Game engine development in Polish game industry

Mroczne Sekrety Twórców Gier Komputerowych

Game Engine Development
Agenda

- Introduction
- State of Game Engines in Poland
- Mobile Multiplatform Engine
- Publishing
- What is your path?

Bonus (if there will be time):

- Case Study: DOD Scene Graph

Game Engine Development
Introduction

Karol Gasiński

http://www.linkedin.com/

kuktus@gmail.com

Graphic Software Engineer @ Intel

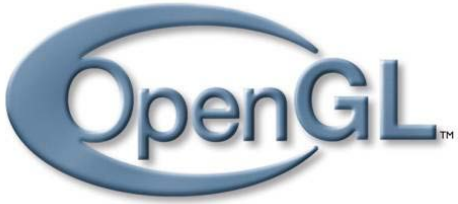
http://www.intel.com/

KHRONOS Group member

Contributes to OpenGL specification

http://www.khronos.org/

http://www.opengl.org/



Game Engine Development
Introduction

Projects:

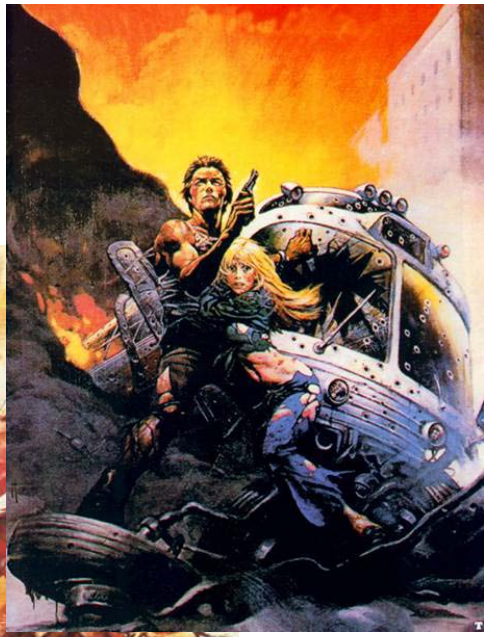
- TrueColor graphics library for DOS
- Multitasking Operating System Microkernel in ASM
- Multiplatform game engine (Android/BlackBerry/iOS/Windows)

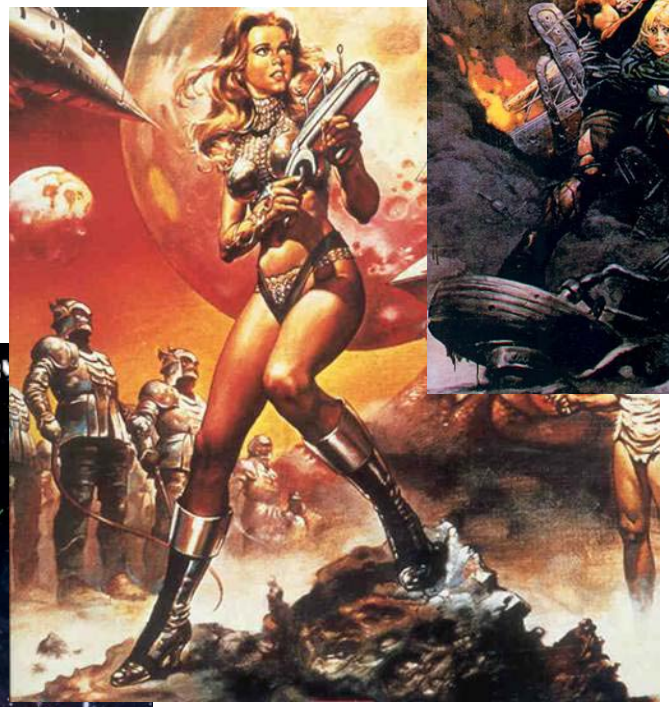
Worked on mobile versions of:

- Medieval Total War
- Pro Evolution Soccer
- Silent Hill
- Invaders Must Die!

Currently developing:

- Heroic Sci-Fi Title TBA





Game Engine Development
Introduction

Founder And Chairman:

WGK – Polish Conference on Computer Games Development

- http://wgk.pgda.pl
- 350+ international participants
- ~40 lectures, panels, workshops
- 3 editions away
- 3 full days

Speaker at:

- Digital Frontier, GameDay, WGK, IGK, Gdańsk University of Technology...

You can also meet me at:

- GDC, GDC Europe, SIGGRAPH, GamesCom...

