



# Facilitating the Education of Game Development

Defense of the Diploma Thesis of  
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## Content of the Thesis

1. Motivation
2. Basics of Game Development
3. Development Tools for Games
4. Education of Game Development
  - Quotes from Interviews with Game Developers
5. Conceptual Design of a Tool for Education
6. Elementary Implementation
7. Conclusion
8. Visions and Prospects

## Computer Games in Education

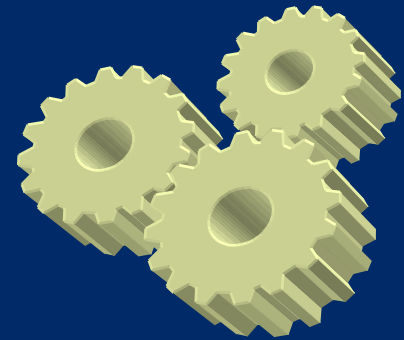
- Almost no research done in this area, yet

## Advantages of Game for Education

- Good Motivators
- Train Skills (Learning-by-Doing)
- Teamwork

# Basics of Development

- Iterative Steps
  - Prototypes (with different characteristics)
- Collaborative Environment
- Interdisciplinary Teams
- Constraints through Market and Ressources

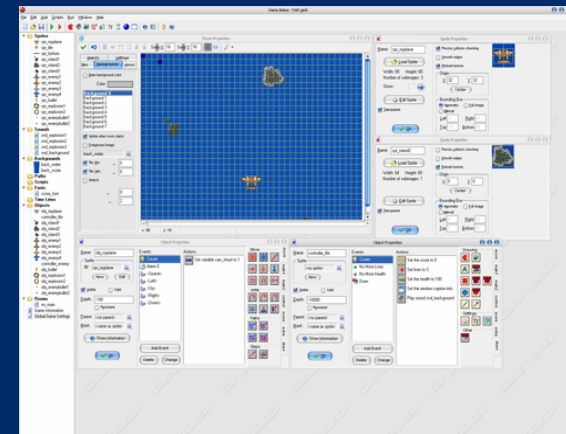
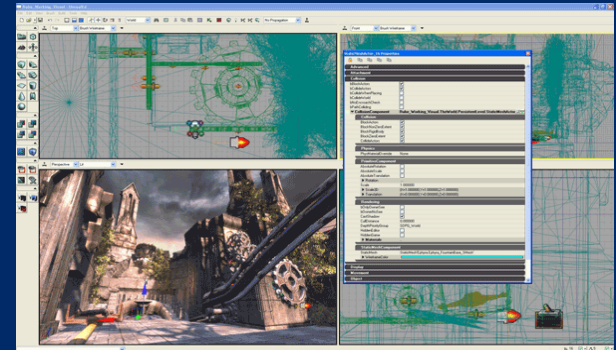


# The Development Process

1. Concept Phase
2. Pre-Production Phase
3. Prototyping Phase
4. Full Production Phase
  1. Alpha Version
  2. Beta Version
  3. Gold Master
  4. Supplemental Services (Patches)

# Development Tools

- Game Engines
- Middleware
- Game Development Environments
  - Professional Environment
    - Gamebryo, RenderWare Studio
  - Non-professional Environment
    - Game Maker, 3D Game Studio
  - Multimedia-Authoring Environment
    - Macromedia Flash, Macromedia Director



# Education of Game Development

„There is no such thing like ‘I study games’!”

*Prof Dr Mark H. Overmars, Utrecht University*

- Types of Educational Facilities
  - Private Schools
    - Standard Applications and Programming Languages
  - Universities
    - Theory, Concepts, Project Management, Programming
  - Specialised Areas of Game Development
    - Liberal Arts Colleges
    - Business Schools
    - Journalist Schools (w. Author Training)

# Reasons for Games in Education

- Professional Training of Game Scientists
  - Industry is growing up
    - Degrees are becoming more important
  - Global and pervasive growth market
  
- Motivational Factor for traditional Computer Science
  - A challenging area of application
    - Technical Requirements (Graphics, AI)
  - Entry Level Motivators for Kids for Learning new Computer Technology



# Views About a Tool for Education

„Player Empathy. Students should train putting themselves ‘in the player’s shoes’ [...] to be successful.“

- *Bob Bates, IGDA chairperson*

„You [...] use keyboard and mouse devices to access games – interface design is critical.“

- *Jochen Hamma, Freelance Producer & Game Designer*

„Game design tools should speed the process of making a prototype that you can play.“

- *Bruce Shelley, Game Designer (Ensemble Studios)*

# Views About a Tool for Education

„In a real sense, the most important aspects of building computer games is working as a team with a diverse group of talented people“

- *David A. Smith, Lead Architect of Croquet*

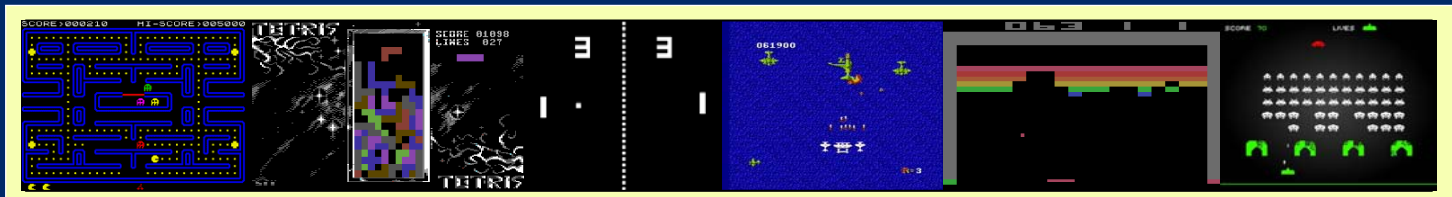
„‘Keep it simple, stupid‘ (KISS). This is a standard principle in interface design. Everything [...] too complex for the average user [...] is only put in as functions in the programming language“.

