

# Dive!Out

Nico Linder, Vivian Huff, Jonathan Müller, Timo Gervens,  
Benjamin Roth, Hendrik Gruß

Computer Graphics Group  
RWTH Aachen University

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# Story

- Revolves around character trapped in a house
- Player has to solve small riddles
- Goal is to escape house



- Riddles should guide the player
- Test different features
- how the player can solve them without a controller
- Must not involve
  - viewing objects from different angles
  - small hidden things
  - moving freely



- ground plan circular
- Two story house plus cellar



- Old fashioned
- Tried to reuse texture
- Keep same style and color scheme
- Low poly count



## Possible things to specify

- World
- Model
- Light (Point, Spot, Box)
- Sticker
- (Walk-)Node
- Path (also One-Way) between Nodes



## Example Model-Entry

```
model
{
    name /basement/basementArrival/basementFloor;
    mesh Data/Models/mainLevel/basementFloorID2117.bm;
    pos 0.4 -1.9 -8.8;
    rot_q 1.0 0.0 0.0 0.0;
    scale 1.0 1.0 1.0;
    material DefTextured;
    texture Data/Textures/FloorsRegular0299_9_S.jpg;
}
```

## How is it built?

- Binary File:
- "boss"+ version (currently 1)
- count of vertices
- position-data
- normal-data
- UV-coordinates
- tangents-data





## Reasons for a new Model-Format

- Loads faster

## BossModel-Converter

- software converts Collada-File (.dae)
- saves models in our new BossModel-Format (.bm)
- saves level in file for LevelParser



- Aim: Building a reusable, clean engine
- Layer architecture
- OpenGL Layer
- Graphics Layer (Material, Mesh, Model etc.)
- Game Layer (Entity, Animatable, Game Manager etc.)



- Memory is limited: Resource management is needed
- ResourceManager: Central class for loading and freeing resources
- Interface IDisposable for resource classes
- resource manager uses reference counting
- frees all used resources in the end: easy to use and safe



- Sound is important for horror game
- OpenAL for platform independency
- Full 3D positional sound
- Classes for Source, Sample, Listener
- Source is an entity: Integration in entity hierachy



- How not to write one update-Methods with thousand if-statements?
- Animations
- Engine structure



- Position
- Rotation
- Scaling
- Hierarchy
- Update Logic
- Name



## Examples for Entities

- Stickey
- Grand
- Pizza Box
- Door
- Pendulum Clock
- Animatable
- Model
- Source



## Entity Factory

- Creates all entities
- Separating paths and positions from functionality

## Entity Manager

- `entityManager->manage(entity);`
- Handlers
- Search by name



## Event Slots

- communication between entities
- `piano->onSolved.addEvent(event);`

## MainLevel.cpp

- no `update()` needed
- realizes game plotline by initializing entities and events

- Forward Rendering
- Deferred Pipeline
- Efficient sorting
- Glow Effect
- Realtime dynamic lighting (deferred and forward)
- Cube-, shadow-, normal mapping
- Culling
- Font Rendering
- Sprite Batch



