

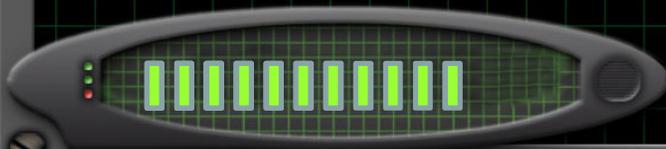
O que esperar do Futuro dos Vídeo Games?

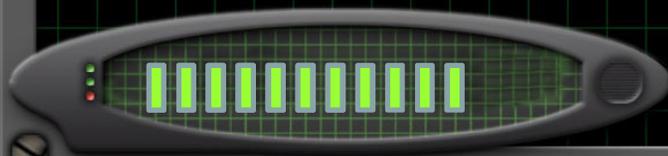
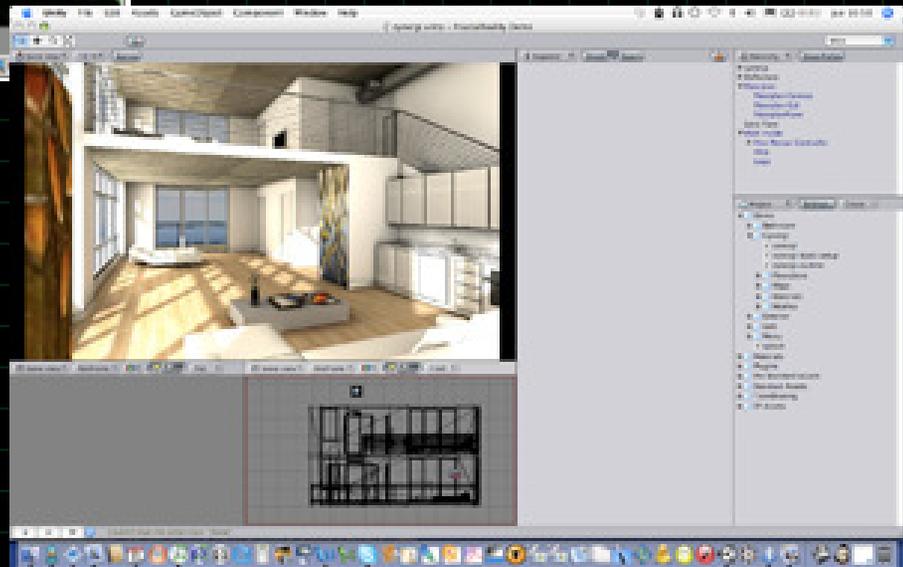
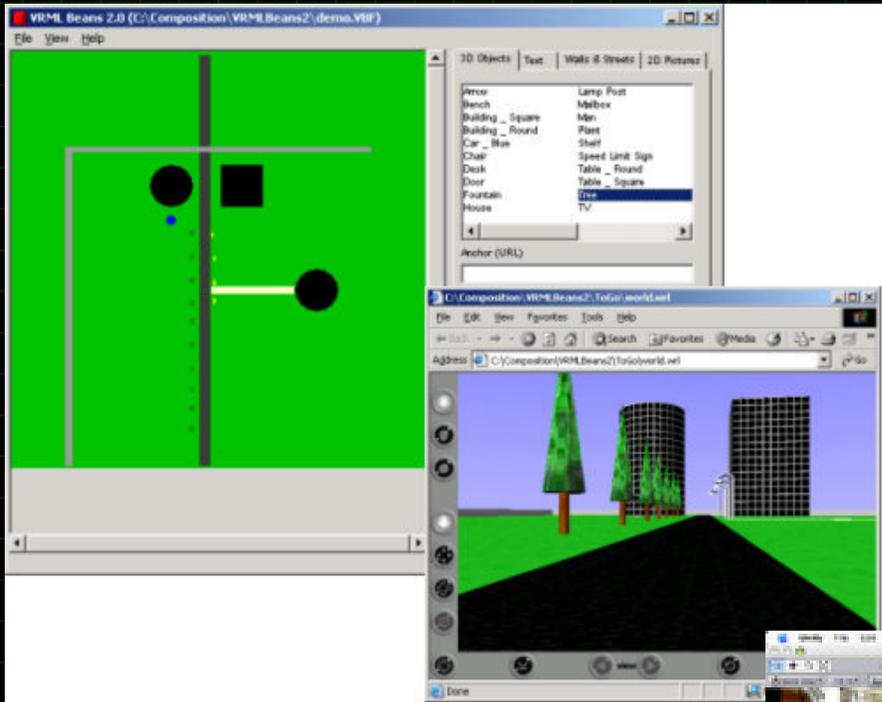
Esteban Walter Gonzalez Clua
Medialab - Instituto de Computação
Universidade Federal Fluminense



START

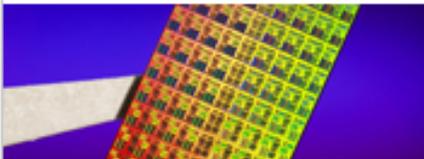
O que homem na Lua tem haver com o meu almoço?





Arquiteturas baseadas em muitos núcleos

80-Core Programmable Processor First to Deliver Teraflops Performance



Intel Corporation researchers have developed the world's first programmable processor that delivers supercomputer-like performance from a single, 80-core chip not much larger than the size of a finger nail while using less electricity than most of today's home appliances. [Windows Media® 4MB]

[View Video Demo >](#)
[View Animation >](#)

The Fastest Just Got Faster

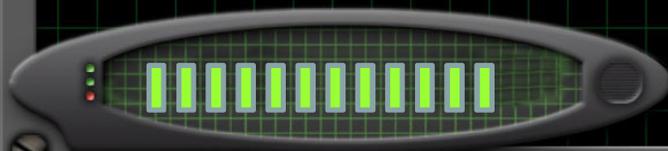
Get unparalleled performance with the unlocked, ultra-threaded all new 2010 Intel® Core™ i7-980X processor Extreme Edition, the world's fastest*1, smartest desktop PC processor.

[Learn more >](#)

- Automatically speeds up when your PC needs extra performance*1. That's Intel® Turbo Boost Technology.
- Features 12-way multitask processing that allows each core of your processor to work on two tasks at the same time*2. That's Intel® Hyper-Threading Technology.
- Overclock-enabled*2 so you can tune your system for extra performance.
- Perfect for power users who demand unlimited digital creativity and extreme gamers who demand unmatched desktop performance.

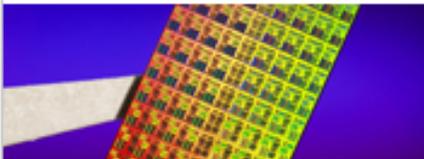


Processor Number	Cores/ threads	Clock Speed	Intel® Smart Cache	Silicon	Intel® Turbo Boost Technology	Intel® Hyper-Threading Technology
i7-980X	6 cores/ 12 threads	3.33 GHz, up to 12 MB 3.60 with turbo boost		32 nm	Yes	Yes



Arquiteturas baseadas em muitos núcleos

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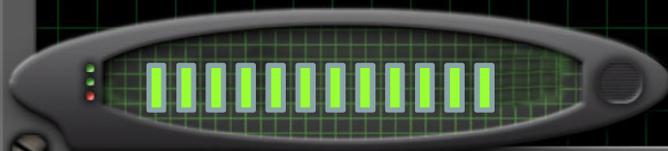
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GPUs



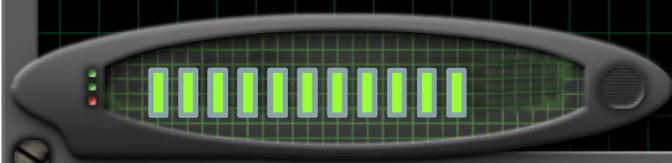
+ Additional Views

GeForce GTX 480

Pure adrenaline meets visual bliss

BUY NOW

[Mais sobre a arquitetura da serie 400](#)



GPUs



Exceptional Gaming Performance

First and foremost, GF100 is designed for gaming performance leadership. Based on the new generation Streaming Multiprocessor (SM) architecture, GF100 doubles the number of SMs over the previous architecture.

