



semcomp¹¹

13 a 17 de Outubro de 2008 - ICMC - USP São Carlos

Desenvolvimento Rápido de Jogos em 3D Usando o Dark GDK com o Microsoft Visual C/C++ (Game RAD - *Rapid Application Development*)

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Material Complementar

Página Web: <http://www.icmc.usp.br/~fosorio/>

Parte I
15/10/08

1

Outubro 2008



Temas Abordados:

- 8h00-12h00 Introdução ao Desenvolvimento Rápido de Jogos
Ferramenta Dark GDK / TheGameCreators
Demonstração: Exemplos de Jogos feitos com o GDK
Introdução a Linguagem Dark GDK – Programação em C++
Hands-On: Criando Jogos em 3D!
- 14h-18h00 Projeto de um Jogo e Ferramentas Complementares
> Design Doc., Modelagem 3D, Som, Texturas, Animações
Técnicas de Desenvolvimento de Jogos
> Cenário: Skybox, Terrenos, BSP
> Atores: Movimentação, Animação, Ações, Comportamento
> Colisão: Cenário, Objetos, Atores, Gravidade
Jogos Multi-Player
> Conexão em Rede: P2P, Cliente-Servidor, MMOG

2

Outubro 2008

Desenvolvimento Rápido de Jogos – Game RAD:

Conceitos de Programação RAD para Jogos

Conceito de... **BIBLIOTECA** => **LIBs, DLLs. Bibliotecas de**
Gráficos 2D e 3D, Áudio (sons, músicas)
Interface, Rede/Multiplayer, Física, I.A.

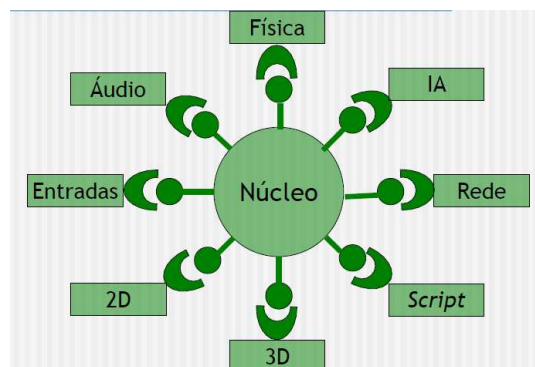
ENGINE => **Integração de Ferramentas e Bibliotecas**
Ogre3D, Crystal Space, Unreal Engine, ...
Editores de Cenários, Editores de Nível, ...

Ferramenta RAD => **Biblioteca + Engine + Ambiente Integrado**
Ferramentas de Apoio + Simplicidade de Programas

Exemplos de **BIBLIOTECAS, ENGINES e FERRAMENTAS RAD**

Desenvolvimento Rápido de Jogos – Game RAD:

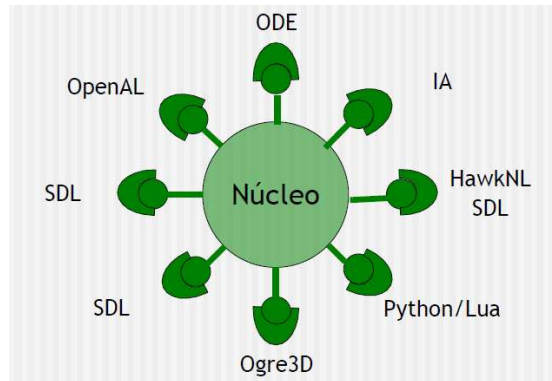
Conceitos de Programação RAD para Jogos



Exemplos de **BIBLIOTECAS, ENGINES e FERRAMENTAS RAD**

Desenvolvimento Rápido de Jogos – Game RAD:

Conceitos de Programação RAD para Jogos



Exemplos de BIBLIOTECAS, ENGINES e FERRAMENTAS RAD

Desenvolvimento Rápido de Jogos – Game RAD:

Exemplos de BIBLIOTECAS, ENGINES e FERRAMENTAS RAD

BIBLIOTECAS

OpenGL, DirectX, OSG, ODE, Allegro, SDL, SDL-Net, OpenAL, ...

ENGINES, TOOLKITS (SKD) [Framework]

Ogre3D, Crystal Space, Unreal Engine, Irrlich, Game Blender, Torque, ...