Game Engine Development

State of Game Engines in Poland

Some facts:

- ~120-150 Game Studios in Poland
- How many of them license game engine?
- Common sense says that most of them, but..

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HARD FACTS:

- Only 5 companies in Poland uses Unreal Engine (UE3/UE4)!
- Only about 20 Polish Studios use Unity!
- More than 100 of game companies uses their own tech!

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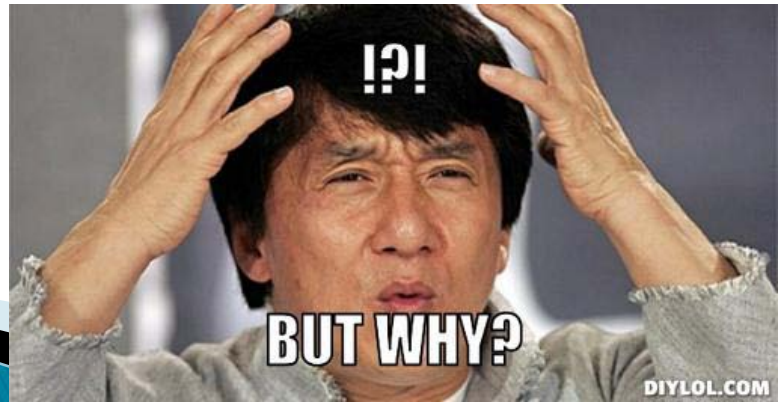
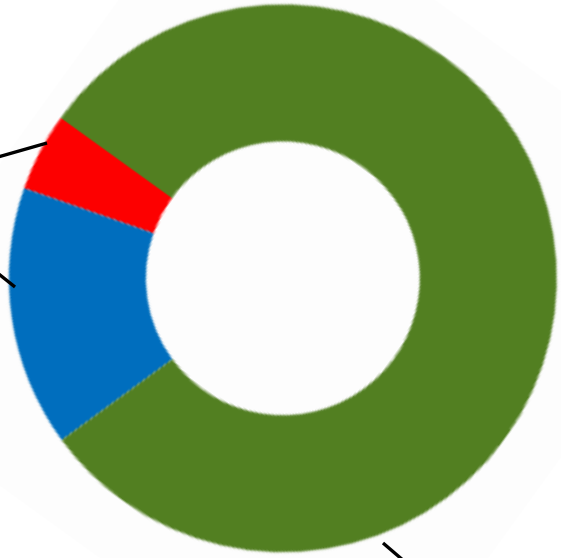


Game Engine Development

State of Game Engines in Poland



CI Games
People Can Fly
The Farm 51
Astronauts
Dark Stork
Nicolas Games

Fuero Games
Crunching Coalas
GameLab
Ganymede
Infinity Dreams
INTERMARUM
Jujubee
Tap It Games
AideMMediA
Anshar Studios
Nawia Games
…

CD Projekt RED
Techland
Reality Pump
Flying Wild Hog
Vivid Games
Artifex Mundi
11bit Studios
Teyon
Tate Interactive
QubicGames
PlayWay
Nitreal Games
Nano Games
Nano Titans
Gamelion
EXOR Studios
Big Daddy's Creations
Drago Entertainment
…

Game Engine Development
State of Game Engines in Poland

Small studios targeting mobile's:

- Tablets, Smartphones, Handheld Consoles…
- Android, BlackBerry 10, iOS, Windows Phone…
- HTML 5, Facebook, browser games…

Licensing is too expensive for such small studios.
There is too much targets to support.
They choose to make their own, minimal Frameworks for that.

