

Tópicos Especiais I - Jogos

Game Engines



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➤ Game Engines... “The Choice”

- Genesis3D - <http://www.genesis3d.com/>
- ENG32 - <http://www.infrasoft.co.at/hn/>
- Frog Engine - <http://www.geocities.com/SiliconValley/Lakes/1322/>
- Dream Engine - <http://www.geocities.com/SiliconValley/Horizon/8292/de10.htm>
- libCON - <http://photoneffect.com/default.html>
- Fly3D - <http://www.fly3d.com.br/>
- Allegro - <http://www.talula.demon.co.uk/allegro/>
- Crystal Space - <http://crystal.sourceforge.net/>
- Dark Basic - <http://www.darkbasic.com/>
- DirectX - <http://www.microsoft.com/directx/>
- Blitz3D - <http://www.blitzbasic.com/>
- 3DGPL, Focus, Katharsis, VD/Eclipse, PV-Panard Vision SDK, Nectar Engine, Duality Engine, VisKit, JTGame, Legus3D, Quake, ...

From:

<http://meshes.com/cssgame/engine1.htm> [engine2.htm](http://meshes.com/cssgame/engine2.htm) [engine3.htm](http://meshes.com/cssgame/engine3.htm)

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➤ Game Engines...

All we need is... “modules,modules”
Modules is all you need!

- I/O Periféricos: Teclado, Mouse, Joystick, FFB, DG, etc
- Interface com os Dispositivos Gráficos:
Driver da Placa Gráfica, Rotinas Gráficas (Bitmap, 2D, 3D, 3D Accel.)
- Interface com os Dispositivos de Áudio:
Músicas (e.g. midi), Sons e Vozes (e.g. wav), Controles e Mixagem
- Interface com a Rede (Local/Internet):
Multiplayer, Servidor-Cliente, Protocolos
- GUI: Graphical User Interface – Menus, Janelas
- Temporização: Acesso a rotinas do Timer
- Utilitários:
 - ✓ Importação e Exportação de arquivos (ler/escrever)
 - ✓ Compactação e Descompactação de Dados (codecs)
 - ✓ Funções Matemáticas
 - ✓ Detecção de colisão, animação, etc.

➤ Game Engines... Todos tem seu preço!

- Padronização: OpenGL, DirectX, Xfree, Vesa/VBE, ...
- Portabilidade: Microsoft, Linux, Apple, ...
- Disponibilidade: GPL, LGPL, Freeware, Shareware, Comercial, ...
- A difícil escolha...
 - ✓ **DirectX** – DirectInput, DirectSound, DirectMusic, DirectPlay, DirectDraw, Direct3D => Microsoft Windows
 - ✓ **OpenGL** – Mesa (OpenGL API), GLUT (I/O, Windows Handling) => Microsoft Windows, Linux, SiliconGraphics, ...
 - ✓ Fly3D – OpenGL + DirectX
 - ✓ Allegro – Rotinas próprias => Microsoft, Linux, Apple, ...
DirectX => Microsoft Windows
 - ✓ Crystal Space – OpenGL => Microsoft, Linux
 - ✓ Dark Basic – DirectX => Microsoft Windows

➤ Game Engines... Tendências em 2003

- OpenGL + DirectX

Engines:

DirectX	IO,G,A,N	Windows	SDK Free
OpenGL	G [I/O]	Multiplataforma	DLL Free
Fly3D	IO,G,A,N	Windows	SDK Free
CrystalSpace	IO,G,A [N]	Multiplataforma	Free / GNU GPL
Allegro4	IO,G,A [N]	Multiplataforma	Free / GNU GPL
DarkBasic	IO,G,A [N]	Windows	Comercial
Blitz3D	IO,G,A [N]	Windows	Comercial
Quake Engine	IO, G, A, N	Multiplataforma	GNU GPL

➤ Game Engines... Overview

- **DirectX** - <http://www.microsoft.com/directx/>
 - Principais versões: Dx3, Dx5, DX7 e atual DirectX 9.0b

Microsoft® DirectX® 9.0 is made up of the following components:

- **DirectX Graphics** combines DirectDraw® and Direct3D® components of previous DirectX versions into a single API that you can use for all graphics programming. The component includes the Direct3D extensions (D3DX) utility library, which simplifies many graphics programming tasks.
- **DirectInput®** provides support for a variety of input devices, including full support for force-feedback technology.
- **DirectPlay®** provides support for multiplayer networked games.
- **DirectSound®** can be used in the development of high-performance audio applications that play and capture waveform audio.
- **DirectMusic®** provides a complete solution for both musical and non-musical soundtracks based on waveforms, MIDI sounds, or dynamic content authored in DirectMusic Producer.
- **DirectShow®** provides for high-quality capture and playback of multimedia streams.
- **DirectSetup** simple API that provides one-call installation of DirectX components.
- **DirectX Media Objects** provide support for writing and using data-streaming objects, including video and audio encoders, decoders, and effects.

