New York University Tandon School of Engineering
Technology, Culture and Society
Integrated Digital Media
Course Outline DM-UY 1133 Creative Coding section B
Fall 2019
Professor Alex Nathanson
Monday & Wednesday 2:30-4:20; 370 Jay St., 311

To contact professor: an2535@nyu.edu
Office hours: by appointment (appointment scheduler: https://calendar.google.com/calendar/selfsched?sstoken=UURfOUh2d2JrOUtkfGRlZmF1bHR8MzVlMzBkYTBjZjI4NWY3ZWRjZjI0N2RlNDg1MzdjOGI)

This syllabus is subject to change, so check back regularly. (Updated 9/9/19)

Course Description
In this course you will learn how to make art and design in the medium of software. We will be exploring poetic and creative computation using the free and open-source programming environments, Processing and P5.js. We will be learning fundamental programming concepts, exploring computation as a medium for art and looking at a range of artists who work in this area. You will be experimenting with a range of different techniques to realize creative projects which will be documented online. Topics will include programming interactivity, generative graphics, and computer vision.

Program Learning Objectives
Students will:

- Develop conceptual thinking skills to generate ideas and content in order to solve problems or create opportunities in art and design.
- Develop technical skills to realize their ideas.
- Develop critical thinking skills that will allow them to analyze and position their work within cultural, historic, aesthetic, economic, and technological contexts.
- Gain knowledge of professional practices and organizations by developing their verbal, visual, and written communication for documentation and presentation, exhibition and promotion, networking, and career preparation.
- Develop collaboration skills to actively and effectively work in a team or group.

Course Objectives
- Learn the fundamentals of computational thinking applied in the Processing (Java) and P5JS (Javascript) environments.
- Learn best practices for designing software within an event-driven, object-oriented, real time framework.
- Ideate and conceptualize original creative works in the medium of software

- To develop a cultural literacy of the computational arts by critically engaging with historic and contemporary practices.
- Develop personal learning strategies, project planning, troubleshooting and problem solving skills.

Course Structure
For this class, there will be lectures, discussions, and student presentations in class, weekly homework assignments that include readings, research, and coding projects, a midterm assessment, and a final project.

Readings
The required texts for the course are:

- Shiffman, Daniel. *Learning Processing: a beginner's guide to programming images, animation, and interaction.* Morgan Kaufmann, 2009. (online access through NYU libraries: https://ebookcentral-proquest-com.proxy.library.nyu.edu/lib/nyulibrary-ebooks/detail.action?docID=4003651)
- *Make: Getting Started with p5.js: Making Interactive Graphics in JavaScript and Processing*, by Lauren McCarthy, Ben Fry, and Casey Reas. (online access through NYU libraries: https://www-oreilly-com.proxy.library.nyu.edu/library/view/make-getting-started/9781457186769/?orpqemail=jas920tstamp=1567099300id=0E7C63FD50827DD453B5E04C5458AFE1D3663DF0)

It is compulsory that you get these texts and you are likely to refer to them both throughout your time at NYU. Although digital copies might be easy to find, it is required that you get print copies of these books so that you can easily refer to them, write notes in them, do the exercises in them, etc. They are also in the library.

Links

Slack (for class discussions and research post submissions) - https://join.slack.com/t/idm-cc/shared_invite/enQtNzMzOTE5NDE3NTcxLTY4ODEzOWM5MDZmNTUwYTVlM2ZhZTM2YzA5MzdhNGVhNjQ2NmRhYjkzMWQ2MzYwOWJmY2RlYjcyZDkwZDJkNDQ

Open Processing - https://www.openprocessing.org/class/60233

Additional links to tools, resources, things discussed in class etc. will be available at http://www.courses.alexnathanson.com/creativecodingF19/

Grading and Attendance Policy
Class participation (25%)

- Students are expected to be present and contribute in class.
- More than 2 unexcused absences and you will lose a letter grade for every additional missed class. If you miss a class it is your responsibility to find out what you missed from other students. 3 unexcused late entries will count as an absence.
- No cell phones should be visible in the classroom.

