

Paradise Reloaded

Real Time Rendering

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Effect: Grass Rendering

Description:

Grass is rendered as Geometry at equally distributed positions over a grass-tile. The shader is given a quad and it tessellates it to a blade of grass using spline interpolation.

Each blade of grass has its own bending direction and is influenced by forces like wind. Surprisingly calculating the wind as a simple sinus wave gives more realistic results than more complex attempts.

For rendering performance a LOD algorithm decides how much the blade is tessellated or discards the blade completely. In addition several detail level are calculated at the beginning so that for example fewer blades of grass are considered for reflections.

Sources and Links:

<http://illogictree.com/upload/site/LeeRealtimeGrassThesis.pdf>

Effect: Particle System (Birds)

Description:

Every bird is a particle which is emitted from the hole in the stone building, after a while it leaves the crowd and disappears.

The crowd of birds should follow a given path, but every bird has its individual way inside the spline. The path can be described as a set of points in the 3D-space; these are then spline-interpolated. The particles position is updated on the GPU using Transform Feedback.

Example Image:



Effect: Deferred Shading

Description:

We use a standard deferred shading algorithm to be able to draw many point lights with little GPU overhead.

Sources and Links:

http://wiki.delphigl.com/index.php/Deferred_Shading

<http://ogldev.atspace.co.uk/www/tutorial36/tutorial36.html>

Effect: Water rendering

Description:

The scene is rendered twice into a separate G-Buffer for the reflection. The result texture is then rendered using perturbed coordinates of a bumpmap.

Sources and Links:

<http://habibs.wordpress.com/lake/>

Effect: Bloom

Bloom is used normally and in addition it blooms the flames separately.

Effect: Billboard Rendering

For the flames billboards are rendered with a set of textures to animate them. In addition the shine of the point lights are billboards.

Effect: Moving geometry

The tree moves in the wind by applying rotation to the branches and by animating the leaves inside the shader.