GeForce GTX 480

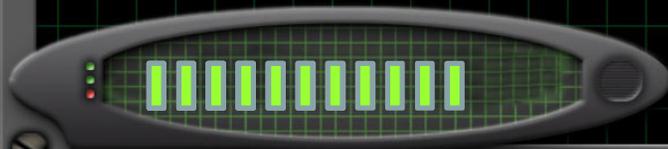
Pure adrenaline meets visual bliss

BUY NOW



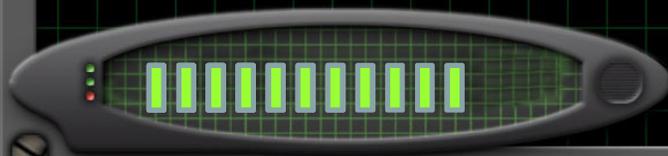
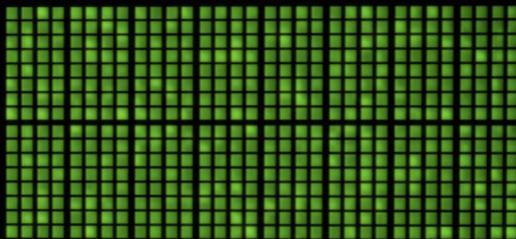
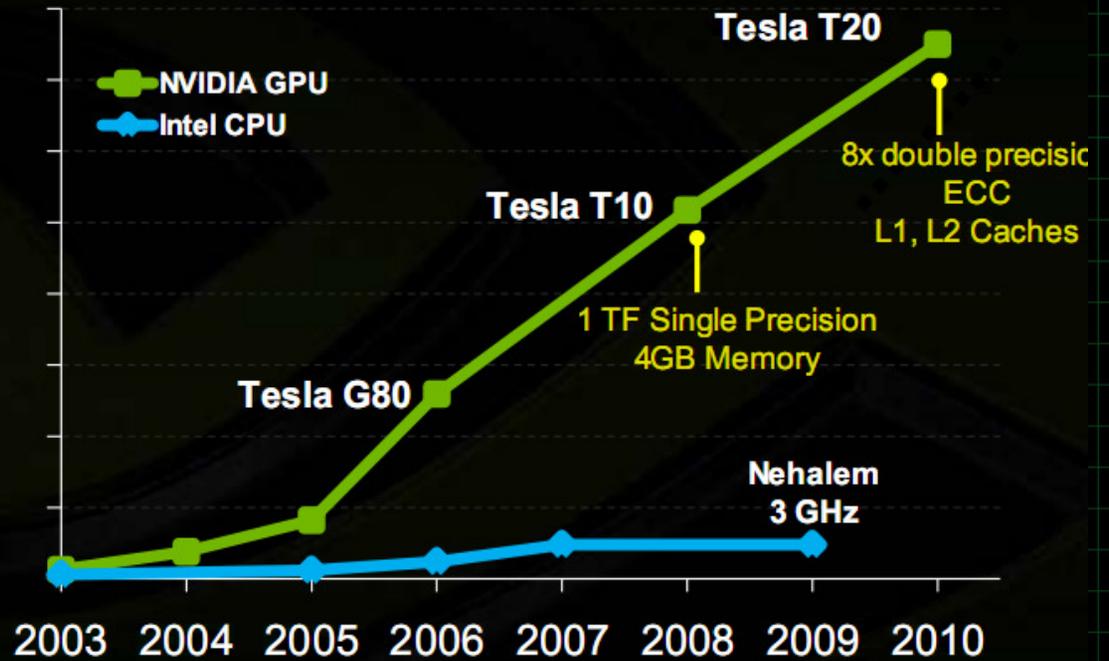
+ Additional Views

[Mais sobre a arquitetura da serie 400](#)



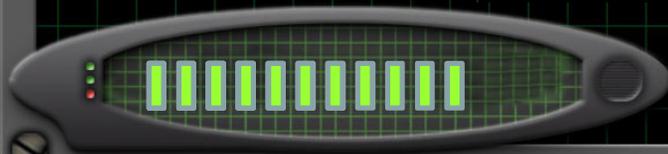
FERMI

Gflops/sec

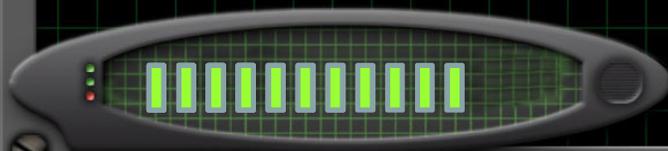
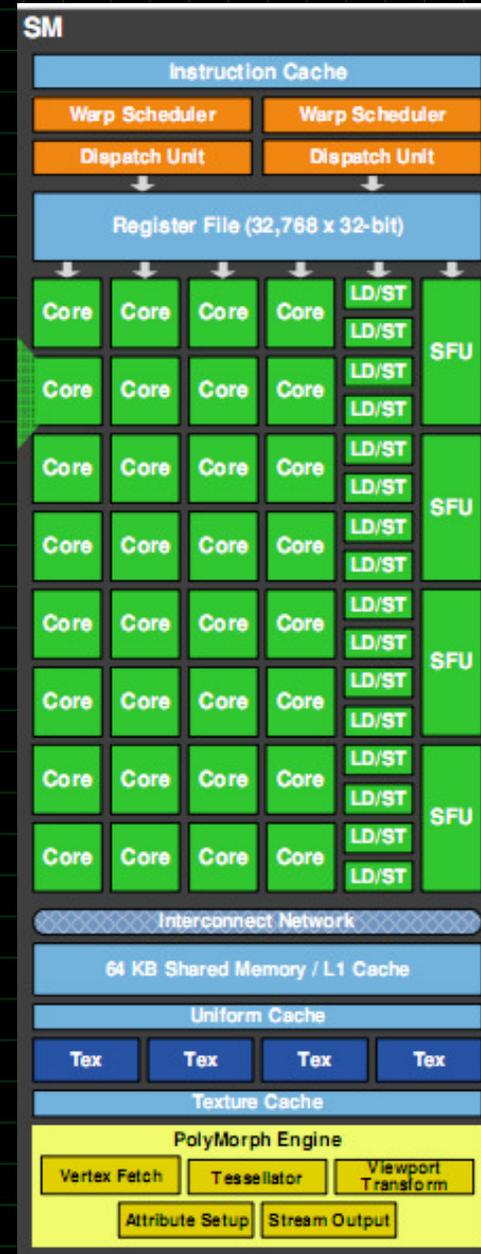


512 núcleos
Hierarquia de cache
8x mais rápido que Teslas

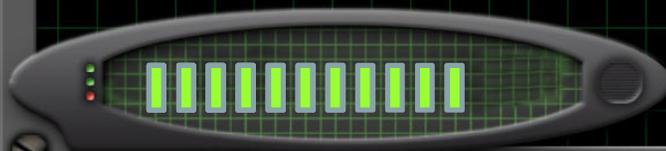
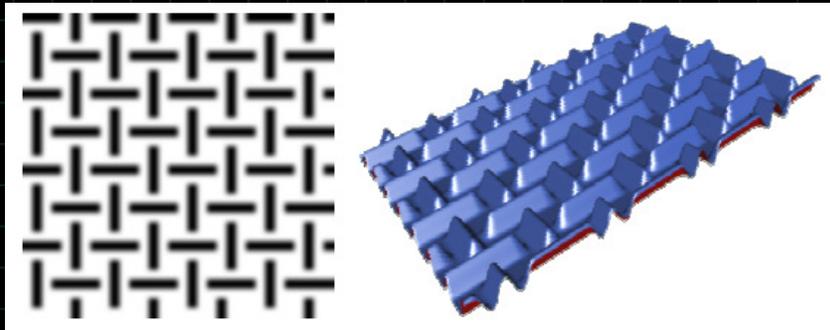
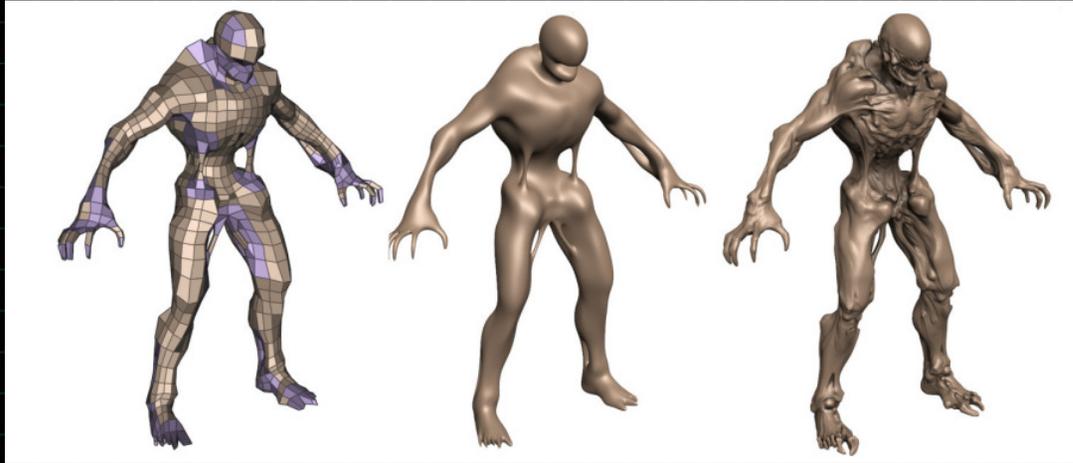
FERMI - GF100



FERMI - GF100



Tessellation com Displacement Mapping



Real Time Ray-Tracing

GF100's compute architecture was built specifically with ray tracing in mind. GF100 is the first GPU to support recursion in hardware, enabling efficient ray tracing and a host of other



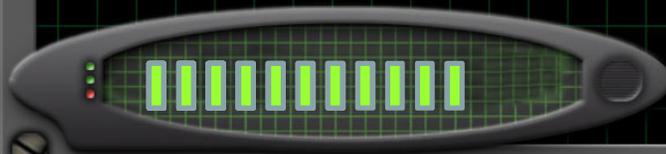
nVidia Complex



nVidia OptiX



nVidia SceniX



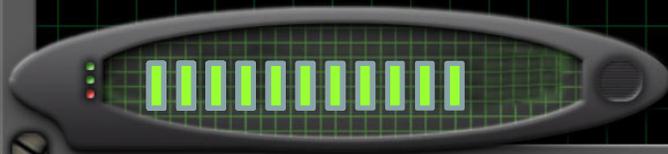
Real Time Ray-Tracing

 NVIDIA.

