Parsons School of Design
Design and Technology
Creative Coding: Unity
PGTE 5566; CRN 8107
Spring 2018
Friday, 3:50 p.m. - 6:30 p.m. 63 Fifth Ave, Room 300

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Course Description

Unity is a fantastic tool for creative coding, but it is explicitly designed for and marketed towards indie game developers. The goal of this class is to learn to use Unity for applications more commonly associated with art practice, such as interactive installations, software art apps, and critical commentary. As such, the focus of the class will be as much on thoughtful conceptualization and intentional use of the affordances of the Unity tools as it is about technical skill. We will actively identify and acknowledge the conventions and inherent values of Unity, and although we might choose to use them, we will do so intentionally and with purpose. In the process, you will also learn common principles of creative coding using the C# language.

Learning Outcomes

By the successful completion of this course, students will be able to:

1. Use Unity as an art-making tool
2. Undo (or using intentionally) the assumptions that Unity makes for you
3. Use many of the powerful tools that are part of Unity, such as physics, a robust animation system, optimized rendering, 3D sound, and an easy-to-use scene graph
4. Code in C# for Unity3D
5. Create virtual reality experiences
6. Enable communication between Unity and external devices (controllers, Arduino, cameras, internet)
7. Deploy applications for Mac, PC, iOS, Android, aware of platform differences
8. Become familiar with artist and creative coders who make work relevant to the course materials

What we won't cover

1. Game mechanics (first-person shooter systems, RPG interfaces, score keeping, etc)
2. Asset production
    a. 3D modeling (Maya, Blender, etc.)
    b. Sound FX production

    c. Texture design
3. Deploying to game consoles

Assessable Tasks

This is a project-based studio class. You will be graded primarily on your projects and assignments. There will not be any kind of written exams. Here are the most important things that I look for in an "A" project or assignment, in rough order of importance:

1. Thoughtful concept that either addresses the assignment, or creatively and purposefully undermines it
2. Interesting, intentional usage of tools
3. Utilizing the technical concepts we covered in class
4. Thorough documentation (for projects)
5. Immersive, meaningful experience
6. Going beyond what we have covered in class and learning on your own
7. Research, understand, and address relevant existing projects
8. Some attempt to share what you have learned with your classmates and/or the Unity community

Participation

Participation is important. It would be great if all of you spoke up and engaged with me and your classmates during class, but I know that's not going to be the case. Luckily, I also really appreciate you guys helping each other out and consider that perhaps even better than speaking up in class. A great way to do this is to create and share unitypackages with your classmates. We will discuss the best way for sharing these in the first few weeks of class.

Assignments

Assignments are meant to be relatively quick exercises to solidify the concepts and tools that we discuss in class. Each one of them is worth just a little more than 1% of your grade, and they should only take a few hours. Each assignment will be published on Canvas the night before class. You will also submit your assignments through Canvas.

Submitting assignments: Please make an OS X build of your assignment and zip it up with the source code. We will go over how to do this in class. When complete, put the zip file into your Dropbox, copy the public link to it, and submit it on Canvas.

If appropriate (ie: if it's not clear how your assignment works, or if there are special instructions), I also encourage you to make a screen recording of your submission and either include it in the zip file, or upload it to Vimeo and submit a link along with the assignment. This is not required for assignments, but recommended instead of text if instructions are needed. See the "Materials and Supplies" section for more information.

Projects

As stated above, this is a project-based studio class, which means that the class is mostly structured around allowing you to carefully develop several projects of which you can be proud. I'd like you to be able to use these projects as portfolio pieces. Combined, the projects will make up around 66% of your grade. Whereas assignments are private exercises, you will share your projects with your classmates, so you want to make them as polished as possible.

It's also worth noting that the concept, the product, and the presentation are all graded separately. This system is meant to emphasize that not only is it important to make great work, but also to talk clearly about your concepts, and present the work engagingly at the end.

