CSCI 3312 (Intro to Game Development; Fall 2018)

Course description

This course provides a practical introduction to the methods and techniques used to create video games and interactive media by creating entire games from conception to completion. We will focus on aspects of general software development (especially classic design patterns and Agile/Scrum techniques), as well as game-specific software design concerns (such as graphics performance, networking, user interactions, etc), while also exploring game design and development beyond software implementations. The course will focus on creating 2D video games, and will cover specific topics including game engines, 2D user interactions, 2D graphics, game mechanics, level design, art direction, sound direction, project management, code collaboration, and testing.

The course content assumes a general knowledge of basic data structures (e.g. linked lists, binary search trees, stacks, etc.), a general knowledge of object-oriented programming concepts, and a general knowledge of math including basics in trigonometry, geometry, linear algebra, and calculus. While we will not be using many advanced concepts from these math areas, we will be touching on all of them.

Basic information

Class meets twice per week at:

- TR 12:45pm - 2:00pm, CSI 257

Additionally, exams will take the form of a series of "game jams" to be held on weekends. There will be 4 scheduled game jams, and you must attend 2 of these 4, including one of the first 2 offered jams.

Prerequisites

CSCI 2320 (Data Structures); CSCI 3321 recommended (Software Engineering); or permission of instructor

Instructor contact information

Dr. Matthew Hibbs
Office: CSI 270K
Office phone: (210) 999-7482

Regular office hours will be held on: M 2-4pm; T 10am-noon; W 12-4pm; R 2-4pm. These times are somewhat subject to modification given my other responsibilities. If there are changes to my office hours I'll do my best to update my public calendar. I'm often in my office at other times, and if my door is open, feel free to drop in.

E-mail: mhibbs@trinity.edu

E-mail is also a good way to contact me or ask questions. Responses are usually prompt. However, I'm not always available, and may take more time to respond. I am generally also available through GChat if I am in front of a computer (which is often).

Course materials

Reading Materials / Textbook

With regard to general game design patterns and principles, we will be using the book Game Programming Patterns by Robert Nystrom. This book is available in both print and e-book format for a reasonable price, and it is also available online for free.

We will be using the Unity Game Engine to develop our game, and at least some of what you learn in this course will be specific to the current version of Unity. As this material is rapidly changing, we will be relying on the Internet and the wealth of documentation and online tutorials available for Unity. Of particular interest are the lynda.com Unity tutorials (you get a free account with lynda.com as part of being a Trinity student).

In addition, I am recommending a few non-required books that can help with the course material:
For a description of the software development methodology we will be using:

- Agile Game Development with Scrum by Clinton Keith

For a quick overview of the 3D (and some 2D) capabilities of Unity:

- Unity Game Development in 24 Hours by Mike Geig

For a (biased) perspective on non-software aspects of game development:

- Level Up! by Scott Rodgers

Web page
Most course-related information (this syllabus, homework and reading assignments, etc.) will be made available via the Web. The course web page is a starting point for online course material. The easiest way to find it is to follow the links from my home page:
http://www.cs.trinity.edu/~mhibbs

Course Requirements
Grading
The grade for this course will be composed of three components, discussed below. This table summarizes the contribution of each to your grade in the course.

Individual Game	30%
Class Game	30%
Game Jams (15% ea.)	30%
Write-ups/Critiques	10%

The Individual Game
For roughly the first half of the semester, you will be responsible for designing, implementing, and testing a game of your own choosing. This work will be conducted individually, with the goal that you will learn the basics of the Unity development environment and C# coding. The assignment will expect you to implement a number of game features, and to include several design patterns in your implementation. You should have a complete, working game prototype or demo by the end of the first half of the semester. During this development process, you will present a "pitch" of your game to the class, meet with Dr. Hibbs at for a formal progress report, present your final product to the class, and go through a final code review with Dr. Hibbs.

The Class Game
During the second half of the semester, the major goal of this course is for us to create, from beginning to end, a fully functioning 2D video game so that you will have a firsthand approximation of the development process. The class game will be created using an Agile/Scrum development process. The class will be divided into Scrum teams of 3-5 students per team, and we will proceed on a schedule of multiple 2-3 week Agile/Scrum phases ("sprints"). At the end of each sprint, our goal is to a have the game in a fully-playable state. Sprint planning sessions, backlog management, scrum meetings, and sprint evaluations will all take place during class. At the end of each sprint, all team members will evaluate themselves and the other members of their team through peer evaluation forms. Individual grades for The Game will be based on your teammate's evaluations of you, the quality of your self-evaluation and evaluations of your teammates, your team's usage of good Agile/Scrum development practices (including maintaining/updating your backlog and burndown charts), and by my evaluation of your performance in development of the game, including your individual participation in meetings and class, your team's productivity and quality, and your team's ability to deliver on sprint goals.

Game Jams

Many (if not most) game development houses participate in a process called "game jamming", where in a defined and limited amount of time, the team creates an entire, functional game. These are typically small scale, often exploratory projects, but many have turned into major hits, and the practice has become a strong creative avenue for game development. Rather than hold traditional exams for this course, we will have a series of game jams on weekends throughout the semester. A total of 4 jams will be held, and **each student must participate in at least 2 of the 4 jams** to receive full credit. Further, you should attend one of the first 2 jams in order to immerse yourself in Unity development as early as possible. The dates of the jams are available on the course schedule page; in case of unavoidable conflicts, contact Dr. Hibbs as soon as possible to make alternate arrangements. Grading will be similar to the class game, in that the evaluation by your teammates, your self-evaluation, and evaluation by the instructor will all be considered.

Write-ups/Critiques

A few times through the semester, I will assign short (less than 2 pages) writing assignments that are written critiques analyzing and evaluating the design of 4 different games. Written critiques should address the questions assigned for each game, as well as contain your own thoughts and evaluation of its design. This portion of your grade will be based on completion of the short writing assignments, as well as your participation in class during game critiques and discussion.

Course Policies

Late and Missed Work

As per Agile/Scrum methods, sprint deadlines are fixed and cannot be changed. As such, work cannot be accepted late, rather it is pushed back into the pool of available tasks and re-distributed in the next sprint. Thus, late or missed work will result in poorer evaluations by teammates and the instructor during development.

Academic integrity at Trinity

All students are covered by the Trinity University Honor Code, which prohibits dishonesty in academic work. The Code asserts that the academic community is based on honesty and trust. It defines specific violations as well as the procedure to determine if a violation has occurred. It also covers the process of hearings for alleged violations and the various sanctions applied for specific violations, and it provides for an appeal process.

Collaboration and academic integrity in this course

This course is largely about teamwork, reflecting a (quasi-)realistic game development environment. Please help each other. Please be in the labs together working with your teams. Please use the Internet and don't reinvent more wheels than necessary. This is the key point for academic integrity in this course: **We must follow copyright, intellectual property, and common sense laws in the use of any materials from the Internet**. This means that if you want to use someone else's code, image, sound, movie, effect, etc., you must have permission, and you must document that permission. This is especially important, because **in order to release your games, we must have the rights to do so.**