Wikipedia - http://en.wikipedia.org/wiki/List_of_game_engines

Ferramentas RAD

[YoYo Games] GameMaker

[TheGameCreators - TGC]

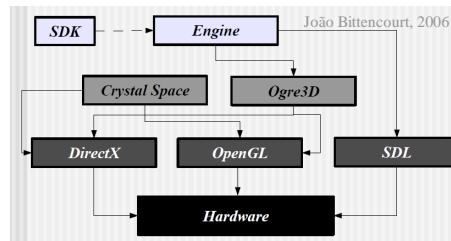
DarkBasic Professional

Dark GDK (SDK)

3D Game Maker

FPS Creator

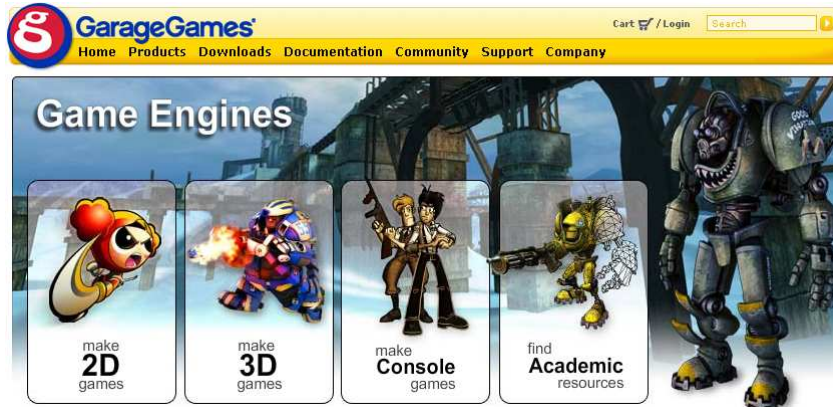
[3D RAD] 3D RAD



Dark
GDK

Desenvolvimento Rápido de Jogos – Game RAD:

<http://www.garagegames.com/products/torque/>



7
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GDK

Desenvolvimento Rápido de Jogos – Game RAD:

<http://www.3drad.com/>



8
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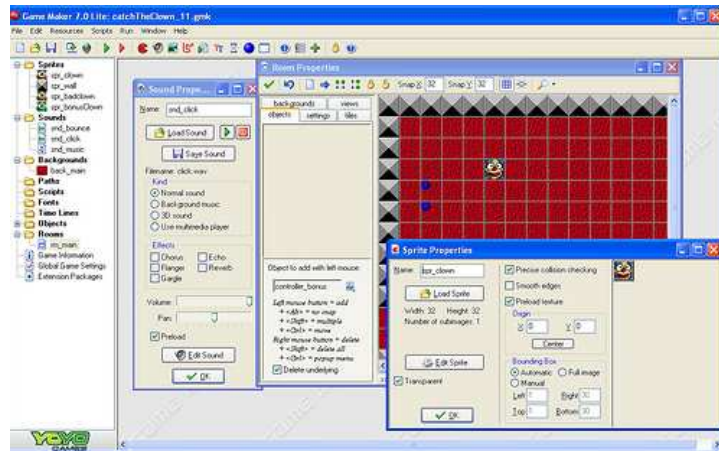
Desenvolvimento Rápido de Jogos – Game RAD:

<http://www.3drad.com/>



Desenvolvimento Rápido de Jogos – Game RAD:

<http://www.yoyogames.com/gamemaker/>



Desenvolvimento Rápido de Jogos – Game RAD:

<http://www.fpscreator.com/>



FULL PHYSICS SYSTEM
MULTI PLAYER
SHARE & SELL
MULTIPLE LEVELS
IMPORT YOUR OWN
GAME SCRIPTING
OVER 800 3D OBJECTS



The real-time fully 3D editor allows you to literally paint your levels, zooming in for pixel perfect control. Drop in objects, set their properties then test the game with one click of your mouse!

Build FPS games with ease

Desenvolvimento Rápido de Jogos – Game RAD:

<http://t3dgm.thegamecreators.com/>



Just Click to Create

Now anyone can build their ideal game in seconds. With just one click of a mouse, you can create a uniquely playable game...

without needing any programming knowledge or artistic skills at all.



Offering over 12 billion gaming options, The 3D Gamemaker opens up a whole new concept in gaming, providing fun for all the family.