There are 4 stages to each project:

1. **Assigned**: When a project is assigned, I will give an overview of the concept and answer any questions you might have. As soon as a project is assigned, you should get to work on the concept and then the concept presentation.
2. **Concept Presentation**: For each project, you will prepare a short concept pitch. The purpose of this is to become comfortable with presenting your ideas, and to get feedback from me and your classmates. Concept presentations should consist of the following:
    a. Concept Overview
        i. What will the experience be like?
        ii. What is the intended audience/setting?
        iii. How does this address the assignment?
    b. Relevant previous work
        i. What other, similar projects inspired you?
        ii. How will your project be similar? How will it be different?
    c. Reference imagery/mood board: provide 3-4 images that illustrate the look and/or mood that you want to achieve
    d. Call out any existing assets (Asset Store, 3D models, images, etc.) that you will be utilizing
    e. Foreseeable technical difficulties
3. **Check-in**: During the first in-class work time after Concept Presentation, I will check in with everyone individually.
4. **Project Presentation:** When the project is due, you will make a short presentation in class. It should include the following:
    a. Review your concept - summarize everything from your Concept Presentation
    b. Demo your project (ideal) and/or show documentation video (required if you are not able to set up project in classroom, recommended otherwise)
    c. Discuss challenges you encountered, and how you dealt with them.
    d. Discuss any changes that occurred, and why you made them.
    e. Post download link on canvas so that your classmates can look at your source

Project Worksheets will be posted in the Files section of Canvas before projects are assigned.

Project Previews

Project 1: Rube Goldberg

Create an experience that utilizes the Unity physics engine to create a Rube Goldberg machine with at least 4 steps. It should be interactive in some way.

Project 2: First Person

Build an experience that re-imagines the first person controller or uses it in an unexpected way. For example, instead of the POV representing the eyes of a human protagonist, create a stereoscopic interface of a creature with eyeballs on its feet as the protagonist.

Project 3: Unconventional Interface

Create an experience that does not use keyboard, mouse, or game controller. Potential alternatives are: camera-based interaction (webcam or depth camera, such as Kinect), heart rate sensor, audio input (speech to text or volume detection), custom arduino interface, dance pad, brainwave sensor, or a game controller such as a Guitar Hero guitar, but not used for musical input.

Group project: optional

Using Asset Store Packages

I encourage you to take advantage of assets that you find online and/or Asset Store packages in your projects. However, some assignments are clearly designed to help you learn technical concepts by doing them yourself. In these cases, I will not accept submissions where you used assets written by someone else to achieve the assignment. There will definitely be grey area, but if you are ever in doubt, just ask me.

Artist Presentation

Each week, one student will give a 5-10 minute presentation about an artist or group who uses Unity (or a similar tool) in their art practice. Prepare a short Google Slide presentation and send me a link. I will give a sample presentation on the first class (https://goo.gl/gyizBL) . Be sure to answer the following questions:

1. Why did you choose this artist?
2. What is original/unique about how this artist uses technology?
3. What are some examples of his/her work?
4. What kind of code did the artist use? (JavaScript? Flash? Processing? openFrameworks?)

I encourage you to present an artist or group whose work you particularly enjoy. But if you have trouble finding an artist, check the sites listed under “Recommended Reading” below.

Final Grade Calculation

Participation/Attendance	30 (2pt per class)	14.29%
Artist Presentation	6	2.86%
Project 1: Concept	10	4.76%
Project 1: Product	20	9.52%
Project 1: Presentation	6	2.86%
Project 2: Concept	15	7.14%
Project 2: Product	25	11.90%
Project 2: Presentation	6	2.86%
Project 3: Concept	20	9.52%
Project 3: Product	30	14.29%
Project 3 Presentation	6	2.86%
Assignments	36 (3pts each)	17.14%
TOTAL	**210**	**100.00%**

