Game Architecture

Introduction

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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**
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- Original material will be shown
- Interrupt with questions & comments

HOWTO Game Architecture the class

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- 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

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- **Do t**
- Pitch
- Be professional
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For most homeworks, correctness means the code passes all the provided unit tests and looks correct under code review.

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Good code follows the GA2017 coding standard and solves the problem without creating new ones. More on this later.

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- 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

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- Get your big girl/boy pants on:
  - Integrity
  - Ethics
  - Hard work
  - Ownership
  - Good engineering judgment

HOWTO Game Architecture the class

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- 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**
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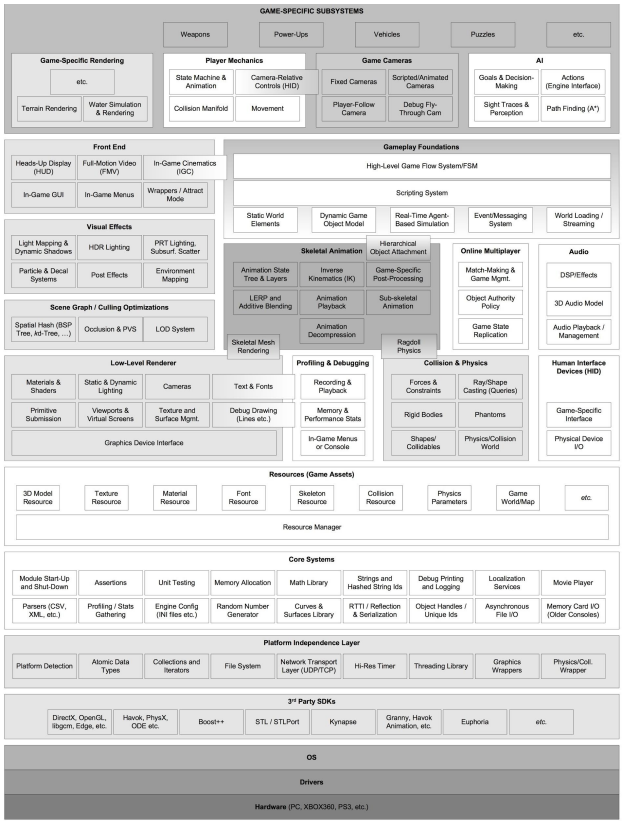
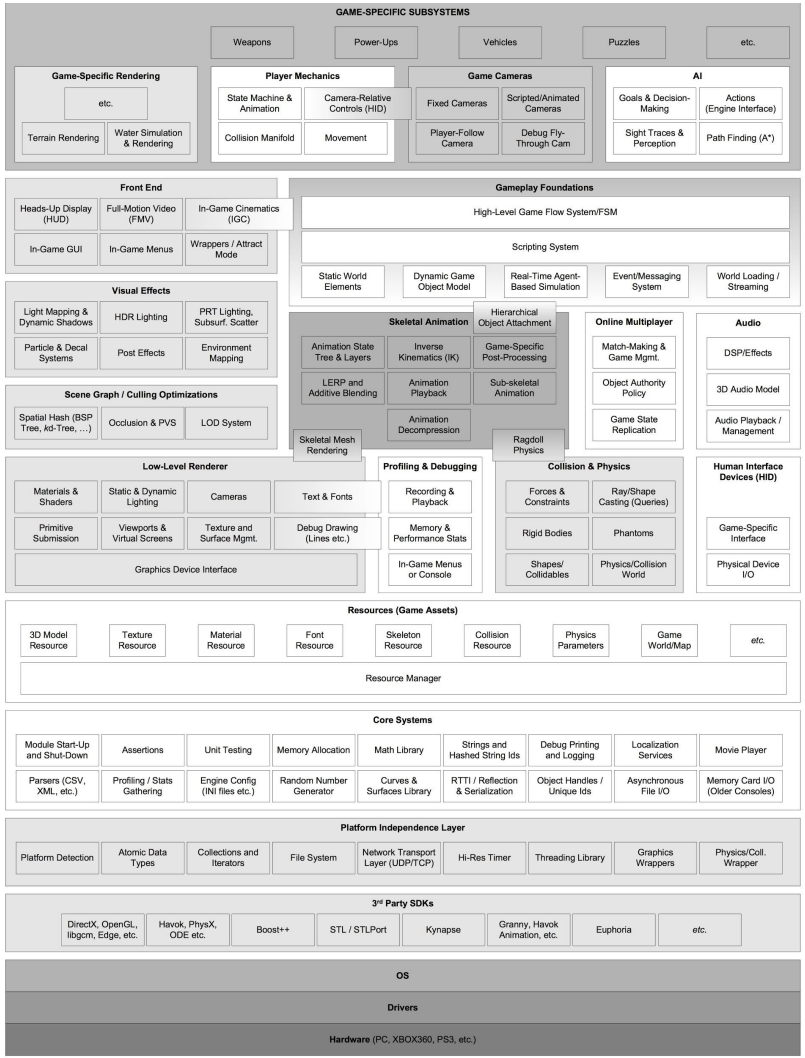
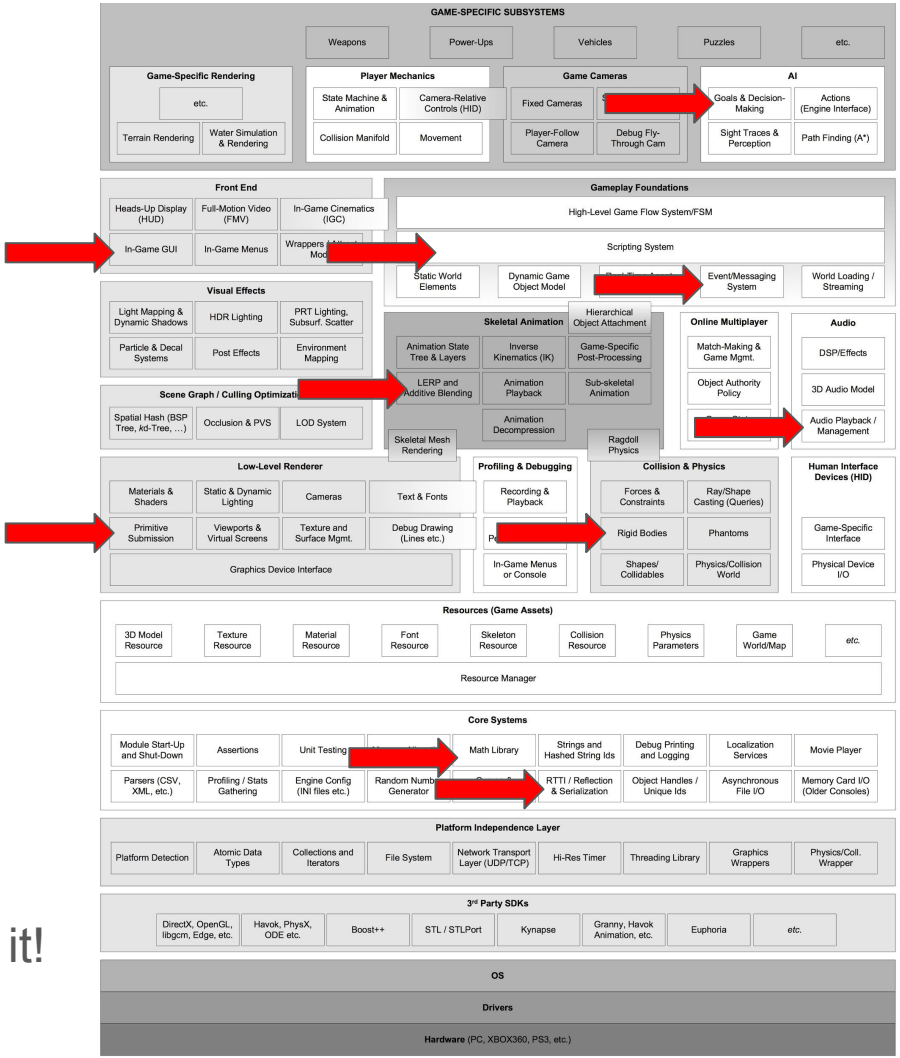
- What is engine architecture





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 a game engine
  - FMOD - Audio
  - Ogre 3D - Graphics
  - Granny - Animation
  - Havok - Physics
- Engines typically 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 Graphics 2 Kevin Todisco	10
13 Graphics 3 Kevin Todisco	14	15	16 Graphics 4 Chad Layton	17
20 UI Chris McEvoy	21	22	23 Physics 1 Kevin Todisco	24
27 Physics 2 Kevin Todisco	28			

Course Schedule - March

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

Course Schedule - April

Monday	Tuesday	Wednesday	Thursday	Friday
3 Debugging Kevin Todisco	4	5	6 Hardware Chad Layton	7
10 Integration Chris McEvoy	11	12	13 Open Studio	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.)