PIPS:lab

PLEIX

The Soul of a Supercomputer in the Body of a GPU

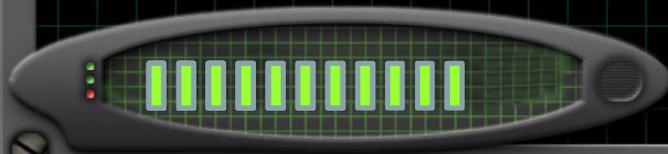


Modelagem da Hashed Octree em Arquitetura de GPUs

Projeto em colaboração com PUC-Rio

Limitações das GPUs:

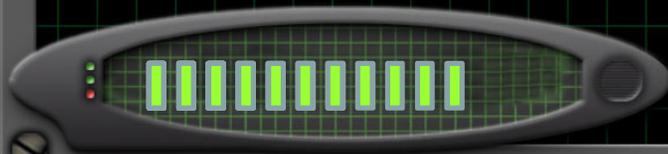
- Comunicação com a CPU
- arquitetura da memória
- operações custosas: random, modulo
- impossibilidade de uso de ponteiros



Modelagem da Hashed Octree em Arquitetura de GPUs

Projeto em colaboração com PUC-Rio

- Cada busca é implementada por uma thread
- Utiliza-se o código de Morton para codificação da tabela de Hash
- Otimização estatística para gerar código de busca

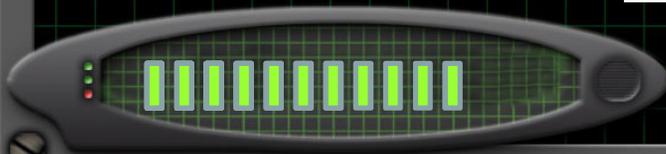


Modelagem da Hashed Octree em Arquitetura de GPUs

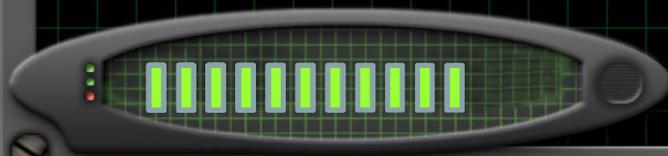
Projeto em colaboração com PUC-Rio

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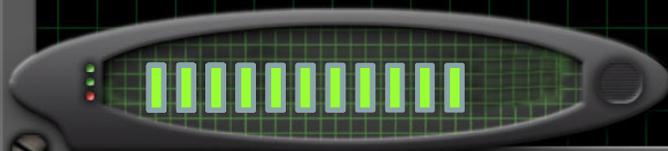
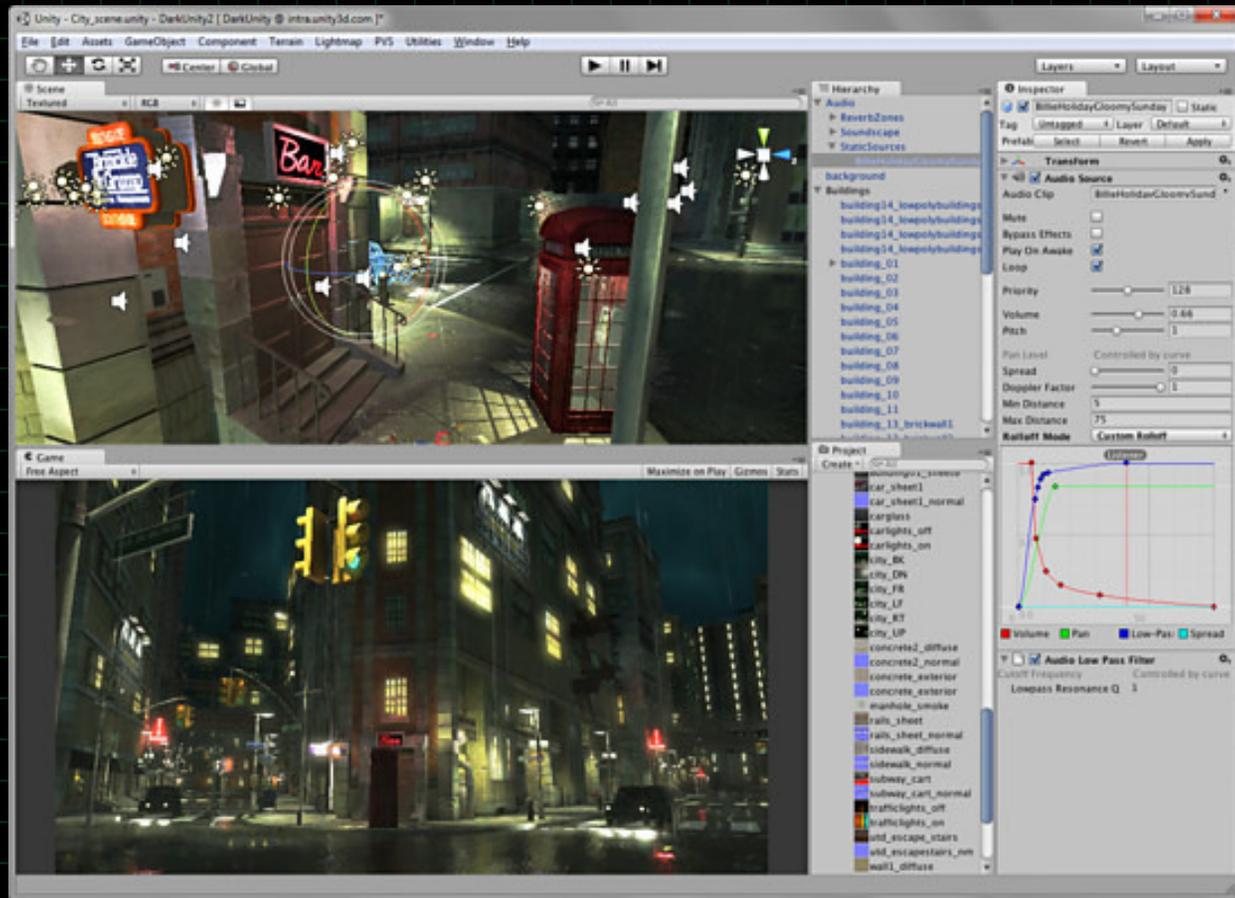
Tamanho da tabela hash (em número de elementos)					
	2,000,000	1,000,000	500,000	250,000	100,000
CPU	5 s	2 s	1 s	1 s	1 s
GPU	0.33 s	0.29 s	0.28 s	0.28 s	0.27 s



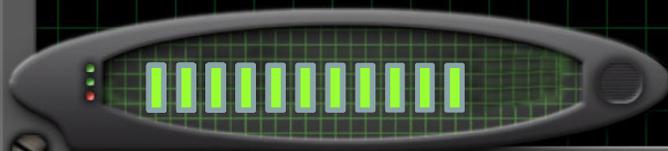
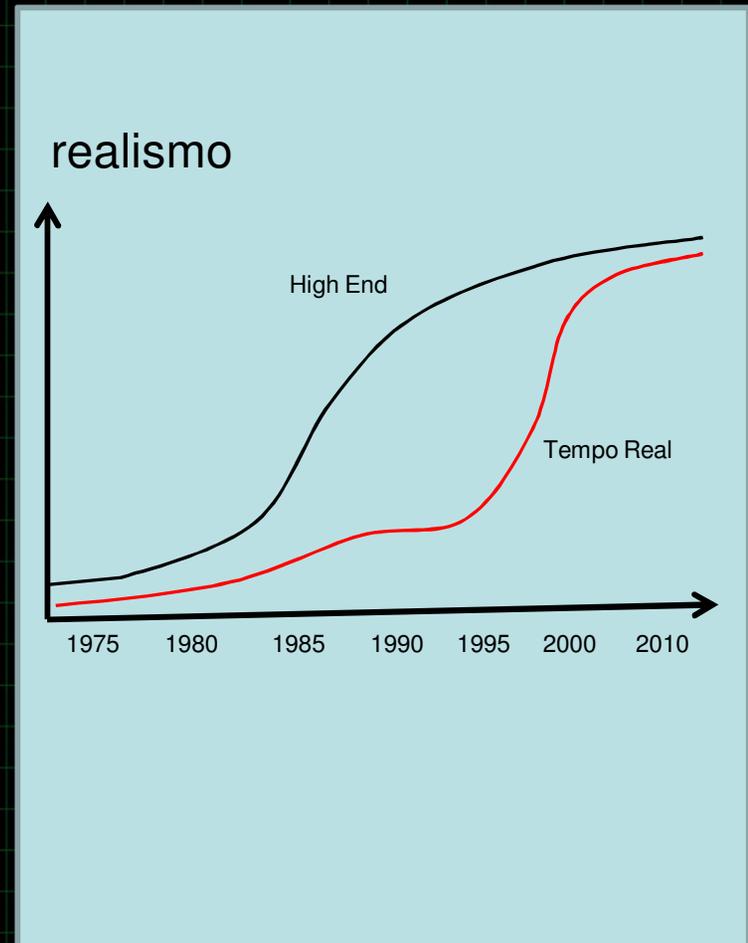
Real Time radiosity



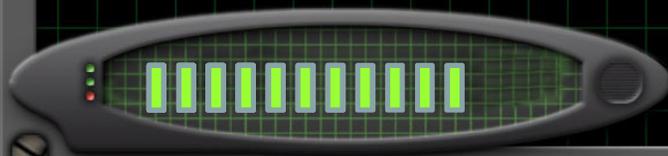
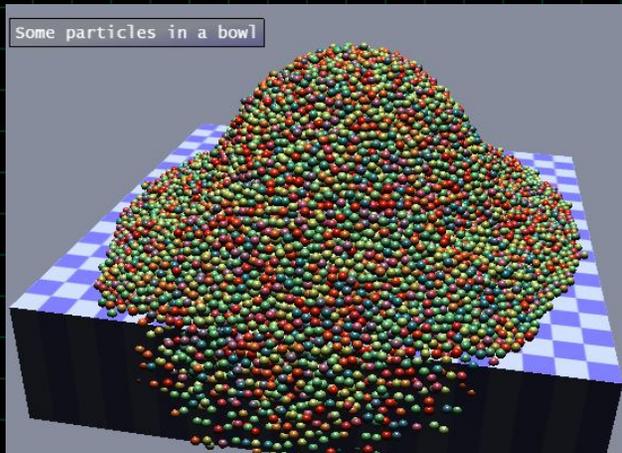
Real Time radiosity



