FLAP HIGHER THAN THE BIRDS: DIFFERENTIATE YOUR ANDROID GAME WITH TEGRA & ALLEGROGRAPHIC SUBSTANCE

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GOOD MORNING!

- Welcome to GTC 2014
- And yes, that is the time!
GOOD MORNING!
OVERVIEW

- Today’s Android and Google Play Store
- NVIDIA Technology
  - SHIELD
  - Tegra K1 & the Kepler GPU architecture
- Hands on with Allegorithmic Substance
- NVIDIA GameWorks
  - Libraries & Samples
  - Tools
  - TegraZone
- Wrap up
ANDROID IN 2014

- The world’s most popular mobile OS
- Over 1 billion devices (as of September 2013)
- 1 million new devices every day
- Devices in over 190 countries
GOOGLE PLAY STORE

- Play Store has over 1 million apps and games
- Over 1.5 billion apps and games downloaded each month
- With great success comes great problems
  - How do you get noticed through the noise?
GETTING NOTICED
GETTING NOTICED

- Today’s mobile games are often too simple or clones
  - Angry Birds and Flappy Birds (and 2048?) will still happen
  - You may win the lottery
- The Wild West is becoming more mainstream
  - Quality games are trending higher more often
- Quality games
  - “Quality” is a nebulous term
  - Game design is hugely important
  - Differentiation
    - General niceties
    - Graphics and next-gen visuals
TODAY’S THEME

Human’s are visual creatures; we like things that are different, pretty, and which stand out.

Stand out from the crowd:
- Be different
- Get noticed
- Succeed
NVIDIA TECHNOLOGY
NVIDIA SHIELD

- Tegra 4 powered
- 5 inch 720p & multitouch display
- Console-grade controller
- High speed Wi-Fi
- Full connectivity (HDMI, Miracast, USB, MicroSD, headphone, Bluetooth)
- Tuned port base reflex speakers
- Pure Android
- 3D dashboard
SHIELD DEVELOPMENT CONSIDERATIONS

- Support landscape screen orientation
  - Don’t assume device is a phone and lock to portrait based on DPI

- Don’t *require* touch
  - UI useable with controller
  - Highlights for UI

- Test using HDMI
  - Is everything possible without getting up?
  - How does it look on a big screen?

- Controller is King!
CONTROLLER IS KING!

- Don’t require touch
  - UI useable with controller
  - Highlights for UI
  - Add navigation in game and all menus

- Adjust your Manifest
  - include <uses-feature
    android:name="android.hardware.touchscreen"
    android:required="false" />

- Check NVIDIA GameWorks
  - Visit NVIDIA for sample code and controller recommendations: NVIDIA has many years of controller support consulting
SHIELD PREP IS MICRO-CONSOLE PREP

- Android on the TV
  - Potentially very large market
- Many partners preparing uConsoles
- New differentiation options:
  - Same-screen multiplayer
  - Split-screen multiplayer
  - Large screen UI or layout
THE ANDROID MANIFEST

- Read up on the Android Manifest - [http://goo.gl/TRCt2](http://goo.gl/TRCt2)
- Use the NVIDIA tool to verify your Android Manifest
  - For uConsoles, include `<uses-feature
    android:name="android.hardware.touchscreen"
    android:required="false" />
  else you are invisible!
  - Beware of `<compatible-screens>`
    - Don’t exclude customers!
    - A partner recently excluded the TegraNOTE 7 and Nexus 7 as they missed “tvdpi”
GRAPHICAL DIFFERENTIATION

- NVIDIA continue at the cutting edge of visual computing
- Visual differentiation has driven the PC and console industries
DEMO: UE4 INFILTRATOR
NVIDIA: DRIVING MOBILE GRAPHICS

- World’s leader in visual computing
- At CES 2014 launched its latest generation mobile processor
  - NVIDIA Tegra K1
  - Quad-core A15
  - 192 core GPU
# Tegra K1

## GPU Features
- **Xbox 360**: DX9
- **PS3**: DX9
- **TEGRA K1**: DX11

## GPU Horsepower
- **Xbox 360**: 240 GFLOPS
- **PS3**: 192 GFLOPS
- **TEGRA K1**: 365 GFLOPS

## CPU Horsepower
- **Xbox 360**: 3600 SPECInt
- **PS3**: 1200\(^1\) SPECInt
- **TEGRA K1**: 5600 SPECInt

## Power
- **Xbox 360**: 100W
- **PS3**: 100W
- **TEGRA K1**: 5W

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GPU Horsepower: Peak fragment shader GFLOPS
CPU Horsepower: SPECInt #s estimated for consoles +/- 20%.

