

Game Engine Architecture

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Useful Info

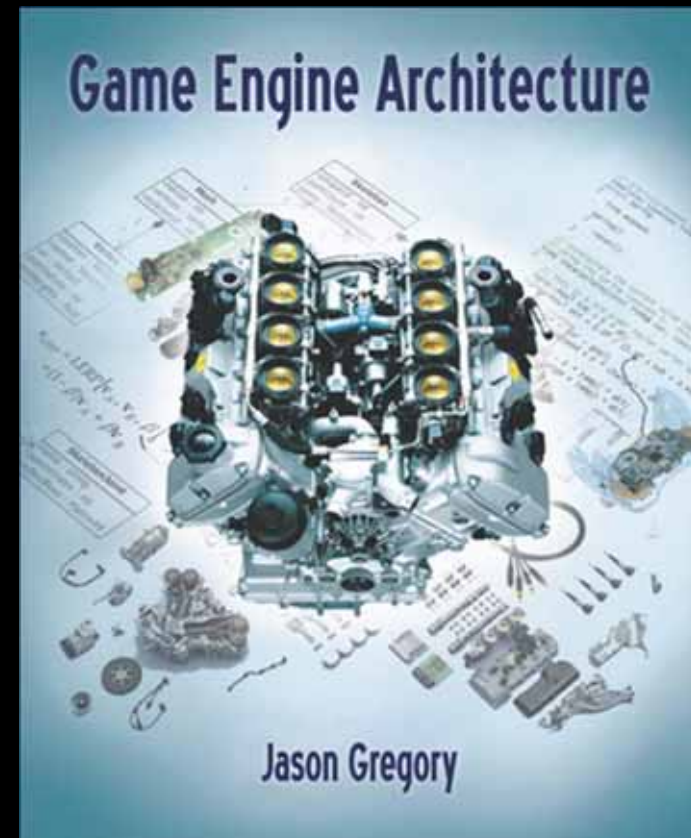
- **Course Web:**

<http://cadia.ru.is/wiki/public:t-gede-12-1:main>

- **Instructor:** Hannes Högni Vilhjálmsson
- **Meet:** Office in Venus 2nd floor, call 559-6323 or 618 6323 (open office hours)
- **Email:** hannes@ru.is
- **MSN:** skuggavera@hotmail.com
- **Web:** <http://ru.is/~hannes>

Textbook

- "Game Engine Architecture" by Jason Gregory, published by AK Peters in 2009.
- Available in the bookstore
- Based on course at USC



Intended Learning Outcomes (1 of 2)

- Explain, compare and evaluate game engines
- Sketch the typical components of a runtime game architecture
- Use C++ development tools and apply best practice in object oriented C++ development
- Design and implement low-level engine systems that deal with:
 - start-up/shut-down, memory management, complex data types, engine configuration, file system, game resources, game loop, rendering loop and interface devices

Intended Learning Outcomes (2 of 2)

- Apply 3D math for solving game world problems
- Explain the core functionality of the rendering and animation system
- Solve basic collision detection and use rigid body physics middleware
- Explain the anatomy of a game world, game objects, data-driven game engines and the general construction of a runtime gameplay foundation system

Week Structure

- Lectures / Discussion:
 - Tuesdays 8:30-10:05 (M121)
- Labs :
 - Thursdays 14:55-15:40 (M106) [not always]
- Practical / Demos:
 - Fridays 10:20-11:55 (M121)

Tentative Schedule

FOUNDATION

- 01 (JAN 09-13) Chapters 1-2: Introduction and Tools
- 02 (JAN 16-20) Chapter 3: Software Engineering

LOW-LEVEL ENGINE

- 03 (JAN 23-27) Chapter 5: Engine Support Systems
- 04 (JAN 30-03) Chapter 6: Resources and the File System
- 05 (FEB 06-10) Chapter 7: The Game Loop and Real-Time Simulation
- 06 (FEB 13-17) Chapter 8: Human Interface Devices

GRAPHICS AND MOTION

- 07 (FEB 20-24) Chapter 4: 3D Math for Games
- 08 (FEB 27-02) Chapter 10: The Rendering Engine
- 09 (MAR 05-09) Chapter 11: Animation Systems
- 10 (MAR 12-16) Chapter 12: Collision and Rigid Body Dynamics

GAMEPLAY

- 11 (MAR 19-23) Chapters 13-14: Gameplay System
- 12 (MAR 26-30) Final Project Presentations and Review

