

Video Game Technologies

11498: MSc in Computer Science and Engineering

11156: MSc in Game Design and Development

Chap. 0 — Course Introduction, Planning, and Project

Introduction

**COURSE INTRODUCTION
AND
PLANNING**



Goals:

- *To learn to build your own 3D game engine from scratch*
- *To build games on the top of a game engine*
- *To improve your software engineering and design skills*



Assessment:

- **Paper presentation** (5%)
 - The presentation will be done publicly using a Latex/PowerPoint
 - This requires the previous study of a scientific paper in detail
 - The paper is the starting point of one of the project algorithms
- **3D project** (40%) / **3 algorithms to be implemented** (10%+3x10%)
 - This requires the building up of a simple game prototype on jMonkey SDK
 - Groups of 3 maximum (at least 1 design profile + 1 computer science profile) is desirable
- **Written examination** (30% = 10% + 10% + 10%)
 - theory learning outcomes + some problem solving
- **Lab tests** (25% = 5x5%)
 - theory learning outcomes + some problem solving

Assessment... what does it all mean?

- The project may be big...
- The exam is not that big...
- You'll need the theory to do the project...



The project is key to passing this course (cramming isn't)



Doing well in the project will likely mean doing well in the exams



The project can't be left until the last few weeks



Learning on this course:

- People learn things because they are either **useful** or **fun**
- People learn things by doing them and getting better through **practice**; hence the project
- Teaching is based around the **game engine** and **project/algorithms** development and has a weekly structure...
 - Most weeks will have a prior study pack
 - Lectures will assume the pack is read and focus on extended material
 - Links to further reading will be provided



The weekly schedule ...

Week 1:
**Introduction
&
Planning**

Week 2:
**Game Genres
&
Engines**

Week 3:
**Object Data
Structures**

Week 4:
**Scene Graph
&
Management**

Week 5:
**Spatial Data
Structures**

Week 6:
Culling

Week 7:
**Terrain
Generation &
Modeling**

Week 8:
**Motion &
Collisions**

Week 9:
**Collision
Detection /
Resolution**

Week 10:
**Game
Physics**

Week 11:
Path Finding

Week 12:
**Steering
Behaviors**

Week 13:
**Networking
(?)**

Week 14:
**Networking
(?)**



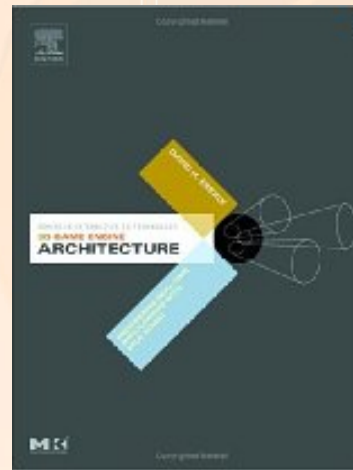
Recommended Reading

3D Game Engine Design

by David Eberly
Hardcover: 1018 pages
Publisher: Morgan Kaufmann
(2007)
ISBN-13: 978-0-12-229063-3

3D Game Engine Architecture

by David Eberly
Hardcover: 736 pages
Publisher: Morgan Kaufmann
(2005)
ISBN-13: 978-0-12-229063-3

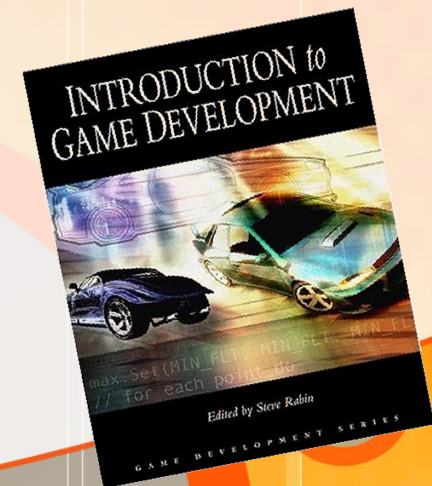
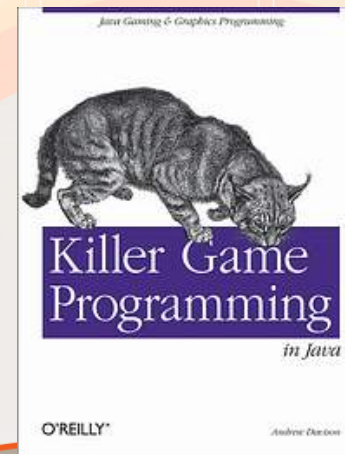