Desenvolvimento Rápido de Jogos – Game RAD:

<http://darkbasicpro.thegamecreators.com/>



Next Generation Games Development

DarkBASIC Professional is the most advanced games development package built on the BASIC language currently available. No other package out there makes it as easy to incorporate all of the special features and effects you see in today's games and no other package natively offers the benefits of Microsoft's DirectX 9 technology.



Just some of the features...	MACHINE CODE EXE's	BRAND NEW 3D ENGINE
BSP SUPPORT	MULTI-PLAYER SUPPORT	3rd PARTY DLL SUPPORT
PIXEL/VERTEX SHADERS	BONE BASED MODELS	DIRECTX 9 SUPPORT

... and some of the great games created so far

Desenvolvimento Rápido de Jogos – Game RAD:

<http://darkbasicpro.thegamecreators.com/>

3D Engine	General Features	Misc. Features
Binary Space Partitioning (BSP) Potential Visibility Set Pixel & vertex shaders Real time shadows True reflections Lights Matrices Advanced terrain Multiple camera views Particle system Lightning fast 2D sprites Polygon collision detection Bump mapping Light mapping Environment mapping Multitexturing Bone based animations Cartoon shading Rainbow rendering Low level access of object data Vector and matrix manipulation	2D FEATURES Super-Fast 2D Sprites Mirror, Stretch and Blur Fade, Transparency and Rotate Screen-Sized sprites Fast Collision Animated Sprites Gamma Control Scale Sprites 2D Drawing Functions EXPANDABLE DLLs containing FORMATTED FUNCTIONS can be dropped into the plug-ins directory, after which they become commands within the language All components are modular for safe and stable upgrading	COMPILER Modern design Creates .EXE files Encrypt and compress exes Icon control of exes managed Breakpoint markers Produces 100% machine code INTERGRATED DEBUGGER Breakpoints Step Through Mode Variable Watcher EDITOR Project manager Function folding Syntax formatting Fully Windows XP compliant Online help Showcase examples Tutorials

Desenvolvimento Rápido de Jogos – Game RAD:

**BIBLIOTECAS
ENGINES
SDKs
TOOLKITS
FRAMEWORKS
FERRAMENTAS RAD PARA JOGOS
...**

Diversas e Variadas Opções!

Qual escolher?!?!



Desenvolvimento Rápido de Jogos – Game RAD:

DARK GDK - <http://gdk.thegamecreators.com/>



DarkGDK

Develop powerful and cool 2D / 3D games
with Dark GDK and Visual C++ 2008 Express

Free Professional Game Development Environment

The Game Creators are pleased to announce that their flagship C++ game development package, Dark GDK is now included free of charge with Microsoft Visual C++ 2008 Express, part of the Microsoft Visual Studio Express range.

Desenvolvimento Rápido de Jogos – Game RAD:

DARK GDK - <http://gdk.thegamecreators.com/>

Dark GDK porque...

- É uma ferramenta SDK-Toolkit com recursos de Game RAD
- É a versão do DarkBasic Professional “DBPro” (Basic) em C/C++
- É distribuída gratuitamente junto ao Visual Studio Express 2008
- A Microsoft adotou como ferramenta RAD para Jogos
- Encontramos muitos exemplos de código aberto...
- Encontramos muitos modelos 3D compatíveis com a ferramenta...
- Possui uma linguagem simples, completa e fácil de ser usada...

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PORQUE, AFINAL, VOCÊ SE INSCREVEU NESTE CURSO!





Dark
GDK

TGC / DARK GDK

DARK GDK

<http://gdk.thegamecreators.com/>

Características: Dark GDK features

- * Use virtually all of the DarkBASIC Professional 5.9 functions from within C++
- * Works with Microsoft Visual C++ 2008 Express
- * Small EXE size (starting at 1.8 MB with the 3D engine invoked)
- * 6 types of 2D Image Formats Supported
- * 5 types of 3D Object File Formats Supported
- * Over 1000 game orientated commands
- * Binary Space Partitioning (BSP) Support
- * Potential Visibility Set (PVS)
- * Nodetree Optimisation
- * Bump Mapping
- * Light Mapping
- * Environment Mapping
- * Sphere Mapping
- * Cubic Mapping
- * Multi-texturing
- * Bone Based Animations
- * Pixel and Vertex Shaders

