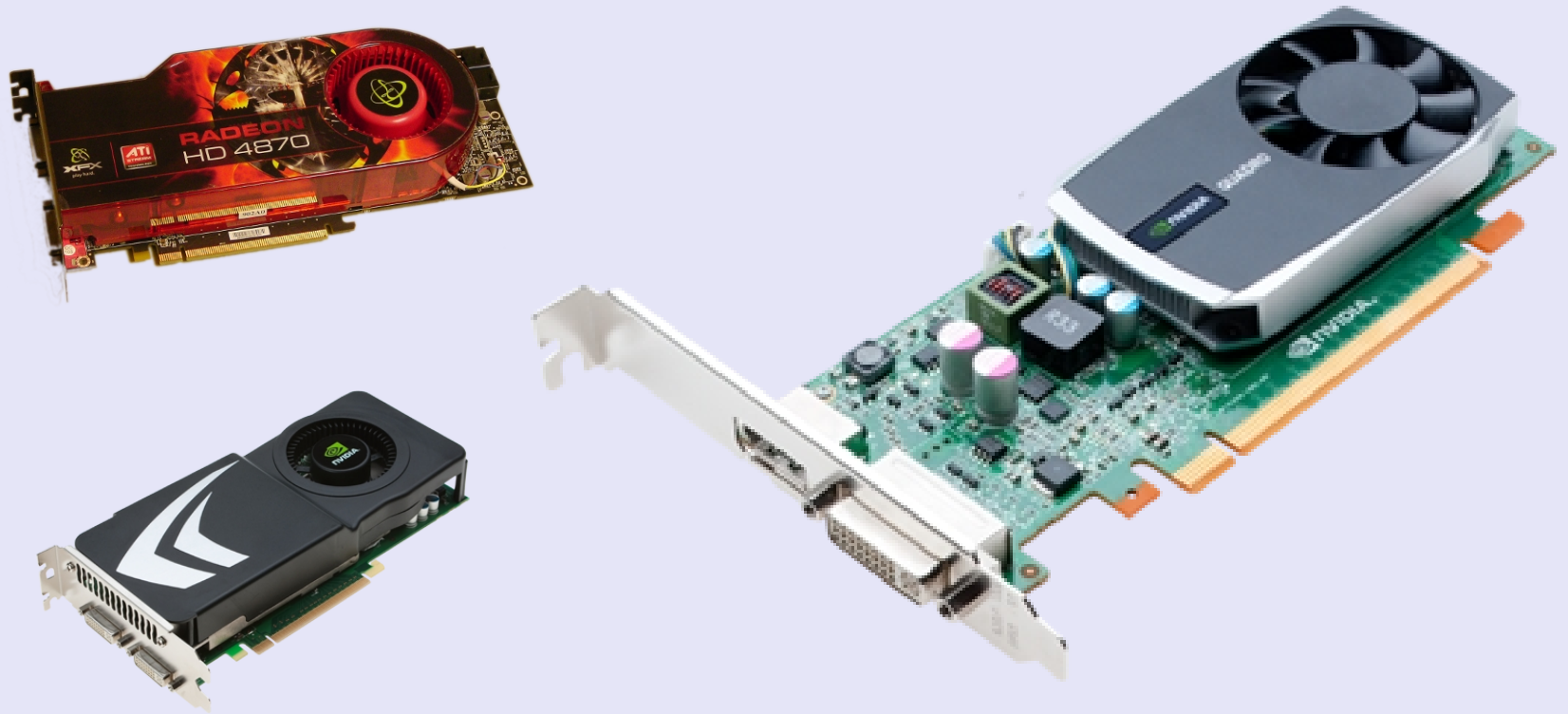


Breve introdução a GPGPU

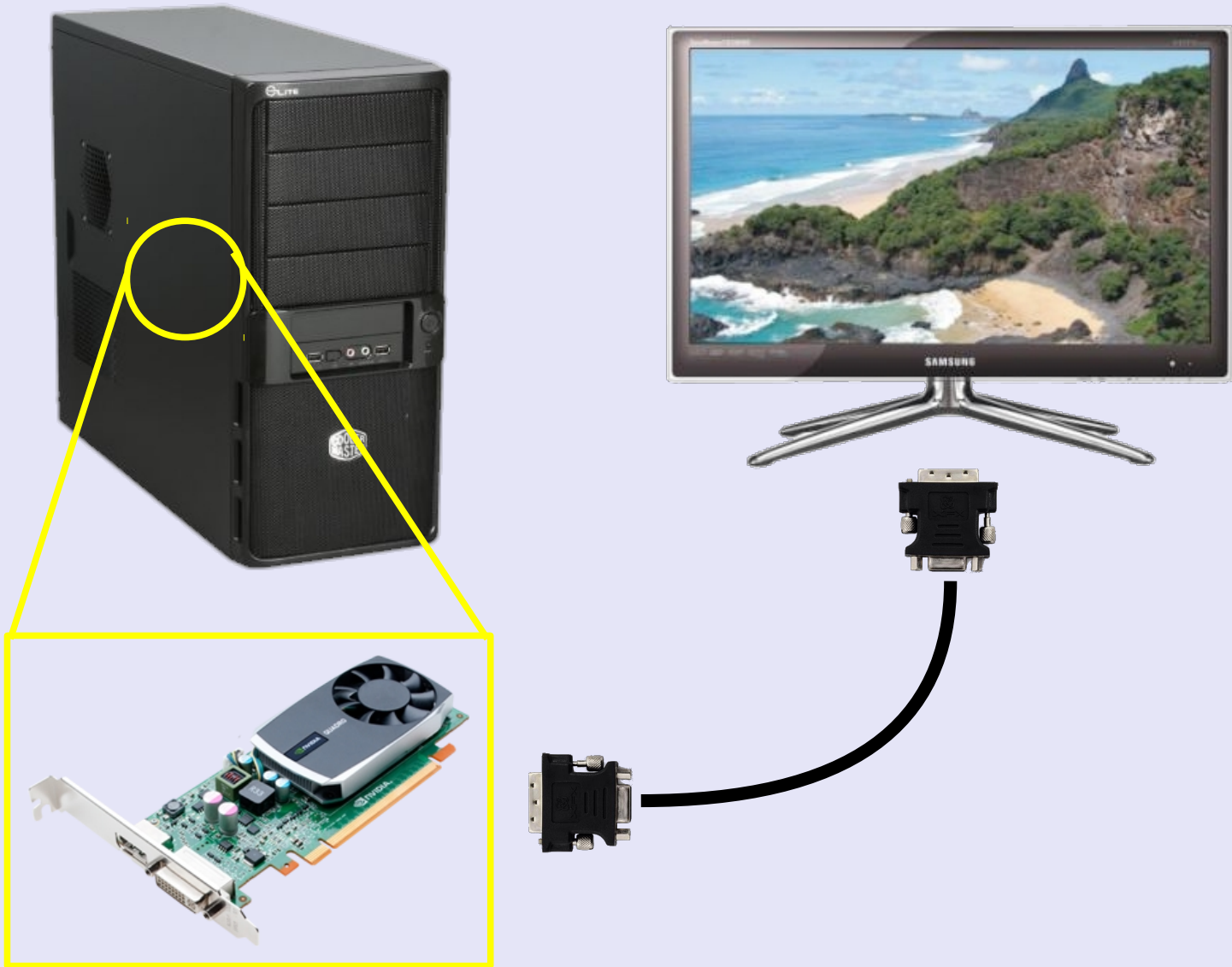
Pedro de Souza Asad
(pedrosa@cbpf.br)