Game Engine Development
Mobile Multiplatform Engine

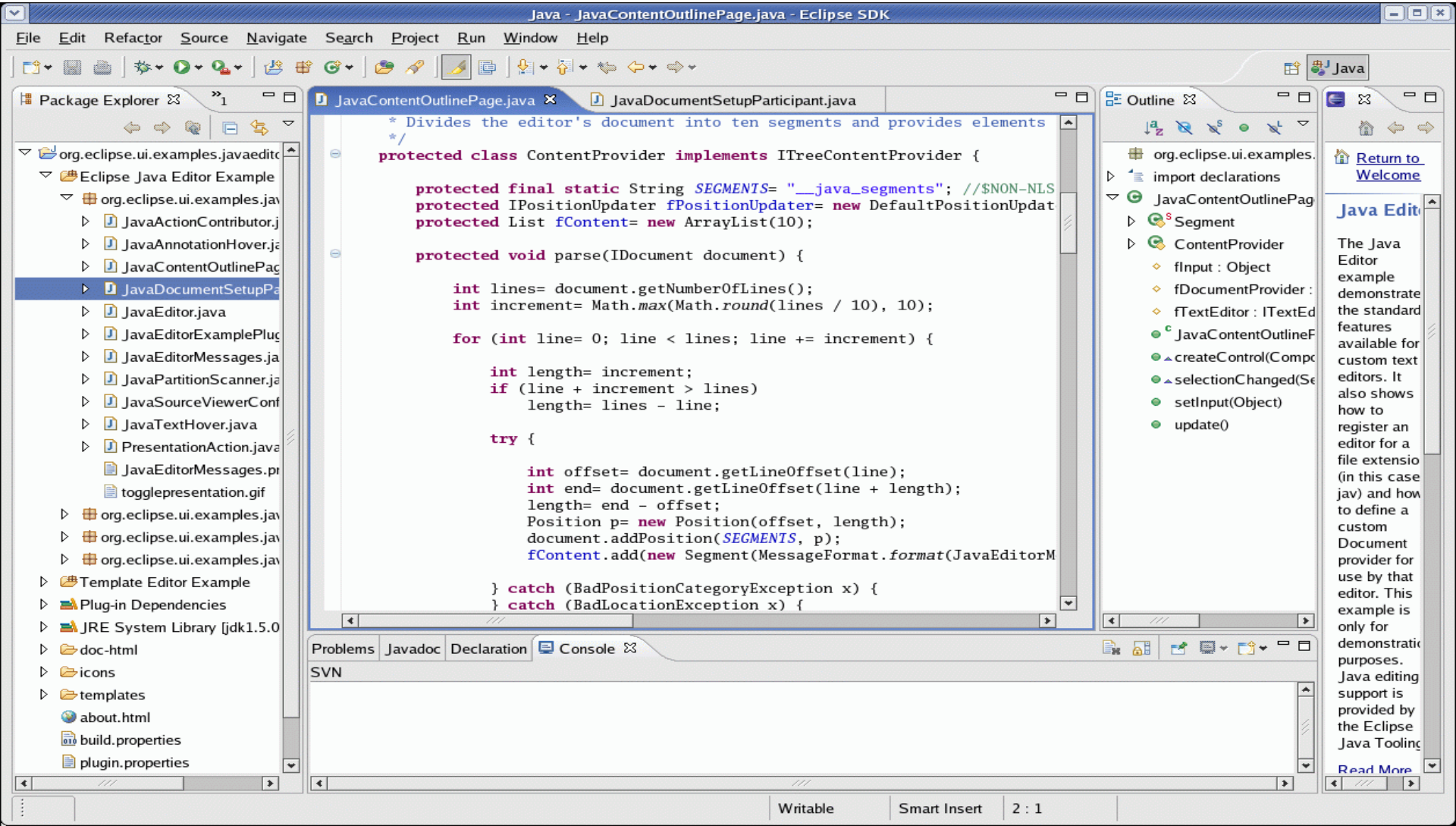
- Check what devices do you have:

	Android	BlackBerry	iOS	Windows
Default IDE:	Eclipse	Momentics	XCode	Visual Studio
Default language:	Java	C++/AIR/HTML5	Objective-C	C/C++
Required devices:	- **Android 2.3+** - Phone or Tablet	- Emulator - **Dev Alpha** - PlayBook, **Z10**, Q10	- **MacBook** - Emulator - **iPhone**, iPad, iPod	**None**

- What about Windows Phone?
- Features available from version 8:
  - DirectX 9 like interface for rendering, SM 2.0 HLSL.
  - Native development in C++
- Conclusion:
- WP is not worth multiplatform development effort at this moment.