- * Cartoon Shading
- * Rainbow Rendering
- * Code your own Shaders
- * Vector and Matrix Manipulation
- * Real Time Shadows
- * True Reflections
- * Lights (Omni, Spot, Directional)
- * Matrices and Terrains
- * Particle System
- * Extremely fast 2D Sprites
- * Polygon Collision and Response
- * Create Multi-player Games (Lan and Internet)
- * Fully Windows XP compliant
- * 3D Studio and Direct X Object Support
- * Sprite support including flipping, scaling and collision
- * Set and control sounds in 3D space
- * Load, Play and Loop Music files
- * Control 3D Fog depth, distance and colour
- * Full Object Rotation control
- * Control Object Limbs (direction, angle, rotation, size)
- * Create and Delete Object Meshes
- * Global or Object based automatic 3D Collision Detection
- * Automatic Camera and Camera to Object Orientation Commands
- * Create, Position and Colour Lights
- * Build, Texture and Map Matrix Landscapes
- * System Test Commands let you check for compatibility



19

Outubro 2008



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TGC / DARK GDK

DARK GDK

<http://gdk.thegamecreators.com/>

File Format	Name	Load	Save
2D Image - BMP	BMP	Yes	Yes
2D Image - Device Independant Bitmap	DIB	Yes	Yes
2D Image - Portable Network Graphics	PNG	Yes	
2D Image - JPEG	JPG	Yes	Yes
2D Image - DirectDraw Surface	DDS	Yes	Yes
2D Image - Targa	TGA	Yes	
3D Object - 3D Studio	3DS	Yes	
3D Object - DirectX	X	Yes	Yes
3D Object - MDL	MDL	Yes	
3D Object - MD2	MD2	Yes	
3D Object - MD3	MD3	Yes	
BSP World Support	Quake 2	Yes	
BSP World Support	Quake 3	Yes	
BSP World Support	Half Life	Yes	
Sound - Wave File	WAV	Yes	Yes
Sound - Windows Media Audio	WMA	Yes	
Sound - Windows Media Audio	AIFF	Yes	
Sound - Windows Media Audio	AU	Yes	
Sound - Windows Media Audio	SND	Yes	
Sound - Mpeg Layer 3	MP3	Yes	
Music - MIDI playback	MIDI	Yes	
Music - CD Audio Tracks	CD-Audio	Yes	

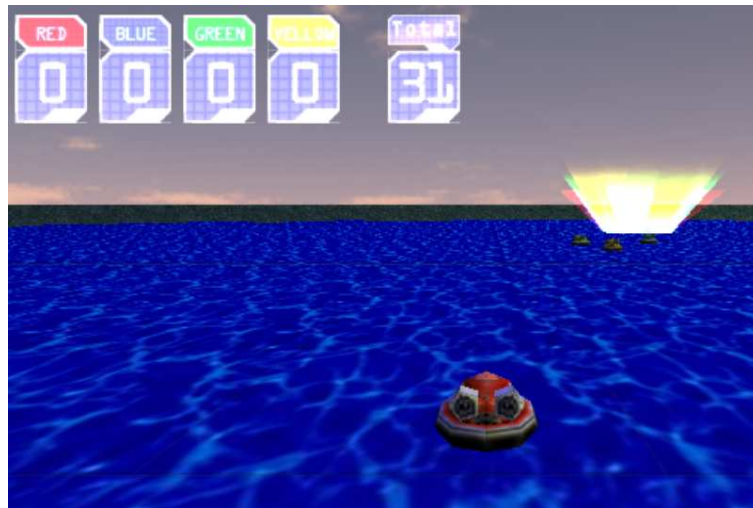
20

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DARK GDK / DBPro Exemplos

RC Motorboat

Matheus Winter



DARK GDK / DBPro Exemplos

RC Motorboat

Programas utilizados

- DarkBasic Professional 1.057
- Terragen 0.9
- 3D Canvas 6.5.1.0 (Freeware Edition)
- Terranim 2.1.4
- MatEdit 1.6b
- Wav MP3 Editor 10.1
- VirtualDubMod 1.5.10.1
- Capture Solution 8.1
- Tasker 3.13

