Scenegraphs and Engines

Scenegraphs

Application

Scenegraph

Windows/Linux

OpenGL

Hardware

Scenegraphs

- **Choosing the right libraries is a difficult process**
    - Very different target applications
    - Different capabilities
    - Underlying Graphics APIs

- **Needs to fit the content pipeline**
    - Important for application development
    - Not important for research (though convenient)
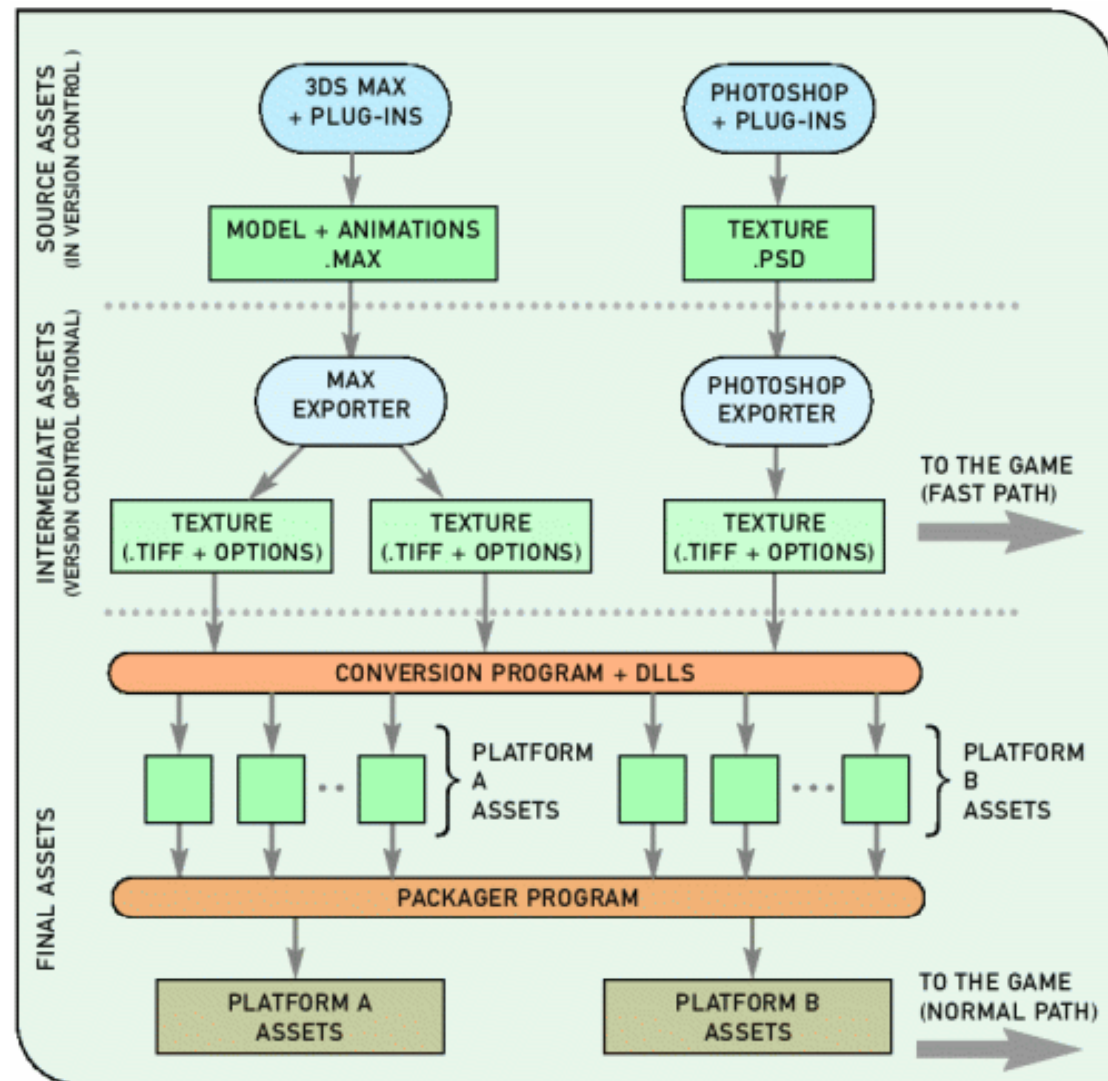
Content Pipeline

