Chapter 1: Saying Hello to Unity and Android

Setting up the development environment

Installing the Android SDK

<table>
<thead>
<tr>
<th>Platform</th>
<th>Package</th>
<th>Size</th>
<th>SHA1 Checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>installer_r24.0.2-windows.exe (Recommended)</td>
<td>91428280 bytes</td>
<td>edac14e1541e97d68821fa3a709b4e8c659e676</td>
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<tr>
<td></td>
<td>android-sdk_r24.0.2-windows.zip</td>
<td>139473113 bytes</td>
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<td>Linux</td>
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<td>140097024 bytes</td>
<td>b6fd75a8b06b0028c2427e5da7d8a09d8956a86</td>
</tr>
</tbody>
</table>
Android SDK Manager

SDK Path: C:\Program Files (x86)\Android\android-sdk

Packages

Name | API | Rev. | Status
--- | --- | --- | ---
Tools |  |  | 
Android SDK Tools | 23.0.2 | | Update available
Android SDK Platform-tools | 20 | | Installed
Android SDK Build-tools | 20 | | Not installed

Show: Updates/New, Installed, Obsolete
Sort by: API level, Repository

Install 8 packages... Delete 9 packages...

Done loading packages.
Installing Unity 3D
Thank you for downloading Unity! Choose between the available license options below.

- **Activate the existing serial number you received in your invoice**

  In the field above, please enter the serial number you received from your invoice. Once your serial number is activated, you can start to use Unity’s power, performance and polish to create professional-quality games and interactive content.

- **Activate the free version of Unity**

- **Activate a free 30-day trial of Unity Pro**

**OK**
Building a simple application

Hello World
No supported Asset Server diff tools were found. Please install one of the following tools:
- SourceGear DiffMerge
- TkDiff
- P4Merge
- TortoiseMerge
- WinMerge
- PlasticSCM Merge
Game Settings:

Company Name: TomPacktAndroid
Product Name: Ch1 Hello World
Default Icon: None (Texture2D)
Default Cursor: None (Texture2D)

Identification:

PlayerSettings.bundleId: com.TomPacktAndroid
PlayerSettings.bundleVersion: 1.0
Bundle Version Code: 1
Minimum API Level: Android 2.3.1 'Gingerbread'
Chapter 2: Looking Good – The Graphical Interface

Creating a Tic-tac-toe game

The game board
Creating the board
Controlling the game
Messing with fonts
Rotating devices

X
X
X

O
O
O

O
X
X

X's Turn
Menus and victory

Setting up the elements
Chapter 3: The Backbone of Any Game – Meshes, Materials, and Animations

Tank import settings
Revert and Apply buttons
Setting up the tank

The tank
Putting the pieces together
Creating materials

The city
Secondary Maps
Animations in Unity
Target Import Settings

Import Animation: Checked

Rotation Error: 0.5
Position Error: 0.5
Scale Error: 0.5

Rotation error is defined as maximum angle deviation allowed in degrees, for others it is defined as maximum distance/delta deviation allowed in percents.

Clips

<table>
<thead>
<tr>
<th>Clips</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Take</td>
<td>0.0</td>
<td>249.0</td>
</tr>
<tr>
<td>ArmatureAction</td>
<td>0.0</td>
<td>127.0</td>
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</table>
State machines to control animations in Unity

Target state machine
Chapter 4: Setting the Stage – Camera Effects and Lighting

Camera effects

Skyboxes and distance fog
Target indicator
Creating the pointer
Working with a second camera
Turbo boost
Lights