Homework (45%)

- There will be weekly homework assignments, consisting of research posts, readings, and coding projects. Homework will be due prior to the start of the Monday class. See deliverables and class schedule below for more info.
- Each coding project will be worth 10% of the overall grade, the research posts and smaller homework assignments will be cumulatively worth 5% of the overall grade.
- This rubric will be used for grading projects:

  A: Project exceeded technical expectations with additional creative effort and experimentation from the student to make it unique (not just a tech demo)
  B: Project met expectations
  C: Minimal effort put into project
  D: Substandard, incomplete, or very late
  0: Assignment not turned in

Midterm Assessment (5%)
Final Project (25%)

Academic Accommodations

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at http://www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

Deliverables
See schedule for additional homework (readings and/or research posts)

All coding projects should be posted to Open Processing prior to the start of Monday's class, unless otherwise noted.

Project 1 (Due 9/16) - Drawing Machine (10%)

> Make a drawing machine. Think about what a drawing tool is typically intended to accomplish and ways you can build on or subvert that goal. What would a drawing tool look like that makes it harder to draw rather than easier? The project must include some predetermined element(s), mouse interaction, and some random element(s). This will be made with Processing.

Project 2 (Due 9/30) - Visualizing Time (10%)

Make a unique visual clock. Think of creative ways to represent time and consider different types of time (lunar, geological, historical, biological, screen-time, etc.). The project must include loops, matrix transformations, and custom functions. This will be made with Processing.

Project 3 (Due 10/15) - Generative Landscape (10%)

Create a generative landscape. What consists of a landscape is open to interpretation. Consider depth of field, foreground, midground, background, and scale. How can you keep the landscape from becoming too predictable? Your project must use custom classes and arrays. This will be made with P5JS.

Project 4 (Due 11/4) - Game or A/V Instrument (10%)

You can choose to make either a game or an audio/visual instrument (or some combination of the two). The project must include some aspect of sound. This will be made with P5JS.

If you're making a game, what is the goal of the game? What are the rules? How do you play it? How do you win (assuming the goal is to "win")?

If you're making an A/V instrument, how do you change the output to produce something aesthetically impactful? Consider how you would compose/structure a performance piece to be performed with your new instrument. Consider additional effects beyond just individual sounds or visual effects, like looping. How does the sound relate to the images and vice versa?

Research Posts (See schedule for due dates) - (5%)

All research posts should be posted to the class slack.

Research Post #1 (Due 9/9)- Find an example of creative coding (ideally using Processing or P5JS) that you find exciting/ inspiring. Write a short paragraph about what you find interesting about it and post your paragraph along with a link or relevant media to the class slack channel.

Research Post #2 (Due 11/18) - Prepare a 5 minute presentation on an artist/designer that relates to your final project. What is this person trying to accomplish through their work? How is this person using technology?

Midterm Assessment (Due 10/21) - (5%)

The midterm will consist of a few short take-home written responses and a self-assessment. Details will be announced when it is assigned.

Final Project (Due 12/9) - (25%)

The final project can be anything that displays your creative skills within a software environment, such as an interactive tool, data visualization, performance project, or anything else. You will need to submit a proposal for your final project, which I will need to approve. This project should be more than a technical demonstration. You should attempt to create an impactful aesthetic experience for the viewer/ user. It can be built in either Processing or P5JS, however you must articulate why you chose one or the other in your project proposal. Your code must be thoroughly commented. Any libraries, templates, or inspiration must be credited.

Part 1: Project Proposal (5%)

The project proposals should include:

- A description of what you plan to create.
- Why did you choose this project? Is there a question you're trying to answer? Is there something you're commenting on or critiquing with your work?
- How are you going to build it? Be as specific as possible. What programming language are you going to use and why? What libraries might you use? What will the user or viewer experience be? The more you plan in advance the easier it will be to successfully produce.

The project proposal presentation should be 3-5 minutes long.

Part 2: Project Submission (20%)

The final project code along with any necessary technical specs and other documentation will need to be uploaded to Git Hub. Documentation will likely be different for every project. It could be a screen recording, video of a performance, video of users interacting with your program, etc. The documentation does not need to be incredibly high resolution, but it does need to accurately reflect your project.

Class Schedule

Check this schedule every week. This schedule is subject to change depending on the interests and pace of the class, etc.

