Fall 2015

CSCI 5670

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University of New Orleans

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CSCI 5670: Fundamentals of Game Development

Spring 2015: Tuesday and Thursday in Math 122 from 2:00 to 3:15 PM.

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Course Description

This is the first class specifically focused on video game development. It covers basic principles of game design, game history, the games industry, and technical topics specifically related to games. The projects in this class are designed to increase your awareness of and familiarity with game design tools and to help you establish a very modest portfolio.

Topics covered in this class include:

- The definitions of concepts like game, toy, sport, play, flow, and engagement
- History of video games
- Game genres
- Core game mechanics
- Narrative
- Game physics
- Simple Artificial Intelligence
- Procedural Content Generation
- The nature of the video games industry
- Current game development tools and game engines
- Game design documents and pitches

This class is divided into two halves. The first half will focus on theoretical questions of game design, and the second will focus on practical game development programming skills.

This class will be most effective if you later take CSCI 5675: Advanced Game Development.

In addition to learning about the above topics in game development, students will gain experience in surveying and writing about current topics in some area of game-related research. Graduate students will also be expected to demonstrate more innovation in their game development projects than their undergraduate colleagues, and this is reflected on the grading rubrics for those projects.

Learning Outcomes

After taking this class, students should:

- Understand game design and the history of video games in particular.
• Be able to write critically about games in terms of their rules, play, and culture aspects.
• Be familiar with basic game programming concepts, such as physics, AI, and content generation.
• Be familiar with at least three tools used to design and create games.
• Have a basic understanding of the nature of the game development industry.
• Produce innovative small game projects.
• Be capable of reading and writing about game scholarship at a graduate level.

Instructor

Prof. Stephen G. Ware
Department of Computer Science
Math Building, Room 337
sgware@uno.edu
Office Hours: 3:30 PM to 5:00 PM on Tuesday and Thursday

Prerequisites

Before taking this class, you must:

• Learn basic programming skills.
• Familiarize yourself with the Java programming language and the Eclipse IDE.
• Pass CSCI 2125: Data Structures with a C or better.

Text

Rules of Play: Game Design Fundamentals (RoP for short) by Katie Salen and Eric Zimmerman

The book will primarily be used in the first half of the class and will be a major source of information for the written midterm exam. Reading assignments will come many chapters at a time, and I understand that you may not always have time to do the reading. Please at least read the 1 page summaries at the end of the chapters. To encourage the reading, I will give bonus points when someone answers an in-class question that demonstrates a clear understanding of the assigned reading.

Grading

Final grades will be determined by the following elements. The weight of each element depends on whether you are enrolled in the undergraduate or graduate version of the class.

Projects

Game Development Projects

If you plan to apply for a job in the games industry, you will need a portfolio. To that end, this class requires 3 small game design projects which are meant to demonstrate what you have learned, build your portfolio, and introduce you to current game development tools.

Choose 3 of the 5 projects listed below. You may do them in any order, but they are listed in a recommended order. You should use one or more of the development tools listed for that project, and you may not use the same development tools for more than one project. For example, if you use Unity to create a Puzzle Game, you may not also use Unity to create a First Person 3D Game. Other
development tools not listed below must be approved by the instructor at least a week in advance of the project due date.

- **Physical Board or Card Game** using paper, card stock, markers, game pawns, 3D printing, etc.
- **Adventure Game** using Inform, Twine, or Adventure Game Studio
- **Puzzle Game** using Game Maker Studio, Torque 2D, Unity, HTML5, Java, or Objective C
- **Arcade Game** using Game Maker Studio, Torque 2D, Unity, HTML5, PyGame
- **3D Action Game** using Unity, Unreal Engine, Torque 3D (Up to 5% bonus can be earned for completing this project.)

These projects are *not* intended to be large undertakings, but simply to introduce you to new technology. Rather than creating a game entirely from scratch, I highly recommend that you take an existing game or game tutorial and modify it in some way. Some examples of good projects would be:

- A simple “escape the room” adventure in Inform.
- Single player Tic-Tac-Toe Android app that is played on a 4x4 grid rather than a 3x3 grid.
- Complete the Unity stealth game tutorial, but modify the layout of the level.

