Parsons School of Design
Design and Technology
Creative Coding: Large Systems
PGTE 5566; CRN 2998
Spring 2018
Tuesday 7:00 p.m. – 9:40 p.m.
6 East 16th Street, Room 1208

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Available one hour before class or by appointment

Course Description

This class will cover turning sketches and prototypes into the large scale interconnected systems found in practice. Focus will be placed on networking, protocols like OSC, architectures like REST, formats like JSON, and other technologies designed to make disparate systems communicate.

Learning Outcomes

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

1. Design and implement systems that coordinate code running in parallel
2. Competently troubleshoot problems that arise from such systems
3. Interact with existing Large Systems, such as Web APIs and other servers
4. Reason about the political implications of the tools they build on

Assessable Tasks

Final Grade Calculation
Participation   15%
Homework   15%
Midterm   30%
Final Project   40%
TOTAL   100%

Course Outline

WEEK 1	Jan 23	Introduction: What is a Large System?
WEEK 2	Jan 30	Networks: How Machines Communicate Layered protocols and the internet
WEEK 3	Feb 6	Networks: Overview of Protocols and Formats RESTful system design and packet serialization
WEEK 4	Feb 13	Networks: APIs and Interfaces Talking to web APIs in browser JavaScript

WEEK 5	Feb 20	Computers: Communication Communicating between computers on a local network in JavaScript. Includes TCP, UDP, and OSC
WEEK 6	Feb 27	Computers: Serialization Encoding data over a network. Includes OSC, XML, and JSON
WEEK 7	Mar 6	Midterm Class-wide Networked Game
WEEK 8	Mar 13	JavaScript: The Language The unique and useful features of JavaScript. Includes closures and object literals.
WEEK 9	Mar 20	SPRING BREAK
WEEK 10	Mar 27	JavaScript: Servers Writing servers in JavaScript. Includes node.js and express.js
WEEK 11	Apr 3	Cloud: Deployment Deploying Code to remote hosts. Includes Amazon AWS and Digital Ocean
WEEK 12	Apr 10	Cloud: Databases Persisting data in the cloud. Includes MongoDB, Redis, and DynamoDB
WEEK 13	Apr 17	Hardware: Communication Chip level protocols on Arduinos. Includes I2C, SPI, and Serial
WEEK 14	Apr 24	Hardware: Serialization Packing and unpacking streams of bytes over I2C, SPI and Serial
WEEK 15	May 1	Final Projects In class work on final projects
WEEK 16	May 8	Final Presentations Present final projects

Recommended Reading

There is no required reading for the class, but the following books might be of interest:

• Networks of New York by Ingrid Burrington
• Making Things Talk by Tom Igoe

Materials and Supplies

You will need a modern laptop computer. I will be using macOS in class.

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.

Making Center

The Making Center is a constellation of shops, labs, and open workspaces that are situated across the New School to help students express their ideas in a variety of materials and methods. We have resources to help support woodworking, metalworking, ceramics and pottery work, photography and film, textiles, printmaking, 3D printing, manual and CNC machining, and more. A staff of technicians and student workers provide expertise and maintain the different shops and labs. Safety is a primary concern, so each area has policies for access, training, and etiquette that students and faculty should be familiar with. Many areas require specific orientations or trainings before access is granted. Detailed information about the resources available, as well as schedules, trainings, and policies can be found at resources.parsons.edu.

Grading Standards

Undergraduate

A student's final grades and GPA are calculated using a 4.0 scale. Please note that while both are listed here, the 4.0 scale does not align mathematically with the numeric scale based on percentages of 100 points.

A [4.0; 95 – 100%]
Work of exceptional quality, which often goes beyond the stated goals of the course

A- [3.7; 90 – <95%]
Work of very high quality

B+ [3.3; 87 – <90%]
Work of high quality that indicates higher than average abilities

B [3.0; 83 – <87%]
Very good work that satisfies the goals of the course

B- [2.7; 80 – <83%]
Good work

C+ [2.3; 77 – <80%]
Above-average work

C [2.0; 73 – <77%]

Average work that indicates an understanding of the course material; passable
Satisfactory completion of a course is considered to be a grade of C or higher.

C- [1.7; 70 – <73%]
Passing work but below good academic standing

D [1.0; 60 – <70%]
Below-average work that indicates a student does not fully understand the assignments;
Probation level though passing for credit

F [0.0; 0 – <60%]
Failure, no credit

Graduate

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:

Graduate students: 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

● <u>Responsibility</u>

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.

● <u>Participation</u>

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.

● <u>Attendance</u>

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.

● <u>Delays</u>

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.

● <u>Electronic Devices</u>

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.

● <u>Academic Honesty and Integrity</u>

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/#
- Fun

It is a requirement of the class that you have fun making your projects. If you're not having fun, then you're either making the wrong projects or making them in a way that doesn't suit your natural workflow. Talk to me if any of your work feels like a drag and we will figure something out. I am serious about this.