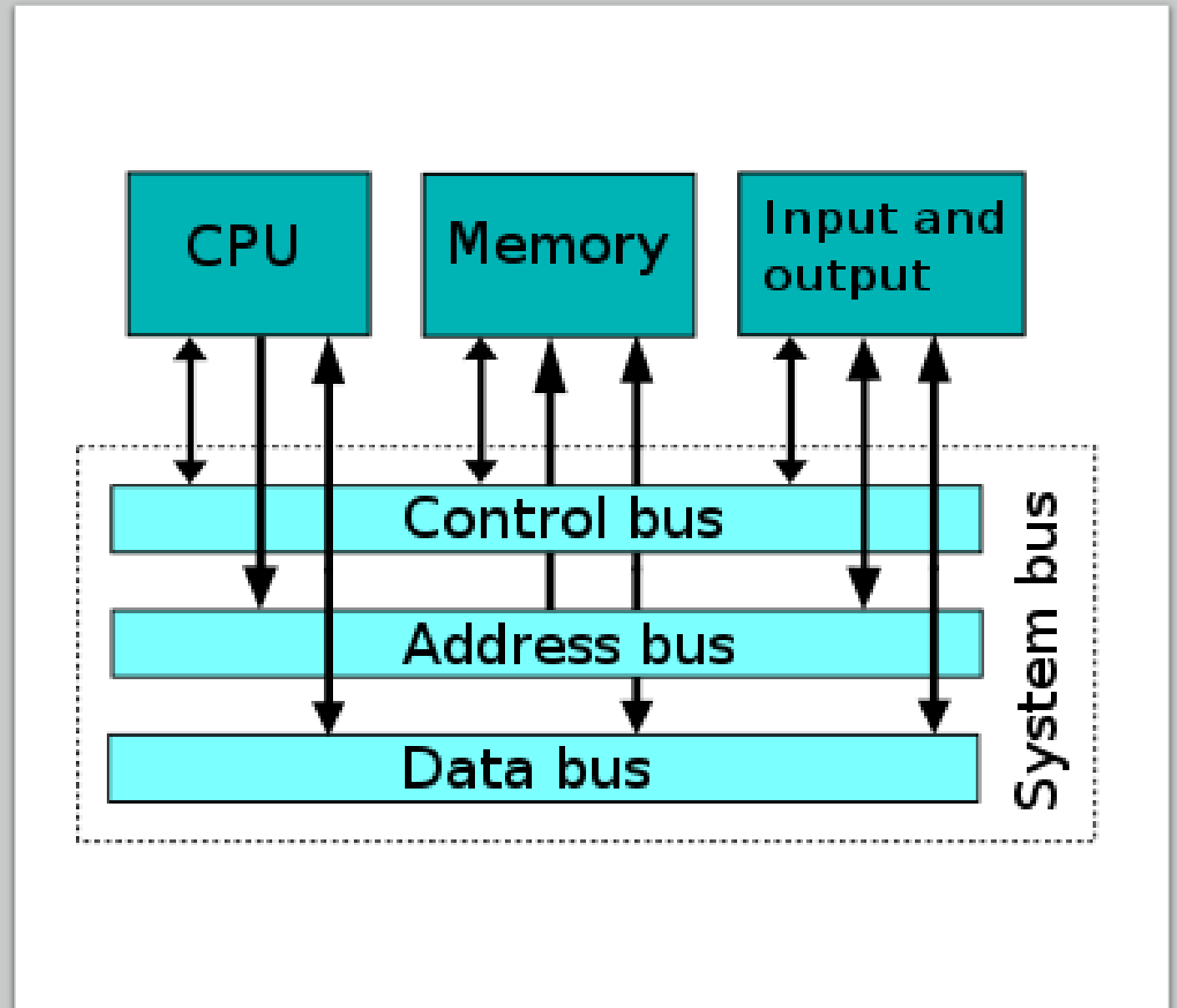


Pipeline Minne

oscarbj@ifi.uio.no

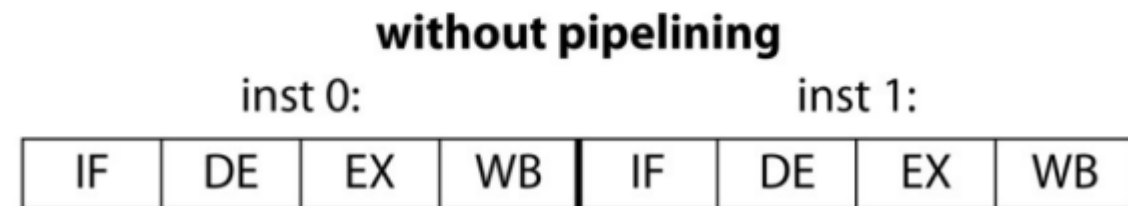
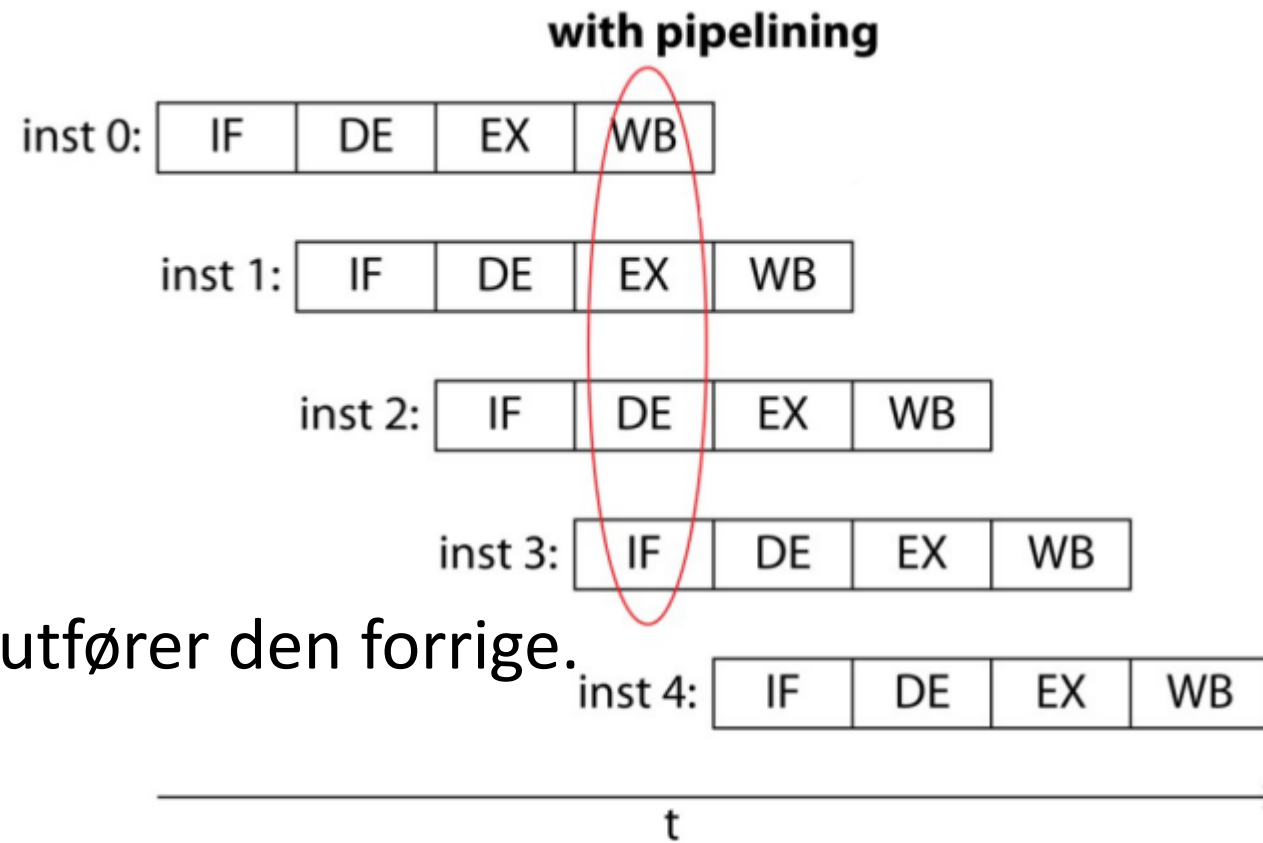
BUS

- Felles kommunikasjonskanal
- Deles, og bare en av gangen



Pipeline

- Samlebånd
- Deler opp instruksjonene.
- Kan lese neste instruksjon mens vi utfører den forrige.
- IF-Instruction fetch
- DE- Decode instruction
- EX- execute
- WB- Write back



Problemer med pipeline?

