Proposal for 6.001 in ESG
Spring Term 2004

Ben Vandiver
January 19, 2004

Background

ESG

ESG’s strengths lie in a couple of areas. First, the class size is much smaller, allowing for a much better teacher-student interaction. This enables courses to be more tailored to the students. It also allows the class to be more flexible and thus better respond to student needs and interests. Second, a fair number of people from ESG are available and interested in teaching 6.001. ESG’s instructors are undergraduates who have taken the class, done well, and are interested in passing on their knowledge. Each instructor approaches teaching the material differently, but fall back on each other and the ESG staff when they run into trouble. Lastly, the students are oriented towards individual exploration and group work.

6.001

6.001’s objectives are threefold: introducing students to thinking programmatically, understanding the basic concepts of computer science, and surveying the topics in computer science. Thinking programmatically involves turning concepts into processes and being able to observe the behavior of systems and draw conclusions about how they work. The basics of computer science which 6.001 touches on are things like abstraction, simplicity, pattern recognition, wishful thinking, language, orders of growth, etc. Topics covered in 6.001 include cryptography, graphics, object systems, compilers, game theory and more, depending on the term.

Class time is divided into three areas: lecture, recitations, and tutorials. The lectures are delivered online from the course website. Students are expected to watch 2 1-hour lectures per week and do a small set of exercises for each. Recitations occur twice a week for 1 hour each, are taught by a faculty member to a group of 20-30 students, and serve to reinforce material delivered in lecture. Tutorials occur once a week for 1 hour, are taught by a graduate TA to a group of 3-5 students, and serve to give students hands-on experience working with the class material. Problem sets are assigned weekly and are completed through the course website. Biweekly projects exercise programming skills and code comprehension while covering various topics in computer science. The class has two quizzes and a final. Collaboration is encouraged on the projects and disallowed on problem sets.
Objective

An implementation of 6.001 in ESG should leverage the student instructors and small class sizes, while keeping true to 6.001 by interacting with course staff and remaining accountable to the regular course.

Implementation

- ESG students are responsible for viewing the lectures, doing the problem sets and projects, and taking the exams of the mainstream class.
- A single 6.001 TA will have all the ESG students, and will attempt to place them in tutorial together. This TA should optimally have prior experience with 6.001.
- ESG instructors will teach the students in place of regular recitation. This consists of two class meetings per week to cover material covered in the lectures. The instructors are students who have taken 6.001 and mastered the material.
- The ESG instructors and I will meet on a regular basis to ensure that content delivery is progressing smoothly and to discuss techniques for teaching the material.

Basically, the ESG students get small adaptable class sizes while otherwise taking the class normally. The 6.001 staff remains able to grade the ESG students like normal students.