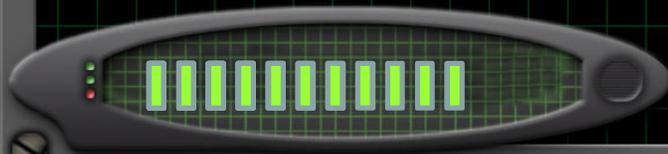
Computação Gráfica



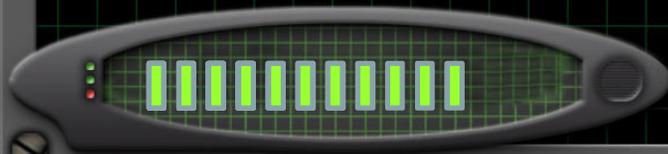
Física



Física – corpos flexíveis

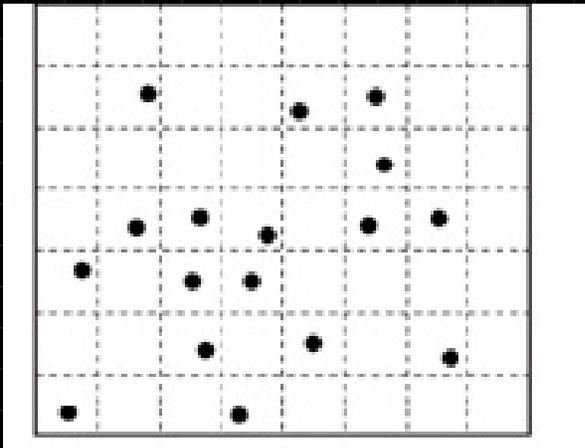


Física – fluídos



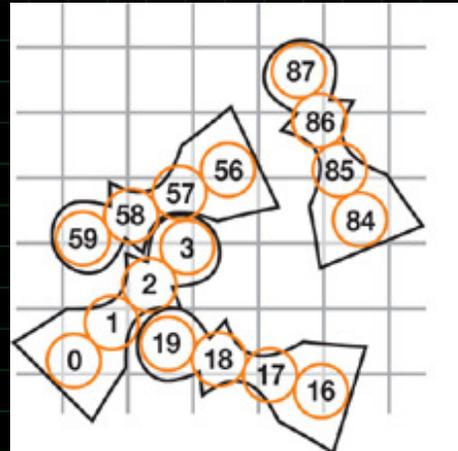
Ambientes heterogêneos entre CPU e GPU para Colisão entre corpos rígidos e fluidos

Projeto em colaboração com DCC/UFMS



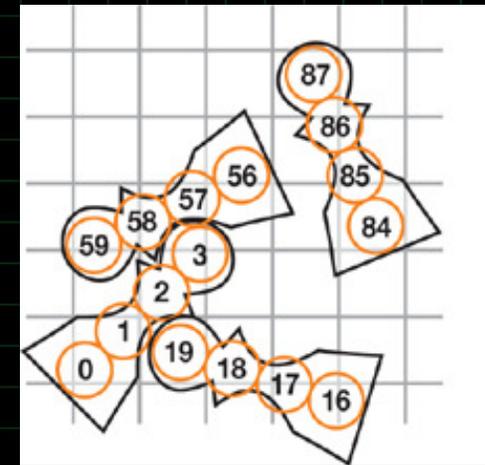
SPH Hashed Grid

Atualizada a cada frame



Static RB Hashed Grid

- Atualizada somente 1 vez na GPU com as posições **absolutas** das partículas dos corpos rígidos estáticos



Dynamic RB Hashed Grid

-Atualizada somente 1 vez na GPU com as posições **relativas** das partículas dos corpos rígidos dinâmicos.

- A cada frame, é atualizado somente o array de posição dos RB.

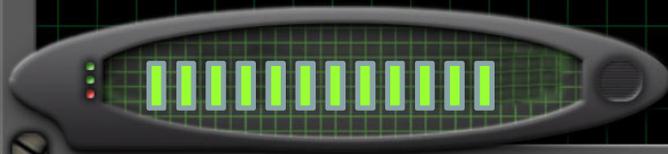
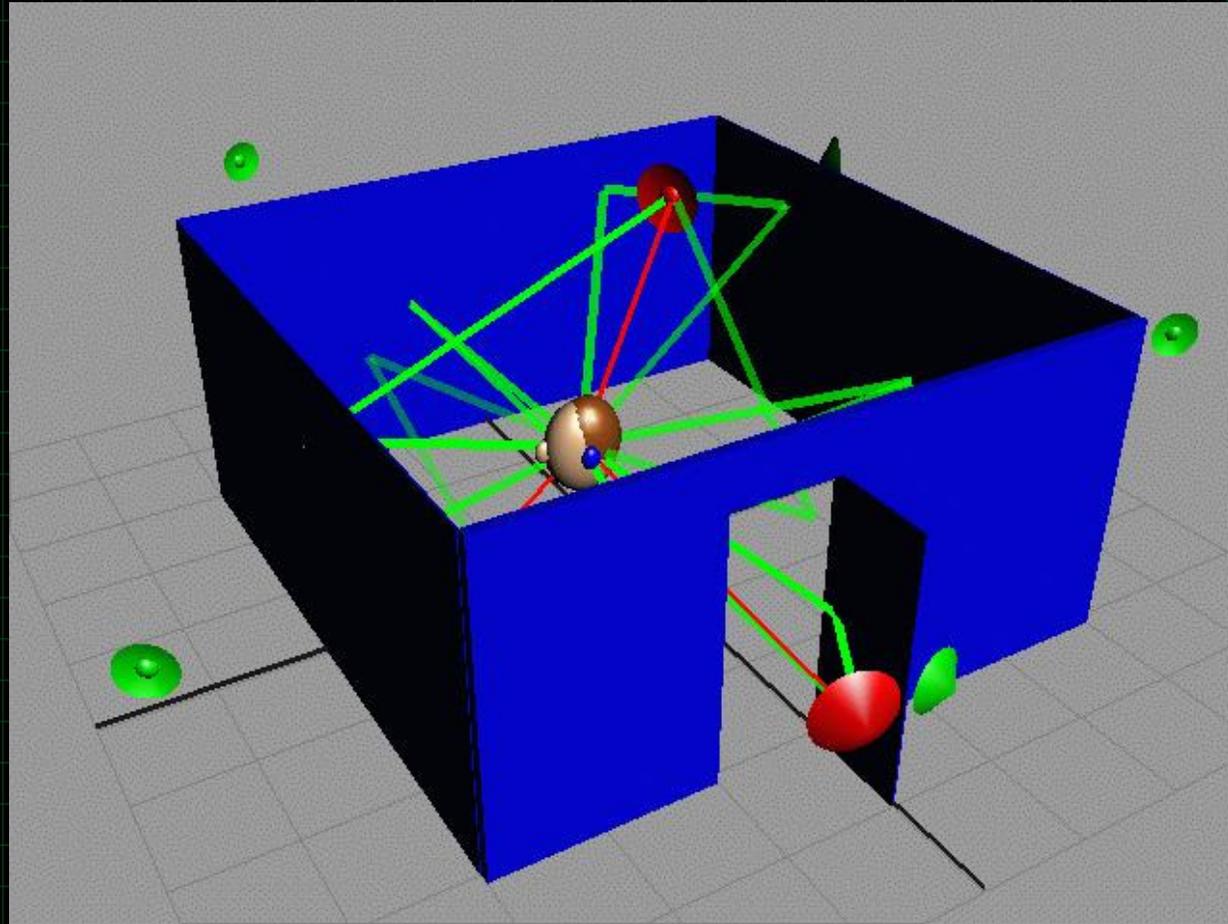


CPU	GPU
Init_scene();	
Update_static_objects_to_GPU(); Update_dynamic_objects_to_GPU();	
	Calculate_neighborhood_particles_SPH(); Calculate_neighborhood_static_particles_RB(); Calculate_neighborhood_dynamic_particles_RB();

CPU	GPU
Broad_phase_collision(); Generate_collision_works();	Calculate_density(); Calculate_SPH_rigid_body_collisions();
	Calculate_rigid_body_forces_from_collision_works();
[In parallel] Dynamic_Rigid_Body_Integration(); Update_dynamic_objects_to_GPU();	Calculate_SPH_internal_forces(); Integration(); Calculate_neighborhood_particles_SPH();
	Calculate_neighborhood_dynamic_particles_RB();

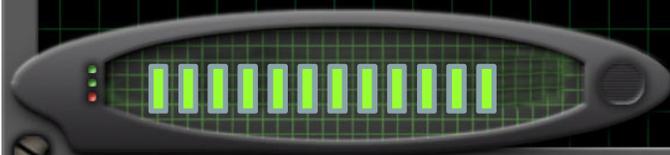
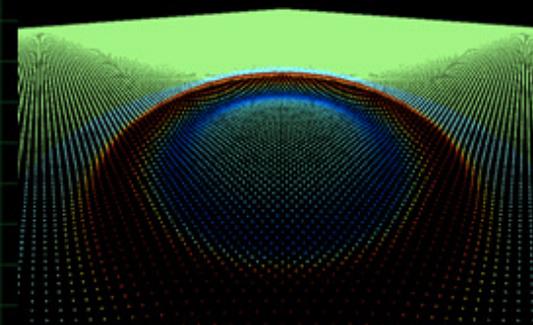
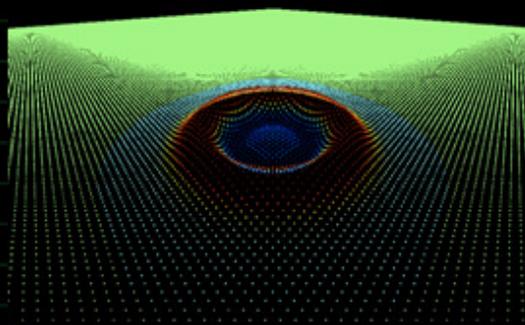
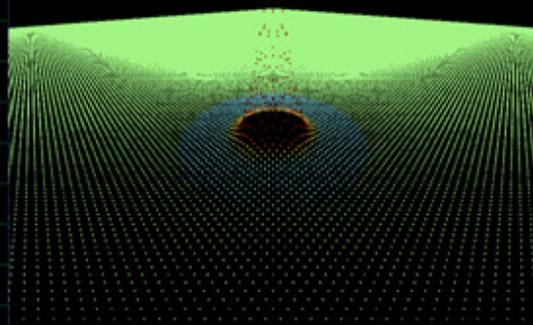