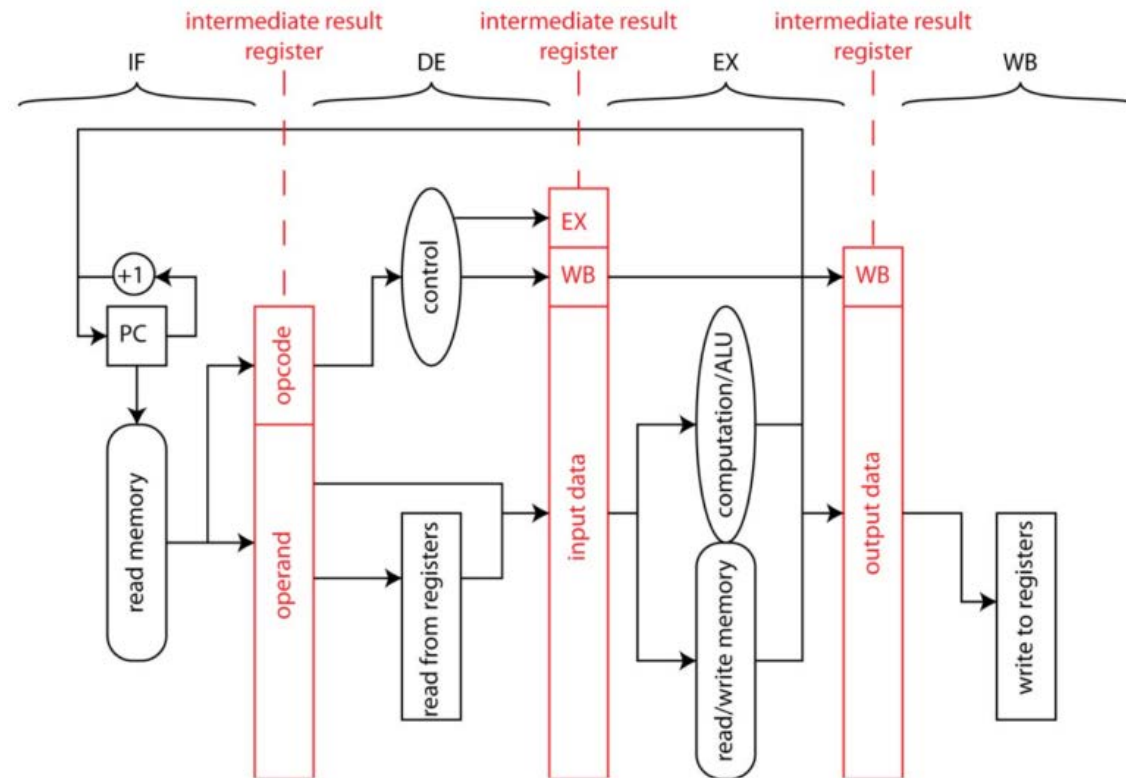
Hente data for tidlig

-Løsning?

$i=0$

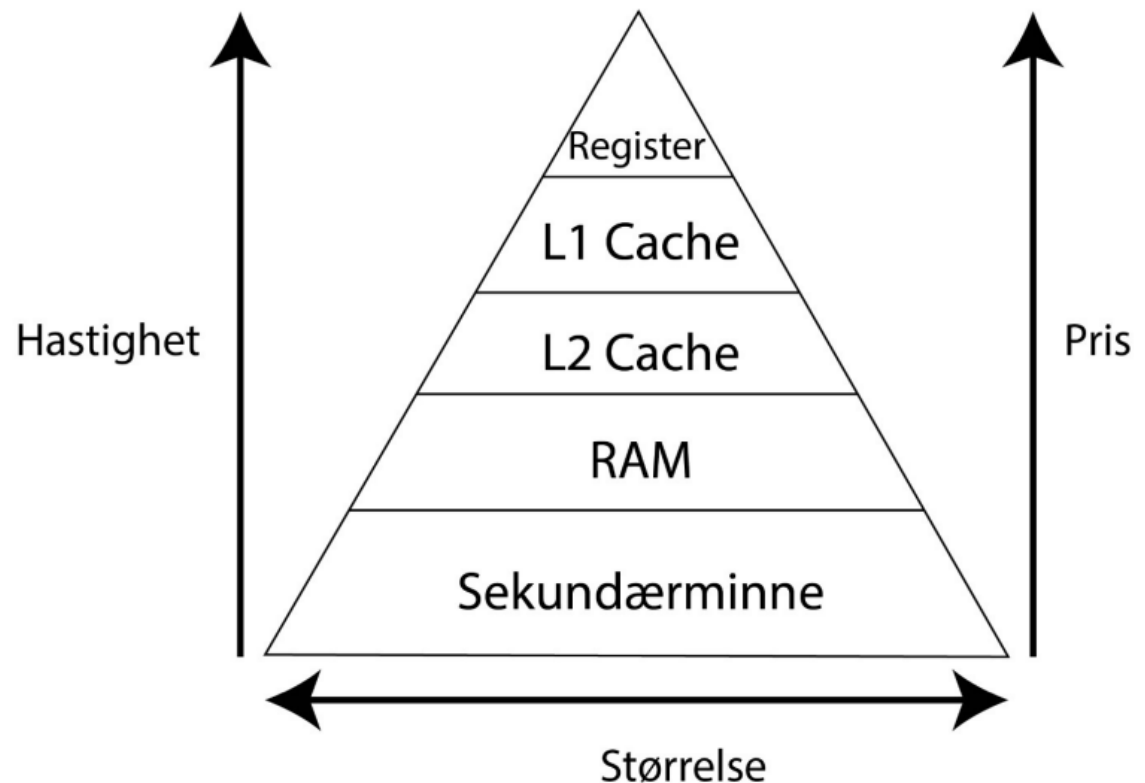
while (true):