Adding more lights
**Lightmaps**

<table>
<thead>
<tr>
<th><strong>General GI Settings</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Workflow</td>
<td>On Demand</td>
</tr>
<tr>
<td>Global Parameters</td>
<td>Default</td>
</tr>
<tr>
<td>Sky Light</td>
<td>0.2</td>
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<tr>
<td>Realtime Sky</td>
<td></td>
</tr>
<tr>
<td>Albedo Scale</td>
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</tr>
<tr>
<td>Indirect Scale</td>
<td>1</td>
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<table>
<thead>
<tr>
<th><strong>Realtime GI Settings</strong></th>
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</thead>
<tbody>
<tr>
<td>Realtime Resolution</td>
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<tr>
<td>Realtime Atlas Size</td>
</tr>
<tr>
<td>CPU Usage</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Baked GI Settings</strong></th>
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<tbody>
<tr>
<td>Directional Mode</td>
</tr>
<tr>
<td>Baked Resolution</td>
</tr>
<tr>
<td>Baked Atlas Size</td>
</tr>
<tr>
<td>Padding</td>
</tr>
<tr>
<td>Direct Scale</td>
</tr>
<tr>
<td>AO Exponent</td>
</tr>
</tbody>
</table>
Cookies
Blob shadows
Chapter 5: Getting Around – Pathfinding and AI

The NavMesh
**Navigation**

**Baked Agent Size**

![Graph](image)

- **Agent Radius**: 0.5
- **Agent Height**: 2
- **Max Slope**: 45°
- **Step Height**: 0.4

**Generated Off Mesh Links**

- **Drop Height**: 0
- **Jump Distance**: 0

**Advanced**

- **Manual Voxel Size**: Enabled
- **Voxel Size**: 0.1666667 (3.00 voxels per agent radius)

Voxel size controls how accurately the navigation mesh is generated from the level geometry. A good voxel size is 2-4 voxels per agent radius. Making voxel size smaller will increase build time.

- **Min Region Area**: 2
- **Height Mesh**: 

---

```
Voxel size controls how accurately the navigation mesh is generated from the level geometry. A good voxel size is 2-4 voxels per agent radius. Making voxel size smaller will increase build time.
```
The NavMeshAgent component
Making the enemy chase the player

Chasing the player
Being attacked by the enemy
Spawning the enemy tanks
Chapter 6: Specialties of the Mobile Device – Touch and Tilt

A basic environment
Controlling with tilt
Following with the camera
Adding the monkey
Keeping the monkey on the board

Winning and losing the game
Putting together the complex environment
Adding bananas
Collecting bananas with touch
Chapter 7: Throwing Your Weight Around – Physics and a 2D Camera

2D games in a 3D world

Setting up the development environment
Physics

Building blocks
Characters

Creating the enemy
Controls

Attacking with a slingshot
Creating the parallax background
Adding more birds

The black bird
Level selection

Level 1
Score: 0

Level 2
Score: 0

Level 3
Score: 0
Chapter 8: Special Effects – Sound and Particles

Understanding audio

Import settings
Audio Source
3D Sound Settings

- Doppler Level: 1
- Volume Rolloff: Logarithmic Rolloff
- Min Distance: 1
- Spread: 0
- Max Distance: 500

Listener

Graph with axes from 0 to 500 and values from 0 to 1.48.

- Red: Volume
- Green: Spatial
- Blue: Spread
- Yellow: Reverb
Understanding particle systems

Particle system settings

![Particle System settings diagram]

- **Duration**: 5.00
- **Looping**: Yes
- **Prewarm**: No
- **Start Delay**: 0
- **Start Lifetime**: 5
- **Start Speed**: 5
- **Start Size**: 1
- **Start Rotation**: 0
- **Start Color**: [Color option]
- **Gravity Modifier**: 0
- **Inherit Velocity**: 0
- **Simulation Space**: Local
- **Play On Awake**: Yes
- **Max Particles**: 1000

![Emission settings diagram]

- **Rate**: 10
- **Time**: [Time option]
- **Bursts**: [Table with Time and Particles columns]
### Sub Emitters

<table>
<thead>
<tr>
<th></th>
<th>Birth</th>
<th>Collision</th>
<th>Death</th>
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<tbody>
<tr>
<td></td>
<td>None (Particle System)</td>
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### Texture Sheet Animation