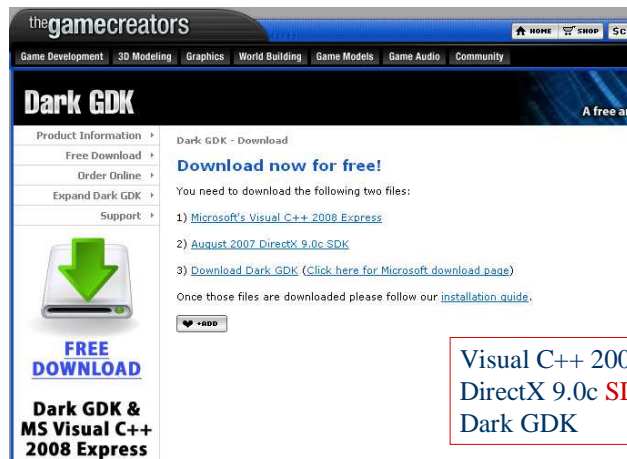
DARK GDK / DBPro Exemplos

Bruno Ferreira
Nelson Florisbal



DARK GDK - Instalação

<http://gdk.thegamecreators.com/?f=downloads>



the game creators

Game Development | 3D Modeling | Graphics | World Building | Game Models | Game Audio | Community

Dark GDK

Product Information > Dark GDK - Download
Free Download > **Download now for free!**
Order Online > You need to download the following two files:
Expand Dark GDK > 1) [Microsoft's Visual C++ 2008 Express](#)
Support > 2) [August 2007 DirectX 9.0c SDK](#)
3) [Download Dark GDK \(Click here for Microsoft download page\)](#)
Once those files are downloaded please follow our [installation guide](#).

FREE DOWNLOAD

Dark GDK & MS Visual C++ 2008 Express

Visual C++ 2008 Express
DirectX 9.0c SDK August 2007
Dark GDK



DARK GDK - Instalação

<http://gdk.thegamecreators.com/?f=downloads>

Dicas... By F.S.O

HOW TO INSTALL...

- 1) Install Visual C++ Express
(execute this once... you should start VC++ one time before to continue)
- 2) Install DirectX SDK (SDK not only run-time)
- 3) Install GDK from The Game Creators
- 4) Copy: wizard/Project to My Documents
- 5) Enter in Visual C++: Tools - Options
Set Include path
Set Libs path

DONE!



DARK GDK - Instalação

<http://gdk.thegamecreators.com/?f=downloads>

Dicas... By F.S.O

HOW TO INSTALL...

- 4) Copy: ...\\Dark GDK\\Wizards\\Project To \\My Documents

Copy files... ..\\Dark GDK\\Wizards\\Project

If you are using a Portuguese version of Windows, please create a My Documents directory!

Example: for the user FOSORIO

C:\\Documents and Settings\\fosorio\\Meus documentos\\ and
C:\\Documents and Settings\\fosorio\\My Documents\\

COPY:

C:\\Arquivos de programas\\The Game Creators\\Dark GDK\\Wizards

TO:

C:\\Documents and Settings\\fosorio\\My Documents\\Visual Studio 2008\\Wizards

DARK GDK - Instalação

<http://gdk.thegamecreators.com/?f=downloads>

Dicas... By F.S.O

HOW TO INSTALL...