(1) PS3 GPU: Cell 154 GFLOPS FP32 not included, CPU: SPUs not included.
KEPLER GPU: DIFFERENTIATION OPTIONS

- Dynamic & procedural content
- CUDA / OpenGL compute / Android RenderScript
  - All GPU accelerated
- Graphics
  - OpenGL ES 2, 3 & 3.1 plus full OpenGL 4.4
  - Strong vertex processing allowing higher polygon counts
  - Higher texture resolutions (up to 16k x 16k); ASTC 1 & 2 bit
  - Devices have higher RAM than you think + displays are increasing in resolution
  - Particle effects - turn up the quality dial
  - Tessellation to have the GPU add detail
DEMO: NVIDIA ISLAND
Next-Gen Gaming is Photo Real
NEW MOBILE RENDERING TECHNIQUES

- Multiple render targets (MRT)
- Physically based rendering (PBR)
- Unity 5 announcements at GDC
  - PBR shaders
  - Real-time global illumination
- Unreal Engine 4 announcements at GDC
  - Now has official Android support
  - On Tegra K1, uses the full rendering pipeline with MRT & PBR
DEMO: UNREAL ENGINE 4
ALLEGORITHMIC & RUST LTD

- Hands on demo using Tegra K1 and Unity

K1 exclusive demo by RUST LTD.
THE ELEMENTAL SWORD: FEATURES

- PBR shading (GPU)
- Dynamic texturing (CPU)
- (A lot of) Particles (GPU)
THE ELEMENTAL SWORD DEMO

- A mix of four technologies: Unity engine, Alloy shaders, Substance texturing and TC Particles
ALLOY PBR SHADES

- A set of PBR shaders for the Unity engine
TC PARTICLES

- GPU based particle system & middleware for the Unity engine
ALLEGORITHMIC SUBSTANCE

- Parametric texturing technology & tools
THE ELEMENTAL SWORD: LIVE DEMO

Tegra K1 exclusive demo by RUST LTD.
THE ELEMENTAL SWORD DEMO: SUMMARY

▪ RUST and Allegorithmic: we love working on next-gen real time content

▪ For more information on Substance, visit:
  – http://www.allegorithmic.com

▪ For more information on PBR & this demo, contact:
  – media@rustltd.com
  – contact@allegorithmic.com
NVIDIA CONTENT & TECHNOLOGY TEAM
Pushing the limits of Windows & Android gaming

GAMEWORKS RESEARCH
300 world-class engineers at the intersection of art and science

GAMEWORKS LIBRARY
Visual & physical simulation SDKs
Technology, algorithms, engines, libraries

DEVELOPER TOOLS
IDE-integrated and standalone troubleshooting tools
Debuggers, profilers and utilities
PHYSX SDK

- Most popular physics engine: 500+ games
- Simulation-driven effects
- Major engine integration
- Multi-platform support
- World-class authoring tools
VISUALFX SDK

- Cinematic visual effects
- Robust and easy to integrate
- Multi-platform support
DEMO: FACEWORKS
GRAPHICS & COMPUTE SAMPLES

- Example visual effects, rendering techniques and perf optimizations
- Sample apps, support libs and tools
- Detailed documentation
- Uses industry standards rendering (GL/DX/ES)
- Multi-platform support

https://developer.nvidia.com/gameworks
S4825 - Tegra K1 Developer Tools for Android: Unleashing the Power of the Kepler GPU with NVIDIA's Latest Developer Tools Suite

Day: Monday, 03/24
Time: 14:30 - 15:50
Location: Room 210E
Speaker: Sebastien Domine (Sr. Director SW Engineering - Developer Tools, NVIDIA)

https://developer.nvidia.com/tadp
TEGRAZONE

- Over 6 million installs
- 4+ star rating in Google Play
- 70+ Tegra games available now
- Available for Tegra and non-Tegra devices

http://tegrazone.com
WRAP UP

- The current state of Android & Play Store
  - Stand out from the crowd!

- NVIDIA Technology can help
  - SHIELD
  - Differentiation & catering to the maximum market
  - Graphical enhancements: humans love graphics; Tegra K1 enables new rendering techniques

- Allegorithmic Substance & Rust’s PBR Shader Technology

- NVIDIA GameWorks

- NVIDIA TegraZone
  - http://tegrazone.com
QUESTIONS?

- Please ask questions via the microphones positioned in the center of the room

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  - http://www.allegorithmic.com