- **Choosing the right libraries is a difficult process**
  - Very different target applications
  - Different capabilities
  - Underlying Graphics APIs/Operating Systems

- **Needs to fit the content pipeline**
  - Important for application development
  - Not important for research (though convenient)

Typical Content Pipeline

- We need:
  - Content creation tools
  - Exporters
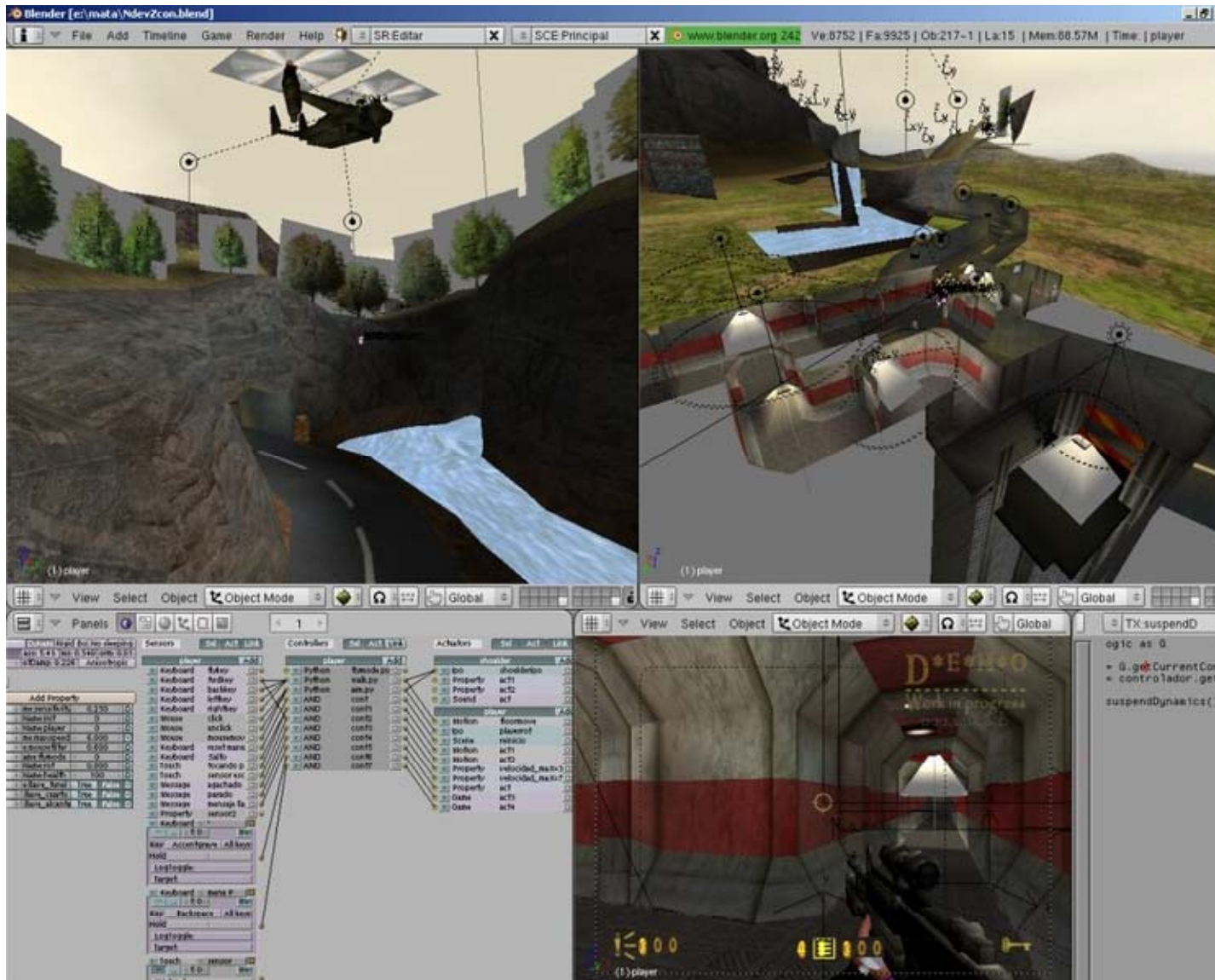 - Scenegraph/ Engine