5) Enter in Visual C++: Tools - Options

Set Include path

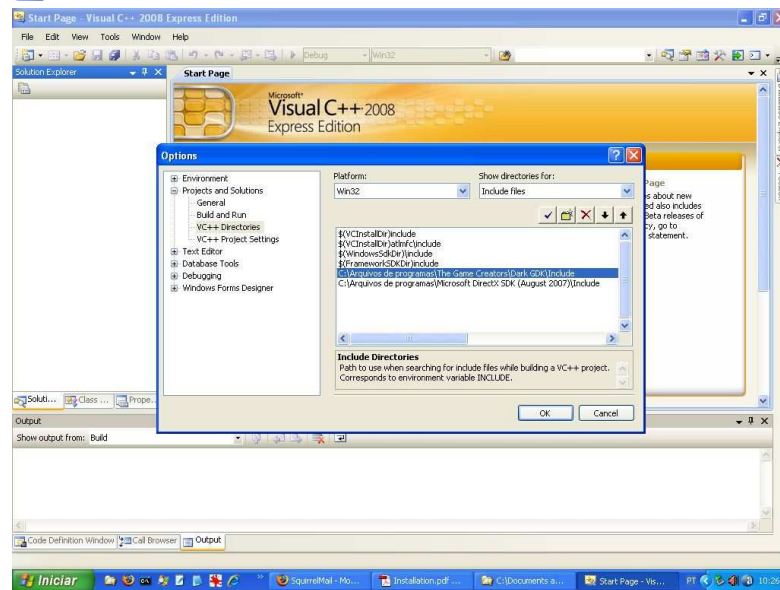
Set Libs path

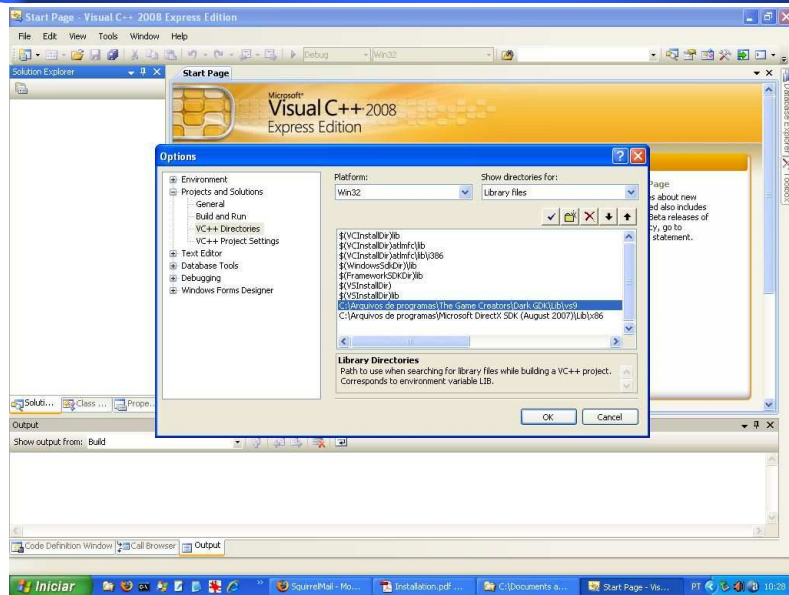
To see how to configure the paths,
Follow the "instructions.pdf"
And see the screen-captures:
Add-Include-in-Tools-Option.jpg
Add-Libs-in-Tools-Option.jpg

I also edited this file:

C:\Arquivos de programas\The Game Creators\Dark GDK\Wizards\Projects\
\Dark GDK - Game\Dark GDK - Game.vsz

=> Replace in the text Mike by Forsorio :-)





DARK GDK - Instalação

<http://gdk.thegamecreators.com/?f=downloads>

Usando o GDK:

1. Veja o HELP

C:\Arquivos de programas\The Game Creators\Dark GDK\Documentation

X	Nome	Tamanho	Tipo	Data de modificação
	The Game Creator			
	Dark GDK.chm	536 KB	Arquivo compilado d...	12/11/2007 13:07

2. Veja os exemplos...

C:\Arquivos de programas\The Game Creators\Dark GDK\Tutorials

C:\Arquivos de programas\The Game Creators\Dark GDK\Samples

3. Use os arquivos de mídia... (objetos, audio, etc)

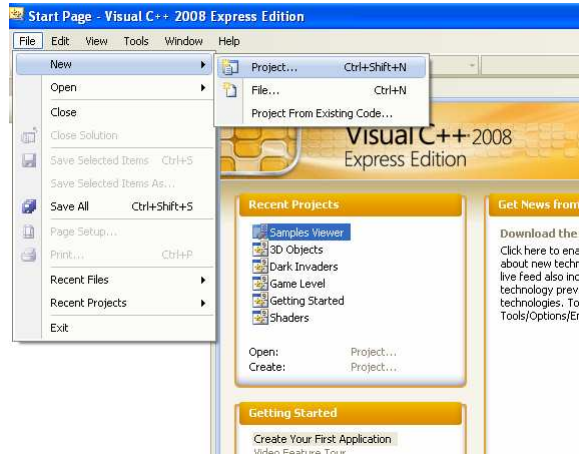
C:\Arquivos de programas\The Game Creators\Dark GDK\Media

C:\Arquivos de programas\The Game Creators\DarkMATTER2 [PAGO]

Acesse o TurboSquid: <http://www.turbosquid.com/> [Modelos Pagos e Gratuitos]

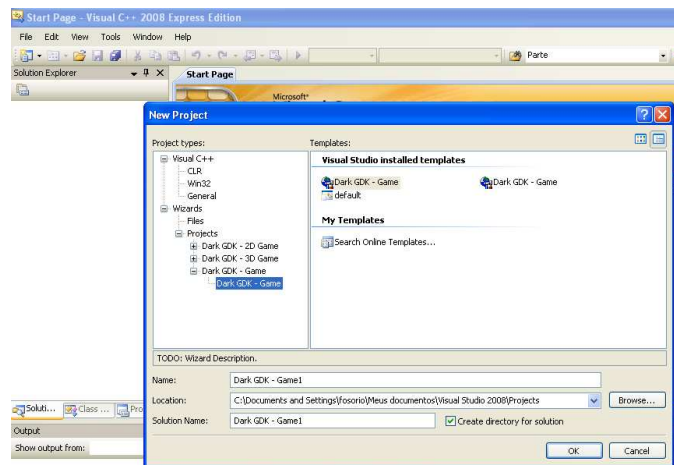
DARK GDK – Meu primeiro programa...