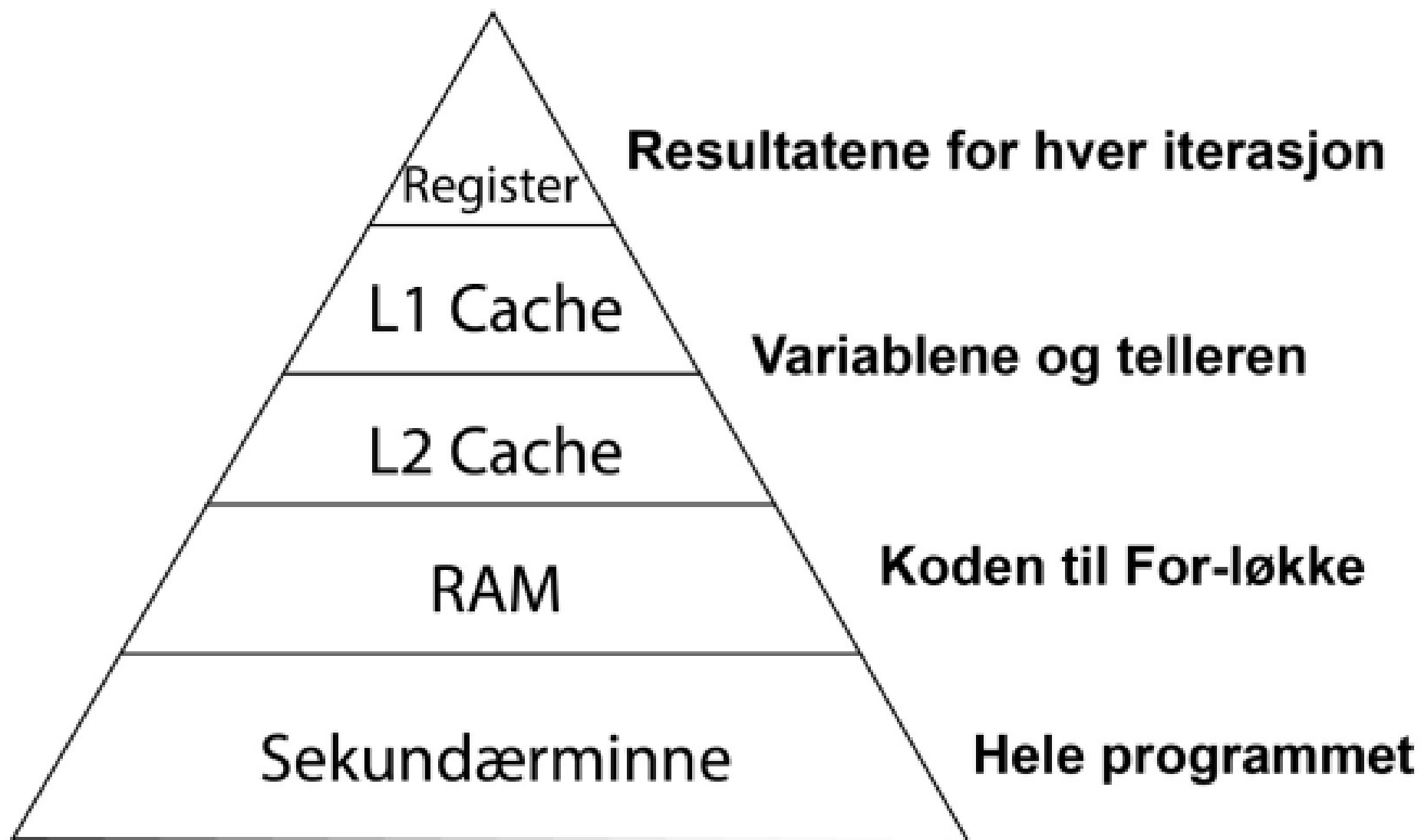
$i=i+1$



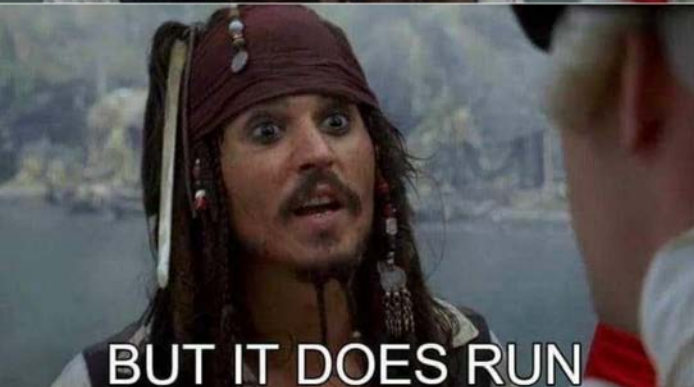
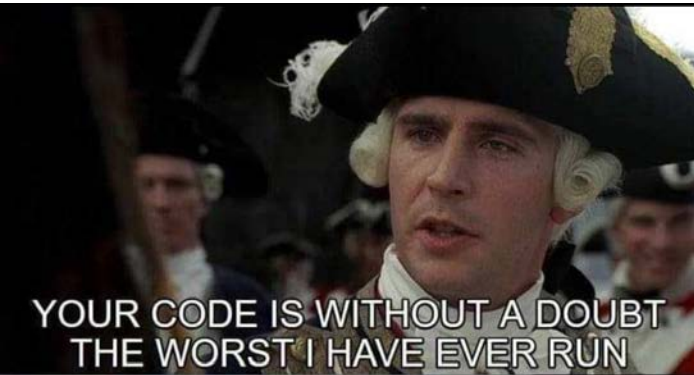
Minne og Minnehierarki

- Forskjellige hastigheter, Forskjellig størrelse, forskjellig pris!
- Register 100 Byte, <1ns
- L1: 10KB, 1ns
- L2,L3 1MB, 2-10ns
- RAM, 20-100ns, flere GB