Sound Rendering



Cálculo de Propagação de Ondas

Projeto em colaboração com Petrobras/CENPES



Método das diferenças finitas para simulação de ondas na GPU

- O problema:
$$\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}$$

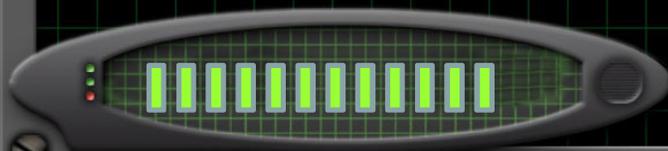
- Domínio:
$$\Omega = [0, L_x] \times [0, L_y]$$

- Condição inicial:
$$u(\Omega, 0) = 0$$
$$u(\Omega, 1) = 0$$

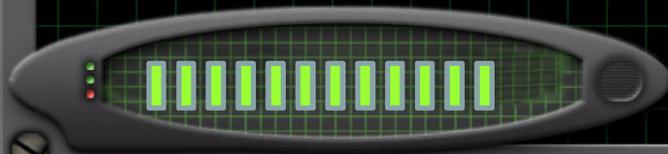
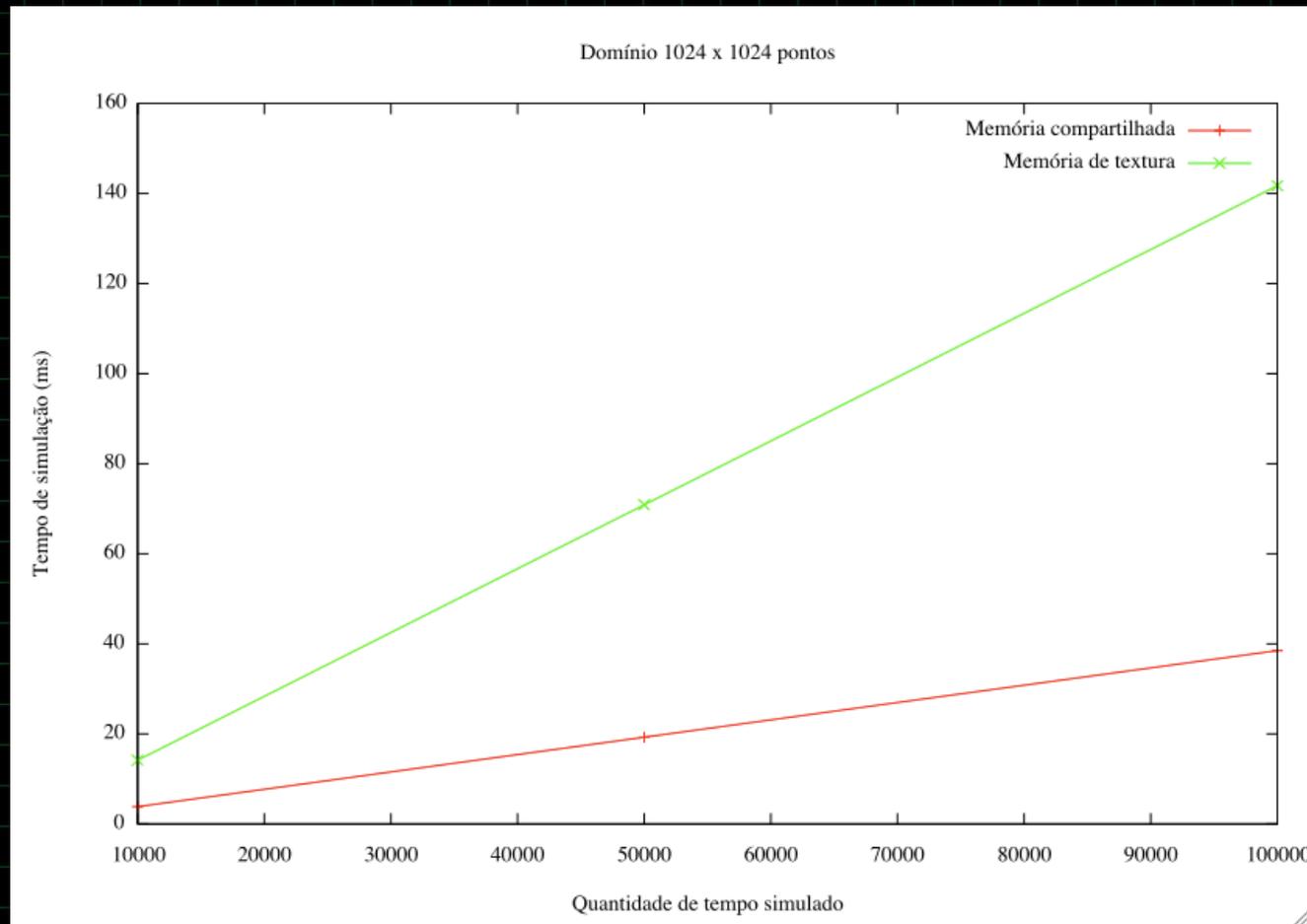
- Condição de contorno (Dirichlet):
$$u(0, 0) = 0$$
$$u(L_x, 0) = 0$$
$$u(L_x, L_y) = 0$$
$$u(0, L_y) = 0$$

- Segunda ordem no tempo e no espaço e utiliza o método explícito no tempo:

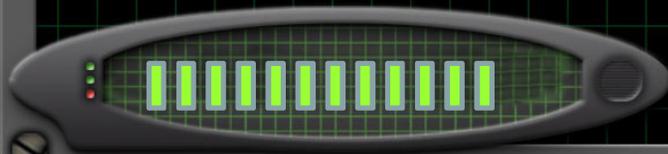
$$u_{i,j}^{t+1} = \Delta t^2 \left[\frac{u_{i+1,j}^t - 2u_{i,j}^t + u_{i-1,j}^t}{\Delta x^2} + \frac{u_{i,j+1}^t - 2u_{i,j}^t + u_{i,j-1}^t}{\Delta y^2} \right] + 2u_{i,j}^t - u_{i,j}^{t-1}$$



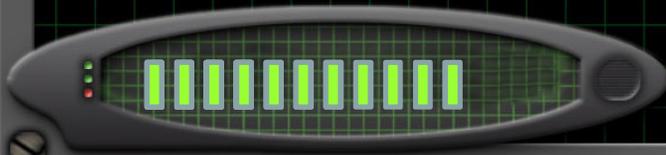
Método das diferenças finitas para simulação de ondas na GPU



Condições de Contorno



IA



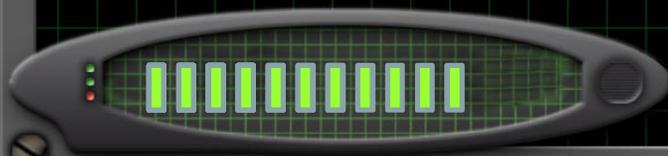
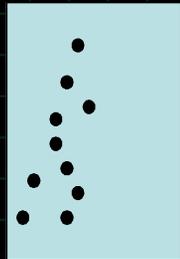
Mas não quer dizer muita coisa...