Placas gráficas



GPU = Graphics Processing Unit

Placas gráficas

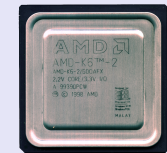
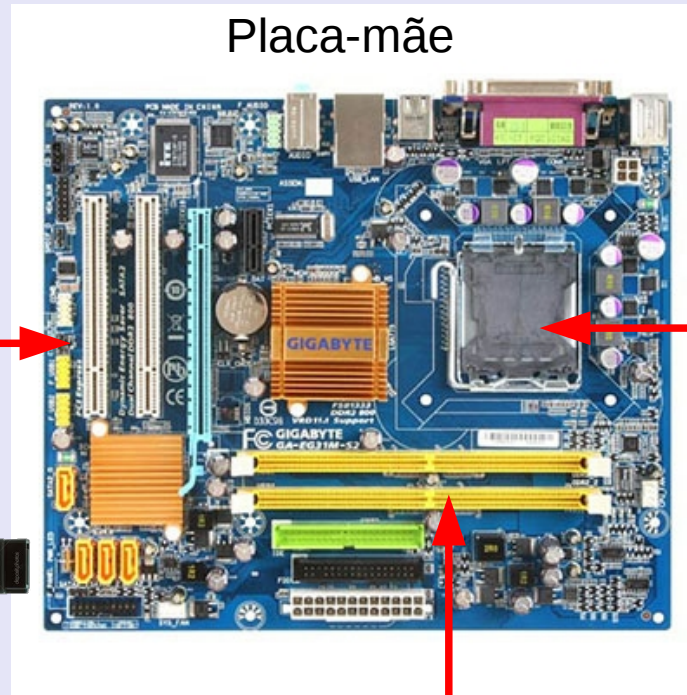


Computador típico

GPU



Placa-mãe



CPU

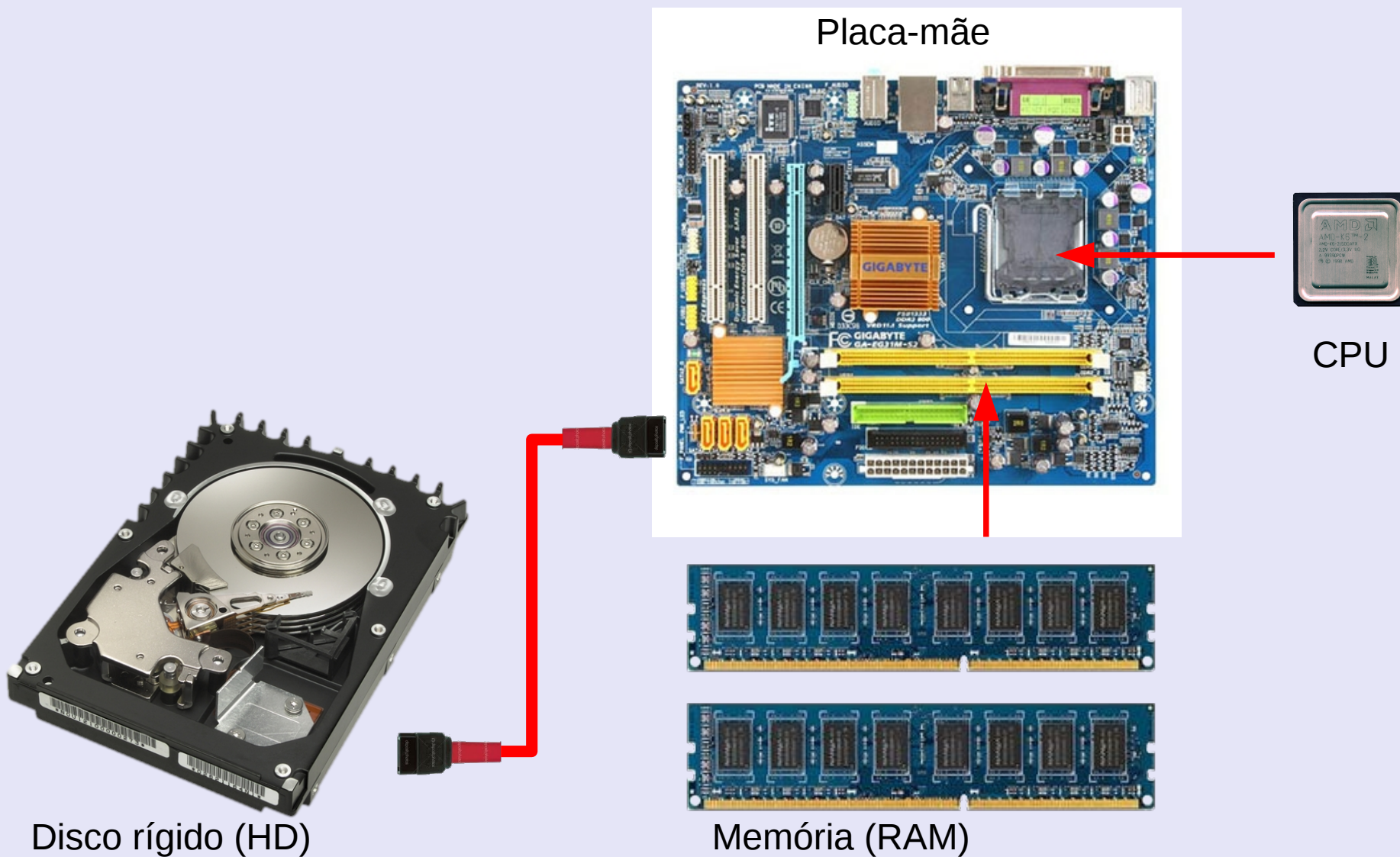


Disco rígido (HD)