MechAssault 2 content pipeline

DCC tools

- Only "real" open source option: *Blender*

- Everything you need for Game/Movie production

  - Modelling/Rigging

  - Animation

  - Rendering/Compositing

- Contains complete game engine+editor

  - Fully integrated with UI

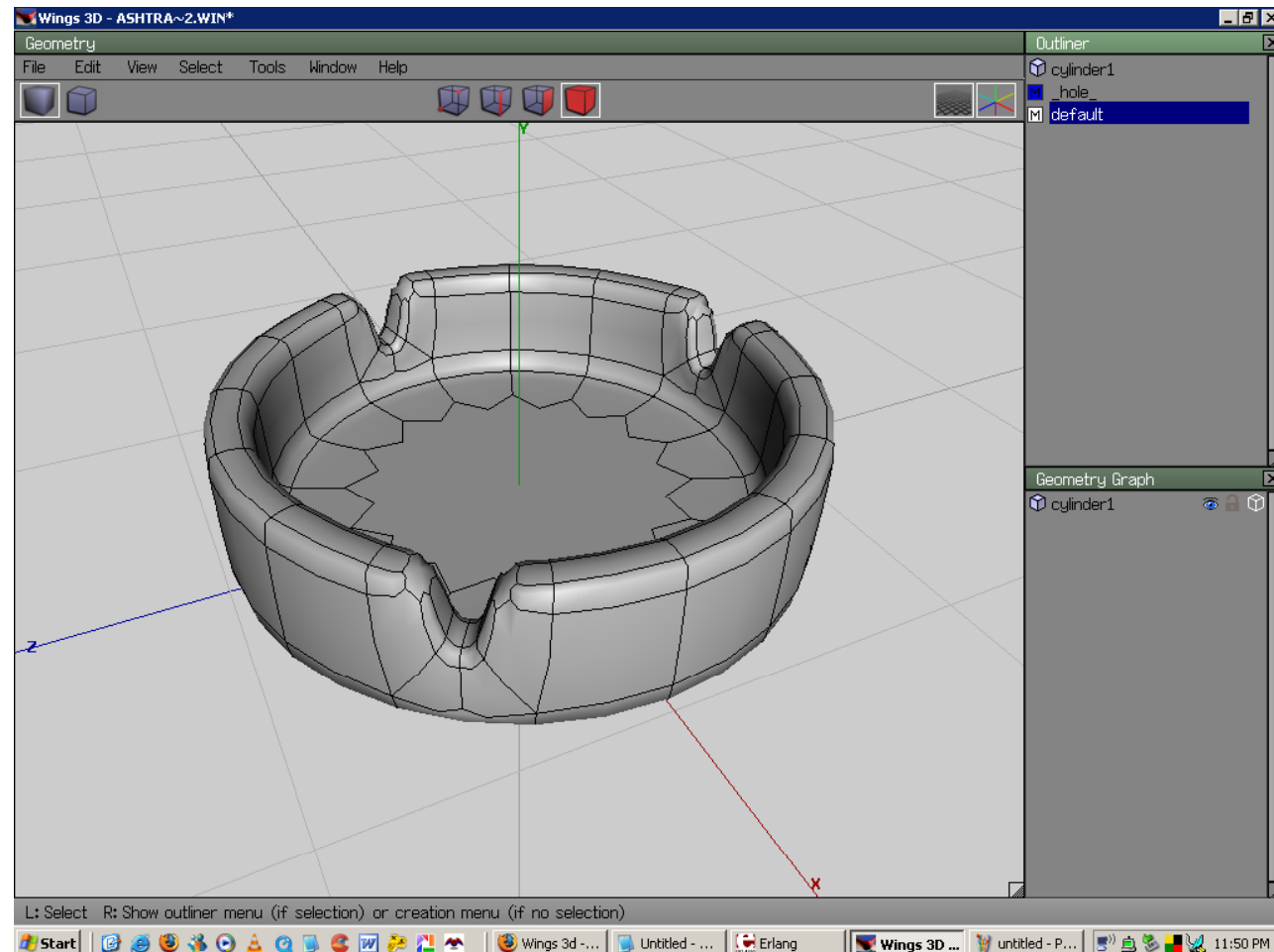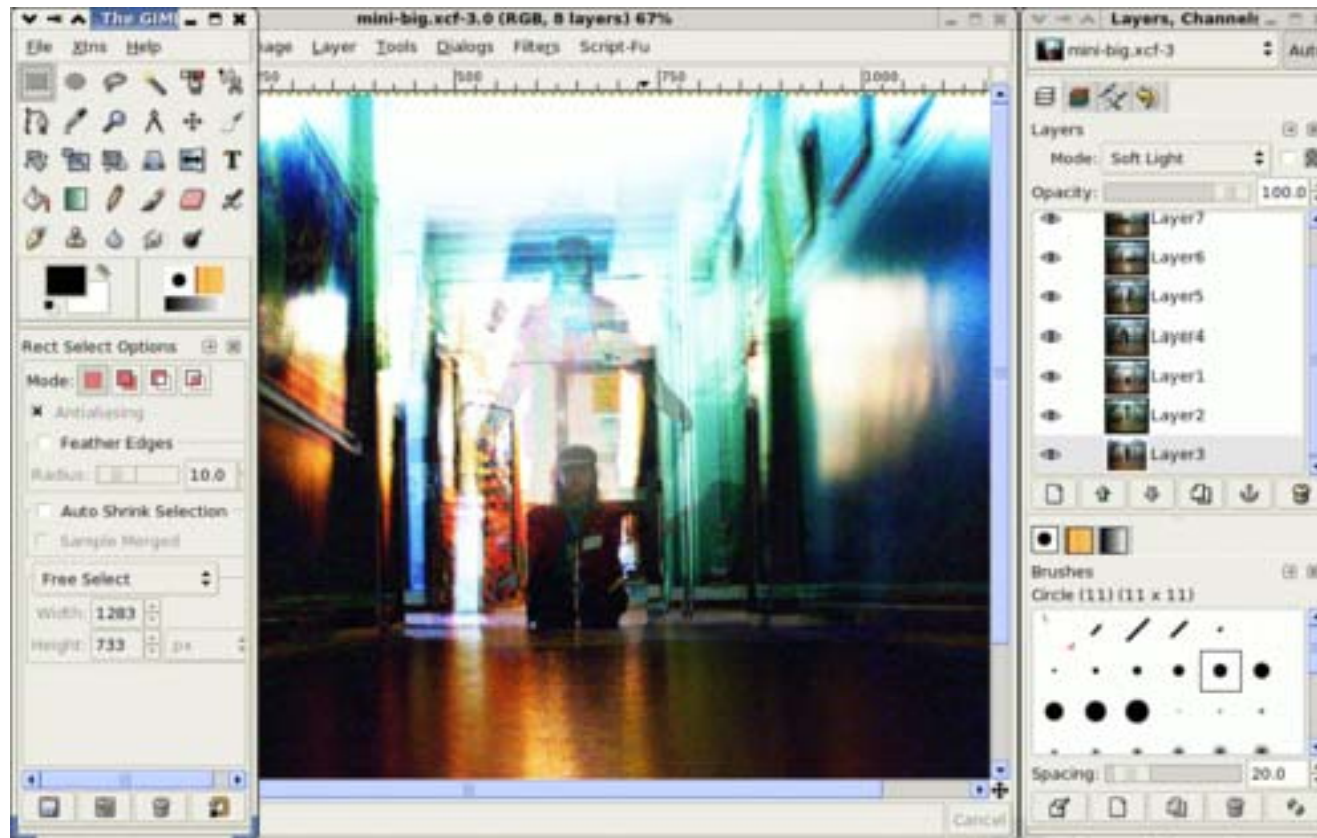- Immense feature list causes steep learning curve!