Crie um projeto novo no Visual C++ 2008 Express Edition



DARK GDK – Meu primeiro programa...

Crie um projeto tipo: Dark GDK - Game





DARK GDK – Meu primeiro programa...

Crie um projeto tipo: Dark GDK - Game

```
// Dark GDK - The Game Creators - www.thegamecreators.com

// The wizard has created a very simple project that uses Dark GD. It contains the basic code for a GDK application
// whenever using Dark GDK you must ensure you include the header file
#include "DarkGDK.h"

// the main entry point for the application is this function
void DarkGDK ( void )
{
    // turn on sync rate and set maximum rate to 60 fps
    dbSyncOn ();
    dbSyncRate ( 60 );

    // our main loop
    while ( LoopGDK ( ) )
    {
        // update the screen
        dbSync ();
    }

    // return back to windows
    return;
}
```



DARK GDK – Meu primeiro programa...

Crie um projeto tipo: Dark GDK - Game

```
// Esqueleto Dark GDK

#include "DarkGDK.h"

void DarkGDK ( void )
{
    dbSetWindowOff ();
    dbHideMouse();

    while ( LoopGDK ( ) )
    {
        // Loop do Jogo
    }

    return; // FIM
}
```



DARK GDK – Meus primeiros programas...

Dark GDK – HANDS ON!

Ex1-Cubo1 => Cubo3D

Ex1-Cubo1 => Cubo3D com Cor

Ex1-Cubo2 => Cubo3D com Textura

Ex1-Cubo3 => Cubo3D com Rotação (animação)

Ex2-Esfera => Esfera3D com Textura

Ex2-Esfera1 => Esfera3D com Textura adaptada e Fundo

Ex2-Esfera2 => Esfera3D Rotacionando nos 3 eixos

Ex2-Esfera3 => Controle pelo teclado: wireframe

Ex3-Camera => Esfera + Câmera Virtual / Teclado (shift/control)

Ex3-Camera1 => Controle da altura da câmera

Ex4-Plano => Cria um plano de referência (Matrix)

Ex4-Plano1 => Reposiciona o Matrix

Ex4-Plano2 => Aplica uma textura no Matrix



DARK GDK – Meus primeiros programas...

Dark GDK – HANDS ON!

Ex5-Obj3D => Troca Esfera por Objeto3D (XWing)

Space/Return, Shift/Control

Ex5-Obj3D1 => Ajuste de escala e posição

Ex5-Obj3D2 => Controle da Nave:

R = Rotate

Q/W, A/Z = Controle direção

I,J,K,M = Avanço, Giro

DEMOS:

> ShowObj

> ShowAnim (mummy)

> ShowXAnim

> ShowBSP

> ExploreBSP

> Matrix com elevação

> Cubo de Cubos

> Abertura

> Planetas

> Terreno

COMANDOS GDK



INFORMAÇÕES SOBRE O MINI-CURSO

USP - Universidade de São Paulo - São Carlos, SP
ICMC - Instituto de Ciências Matemáticas e de Computação
SSC - Departamento de Sistemas de Computação

Prof. Fernando Santos OSÓRIO – Profa. Kalinka Castelo Branco

Web institucional: <http://www.icmc.usp.br/ssc/>

Página pessoal: <http://www.icmc.usp.br/~fosorio/>

**E-mail: [fosorio \[at\] icmc. usp. br](mailto:fosorio@icmc.usp.br) ou [fosorio \[at\] gmail. Com](mailto:fosorio@gmail.com)
[kalinka \[at\] icmc. usp. br](mailto:kalinka@icmc.usp.br)**

SEMCOMP 11 - Outubro 2008

Mini-Curso

Desenvolvimento Rápido de Jogos em 3D:

Usando o GDK com o Microsoft Visual C/C++ (Game RAD)