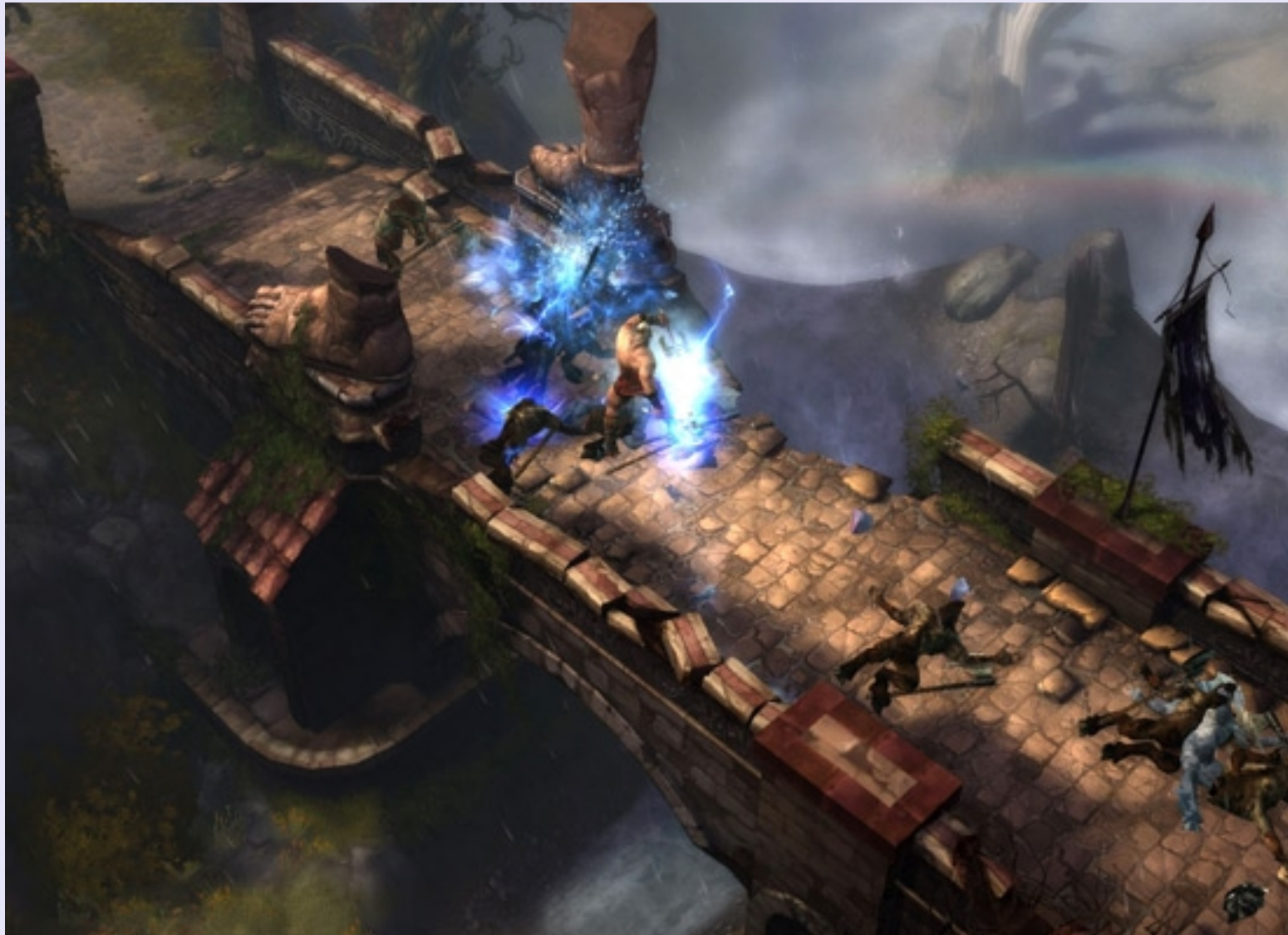
Memória (RAM)

Computador típico (vídeo onboard)