Blender

Blender

Wings3D

- Easy to use subdivion surface modeller

Textures

- **Gimp: Full featured image editing**

Scenegraphs/Engines

- **Scenegraphs deal with Rendering**

- **Engines deal with**
    - Rendering
    - Physics
    - AI
    - Audio
    - Game logic
    - …

OpenScenegraph

- "Inofficial" Scenegraph of OpenGL
    - Implements OpenGL 2.0
    - Very clean design
    - Very high performance
    - High portability
    - Manipulators
- Targeted to
    - VR
    - Application
    - Visualisation

Delta3D
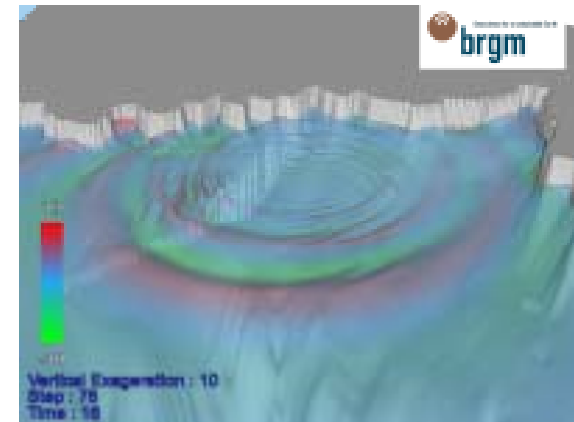
- "Game" and Simulation-Engine, integrates
  - OpenScenegraph
  - OpenDynamics Engine
  - Character Animation Library
  - OpenAL (Audio)
  - Game Networking Engine
  - Tracker
  - Editor

OGRE

- **Commercial Grade Graphics Engine**

  - Highly active community

  - Strong modular design

  - Bindings/Implementations in

    - C++,Java, C#, Python, Ruby

  - State of the art rendering

- **Abstracts DirectX and OpenGL**

- **Combines with a lot of other libraries**

  - Build your own game engine!

OGRE

- Countless tools/addons
- Very extensible
- "Higher order" render management
  - state management, spatial culling, dealing with transparency
- Proven, stable engine used in several commercial products
- Everything you need to make a computer game!

OGRE

- I will use OGRE example implementations throughout the course

- Pretty much everything in this course is implemented in OGRE and OGRE addons

- Very good way to play around with the course contents

- ..without having to implement the basic algorithms

www.ogre3d.org

Scenegraphs

- Open Source delivers many choices:

OGRE	**Irrlicht**
OpenScenegraph	**Crystal Space**
jME (Java)	**Panda3D**
OpenSG	**Blender Game Engine**
The Nebula Device 2	**Reality Factory**
C4 Engine	**RealmForge**

- Many, many others…

- 3D Engine Database/Search Engine:
  - http://www.devmaster.net/engines/

Tipps

- ## Learn one of the major DCC Programs
  - *Blender*, Maya, 3DSMax, Softimage XSI, Cinema4D, Lightwave
    - Takes time and is sometimes painful
- ## Learn one of the major scenegraphs/engines
  - Fast implementation of small projects
  - Reference Design/Implementation
- ## Choose software on
  - Previous knowledge/ Programming Language
  - Required features
  - Application content