**Game Play Journals**

One key skill taught in this class is the ability to critically evaluate a game. You will complete 3 Game Play Journals, during which you play a game (new or one you have played before) and write about your experience. These should be short—between 2 and 5 pages. These journals are meant to exercise your ability to analyze game design and provide constructive criticism to other designers.

**Game Pitch Project**

In place of the final exam, the last assignment of the semester will be to pitch a game concept to the instructor and your classmates. You do not need to actually make this game, only imagine it. You will create a pitch document that follows a specific template and give a short presentation in class to convince a fictional publisher to fund your idea.

**Research Paper**

If you are enrolled in CSCI 5670, you must complete a research paper on a topic of your choice. The paper will be written in LaTeX using a common conference paper template. The topic of this paper must be approved shortly after the mid-term exam, and it must cite recent scholarly research from reputable international conferences and journals.

**Game Development Tools**

**Inform 7** is a tool for creating text-based interactive fiction games using a syntax that reads like natural language. It has an excellent video tutorial and many other well-documented tutorials and examples built into the tool.

**Twine** is a tool for creating choose-your-own adventure stories. It requires little to no knowledge of programming. Anna Anthropy has written a very straight-forward tutorial for making simple games.

**Adventure Game Studio** is a mature, full-featured engine for creating graphical point-and-click adventure games. Most modern graphic adventures (professional and amateur) are made with this tool. It has a comprehensive set of video tutorials.

**HTML5** is the latest standard for the website markup language HTML. One of its most prominent features is the canvas element, which allows for the creation of dynamic 2D graphics with Javascript. Games made in HTML can be played on many platforms---virtually anything with a web browser. This tutorial is a good place to start for making games. This tutorial is a little more comprehensive.

**Game Maker Studio** is a general, easy-to-use tool designed specifically for making 2D games. It has a graphical point-and-click interface for making game logic, which means you can create games without using any code, however it also has a simple and very functional scripting language. It comes with tutorials on how to use specific features, but also a number of walkthroughs for creating sample games.

**Torque 2D** and **Torque 3D** are a pair of open source, full-featured game engines. There are a handful of tutorials for Torque 2D that walk you through making a sample game. There are also a detailed set of tutorial videos for making a multi-player first person shooter in Torque 3D.
Unity is a popular 3D (and now also 2D) game engine. It is favored by independent developers, but is quickly gaining traction at major studios. It has a number of tutorials for individual skills and whole example projects.

The Unreal Engine has long been the industry standard for the development of 3D games by major studios. It has a high learning curve, but is extremely powerful. Unreal 4 has provided many significant improvements to the documentation and usability of the engine, including many helpful tutorials.

**Policies**

These policies are in place to maintain professionalism and mutual respect:

- **Attendance**: Attendance is not required, but it is always strongly encouraged.
- **Devices in Class**: No electronic devices, such as laptops, tablets, or phones, may be used during class unless there is an in-class programming assignment scheduled for that day. You do not have to come to class, but if you do, you have to be a polite and attentive audience.
- **Phones**: Please silences your phones before class.
- **Due Dates**: All assignments are due on Moodle promptly at midnight on the day they are due; however, the submissions will not close until 3 AM the next morning. Consider these three hours an unofficial grace period. At 3:01 AM, your assignment is not 1 minute late; it is 3 hours and 1 minute late, and it will not be accepted.
- **Late Work**: Late assignments will not be accepted without a serious and documented excuse.
- **Missed Exams**: If you need to miss an exam, you must notify me at least a week in advance to schedule a makeup. Missed exams cannot be retaken without a serious, documented excuse.
- **Food and Drink**: Please do not bring food to class. Drinks are allowed, as long as you are respectful of your classmates.
- **E-mail Response Time**: Please allow a minimum of 24 hours for e-mail responses.

**Academic Integrity**

All students are expected to follow UNO's code of academic integrity. Violations of this policy will be dealt with on a case-by-case basis, but punishment will be severe and may include failing the class and expulsion from the university.

**Students with Disabilities**

It is university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with physical or learning disabilities should contact the instructor and the Office of Disability Services. Arrangements will be made on an individual basis.