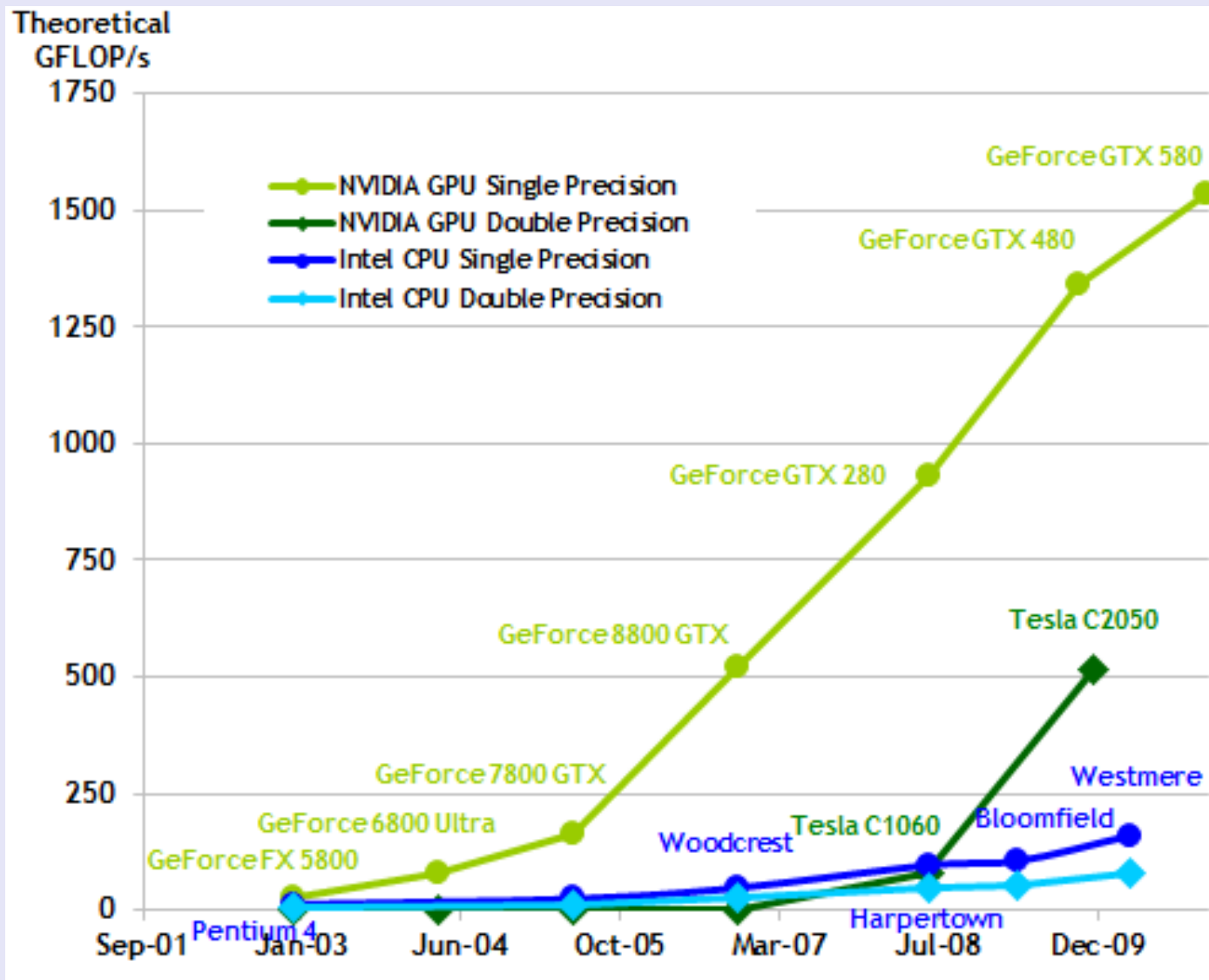


GPU's, para que?

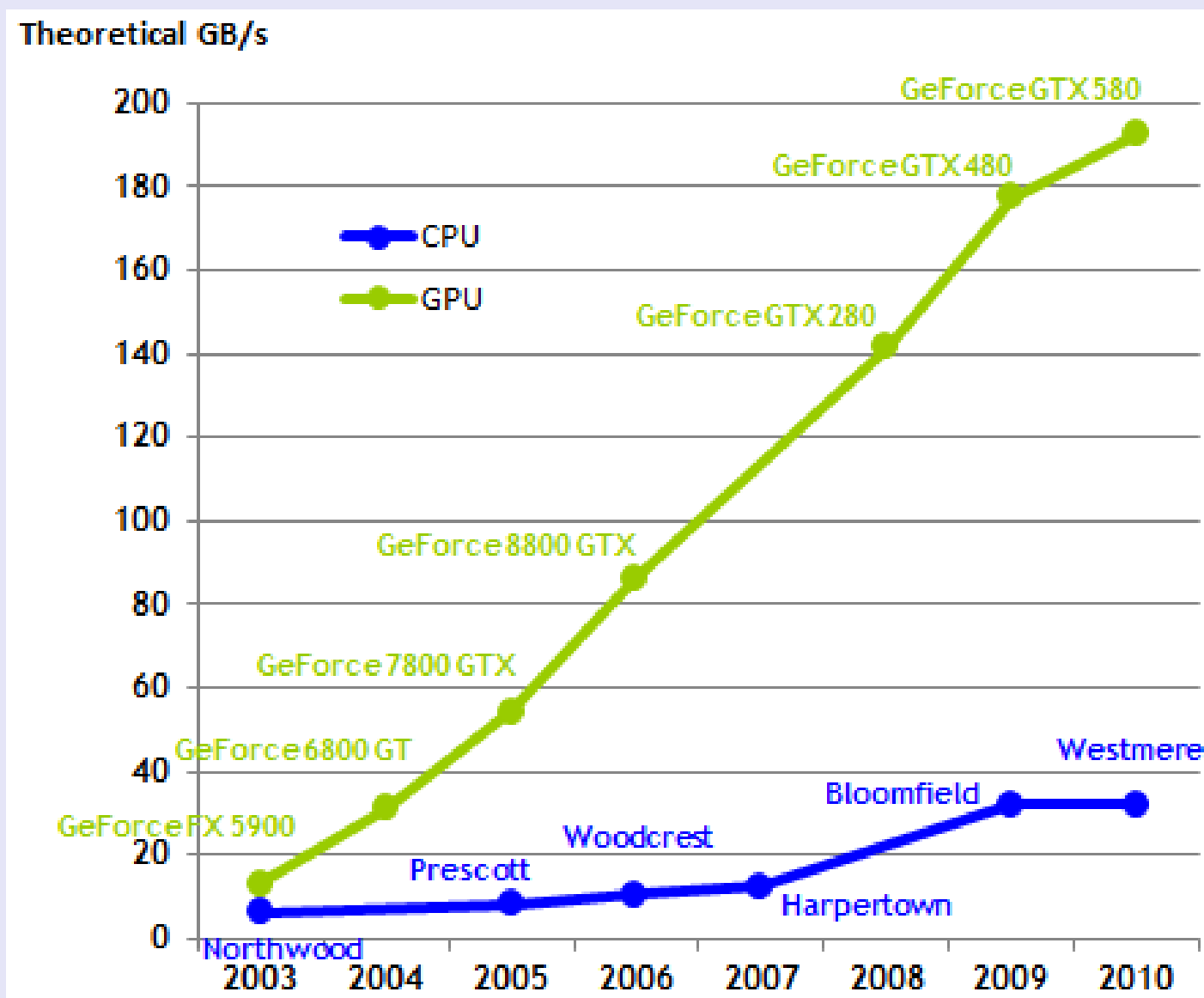
GPU's, para que?



Evolução das GPUs (poder computacional)



Evolução das GPUs (largura de banda de memória)



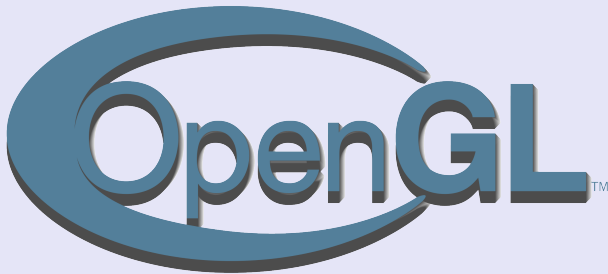
Imagens realistas em tempo real



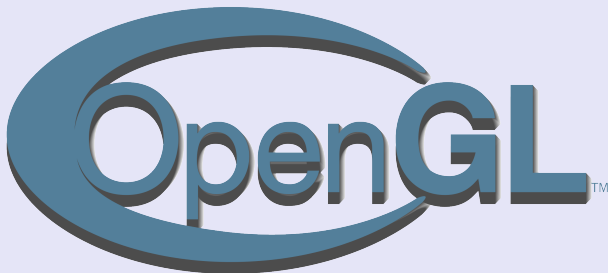
General Purpose GPU!