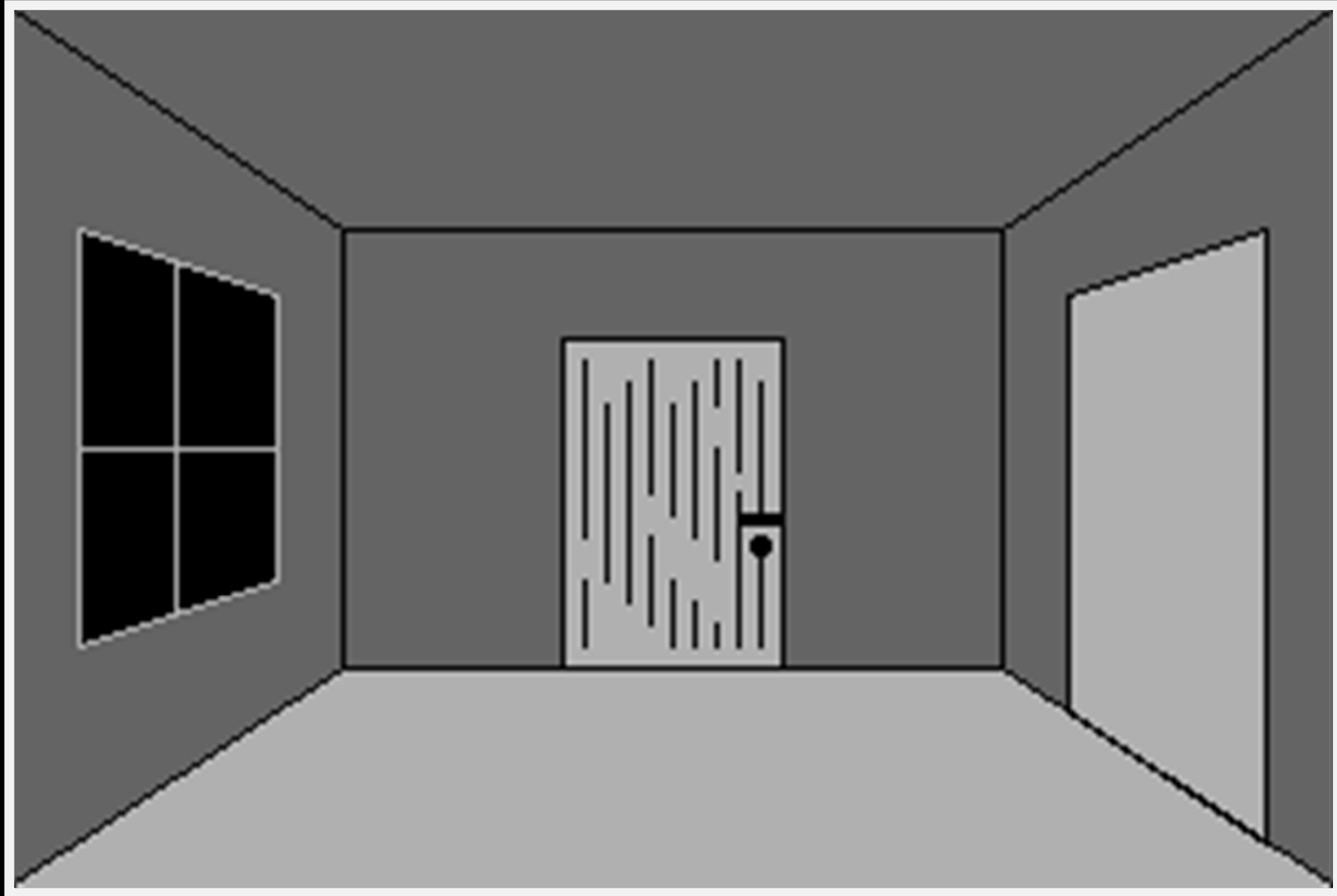
Grading

- Participation 10%
 - Problem Sets (x4) 20%
 - Topical Presentation 10%
 - Final Project 30%
 - Final Written Exam 30%
 - Total 100%
-
- Attendance Requirement: 70%

My Relevant Background

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HouseQuest



REA The Real Estate Agent



REA DEBUG

User Behaviors	User Conversation State	Rea Conversation State	Rea Behaviors
Present	User Turn	Rea Turn	Speaking
Leaving		Taking Turn	Looking Away
Speaking		Listening	Looking At User
Paused	Listening		Giving Head Nod
Gesturing	Wanting Feedback	Giving Feedback	Move Eyebrow
	Interrupt	Planning Utterance	Gesturing
	Disengaged	Disengaged	Facing User

User Speech Act: SA-DECL-RITUAL GREETING
Rea Speech Act: SA-DECL-RITUAL GREETING
Rea Speech: Hello.
User Speech: i am looking for a place near MIT
User Speech Act: SA-IMP-REQUEST lodging
Rea Speech Act: SA-DECL-OFFER HOME2

The Animation Toolkit BEAT



(GA) It is apparently (GT) (some [1 "kind] of] ([2 "virtual [3 "actor]]).

TAGGED

You just need to type in a line like "This is Bradley Beat live from SIGGRAPH", and the actor is able to talk and gesture by itself

00:00:11:14

Below the text and image is a timeline interface with a play button and a table of animation parameters.

	of	virtual	actor.	
Gets Towards				
Eyebrows				
Body				
Gesture				

BodyChat and Spark



Tactical Iraqi



Tactical Pashto

The screenshot displays a 3D game environment of a village with mud-brick buildings and a large tree. A character in a grey suit is in the foreground. In the center, a group of people is gathered, with a green crosshair and a red arrow pointing to a target. The number '3.' is next to the crosshair. A '2.' is next to a blue-bordered icon of a person in the top left. A '4.' is next to a character on the left. A '1.' is next to a character in the center. A '2.' is next to a character on the right. A '3.' is next to a character in the top right. A '3.' is next to a green crosshair in the center. A text box at the bottom center contains the text: Hamed: mayk! (Mike!).

2.

3.

4.

1.

2.

3.

Hamed: mayk! (Mike!)

select
CTRL

hint
R

trans.
T

closer
view
SPACE

run
SHIFT

crouch
C

warn
X

hat
H

glasses
G

RECOGNIZED: zmaa num mayk day.

CADIA Populus (now Impulsion)



CADIA Populus (in EVE)

Screenshot removed as it cannot
be published yet

Game Engines

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Doom (1993)



Star Wars Doom



Simpsons Doom

Quake (1996)



Quake Engine



Unreal Engine



American McGee's Alice



Deus Ex



Source Engine



Unreal 3 Engine