**Calendar**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>Thursday, August 20 Introduction and Syllabus</td>
<td>Review the syllabus.</td>
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<tr>
<td>Tuesday, August 25 Meaningful Play</td>
<td>Read chapters 1 to 6 in RoP.</td>
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<tr>
<td>Thursday, August 27 Defining Games</td>
<td>Read chapters 7 to 10 in RoP.</td>
</tr>
<tr>
<td>Tuesday, September 1 History of Video Games</td>
<td>First Game Play Journal due on Moodle at midnight.</td>
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<tr>
<td>Thursday, September 3 History of Video Games (cont.)</td>
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Sunday, September 6
**Project Deadline**

Tuesday, September 8
**History of Video Games (cont.)**

Thursday, September 10
**Rules**

Tuesday, September 15
**Rules Schemas: Emergent Systems and Uncertainty**

Thursday, September 17
**Rules Schemas: Information Theory and Information Systems**

Tuesday, September 22
**Rules Schemas: Game Theory, Cybernetic Systems, Conflict**

Thursday, September 24
**Play and Play Schemas: Experience, Meaning, Pleasure**

Sunday, September 27
**Project Deadline**

Monday, September 28
**Project Deadline**

Tuesday, September 29
**Play Schemas: Narrative, Simulation, Social**

Thursday, October 1
**Culture Schemas: Rhetoric, Open**

Sunday, October 4
**Project Deadline**

Tuesday, October 6
**Culture Schemas: Resistance, Environment**

Thursday, October 8
**Rules of Play Wrap-Up**

Sunday, October 11
**Paper Deadline**

Tuesday, October 13
**Midterm Exam**

Thursday, October 15
**Mid-Semester Break**

Tuesday, October 20
**Metagaming**

**Game Development**

Thursday, October 22
**Game Physics**

Sunday, October 25
**Project Deadline**

Monday, October 26
**Project Deadline**

Tuesday, October 27
**Game Physics (cont.)**

Thursday, October 29

- First Game Development proposal due on Moodle at midnight.
- Read chapters 11 to 13 in RoP.
- Read chapters 14 to 15 in RoP.
- Read chapters 16 to 17 in RoP.
- Read chapters 18 to 20 in RoP.
- Read chapters 22 to 25 in RoP.
- First Game Development deliverable due on Moodle at midnight.
- First Game Development post-mortem due on Moodle at midnight.
- Read chapters 26 to 28 in RoP.
- Read chapters 29 to 31 in RoP.
- Second Game Development proposal due on Moodle at midnight.
- Read chapters 32 to 33 in RoP.
- Second Game Play Journal assignment due on Moodle at midnight.
- Research Paper proposal due on Moodle at midnight.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday, November 1</td>
<td>Project Deadline</td>
<td>• Third Game Development proposal due on Moodle at midnight.</td>
</tr>
<tr>
<td>Tuesday, November 3</td>
<td>Game AI: A* Pathfinding</td>
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<tr>
<td>Thursday, November 5</td>
<td>Game AI: Behavior Trees</td>
<td>• Third Game Play Journal assignment due on Moodle at midnight.</td>
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<tr>
<td>Sunday, November 8</td>
<td>Paper Deadline</td>
<td>• Research Paper rough draft due on Moodle at midnight.</td>
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<tr>
<td>Tuesday, November 10</td>
<td>Game AI: Behavior Trees (cont.)</td>
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<tr>
<td>Thursday, November 12</td>
<td>Game AI: MiniMax Search</td>
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<td>Tuesday, November 17</td>
<td>Procedural Content Generation</td>
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<td>Thursday, November 19</td>
<td>The Games Industry</td>
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<tr>
<td>Sunday, November 22</td>
<td>Project Deadline</td>
<td>• Third Game Development project due on Moodle at midnight.</td>
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<td>Tuesday, November 24</td>
<td>The Games Industry (cont.)</td>
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<tr>
<td>Thursday, November 26</td>
<td>Thanksgiving Holiday</td>
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<tr>
<td>Tuesday, December 1</td>
<td>Game Pitch Presentation Preparation</td>
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<tr>
<td>Thursday, December 3</td>
<td>Game Pitch Presentation Preparation</td>
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<tr>
<td>Sunday, December 6</td>
<td>Paper Deadline</td>
<td>• Research Paper final draft due on Moodle at midnight.</td>
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<tr>
<td>Thursday, December 10</td>
<td>Game Pitch Presentations</td>
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