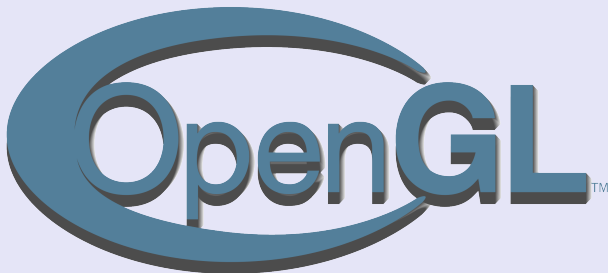
General Purpose GPU!



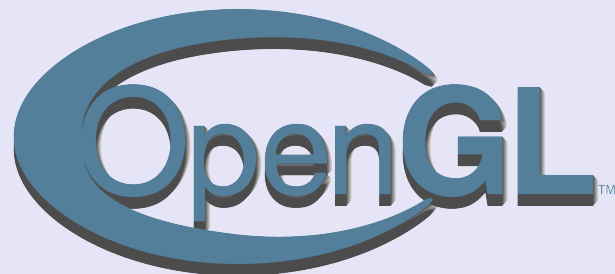
General Purpose GPU!



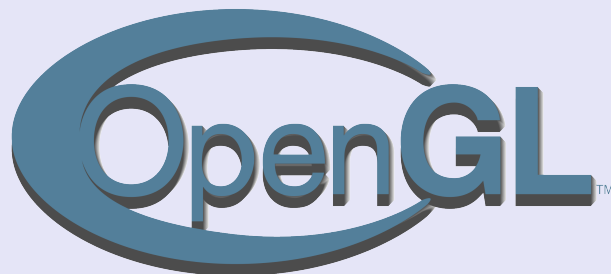
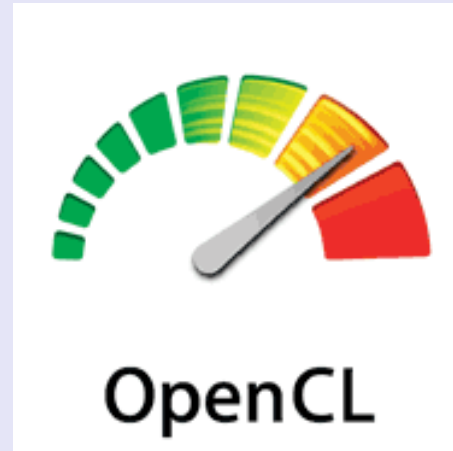
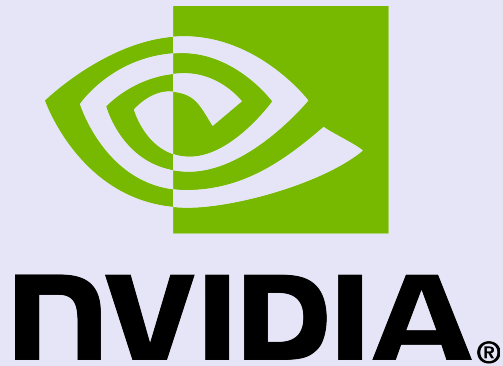
General Purpose GPU!



General Purpose GPU!



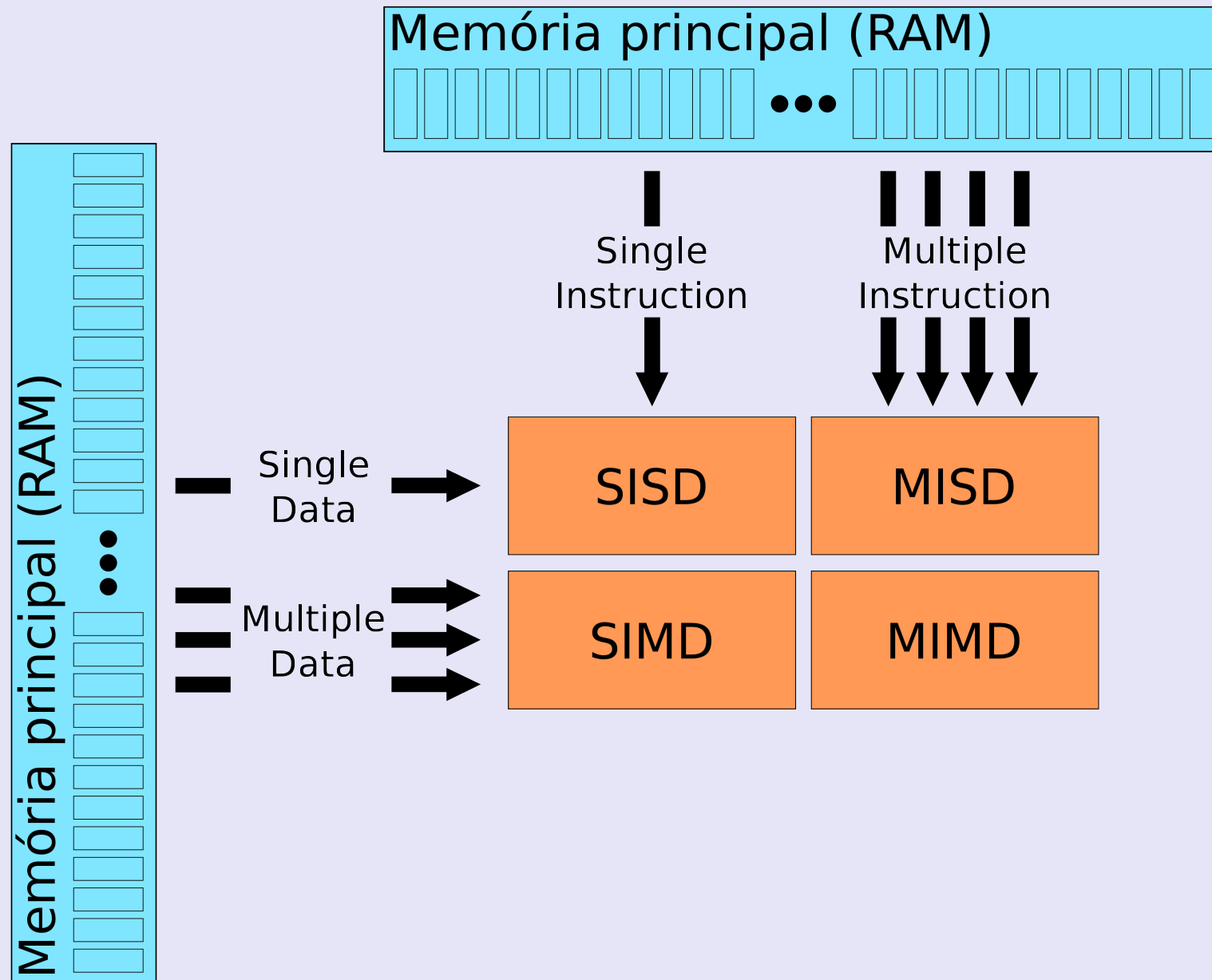
General Purpose GPU!



