Music 256a | CS 476a
Music, Computing, and Design
Autumn Quarter
Instructor: Ge Wang (http://ccrma.stanford.edu/~ge/)

class time: MW 3:15 - 5:05pm
location: CCRMA Classroom (Knoll 217)
prerequisites: introductory (or higher) background in programming (e.g., in C/C++, java)

Description
This course focuses on software design and implementation for computer audio. The goal is to provide students with an understanding of the strategies, best practices, and tradeoffs in building audio software systems of various sizes (S, M, L, XL), with a focus on interactive ("real-time") systems. We will both "zoom out" and look at high-level design and structure as well as "zoom in" and dissect code in a hands-on, "in-the-trenches" manner. Course work is designed to put concepts/ideas into practice, and includes several small programming assignments, in-class quizzes, and a large-ish final software project. Students should have some prior experience programming in C/C++ and/or Java.

Topics include:
* real-time software systems
* useful data structures and algorithms in audio programming
* design principles and patterns (especially for audio)
* integrating systems (audio, graphics, networking, system logic, etc.)
* optimization techniques (and when to optimize)
* synchronization and concurrent programming
* software engineering best practices

Logistics:
- 2 lectures per week
- 3 medium size programming assignments
- large final project (video demos of all projections near the end of class)
- tutorials + hack sessions (organized as necessary)

Grading:
- 50% homework projects (total of 3)
- 30% final project (and presentation)
- 20% proposal + milestone presentations + participation