- *Prof Dr Mark H. Overmars, Utrecht University*

- More Possibilities to Analyse Requirements

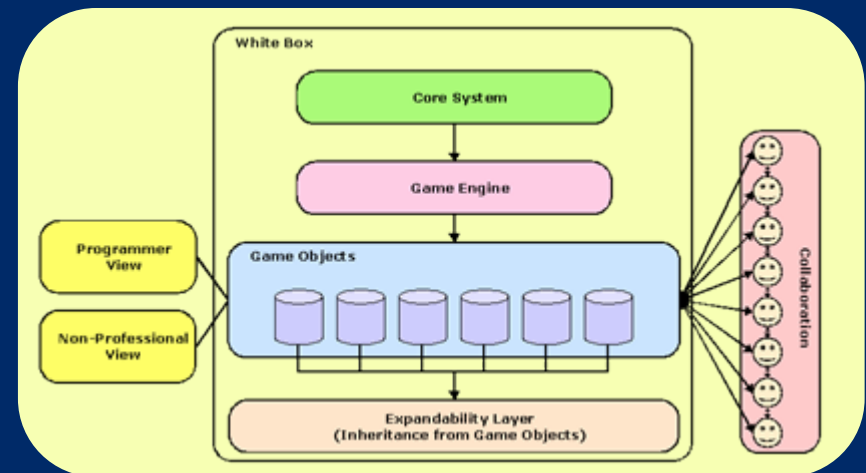
# Requirements Analysis

- Analysis
  - Core Elements
  - Design Patterns
- Here Mini Games
  - (like Pac-Man, Tetris, Pong, 1942, Breakout, Space Invaders)
    - Protagonists or Gamer Avatars
    - Property-Objects
    - Antagonists or Opponents



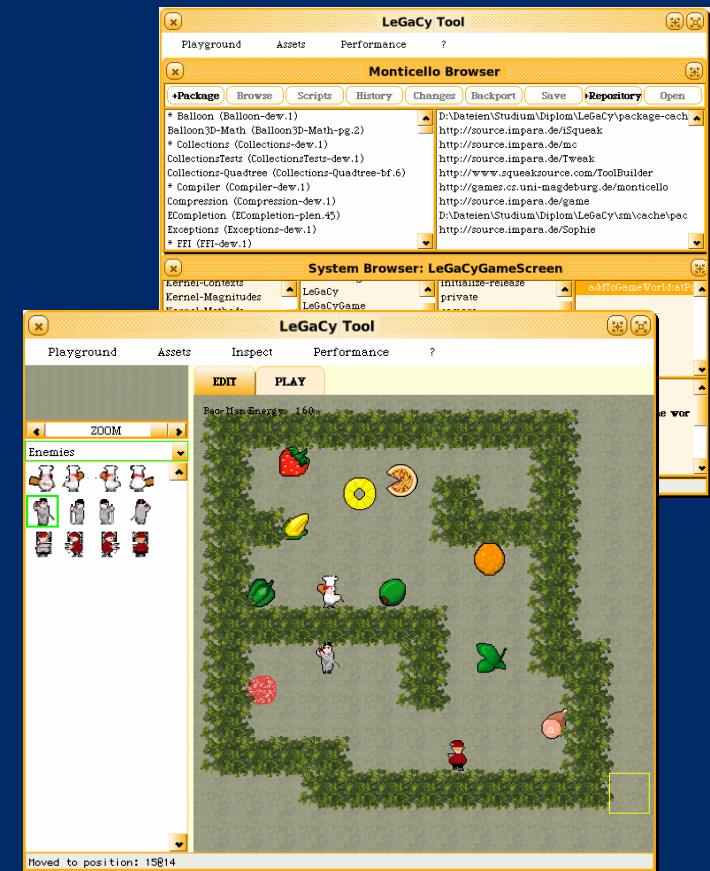
# Conceptual Design

- Main Problem
  - Involve all Aspects (Art, Design, Programming)
- Scalable Complexity
  - Different views
  - Extendability
- Object-Orientation
- Collaboration
- White-Box Architecture
- Creativity



# Implementation

- Object-Oriented Framework
  - Squeak and Tweak as a base
  - iEngine from *impara*
- LeGaCy
  - Define Game Objects
  - First Step towards Scalability
  - Simple 2D Prototypes
  - Usable Library
- Example will follow after presentation



# Conclusion

- Education needs scalable tools
  - Separation of Competencies (different requirement profiles)
- Computer Science profits from Games
- Game Design and Object-Orientation
  - Addition as well as differentiation
- Requirements of the Game Developers
  - Player Empathy (Bates)
  - Hardware-Interface (Hamma)
  - Speeding up Prototype Development (Shelley)
  - Teamwork (Smith)
  - KISS-Principle (Overmars)

# Visions and Prospects

## ■ Visions

- Exact Analysis of Design Patterns in Computer Games
  - New Classification Possibilities
- A finer Granularity of the Interface
  - Fitting more Different Developer Profiles
- Artificial Intelligence as part of Game Design
- Annotation Help and Project Management Features
- Visual Programming (Flowcharts)

## ■ Even More Research Areas

- Serious Games (e.g. Medicine, Army, Management-Training)
  - Design work Processes instead of Entertainment

# Ending

Thank You For Your Attention