Date + Class #	In Class	Homework (listed on date assigned, due the following Monday, before class)
Week 1		
9/4 Class 1	• Introduction to the class	• Join the class Slack • Download and install Processing

	• Download necessary software/ get setup with web-based tools • Processing Hello World ○ Syntax, color	• Make an Open Processing account and join the class https://www.openprocessing.org/class/60233 with this code: 5BF02F • Research post #1 • Read Learning Processing Ch. 1-2 • Suggested Viewing: Shiffman, Learning Processing 1-4
Week 2		
9/9 Class 2	• Data types, variables, math, coordinate system, graphics, mouse interaction	• Read Learning Processing Ch. 3-4 • Suggested Viewing: Shiffman, Learning Processing 5-6
9/11 Class 3	• Randomness, commenting, println(), time	
Week 3		
9/16 Class 4	**Last day of add/ drop** • **Project 1 Due** • Conditionals, keyboard interaction, map(), constrain()	• Read Learning Processing Ch. 5-7 • Suggested Viewing: Shiffman, Learning Processing 7
9/18 Class 5	• Loops, scoping, functions, pseudo code	
Week 4		
9/23 Class 6	• Matrix transformations, motion arrays, text, font, loadStrings()	• Read Learning Processing Ch. 9,13,14 • Suggested Viewing: Shiffman, Learning Processing 9
9/25 Class 7	• Objects	• Suggested viewing: Shiffman, Learning Processing 8
Week 5		
9/30 Class 8	• **Project 2 due** • Intro to P5.JS, javascript workflow	• Read Getting Started with p5.js Ch. 1-6 • Read Processing Transition: https://github.com/processing/p5.js/wiki/Processing-transition • Suggested viewing: Shiffman, Programming with P5JS • Download and install a desktop editor

10/2 Class 9	• P5JS + Javascript cont.	
Week 6		
10/7 Class 10	• OOP, Classes	• Read Learning Processing Ch 8 • Read Getting Started with p5.js Ch. 6-9, 11 • Suggested viewing: Shiffman, Programming with P5JS 6
10/9 Class 11	• OOP, Classes cont.	
Week 7		
10/15 Class 12	**Class meets on Tuesday, not Monday** • **Project 3 due** • JS arrays, objects, images, media	• Midterm Assessment • Make a Github account • Download and install the github desktop app • Complete the Github tutorial
10/16 Class 13	• JS arrays, objects, images, media cont., Command line and git	
Week 8		
10/21 Class 14	• **Midterm Assessment Due** • **Github assignment due** • P5.JS libraries, sound, midi	• Read Getting Started with p5.js Ch. 13
10/23 Class 15	• P5.JS libraries, sound, midi cont.	
Week 9		
10/28 Class 16	• Image processing, computer vision	• Read Learning Processing Ch 15-16 • Suggested viewing: Shiffman, Learning Processing 10, 11 • Suggested viewing: Shiffman, P5JS 11
10/30 Class 17	• Image processing, computer vision cont.	
Week 10		

11/4 Class 18	**Last day to withdraw with a W** ● **Project 4 Due** ● JSON + Data	● Read Getting Started with p5.js Ch. 12 ● Final project proposals ● Suggested viewing: Shiffman, https://thecodingtrain.com/Tutorials/10-working-with-data/
11/6 Class 19	● JSON + Data cont.	
Week 11		
11/11 Class 20	● Final project proposal presentations ● APIs	● Work on your final project
11/13 Class 21	● APIs cont.	
Week 12		
11/18 Class 22	● Research Post #2 Due ● DOM, events	● Work on your final project ● Suggested viewing: Shiffman, https://thecodingtrain.com/Tutorials/8-html-css-dom/index.html
11/20 Class 23	● DOM, events cont.	
Week 13		
11/25 Class 24	● Final project progress presentations	● Work on your final project
11/27	**No class - Thanksgiving Recess**	
Week 14		
12/2 Class 25	● TBD based on student interest (likely Demo P5.JS + NODE.JS + physical computing)	● Work on your final project ● Suggested viewing TBD
12/4 Class 26	● Work on final projects	
Week 15		

12/9 **Class 27**	● **Final Projects Due** ● Final Assignment Presentations	
12/11 **Class 28**	● Final Assignment Presentations	

NYU School of Engineering Policies and Procedures on Academic Misconduct

A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.
2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work that was meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.

6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.