- SSD/Flash 100ns-1us, 1TB
- HDD 1ms, 1 TB





memes



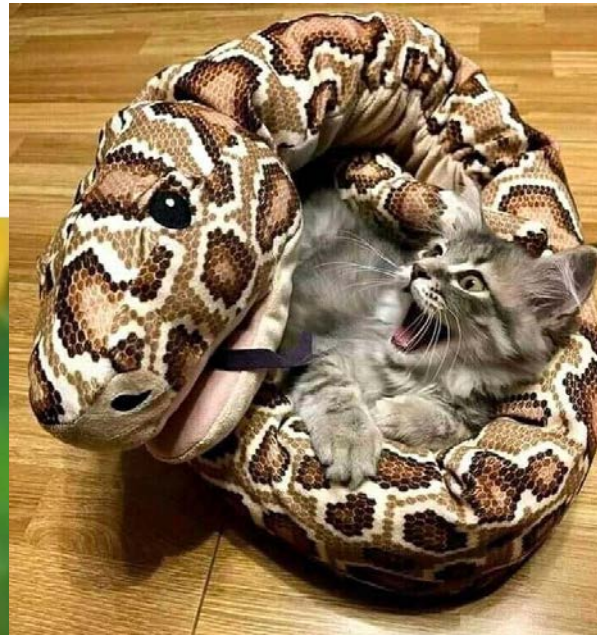
My CPU when the L1 cache misses



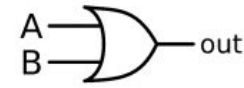
Me: *uses machine learning*
Machine: *learns*
Me:



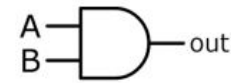
Logic gates



OR gate



AND gate



COL gate



BILL gates