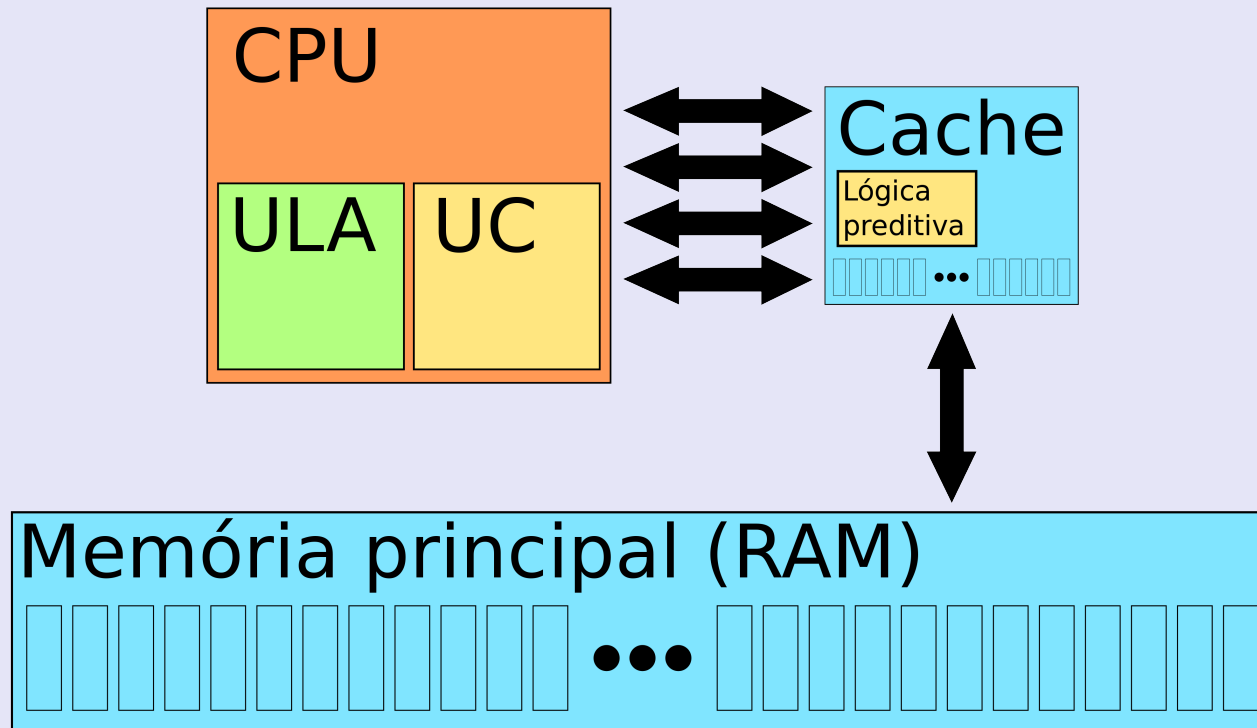
Aplicações de GPGPU

- Processamento de imagens e visão computacional
- Processamento de sinais digitais
- Física estatística
- Finanças computacionais
- Modelagem molecular
- Criptografia e criptoanálise
- Redes neurais
- Simulações climáticas e geofísicas