Killer Game Programming in Java

by Andrew Davison
Paperback: 656 pages
Publisher: O'Reilly
(31 May 2005)
ISBN: 0596007302

Introduction to Game Development

by Steve Rabin
Hardcover: 900 pages
Publisher: Charles River Media
(14 Jun 2005)
ISBN: 1584503777



Lectures:

Monday Lecture 09:00 – 11:00 Room 6.16

Lab Sessions:

Wednesday Lab 14:00 – 16:00 Room 6.19

Important Dates:

Mon 08th February : First lecture
Mon 14th March : 1st Exam (18:00 – 19:00, Room 6.16) + 1st Algorithm/Project
Mon 11th April : 2nd Exam (18:00 – 19:00, Room 6.16) + 2nd Algorithm/Project
Mon 23rd May : 3rd Exam (18:00 – 19:00, Room 6.16) + 3rd Algorithm/Project
Mon 23-30th May : Assurance vivas



Key URLs:

Course Web Page: <http://www.di.ubi.pt/~agomes/tjv>

Instructors: Abel Gomes + Gonçalo Amador

Office: Instituto de Telecomunicações, before the bridge to CI
Office hours: Friday, 16:00 – 19:00

Email: agomes@di.ubi.pt



THE PROJECT



The project – A game you really want to develop: an overview

- Most important aspect of this course
- Spans the complete duration of the course
- Highlights your programming/design skills
- Worth 40% of overall credit
- You will select the game to develop
- You will have some control over mark allocation
- There are compulsory hand-in points
- Assessment at the end of the course
- Assessment will involve a viva



Selecting a project : Some advice...

- Firstly, and most importantly, develop something that you think is **fun**.
- Base your project on a **simple idea** that can be **readily implemented** within the available time.
- Plan to develop a **short demo** and not a fully featured game (aim to have all game features experienced within **10 minutes** of play)



Selecting a project : Some advice...

- Include **contingency planning** within your project.
- Consider the **assessment criteria** for the project (think about your project mark distribution).
- At the start of the third week you will submit a short outline of your planned game and its features and receive feedback on game challenge, scope, etc.



Working as a team ...

- You can work as part of a team on a larger game project if you wish
- Be aware of advantages/disadvantages
- A team that 'gels' and has a good mix of skills will do well. Be aware of problems if this is not the case.
- A single mark will be awarded to the game project (1st part). Peer distribution of marks will then be used
- I will act as a brokering service if needed



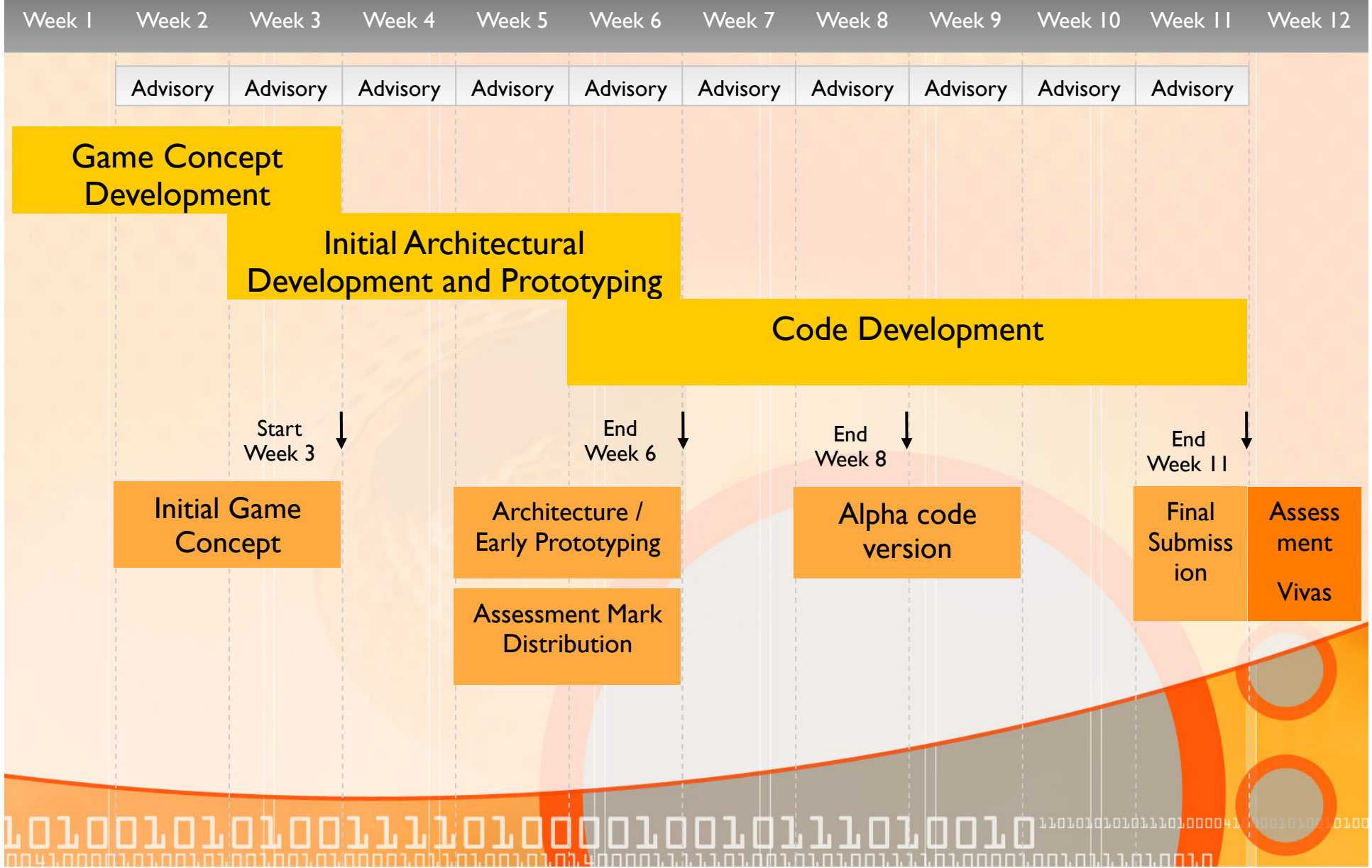
Building your project ...