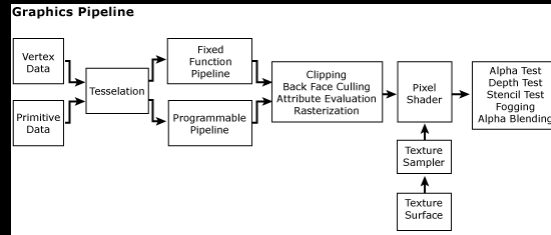
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- ◆ **DirectInput**: keyboard (keypress, scancode), mouse, joystick (analog, digital – calibrate), or other input device (force feed-back, data glove).
- ◆ **DirectSound**: Play sounds (multiple) from WAV format, assign high-priority sounds to hardware-controlled buffers, locate sounds in a customizable 3-D environment, add effects (and change dynamically) such as echo and chorus, capture WAV from a microphone or other input.
- ◆ **DirectMusic**: Load and play sounds from MIDI, WAV, or DirectMusic Producer run-time format, play from multiple sources simultaneously, schedule the timing of musical events with high precision, locate sounds in a 3-D environment, easily apply pitch changes, reverberation, and other effects, use more than 16 MIDI channels. DirectMusic makes it possible for any number of voices to be played simultaneously, up to the limits of the synthesizer, capture MIDI data, or stream ("thru") it from one port to another.

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- ♦ **DirectPlay**: DirectPlay API enables you to write network applications such as multiplayer games. It performs all of the hard work associated with connecting players, even those behind Network Address Translation (NAT) devices, and managing sessions. It allows you to create, find, and connect to multiplayer games. Once connected, DirectPlay enables you to send guaranteed or non-guaranteed messages to other players.
- ♦ **DirectDraw**: Bitmap / Sprites / 2D primitives
- ♦ **Direct3D**:



➤ Game Engines... Overview

- **DirectX** - <http://www.microsoft.com/directx/>
 - Exemplos:

File: PlayAudio.cpp
Mouse.cpp
GetDxVer.cpp
Dolphin, Fur, BumpMapping, Lighting,...
MazeServer, MazeClient

➤ Game Engines... Overview

- **Allegro** - <http://www.talula.demon.co.uk/allegro/>
 - “A game programming library” - “Low level game routines”
 - Principais versões: Allegro 3.0 / Allegro 4.1
 - Ambiente: GNU C/C++ Dos (Djgpp) e Linux

Módulos:

- **E/S**: mouse, teclado, joystick
- **Funções Gráficas**: BitMap, Palette, Sprites, Texto, 2D, 3D e animação (swap buffers)
- **Áudio**: Sons (wav,voc), Músicas (midi) e Stream
- **Arquivos**: Imagens (bmp, pcx, tga, fli, flc) e compressão (lzss)
- **GUI**: Rotinas simples para criar menus, windows (WinAllegro e DirectX)
- **Funções Matemáticas**: Pacote matemático voltado para aplicações gráficas

Vantagens:

- **Simplicidade de uso!**
- **Vide exemplos...** ExHello.c, ExBitmap.c, ExMidi.c, ExMouse.c, ExStars.c (3D)

Desvantagens:

- **Problemas de incompatibilidade com hardware!**

➤ Game Engines... Overview

- **CrystalSpace (CS)** - <http://crystal.sourceforge.net/>
 - Free game programming / Multiplataform / “The best” (?)
 - Ambiente: Microsoft Windows, Linux, MacOS/X

Módulos:

- **Event Handler**
- **Funções Gráficas**: BitMap, 2D, 3D, Textures, LOD, ...
- **Áudio**: Sons, Músicas e Stream (diversos formatos)
- **Arquivos**: Imagens, Vídeo e Compressão (diversos formatos)
- **Gráficos**: Terrenos, Partículas, Detecção de Colisão, ...
- **Rede**: Facilidades para multiplayer

Vantagens:

- **Vide exemplos...** Manual: 1.5 (file:/CristalSpace/CS/docs/html/cs_6.html)

Desvantagens:

- **Alguma?**

➤ Game Engines... Overview

- **DarkBasic** - <http://www.darkbasic.com/>
 - Basic Language programming for Games
 - Ambiente: Microsoft Windows / DirectX (accel. 3D)

Vantagens:

- **Simplicidade de uso!**
- **Vide exemplo... Frog.exe**

Desvantagens:

- **Limitações da linguagem de programação.**
- **Desempenho.**

➤ Game Engines... Programming

• Programação de Jogos:

- Programação 2D => 3D
- Laço principal do Jogo
- Eventos

* **Técnicas de Aceleração**

- Falso 3D (2D e meio). Exemplo: corridas
- Cenários múltiplos
- Texturas

* **Por onde começar?!?!?**

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