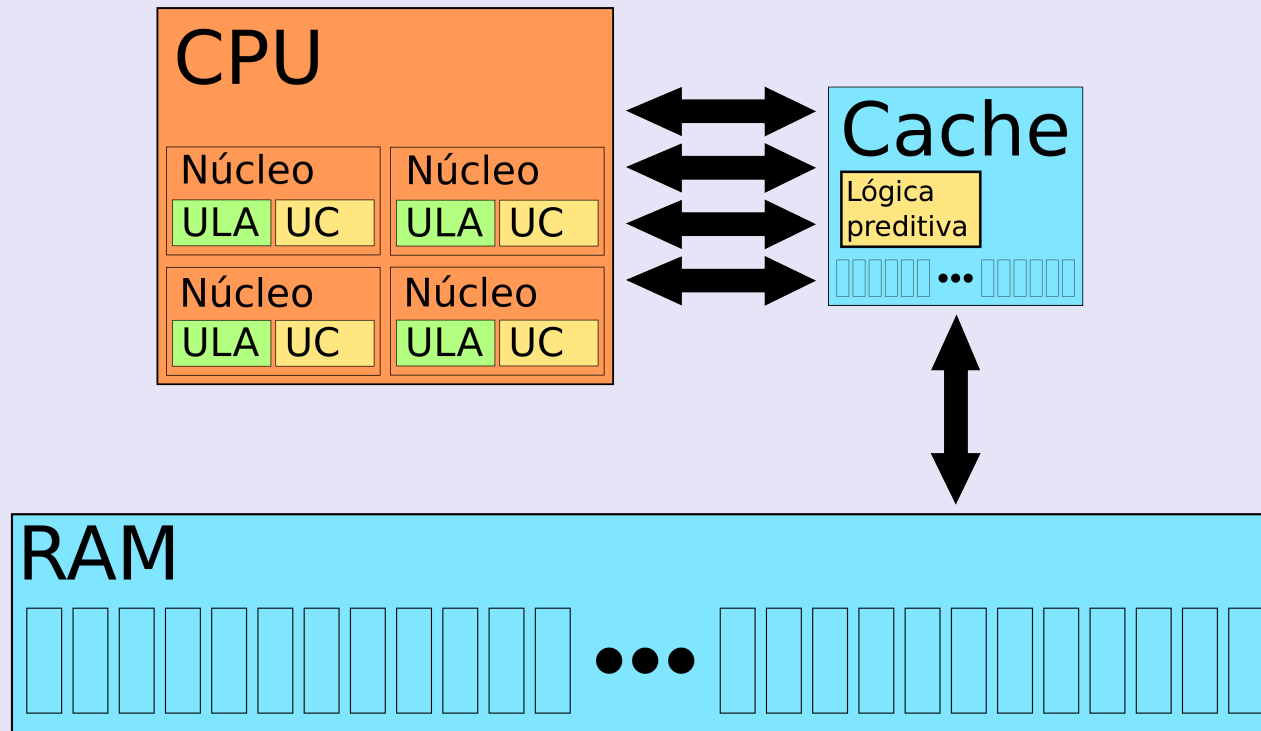
Arquiteturas de computador



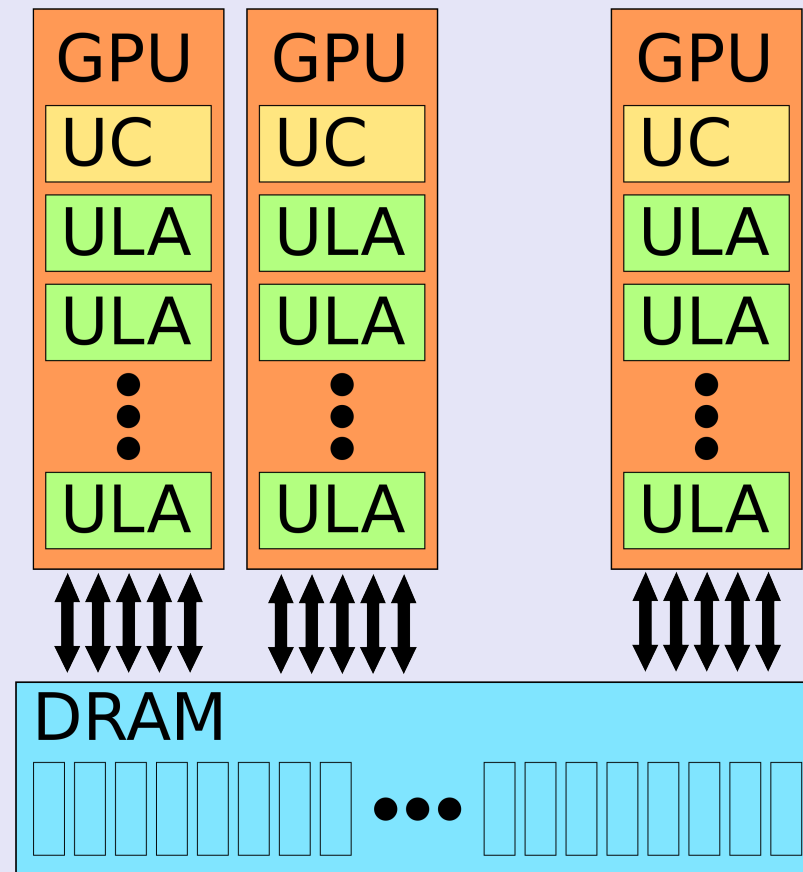
Arquitetura SISD



Arquitetura MIMD



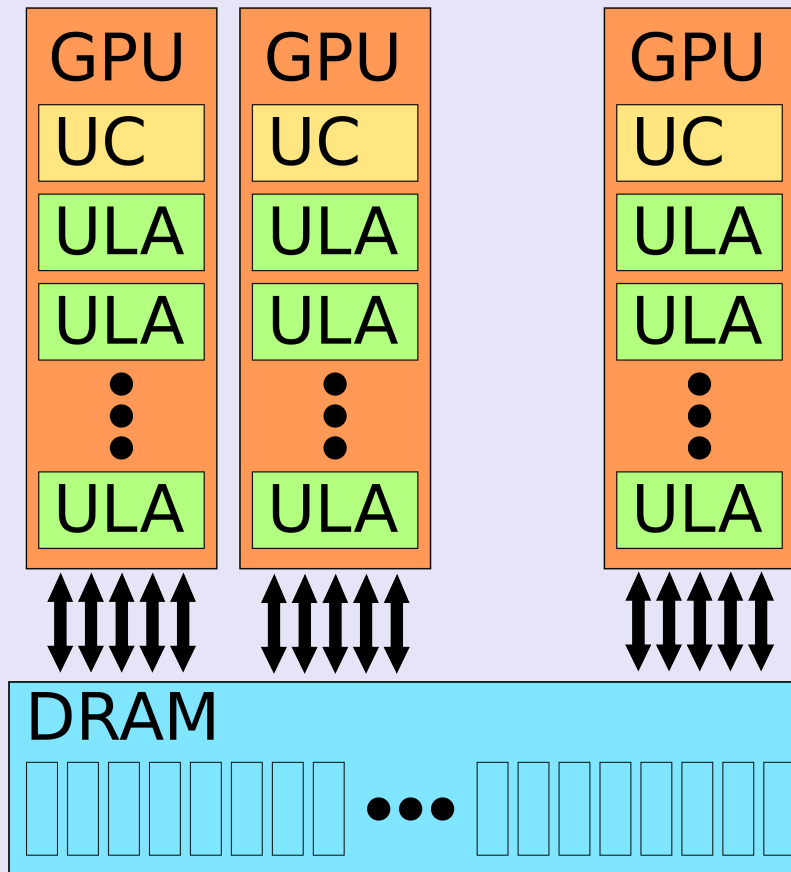
Arquitetura MIMT (GPU)