- Don't worry if this is currently daunting or the process unclear
- Lectures and study packs focus on topics of use to your game development
- Use jMonkey SDK for development
- Make use of existing algorithms, code fragments, classes and libraries from others as needed



Utterly imperative that you clearly identify where you have reused or adapted other code, classes or libraries

Project timeline ... tentatively (organize yourself!)



Building your project ...

- Each project will be marked out of 100 and judged against the following categories of assessment:
 - Game concept and gameplay
 - Quality of architectural design
 - Use of graphics and/or sound
 - Extent of game features
 - Complexity of game algorithms
 - Coding style and code quality
 - Final report



Distributing your project's 100 marks ...

Category	Mark Range	Flexibility
<i>Game concept and gameplay</i>	<i>10 marks</i>	<i>Fixed</i>
<i>Quality of architectural design</i>	<i>10 marks</i>	<i>Fixed</i>
<i>Use of graphics/sound</i>	<i>5-30 marks</i>	<i>Variable</i>
<i>Extent of game features</i>	<i>5-30 marks</i>	<i>Variable</i>
<i>Complexity of game algorithms</i>	<i>5-40 marks</i>	<i>Variable</i>
<i>Coding style and code quality</i>	<i>10 marks</i>	<i>Fixed</i>
<i>Final report</i>	<i>20 marks</i>	<i>Fixed</i>

Assurances ...

- You can make use of existing algorithms, code fragments, classes and libraries. This also entails a need to clearly differentiate your work from others.
 - Hand-in points will be used to record project development.
 - Submitted projects will be subject to an on-line plagiarism test. Important you clearly identify bits that draw on other sources.
 - Vivas will be held to assure the authenticity if there is uncertainty. Failing the viva will result in an automatic failure of the course.

All suspected academic offences will be subject to the University's Academic Offences regulations.



APPROVED



Summary:

- Class goals
- Course assessment and its schedule
- The role of the project (game development) and its companion scientific paper
- The organization of the project development into teams
- Bibliography

Next week:

- Chapter 2: Game Genres

Further reading:

- <http://www.thocp.net/software/games/reference/genres.htm>
- http://www.lgrace.com/documents/Game_types_and_genres.pdf
- <http://tvtropes.org/pmwiki/pmwiki.php/Main/VideoGameGenres>
- <http://www.robinlionheart.com/gamedev/genres.xhtml>

- Chapter 3: Game Engines

Further reading:

- <http://www.giantbomb.com/profile/michaelenger/blog/game-engines-how-do-they-work/101529/>
- <http://www.develop-online.net/news/the-top-14-game-engines-the-list-in-full/0114330>
- <http://www.develop-online.net/tools-and-tech/the-top-16-game-engines-for-2014/0192302>
- <http://html5gameengine.com/>
- <http://www.godotengine.org/wp/features/>
- <http://citrusengine.com/>