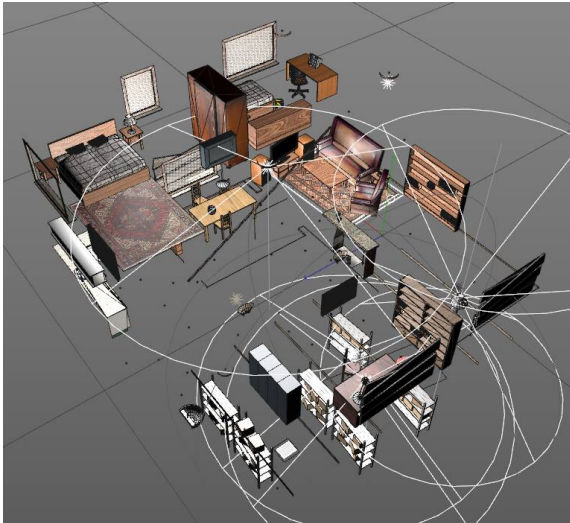
## Rendering Dive!Out



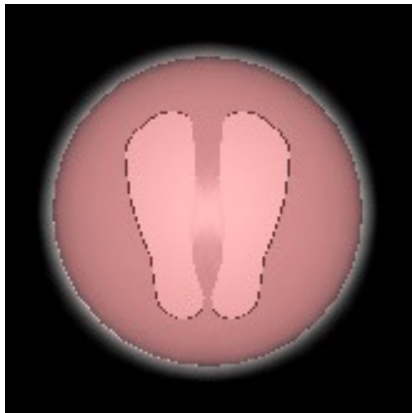
# The Challenge



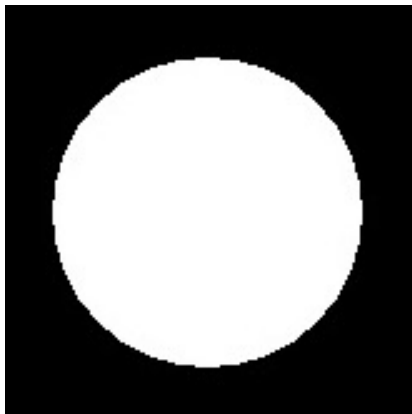
# The Challenge



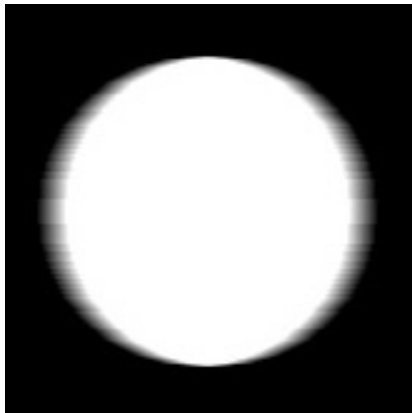
## Glow Effect



## Glow Effect

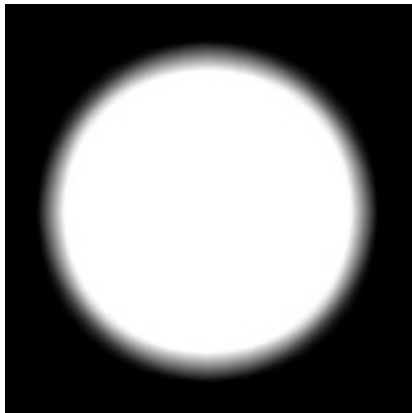


## Glow Effect





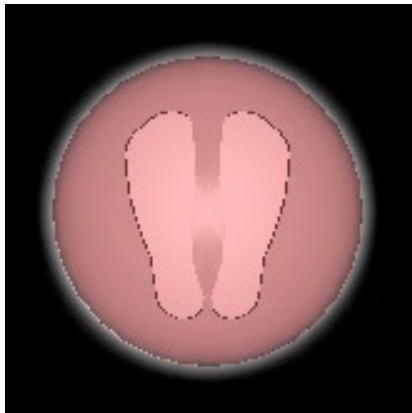
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## Glow Effect



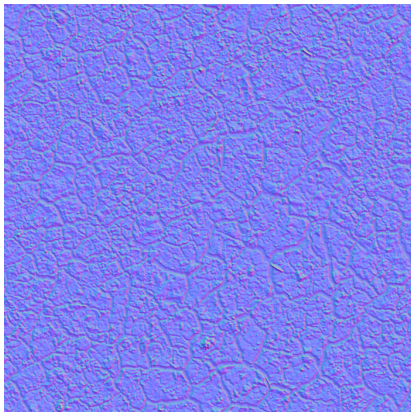
## Glow Effect



## Normal Maps



## Normal Maps



## Normal Maps



## Normal Maps



## Normal Maps

```
19     name GroundLight2;  
20 }  
21  
22 model  
23 {  
24     name /ground;  
25     mesh Data/Models/level1/groundID24.bm;  
26     pos 0.0 0.0 0.0;  
27     rot_q 1.0 0.0 0.0 0.0;  
28     scale 1.0 1.0 1.0;  
29     material DefNormalMapped;  
30     texture Data/Textures/SoilCracked0156_9_S.jpg;  
31     normal Data/Textures/SoilCracked0156_9_SNormal.png;  
32 }
```





iOS



## Windows and iOS

- Mostly the same code base for both platforms
- A few classes that are implemented platform specific
  - Sensor input/movement
  - File handling, image loading
  - Debug logging
- System specific entry points initialize the engine

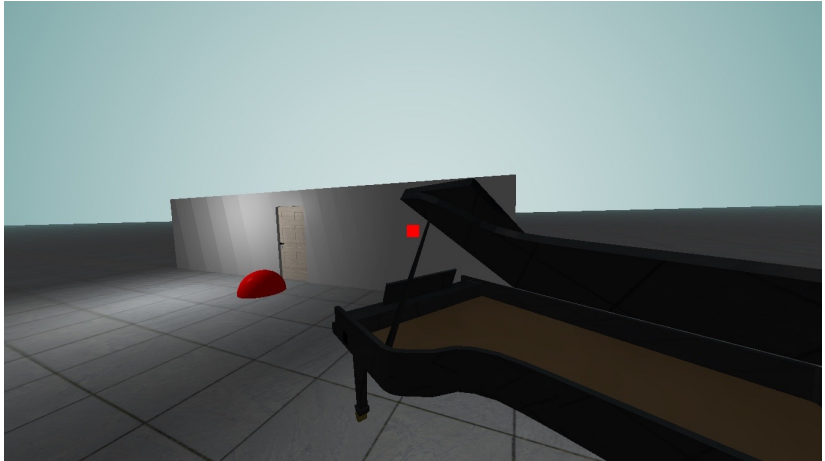


## Just a quick insight

- Visual Studio ↔ Xcode
  - Adding a file to one does not add it to the other
- OpenGL  $\neq$  OpenGL ES



# Problems



# Problems



## The OpenGL<sup>®</sup> ES Shading Language

### Chapter 4.5.3 Default Precision Qualifiers:

```
precision highp float;  
precision highp int;  
precision lowp sampler2D;  
precision lowp samplerCube;
```



## The OpenGL<sup>®</sup> ES Shading Language

### Chapter 4.5.3 Default Precision Qualifiers:

```
precision highp float;  
precision highp int;  
precision lowp sampler2D;  
precision lowp samplerCube;
```

#### Fix:

```
1 precision highp float;  
2 precision highp sampler2D;  
3  
4 //Input
```

Thanks for listening!