Necessidade de animação

Eu acredito

Eu não acredito

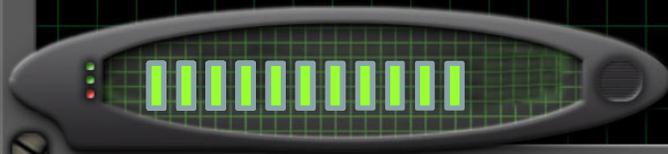
Grau de fidelidade da modelagem



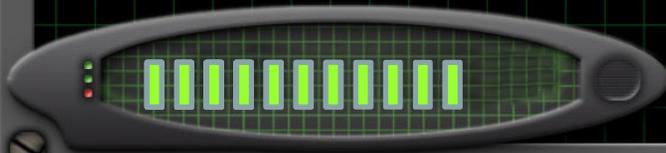
A matemática da Emoção



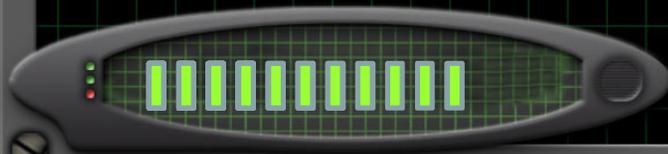
GAMESPOT



Cameras Cinematográficas

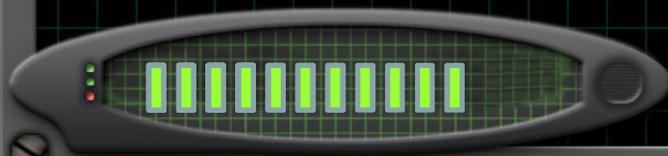


Storytelling



Planned Based x Emergent Based

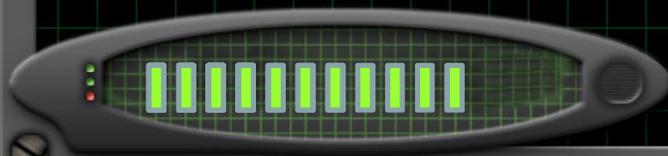
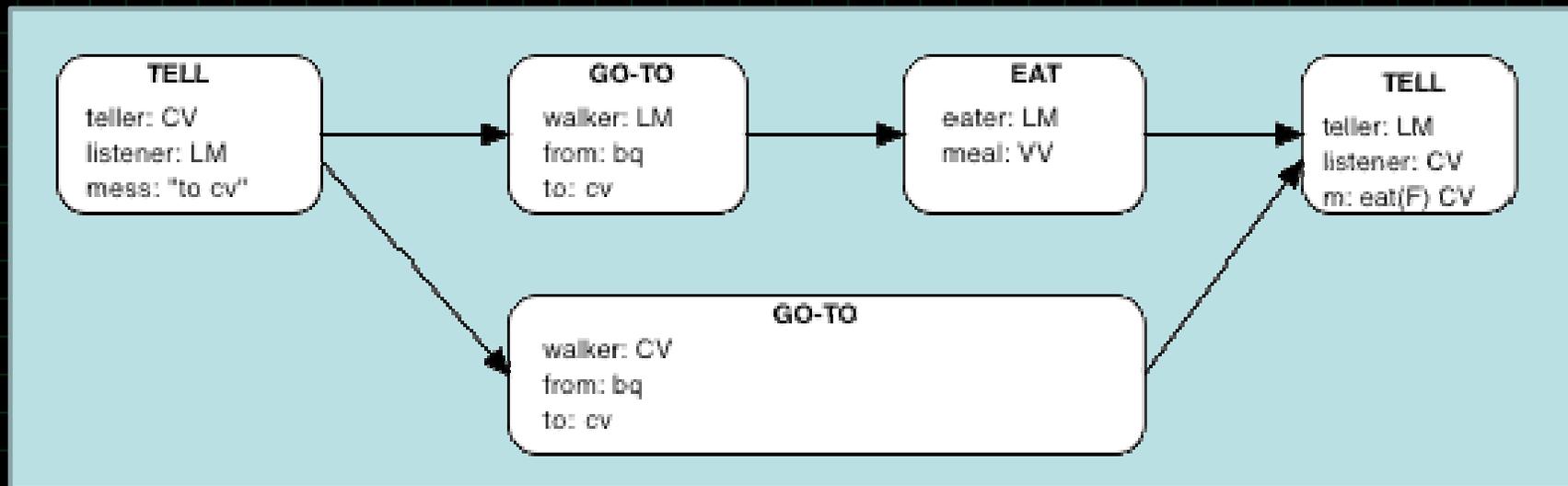
- Enredo
- Personagens
- Dramatização
- Composição
- Análise



Storytelling usando redes PNF

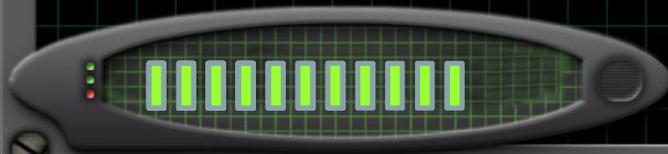
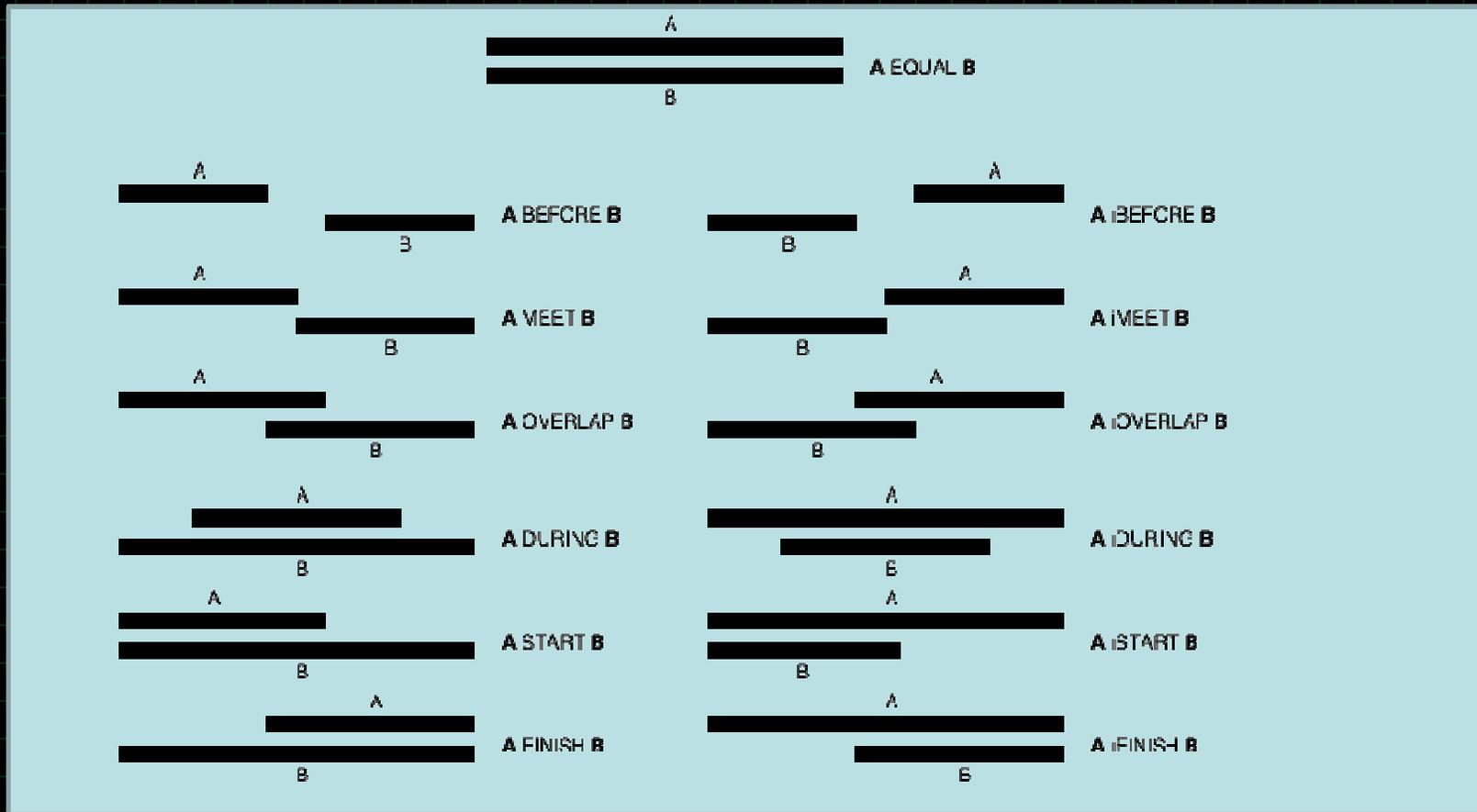
Projeto em colaboração com Camera Culture – MIT, PUC-Rio, Unirio e DCG UFSM

Trecho onde chapeuzinho encontra o Lobo no bosque

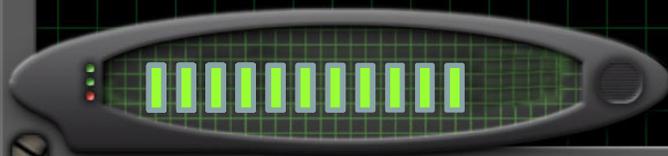
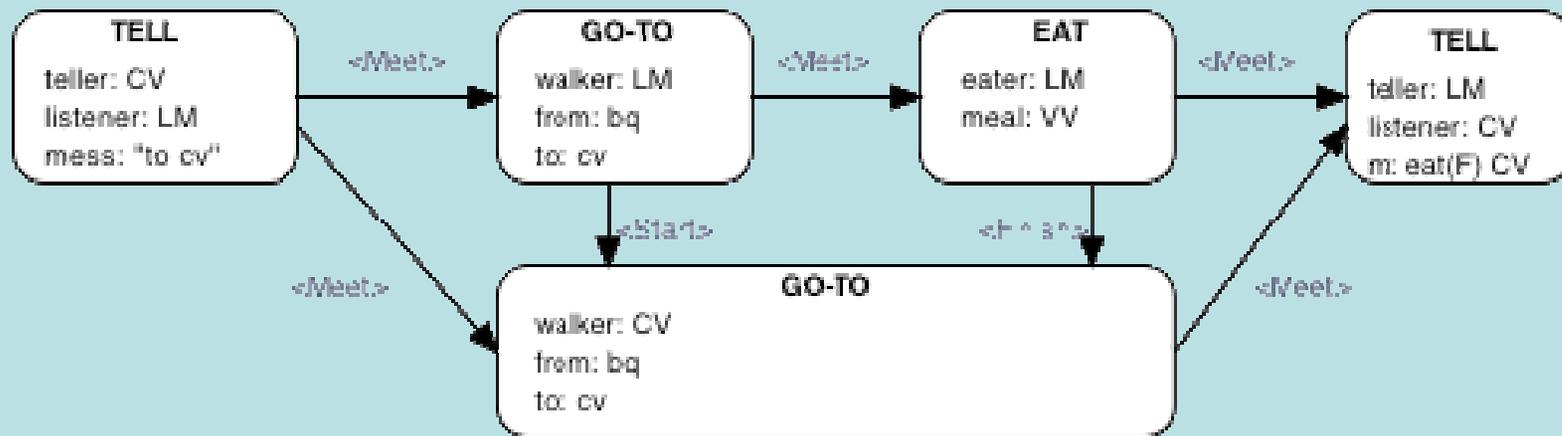


Storytelling usando redes PNF

Álgebra de Intervalos de James Allen



Storytelling usando redes PNF



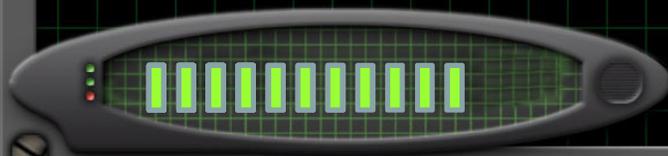
Storytelling usando redes PNF

The screenshot shows the PNF Editor.wjdraw application window. The main workspace is a grid titled "Kidnapp" containing a story network diagram. The diagram consists of several nodes and edges:

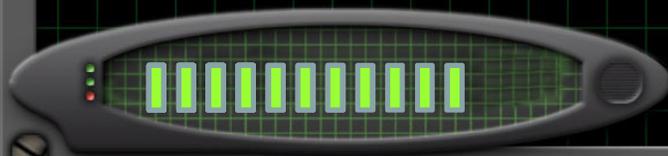
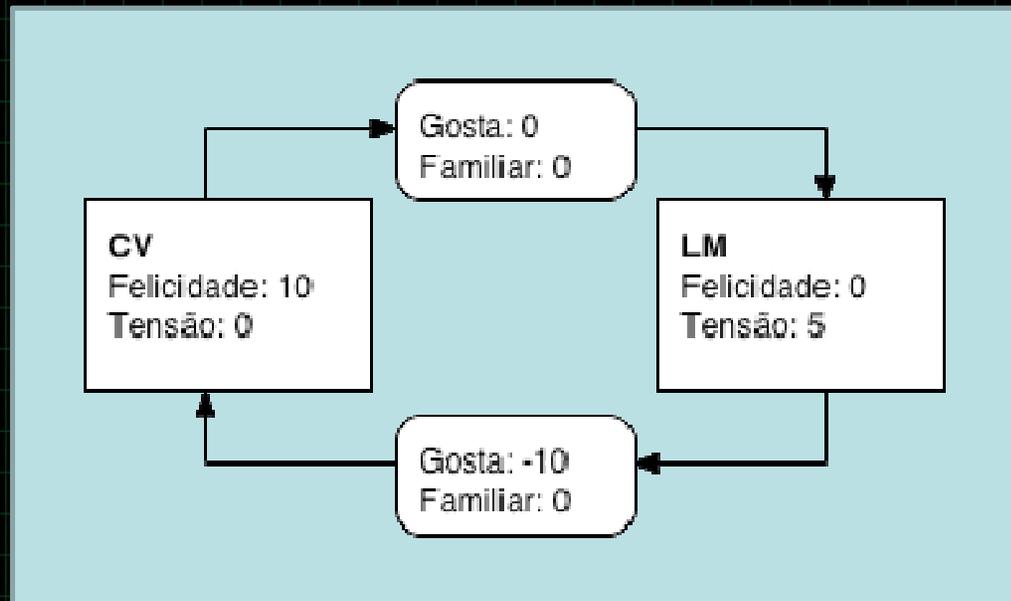
- A "Go-To" node in the top-left corner.
- A "Fight" node in the middle-left area.
- A "Go-To" node in the middle-right area, which is highlighted with a light blue background.
- A "Take" node in the bottom-middle area.

Below the grid is a "Zoom:" slider. To the right of the grid is a "Properties" panel with the following fields:

- Who: \$1
- From: \$2
- To: \$3
- A "New" button at the bottom.

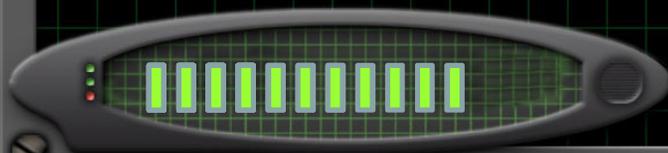


Storytelling usando redes PNF

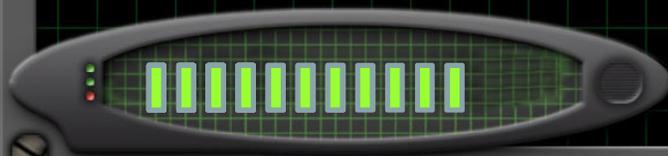


Storytelling usando redes PNF

Eventos	Chapeuzinho Vermelho		Lobo	
	Felicidade	Tensão	Felicidade	Tensão
Início	10	0	0	5
CV Meets LM	---	5	---	10
CV Go-to cv	---	0	---	---
LM Go-to cv	---	---	---	5
LM Eats VV	---	---	5	10
Tell "eat(F)"	0	10	---	---
...
CC Kill LM	5	5	--	---
CC Take-out VV	10	0	---	---



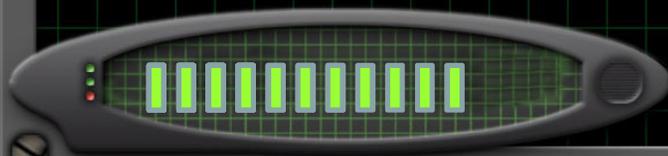
Multidão



Modelagem de Agentes em GPUs

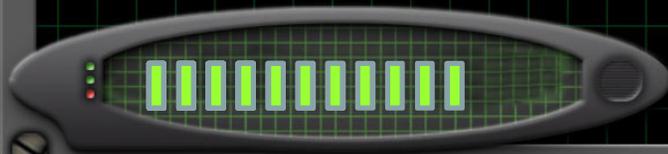


video



Modelagem de Agentes em GPUs

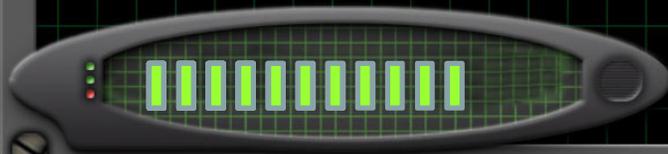
- A checagem sobre quais partículas influenciam as outras (vizinhança) geralmente implica em complexidade seqüencial $O(n^2)$;
- Nesta proposta não se usa uma subdivisão espacial para o ambiente
 - As entidades são diretamente armazenadas em uma grid que representa uma vizinhança topológica aproximada
 - Uma ordenação sobre os três eixos mantém a organização da vizinhança
 - O comportamento de um boid é modelado na base de um agente



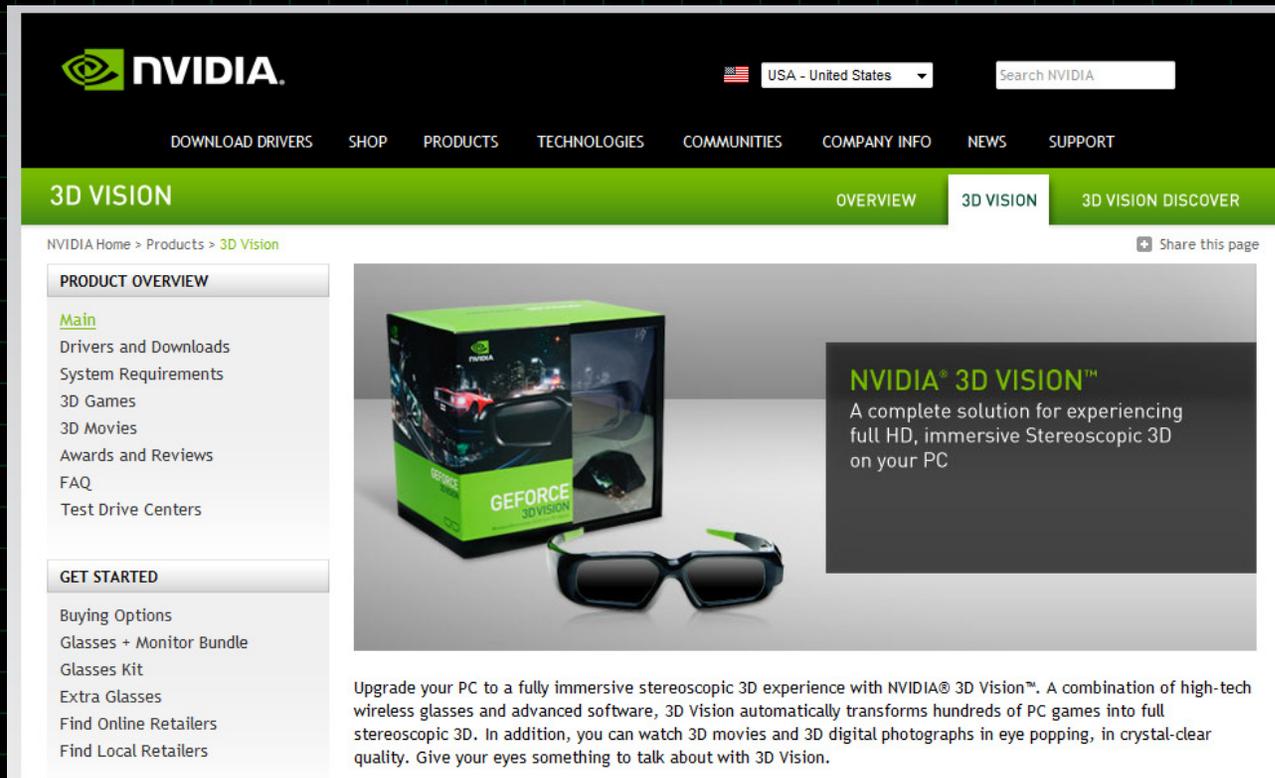
Modelagem de Agentes em GPUs

- Passo 1: ordenação
 - Coloca a grid de vizinhança de forma correta
- Passo 2: atualização da simulação
 - Aplica as regras de comportamento da multidão e executa os agentes baseado em modelagem de threads
- Passo 3: renderização

Resultados com até 1,000,000 entidades interativas em tempo real [video]



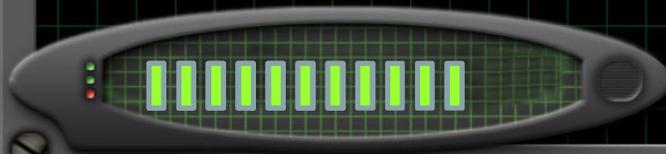
Dispositivos 3D



The screenshot shows the NVIDIA website's 3D Vision product page. At the top left is the NVIDIA logo. To its right is a language dropdown menu set to "USA - United States" and a search bar labeled "Search NVIDIA". Below this is a navigation menu with links for "DOWNLOAD DRIVERS", "SHOP", "PRODUCTS", "TECHNOLOGIES", "COMMUNITIES", "COMPANY INFO", "NEWS", and "SUPPORT". The main navigation bar is green and contains "3D VISION" (highlighted), "OVERVIEW", and "3D VISION DISCOVER".

Below the navigation bar, the breadcrumb trail reads "NVIDIA Home > Products > 3D Vision" and there is a "Share this page" button. A left sidebar contains two sections: "PRODUCT OVERVIEW" with links for "Main", "Drivers and Downloads", "System Requirements", "3D Games", "3D Movies", "Awards and Reviews", "FAQ", and "Test Drive Centers"; and "GET STARTED" with links for "Buying Options", "Glasses + Monitor Bundle", "Glasses Kit", "Extra Glasses", "Find Online Retailers", and "Find Local Retailers".