<table>
<thead>
<tr>
<th></th>
<th>X 1</th>
<th>Y 1</th>
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<tbody>
<tr>
<td>Tiles</td>
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<td></td>
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<tr>
<td>Animation</td>
<td>Whole Sheet</td>
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<tr>
<td>Frame over Time</td>
<td></td>
<td></td>
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<tr>
<td>Cycles</td>
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### Renderer

<table>
<thead>
<tr>
<th></th>
<th>Billboard</th>
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<tbody>
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<td>Render Mode</td>
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<td></td>
</tr>
<tr>
<td>Normal Direction</td>
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<tr>
<td>Material</td>
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<tr>
<td>Sort Mode</td>
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<tr>
<td>Sorting Fudge</td>
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<tr>
<td>Cast Shadows</td>
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</tr>
<tr>
<td>Receive Shadows</td>
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<tr>
<td>Max Particle Size</td>
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<tr>
<td>Sorting Layer</td>
<td>Default</td>
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<tr>
<td>Order in Layer</td>
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<tr>
<td>Reflection Probes</td>
<td>Blend Probes</td>
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<tr>
<td>Anchor Override</td>
<td>None (Transform)</td>
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Creating dust trails
Putting it together

Exploding bananas
Chapter 9: Optimization

Minimizing the application footprint

Editor log

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Size</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Textures</td>
<td>1.9 mb</td>
<td>26.6%</td>
</tr>
<tr>
<td>Meshes</td>
<td>160.2 kb</td>
<td>2.2%</td>
</tr>
<tr>
<td>Animations</td>
<td>0.0 kb</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sounds</td>
<td>0.3 kb</td>
<td>0.0%</td>
</tr>
<tr>
<td>Shaders</td>
<td>834.9 kb</td>
<td>11.3%</td>
</tr>
<tr>
<td>Other Assets</td>
<td>10.2 kb</td>
<td>0.1%</td>
</tr>
<tr>
<td>Levels</td>
<td>124.1 kb</td>
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<tr>
<td>Scripts</td>
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<td>Included DLLs</td>
<td>3.9 mb</td>
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<td>File headers</td>
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<tr>
<td>Complete size</td>
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Used Assets, sorted by uncompressed size:
- 835.0 kb 11.3% Resources/unity_builtin_extra
- 682.7 kb 9.3% Assets/Models/Monkey/Monkey.psd
- 682.7 kb 9.3% Assets/Models/Banana/Banana.psd
- 170.7 kb 2.3% Assets/Models/Map/Grass.psd
- 170.7 kb 2.3% Assets/Models/Fence/wood.psd
Asset compression

Model tab
The Rig tab

The Animations tab

Textures
Audio

Player settings

Rendering

Static Batching requires Android Pro License

GPU skinning requires Android Pro License
Optimization

- Api Compatibility Level: .NET 2.0 Subset
- Prebake Collision Meshes
- Preload Shaders
- Preloaded Assets
  - Stripping Level*: Disabled
  - Enable Internal Profiler
- Optimize Mesh Data*
Tracking performance

Editor statistics

Audio:
Level: -74.8 dB
Clipping: 0.0%
DSP load: 0.4%
Stream load: 0.0%

Graphics:
153.6 FPS (6.5ms)
CPU: main 6.5ms, render thread 0.4ms
Batches: 21, Saved by batching: 174
Tris: 22.3k, Verts: 26.7k
Screen: 933x622 - 6.6 MB
SetPass calls: 14, Shadow casters: 152
Visible skinned meshes: 0, Animations: 0

Network: (no players connected)
The Profiler

Tracking script performance
Minimizing lag

Occlusion

The default parameters guarantee that any given scene computes fast and the occlusion culling results are good. As the parameters are always scene specific, better results will be achieved when fine tuning the parameters on a scene to scene basis. All the parameters are dependent on the unit scale of the scene and it is imperative that the unit scale parameter is set correctly before setting the default values.

- Smallest Occluder: 5
- Smallest Hole: 0.25
- Backface Threshold: 100

Last bake:
Occlusion data size: 58.4 KB