

Game Architecture

Introduction

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Chris McEvoy

Today's Agenda

- Personal introductions
- HOWTO Game Architecture the class
- HOWTO Game Architecture in the real world
- Writing 'good' code
- Logistics

Personal Introductions

Let's go around and say a few words about ourselves...



HOWTO Game Architecture the class

- Attend the lectures
- Do the homework
- Pitch, build, show a final project
- Be professional
- Be curious
- Have fun

HOWTO Game Architecture the class

- **Attend the lectures**
 - Do the homework
 - Pitch, build, show a final project
 - Be professional
 - Be curious
 - Have fun
- Original material will be shown
 - Interrupt with questions & comments

HOWTO Game Architecture the class

- Attend the lectures
- **Do the homework**
- Pitch, build, show a final project
- Be professional
- Be curious
- Have fun
- Seven assignments
- 70% of overall course grade
 - 10 total points each
 - 8 points for correctness
 - 2 points for good code
 - -1 point for every 24 hours late, capped at -5 points
- Use GA2017 framework
 - Write C++
 - Submit via GitHub

HOWTO Game Architecture the class

- Attend the lectures
- **Do the homeworks**
 - For most homeworks, correctness means the code passes all the provided unit tests and looks correct under code review.
- Pitch, present, and defend your work
- Be professional
- Be curious
- Have fun
- Seven assignments
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 - Use GA2017 framework
 - Write C++
 - Submit via GitHub
- Good code follows the GA2017 coding standard and solves the problem without creating new ones. More on this later.

HOWTO Game Architecture the class

- Attend the lectures
- Do the homework
- **Pitch, build, show a final project**
- Be professional
- Be curious
- Have fun
- 30% of overall course grade
- Individual work recommended
 - N^2 level of effort expected, where N is number of individuals involved
- No homework & optional lectures in April, focus on projects
- You will pitch your project idea to the class (and us), build it, and present to class at end of semester

HOWTO Game Architecture the class

- Attend the lectures
 - Do the homework
 - Pitch, build, show a final project
 - **Be professional**
 - Be curious
 - Have fun
- Get your big girl/boy pants on:
 - Integrity
 - Ethics
 - Hard work
 - Ownership
 - Good engineering judgment

HOWTO Game Architecture the class

- Attend the lectures
- Do the homework
- Pitch, build, show a final project
- Be professional
- **Be curious**
- Have fun
- Have a sense of wonder, about everything
- Search for root causes
- Ask questions
- Be persistent
- Be open

HOWTO Game Architecture the class

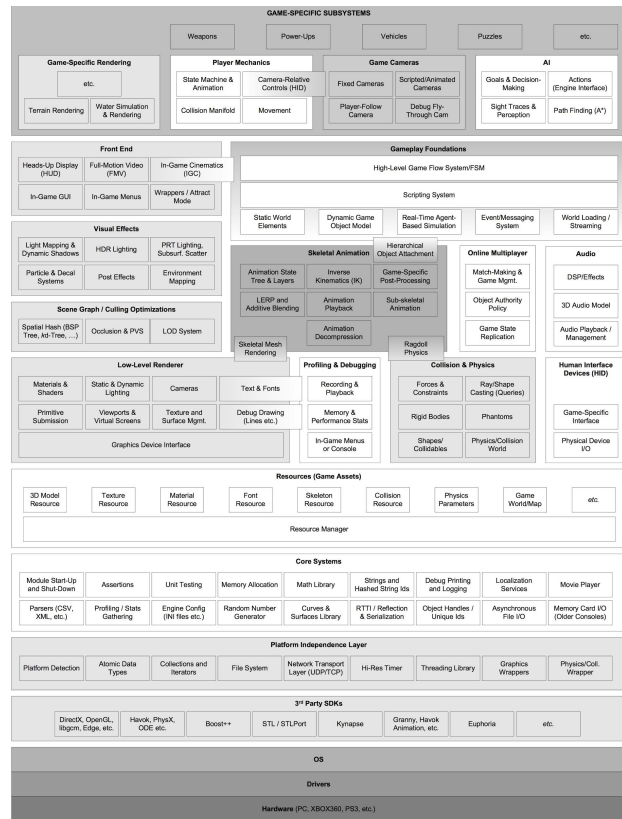
- Attend the lectures
 - Do the homework
 - Pitch, build, show a final project
 - Be professional
 - Be curious
 - **Have fun**
- You're working in the most exciting, mind-bending, ridiculous area of software development out there.
 - Don't take it too seriously and enjoy the ride.