Course Outline

This outline is for overview purposes only. Please check Canvas for assignments

Date	**Pre-class**	**In-class**
Week 1 / Jan 26	Install Unity, introduction to interface	Hello Unity, introductions, Introduction to C#
Week 2 / Feb 2	Prefabs, physics	keyboard/mouse/gamepad input, Asset Store
Week 3 / Feb 9	Lighting	Geometry scripting
Week 4 / Feb 16	Materials	Lighting and Materials Scripting, Surface Shaders
Week 5 / Feb 23	Finish project 1	Critique 1
Week 6 / Mar 2	Particle Systems	Particle system scripting
Week 7 / Mar 9	Trees, terrain, controllers	Custom controllers, PlayerPrefs
Week 8 / Mar 16	3D Audio, audio mixing	Sound scripting
Week 9 / Mar 23		NO CLASS: SPRING BREAK
Week 10 / Mar 30	UI / Canvas, SpriteSheets	UI Scripting
Week 11 / Apr 6	Finish Project 2	Critique 2
Week 12 / Apr 13	Arduino/Serial basics	Serial communication in Unity
Week 13 / Apr 20	Animation, Kinect mocap, RIgging in MayaLT	Animation Scripting, Animator state machine
Week 14 / Apr 27	Vuforia basics	The joys of deploying: debugging, asset management
Week 15 / May 4	Unity 2D	TBD
Week 16 / May 11	Finish project 3	Critique 3

Recommended Reading

The following sites are recommended for inspiration, research into relevant projects, or for choosing an artist for your Artist Presentation.

1. Inspiration/Research
    a. Creative Applications
    b. Prosthetic Knowledge
    c. Create Digital Motion
    d. New Ways of Interaction
    e. Rhizome
    f. #showcase in the Unity Slack
2. Learning
    a. Rick Barraza's YouTube channel
    b. The Unity Manual
    c. Stack Overflow: Unity3D

Materials and Supplies

I recommend you get a 3-button mouse, but that's for your own convenience. There are no required materials for this course. Instead, I suggest setting aside a budget for purchases from the Unity Asset Store. You will almost definitely find yourself browsing through the store while working on a project and find something that would make your project better. If you have a budget set aside that you would have spent on - say - a textbook, you can more easily rationalize the purchase later.

Additionally, a good screen capture program is always a great tool to have. On a Mac, Screenflow is a great option. on Windows, Camtasia is a bit more pricey, but will serve you very well when documenting your work.

Resources

The university provides many resources to help students achieve academic and artistic excellence. These resources include:

- The University (and associated) Libraries: http://library.newschool.edu
- The University Learning Center: http://www.newschool.edu/learning-center
- University Disabilities Service: www.newschool.edu/student-disability-services/

In keeping with the university's policy of providing equal access for students with disabilities, any student with a disability who needs academic accommodations is welcome to meet with me privately. All conversations will be kept confidential. Students requesting any accommodations will also need to contact Student Disability Service (SDS). SDS will conduct an intake and, if appropriate, the Director will provide an academic accommodation notification letter for you to bring to me. At that point, I will review the letter with you and discuss these accommodations in relation to this course.

Grading Standards

A Work of exceptional quality
A- Work of high quality
B+ Very good work
B Good work; satisfies course requirements
Satisfactory completion of a course is considered to be a grade of B or higher.
B- Below-average work
C+ Less than adequate work
C Well below average work
C- Poor work; lowest possible passing grade
F Failure
GM Grade missing for an individual

Grades of D are not used in graduate level courses.

Grade of W
The grade of W may be issued by the Office of the Registrar to a student who officially withdraws from a course within the applicable deadline. There is no academic penalty, but the grade will appear on the student transcript. A grade of W may also be issued by an instructor to a graduate student (except at Parsons and Mannes) who has not completed course requirements nor arranged for an Incomplete.

Grade of Z
The grade of Z is issued by an instructor to a student who has not attended or not completed all required work in a course but did not officially withdraw before the withdrawal deadline. It differs from an "F," which would indicate that the student technically completed requirements but that the level of work did not qualify for a passing grade.