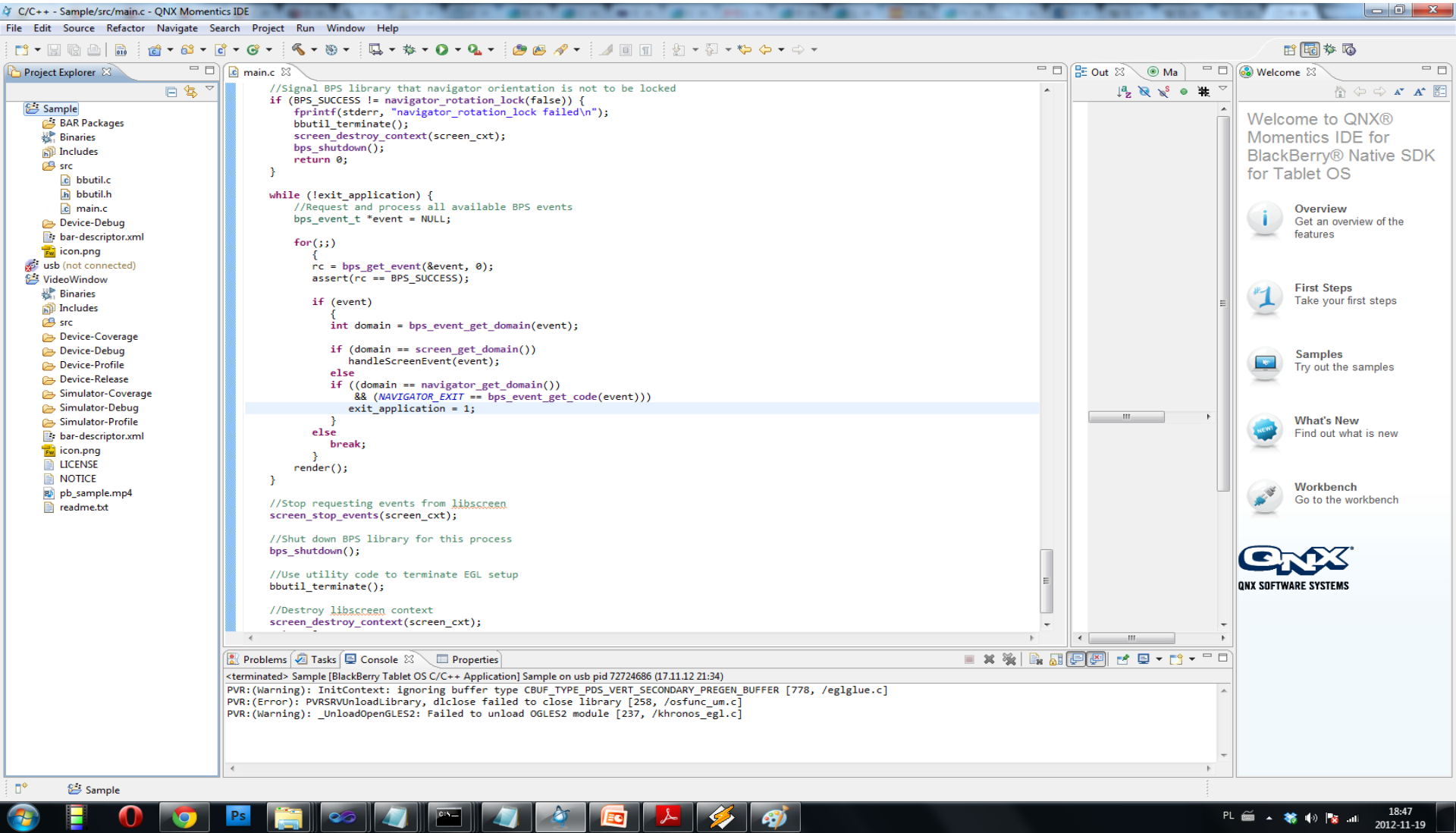
Game Engine Development

Mobile Multiplatform Engine



Game Engine Development

Mobile Multiplatform Engine



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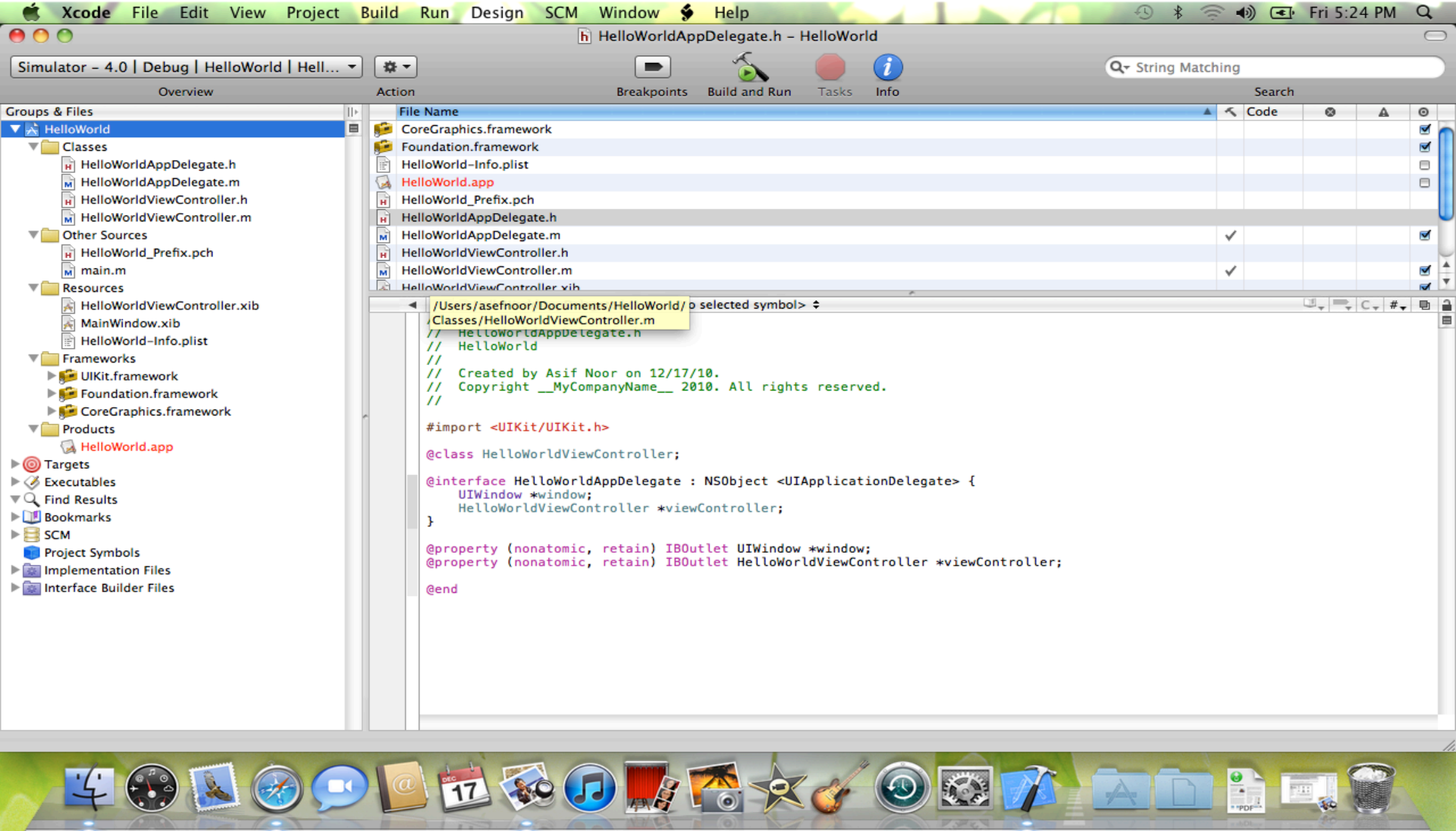
Mobile Multiplatform Engine



Game Engine Development
Mobile Multiplatform Engine

- Introducing common development environment:

	Android	BlackBerry	iOS	Windows
Native development:	Yes	Yes	No	Yes
Language for games:	C++	C++	C++ (Objective-C++)	C/C++
Wrapper required:	Optional	No	Required	No
Debug build VS:	VS Android	Plugin	Only on PC	Yes
Release build VS:	VS Android (?)	Plugin	No	Yes
Debugging in VS:	Plugin console	Plugin	Only on PC	Yes
Graphics:	OpenGL ES	OpenGL ES	OpenGL ES	OpenGL
Audio:	OpenAL	OpenAL (OpenSL)	OpenAL	OpenAL

Game Engine Development
Mobile Multiplatform Engine

- Mobile apps:
  - Are build as a package (apk – Android, bar – BlackBerry):
    - compiled code
    - assets
    - Package descriptor (xml file)
  - This package is mostly zip archive with digital signature.
- Android step by step:
  - Install VS Android: https://code.google.com/p/vs-android/
  - NDK – Native Development Kit

  Allows to create app package that contains module build completly in C++ code
  - Download code samples, check for NDK samples,
  - App GLUE default WRAPPER for JAVA entry points to NDK
  - You can remove GLUE and write everything in C++ from scratch.
  - Android and iOS are specyfic, event loop is handled by OS, app is just events implementer.
  - Android has 16 entry points:

Game Engine Development
Mobile Multiplatform Engine

```
// Main entry point
void ANativeActivity_onCreate(ANativeActivity* activity, void* savedState, size_t savedStateSize)
{
using namespace en;

// Application is starting for the first time, or was
// silently killed in background because device needed
// memory for other one. Create and init all subsystems
// from scratch.

Log << "Ngine4\n";

// Application states
activity->callbacks->onStart                    = en::android::onStart;
activity->callbacks->onResume                   = en::android::onResume;
activity->callbacks->onPause                    = en::android::onPause;
activity->callbacks->onStop                     = en::android::onStop;
activity->callbacks->onDestroy                  = en::android::onDestroy;

// Screen
activity->callbacks->onWindowFocusChanged       = en::android::onWindowFocusChanged;
activity->callbacks->onNativeWindowCreated      = en::android::onNativeWindowCreated;
activity->callbacks->onNativeWindowResized      = en::android::onNativeWindowResized;
activity->callbacks->onNativeWindowRedrawNeeded = en::android::onNativeWindowRedrawNeeded;
activity->callbacks->onNativeWindowDestroyed    = en::android::onNativeWindowDestroyed;
...
```

Game Engine Development
Mobile Multiplatform Engine

```
...

// Input
activity->callbacks->onInputQueueCreated        = en::android::onInputQueueCreated;
activity->callbacks->onInputQueueDestroyed      = en::android::onInputQueueDestroyed;

// Misc
activity->callbacks->onConfigurationChanged     = en::android::onConfigurationChanged;
activity->callbacks->onContentRectChanged       = en::android::onContentRectChanged;
activity->callbacks->onLowMemory                = en::android::onLowMemory;
activity->callbacks->onSaveInstanceState        = en::android::onSaveInstanceState;
}
```

Intel Android Developer resources:
http://software.intel.com/en-us/android
http://www.intel.com/software/beaconmountain

Nvidia Android Developer resources:
https://developer.nvidia.com/tegra-resources

Game Engine Development
Mobile Multiplatform Engine

- BlackBerry step by step:
  - Install BlackBerry NDK:
    http://developer.blackberry.com/native/
  - Install BlackBerry VS plugin:
    http://developer.blackberry.com/native/downloads/fetch/VSPluginInstaller_1.0.exe
  - Install BlackBerry PlayBook NDK and Simulator if needed.
  - Download native samples:
    http://developer.blackberry.com/native/sampleapps/bb10/
  - New BlackBerry devices run on top of Real-Time OS: QNX !
  - Posix standards supported.
  - BlackBerry 10 code is identical like in Windows.
  - There is one entry point and event loop handled by App.

Game Engine Development
Publishing

Digital Distribution old way:

	Operators	Publishers	Developer
North America	~40%	~30%	~30%
Europe	~55%	~25%	~20%
Japan	~10%	~45%	~45%

For more info check Dr. Malte Behrmann's presentation from WGK 2013.

Game Engine Development
Publishing

Digital Distribution:

	Android	BlackBerry	iOS	Windows
Store:	Google Play	BlackBerry World	App Store	Windows Store / AppUp / Any
Publishing fee:	$99/year	No	$99/year	No
App Stores Revenue:	30%	30-10%	30%	differ
Developer Revenue:	70%	70% up to 85%,90%	70%	differ
Store type:	eCommerce platform		Store belonging to Apple	differ
Company required:	Yes	No	No	differ

Jak rozliczyć przychody ze sprzedaży aplikacji w App Store i Google Play?

Game Engine Development
Publishing

Advertising systems:

	Android	BlackBerry	iOS	Windows
Provider Ad System:	No	Yes	No	–
AdMob (Google)	Yes	No	Yes	–
Chartboost	Yes	No	Yes	–
AdColony	Yes	No	Yes	–
TapJoy	Yes	No	Yes	–

BlackBerry 10 has advertising service integrated into OS so you have access to all Ad Providers through it.

Jak rozliczyć przychody z reklam na stronie internetowej lub w aplikacji mobilnej?

Game Engine Development

What is your path?

If you want to:

- code game, not going into every detail
- you're focused on finishing playable prototype
- you like to experiment, prototype, test different solutions
- you're interested in different gameplay models, metrics
- you have cool ideas for story twists or enemies and you want to implement and test them quickly, tinker with

Then you should think about becoming gameplay programer or designer !

Game Engine Development

What is your path?

If you want to:

- know exactly how everything works
- write rendering effects, postprocessess, shaders
- code scene managers, in flight texture decompression
- you want first to make stuff easier for writing games
- but you don’t care so much about writing units AI or balancing it, testing all features, units movement etc.

Then you should think about engine programmer or tools programmer work !