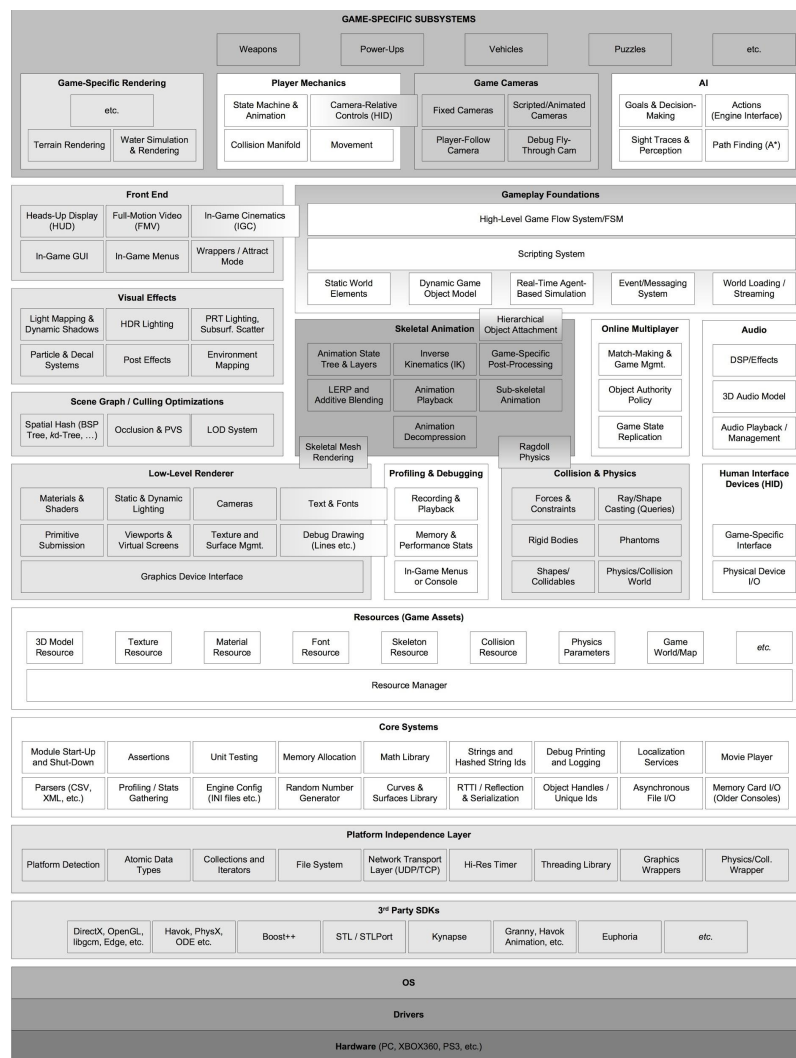
HOWTO Game Architecture in the real world

- What is a game engine
- What is middleware
- What is the role of engineering
- What is engine architecture

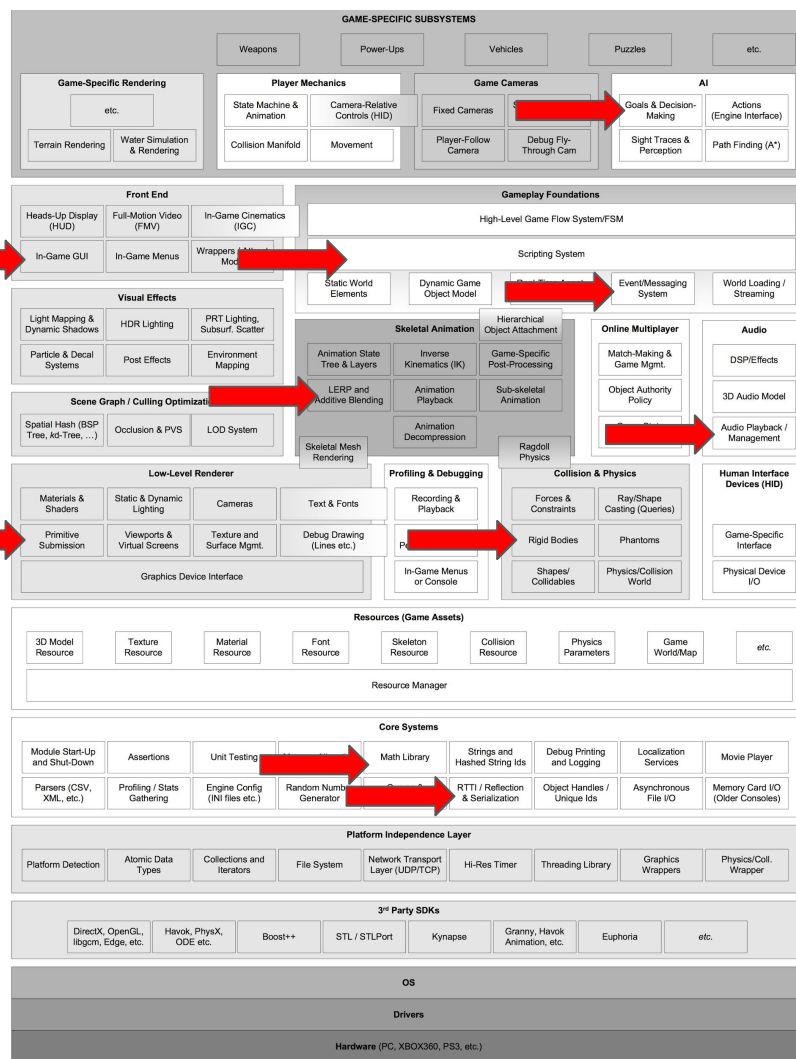
HOWTO Game Architecture in the real world

- What is a game engine
- What is middleware
- What is the role of engineering
- What is engine architecture





It's all the things!