MIMT = Multiple Instruction Multiple **T**hread

MIMD = Multiple Instruction Multiple **D**ata

Arquitetura MIMT

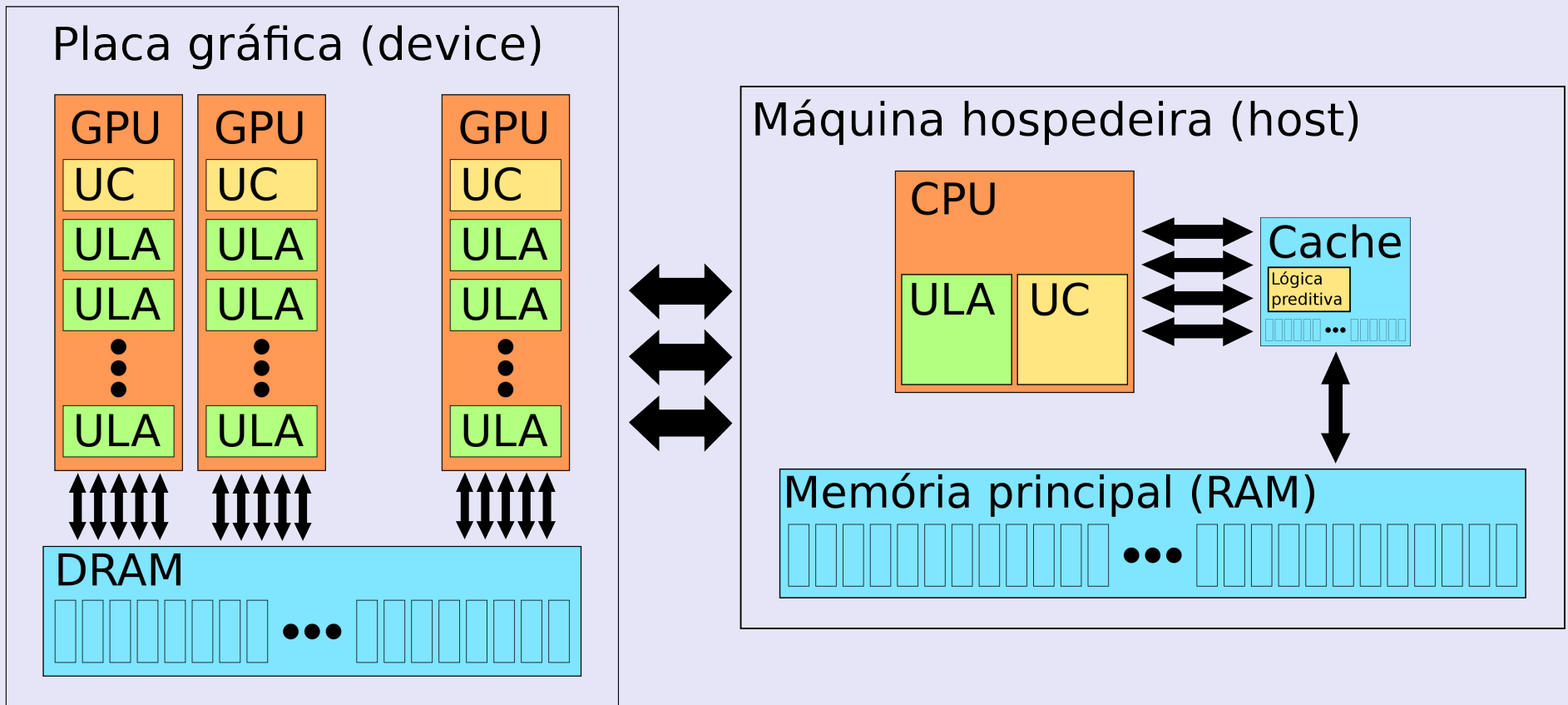


DRAM = Device RAM,
não Dynamic RAM

MIMT = Multiple Instruction Multiple **T**hread

MIMD = Multiple Instruction Multiple **D**ata

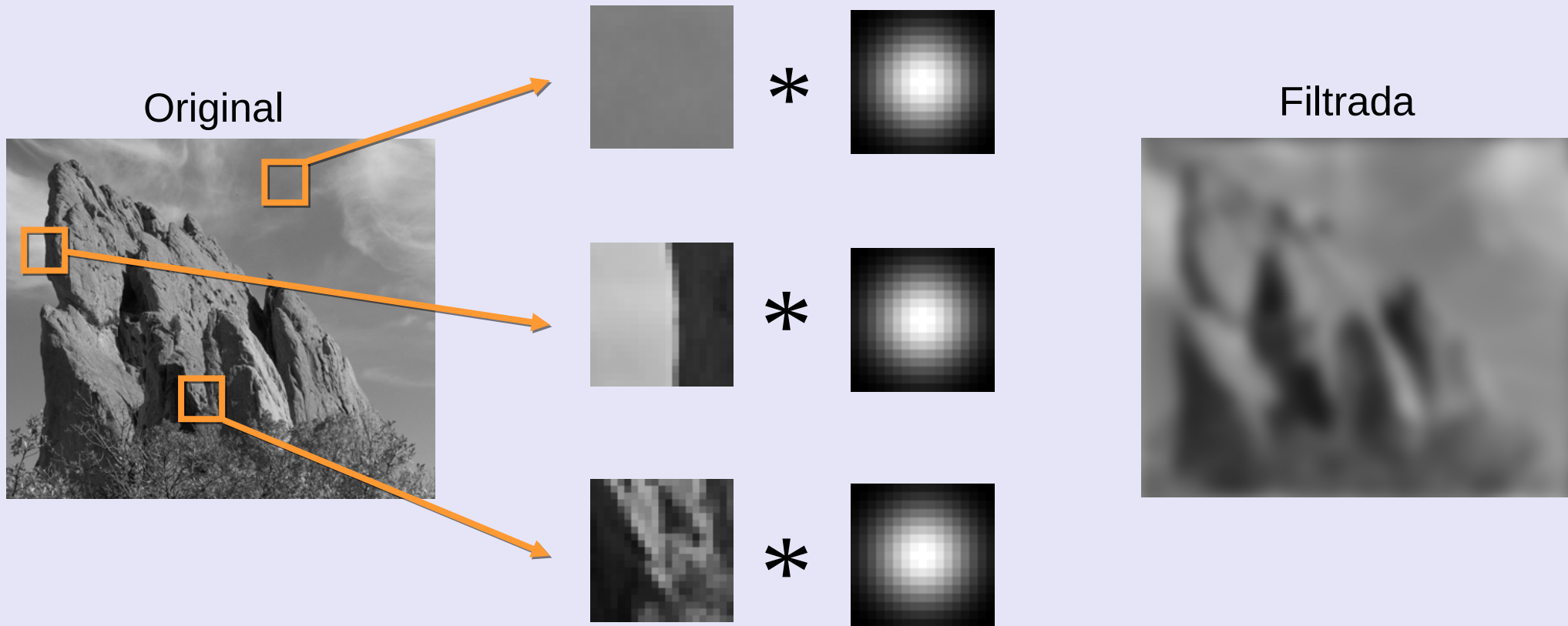
Sistema CPU + GPU



Filtragem bilateral



Filtragem gaussiana



Filtragem bilateral



Algumas referências

- www.gpgpu.org
- www.nvidia.com
 - www.nvidia.com/object/cuda-apps-flash-new.html
- www.khronos.org/opengl
- www.opengl.org/documentation/glsl
- http://people.csail.mit.edu/sparis/bf_course/

Obrigado!