The main content area features a product image of the "GEFORCE 3D VISION" box and a pair of wireless glasses. To the right of the image is a text box that reads: "NVIDIA® 3D VISION™. A complete solution for experiencing full HD, immersive Stereoscopic 3D on your PC". Below this is a paragraph: "Upgrade your PC to a fully immersive stereoscopic 3D experience with NVIDIA® 3D Vision™. A combination of high-tech wireless glasses and advanced software, 3D Vision automatically transforms hundreds of PC games into full stereoscopic 3D. In addition, you can watch 3D movies and 3D digital photographs in eye popping, in crystal-clear quality. Give your eyes something to talk about with 3D Vision."



Dispositivos 3D

Sony estreia TV em 3D no próximo ano

Reuters

Quinta-feira, 03 de setembro de 2009 - 07h01

1 Comentário(s)

Reuters



Produtos da Sony expostos na sede da empresa em Tóquio: PCs Vaio serão compatíveis com a nova tecnologia.

TÓQUIO - A Sony planeja lançar TVs que exibem imagens em três dimensões no próximo ano, publicou o Financial Times.

O CEO da Sony, Howard Stringer, anunciará o lançamento de TV 3D, assim como planos de tornar PCs Vaio, PlayStation 3 e players de Blu-ray compatíveis com a tecnologia durante a feira IFA, que acontece em Berlim, segundo o jornal.

Leia também:

O Financial Times afirmou ainda que Stringer dirá à audiência: "Assim como a

retweet

RSS

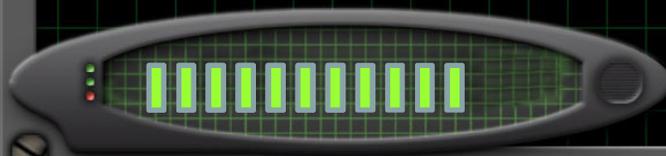
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Tags:

Sony



www.nvidia.com/object/3D_Vision_3D_Games.html

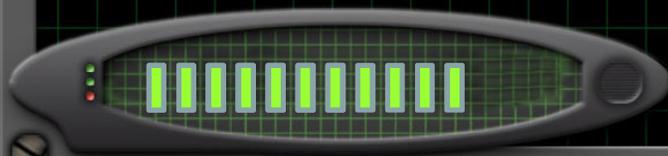
3D Games

NVIDIA 3D Vision Game Support

NVIDIA® 3D Vision™ automatically transforms hundreds of PC games into full stereoscopic 3D right out of the box, without the need for special game patches. By leveraging [The Way It's Meant to be Played™](#) program and its close relationships with game developers, NVIDIA® provides a terrific 3D gaming experience.

The following list is all current games supported by NVIDIA 3D Vision in the latest [v1.11 CD Drivers](#) (3D Vision v190.62).

Rating	Games
Excellent	1701 A. D.
	1701 A. D.-The Sunken Dragon expansion pack
	3D Pong
	Age of Empires 3
	Age of Empires 3 - Asian Dynasties
	Age of Empires 3 - The War Chiefs
	Age of Pirates 2: City of Abandoned Ships
	Alien vs Predator 2
	Alvin and the Chipmunks
	Armed and Dangerous
	Assassin's Creed
	Attack on Pearl Harbor
	Backyard Baseball 2005
	Batman: Arkham Asylum
	Battlefield 2
	Battle Forge
	Bee Movie - The Game
	Beijing Olympics
	Beowulf
	Biohazard 5
	Black and White 2
	Blazing Angels 2 - Secret missions of WWII
	Boarder Zone



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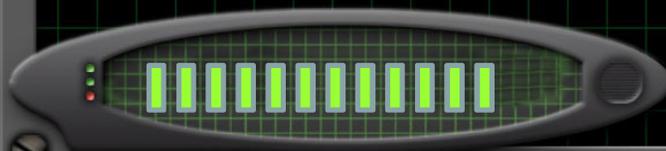


PC
via
browser plug-in



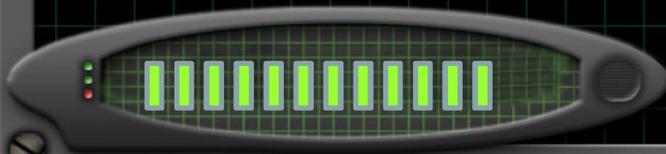
MAC
via
browser plug-in

TV
via
OnLive MicroConsole



[trailer](#)

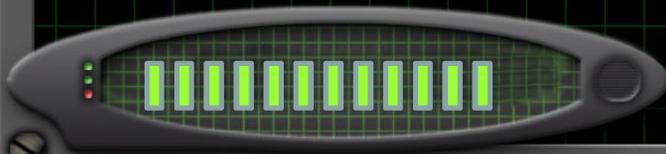
Visão computacional



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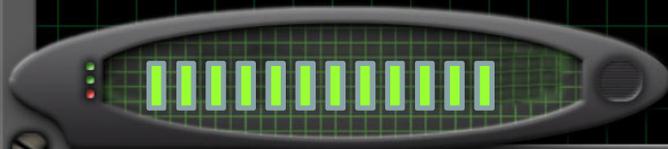
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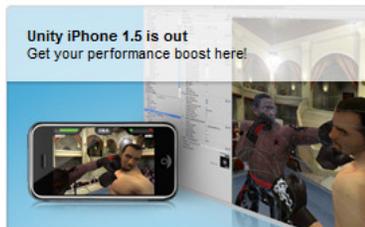
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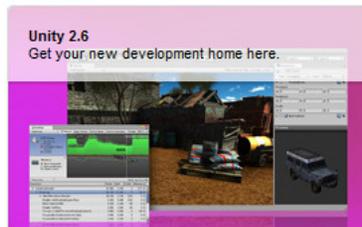
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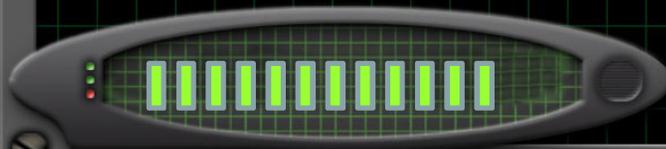
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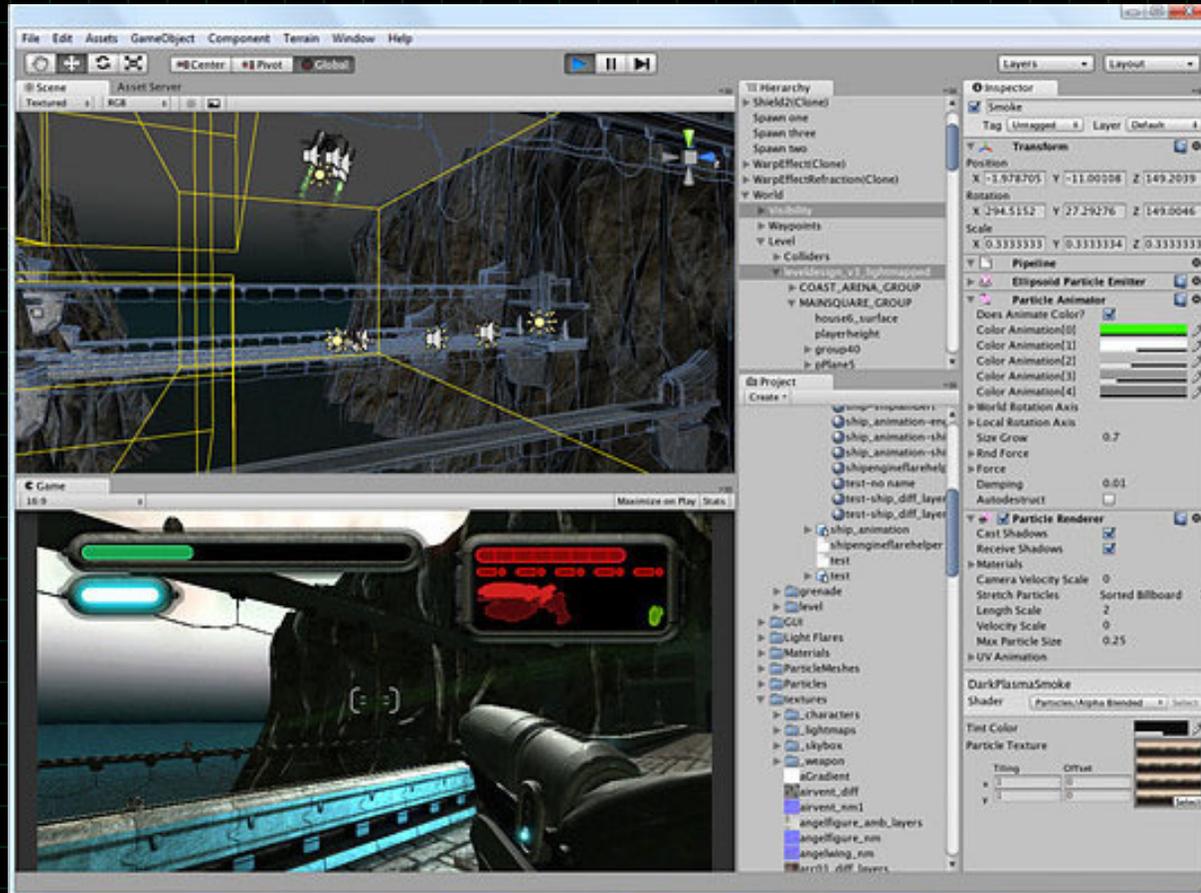
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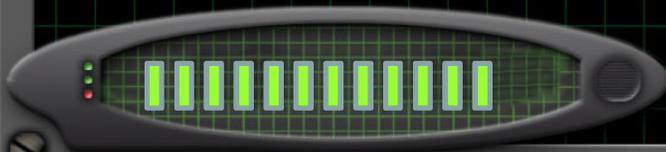
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