We'll cover some of it!

HOWTO Game Architecture in the real world

- What is a game engine
- **What is middleware**
- What is the role of engineering
- What is engine architecture
- Middleware are pieces of an engine
 - FMOD - Audio
 - Ogre 3D - Graphics
 - Granny - Animation
 - Havok - Physics
- Engines incorporate middleware
 - Unreal uses PhysX physics
 - Unity uses Enlighten lighting

HOWTO Game Architecture in the real world

- What is a game engine
- What is middleware
- **What is the role of engineering**
- What is engine architecture
- Primary responsibilities
 - Art/Design = What
 - Production = Who/when
 - Engineering = How
- It's all interrelated
 - *How we make* affects *what we make* now and in future
 - *How we make* affects *who we make it with*

HOWTO Game Architecture in the real world

- What is a game engine
- What is middleware
- What is the role of engineering
- **What is engine architecture**
- Cross cutting concerns
- Integration of the parts
- Flow of control
- Expression of a philosophy
- Driven by context
- Affects (for better or worse) how we think about problems

This course isn't engine architecture.

A necessary prerequisite for (good) engine architecture is broad based understanding. If you leave this course with that, that's a good start.

Writing 'good' code

- Try to avoid unnecessary complication.
- Follow the coding standard.

Writing 'good' code

- **Try to avoid unnecessary complication.**
- Follow the coding standard.
- Write the code you need to accomplish the task at hand.
 - Try to avoid fancy abstractions.
 - Try to avoid writing a lot of code.
 - Try to avoid premature optimization.
 - Most code changes in ways you won't expect before ship.
- BUT, keep the door open for, and have ideas for,
 - Adding more features.
 - Making the code faster.
 - Making the code use less memory.
- Balancing these two seemingly conflicting things is the essential challenge.

Writing ‘good’ code

- Try to avoid unnecessary complication.
- **Follow the coding standard.**

We (Chad, Kevin, and Chris) will use the coding standard as a proxy for good code when we grade homeworks.

Follow the standard, get 20% credit.

We reserve the right to modify the coding standard over the course of the semester.

Let's review the coding standard...

Logistics

- Syllabus and coding standards on GitHub
- All homeworks submitted through GitHub Classroom
- We need your email address and GitHub user name!
- Also, what model laptops do you have?

Tour of RPIGameArch2017 GitHub...

Course Schedule - January

| Monday | Tuesday | Wednesday | Thursday | Friday |
|----------------------------------|---------|-----------|---------------------------------|--------|
| 2 | 3 | 4 | 5 | 6 |
| 9 | 10 | 11 | 12 | 13 |
| 16 | 17 | 18 | 19 Introduction | 20 |
| 23 Patterns 1 Chris McEvoy | 24 | 25 | 26 Patterns 2 Chad Layton | 27 |
| 30 Math 1 Chad Layton | 31 | | | |

Course Schedule - February

| Monday | Tuesday | Wednesday | Thursday | Friday |
|-----------------------------------|---------|-----------|-----------------------------------|--------|
| | | 1 | 2 Math 2 Chad Layton | 3 |
| 6 Graphics 1 Kevin Todisco | 7 | 8 | 9 Snow Day | 10 |
| 13 Graphics 2 Kevin Todisco | 14 | 15 | 16 Graphics 3 Kevin Todisco | 17 |
| 20 Graphics 4 Chad Layton | 21 | 22 | 23 UI Chris McEvoy | 24 |
| 27 Physics 1 Kevin Todisco | 28 | | | |

Course Schedule - March

| Monday | Tuesday | Wednesday | Thursday | Friday |
|--|--------------------|--------------------|-----------------------------------|--------------------|
| | | 1 | 2 Physics 2 Kevin Todisco | 3 |
| 6 Animation Kevin Todisco | 7 | 8 | 9 Scripting Chris McEvoy | 10 |
| 13 Spring Break | 14 Spring Break | 15 Spring Break | 16 Spring Break | 17 Spring Break |
| 20 AI Chris McEvoy | 21 | 22 | 23 Audio Chris McEvoy | 24 |
| 27 Networking Joe Morton (Guest) | 28 | 29 | 30 Project Pitches Students | |

Course Schedule - April

| Monday | Tuesday | Wednesday | Thursday | Friday |
|--------------------------------------|---------|-----------|---|--------|
| 3 Tools Jeff Stewart | 4 | 5 | 6 Debugging Kevin Todisco | 7 |
| 10 Hardware Chad Layton | 11 | 12 | 13 Integration Chris McEvoy | 14 |
| 17 Open Studio | 18 | 19 | 20 Open Studio | 21 |
| 24 Open Studio | 25 | 26 | 27 Final Presentations (and May 1) | 28 |

End lecture.

Office hours start now (and go to 5pm.)