Grades of Incomplete
The grade of I, or temporary incomplete, may be granted to a student under unusual and extenuating circumstances, such as when the student's academic life is interrupted by a medical or personal emergency. This mark is not given automatically but only upon the student's request and at the discretion of the instructor. A Request for Incomplete form must be completed and signed by student and instructor. The time allowed for completion of the work and removal of the "I" mark will be set by the instructor with the following limitations:

Work must be completed no later than one year following the end of the class. Grades of "I" not revised in the prescribed time will be recorded as a final grade of "WF" (for Parsons and Mannes graduate students) or "N" (for all other graduate students) by the Office of the Registrar. The grade of "N" does not affect the GPA but does indicate a permanent incomplete.

Divisional, Program and Class Policies

- Responsibility

Students are responsible for all assignments, even if they are absent. Late assignments, failure to complete the assignments for class discussion and/or critique, and lack of preparedness for in-class discussions, presentations and/or critiques will jeopardize your successful completion of this course.

● Participation
Class participation is an essential part of class and includes: keeping up with reading, assignments, projects, contributing meaningfully to class discussions, active participation in group work, and coming to class regularly and on time.

● Attendance
Parsons' attendance guidelines were developed to encourage students' success in all aspects of their academic programs. Full participation is essential to the successful completion of coursework and enhances the quality of the educational experience for all, particularly in courses where group work is integral; thus, Parsons promotes high levels of attendance. Students are expected to attend classes regularly and promptly and in compliance with the standards stated in this course syllabus.

While attendance is just one aspect of active participation, absence from a significant portion of class time may prevent the successful attainment of course objectives. A significant portion of class time is generally defined as the equivalent of three weeks, or 20%, of class time. Lateness or early departure from class may be recorded as one full absence. Students may be asked to withdraw from a course if habitual absenteeism or tardiness has a negative impact on the class environment.

Whether the course is a lecture, seminar or studio, faculty will assess each student's performance against all of the assessment criteria in determining the student's final grade.

● Canvas
Use of Canvas may be an important resource for this class. Students should check it for announcements before coming to class each week.

● Delays
In rare instances, I may be delayed arriving to class. If I have not arrived by the time class is scheduled to start, you must wait a minimum of thirty minutes for my arrival. In the event that I will miss class entirely, a sign will be posted at the classroom indicating your assignment for the next class meeting.

● Electronic Devices
The use of electronic devices (phones, tablets, laptops, cameras, etc.) is permitted when the device is being used in relation to the course's work. All other uses are prohibited in the classroom and devices should be turned off before class starts.

● Academic Honesty and Integrity
Compromising your academic integrity may lead to serious consequences, including (but not limited to) one or more of the following: failure of the assignment, failure of the course, academic warning, disciplinary probation, suspension from the university, or dismissal from the university.

Students are responsible for understanding the University's policy on academic honesty and integrity and must make use of proper citations of sources for writing papers, creating, presenting, and performing their work, taking examinations, and doing research. It is the responsibility of students to

learn the procedures specific to their discipline for correctly and appropriately differentiating their own work from that of others. The full text of the policy, including adjudication procedures, is found at http://www.newschool.edu/policies/# Resources regarding what plagiarism is and how to avoid it can be found on the Learning Center's website: http://www.newschool.edu/university-learning-center/student-resources/

The New School views "academic honesty and integrity" as the duty of every member of an academic community to claim authorship for his or her own work and only for that work, and to recognize the contributions of others accurately and completely. This obligation is fundamental to the integrity of intellectual debate, and creative and academic pursuits. Academic honesty and integrity includes accurate use of quotations, as well as appropriate and explicit citation of sources in instances of paraphrasing and describing ideas, or reporting on research findings or any aspect of the work of others (including that of faculty members and other students). Academic dishonesty results from infractions of this "accurate use". The standards of academic honesty and integrity, and citation of sources, apply to all forms of academic work, including submissions of drafts of final papers or projects. All members of the University community are expected to conduct themselves in accord with the standards of academic honesty and integrity. Please see the complete policy in the Parsons Catalog.

- Intellectual Property Rights: http://www.newschool.edu/policies/#