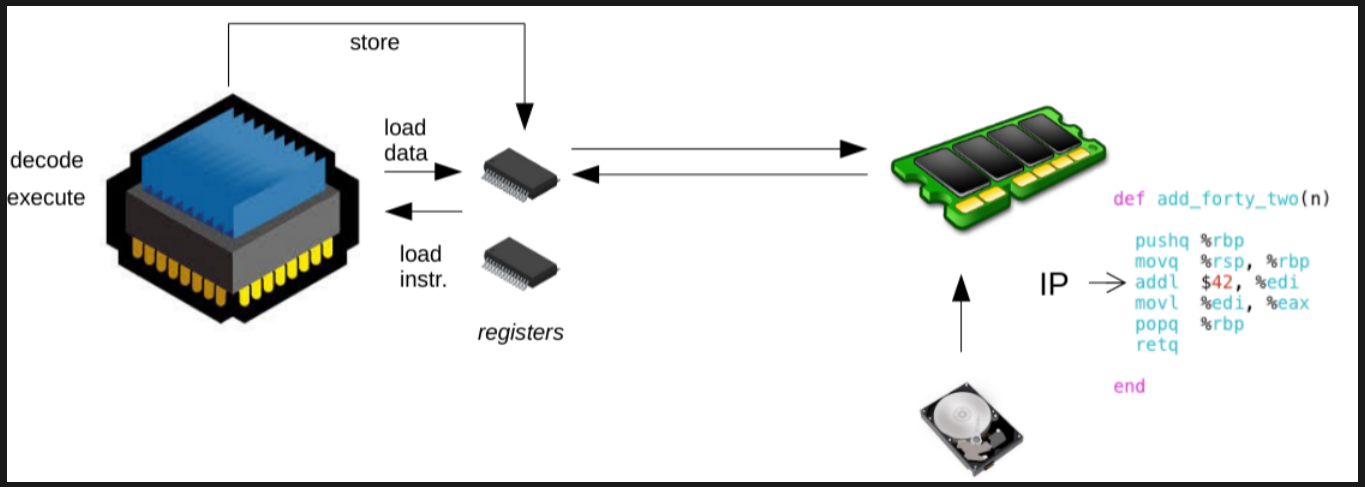
Typical answer in this course

"ça dépend"

"Reminder"


store
decode
execute
load
data
load
instr.
registers
IP
def add_forty_two(n)
pushq %rbp
movq %rsp, %rbp
addl $42, %edi
movl %edi, %eax
popq %rbp
retq
end

"Reminder"



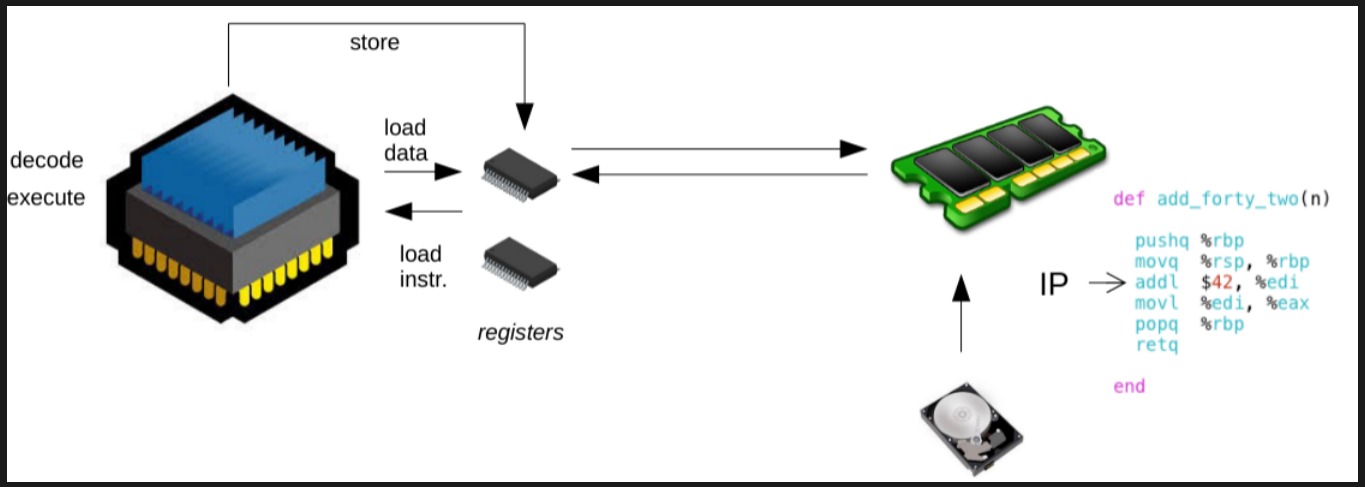
Instruction Types

Flow `IP / JMP ...`

Mem `LD / ST ...`

Calc `ADD / SUB / MULT / DIV ...`

"Reminder"



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Instruction Cycle

- Fetch
- Decode
- Execute
- ...