

Statement of Teaching Philosophy

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My aim as a teacher is to design new undergraduate and graduate courses, to guide graduate students and to help motivated undergraduate students grasp the basics of research in my field of interest that is computer networks and systems.

My first professional teaching experience was when I was a senior at my undergraduate institution, Indian Institute of Technology, Madras. I was assigned the task of a lab assistant who would help freshman undergraduates with basic C and UNIX programming skills. I thoroughly enjoyed interacting with the students. I used to have frequent discussions and debates with them to help them analyze why certain aspects of C and UNIX were designed the way they were. I believe that these discussions helped me form the basis of my teaching philosophy – that students need an environment where they can interactively dissect, critique and evaluate the design of systems to learn faster.

As a second year graduate student at Princeton, I was fortunate enough to be assigned as a teaching assistant to two intensive programming courses: Introduction to Programming Systems ¹ and Advanced Programming Techniques ². The experience that I obtained from teaching these courses helped me further concretize my teaching philosophy.

Inculcating the habit of grasping a concept not just by understanding the best available solution but also by critiquing the alternatives was fruitful. I wanted them to understand that programming was ultimately just a methodology to solve problems and often there are tradeoffs that one has to make. One of the most interesting discussions that I had with the students was about the advantages and disadvantages of using the standard C library functions via two interfaces: using shell commands vs writing new C application programs. While the passionate discussion fringed upon issues ranging from portability, software engineering effort to efficiency, I think ultimately the students benefited from the fact that they were able to dissect, critique and weigh various options to pick the right solution.

Keeping these experiences of mine in mind, I think that the five-point plan outlined as follows can help me make undergraduate and graduate level system design and implementation courses more rewarding on a general and personal level for each student.

1. **Keep the introductory programming courses interactive:** Programming is a field where peers can be motivating and can also be very good source of genuine insight. Learning programming is a very personal experience for many people where they need a right environment to learn as opposed to needing a presentation that states facts. These interactions can also be staged such that students can appreciate the work that was done before their time. Providing a “big picture” idea of system design interactively at the freshman and sophomore level could motivate more undergraduate students to develop a liking for programming.
2. **Personalize the content for more advanced programming courses:** Advanced programming courses designed around the needs of junior undergraduates can be personalized to enhance students’ design skills. Giving them the maximum amount of freedom with respect to choosing a programming assignment can achieve such a goal. Choice can also be given between, various platforms, frameworks, and programming environments. By giving them such a freedom, one can provide them with an early exposure to the life of a system designer; where programming is essentially the final phase and may be even the simplest phase if done right.
3. **Organize new kinds of programming contests:** One way to motivate young minds to go the extra mile to grasp better system design skills is by organizing innovative programming events. Programming contests can be designed to help the students gain a better understanding of new programming languages, compilers, computer networks, and operating systems unlike existing ones that focus mostly on abstract algorithms and datastructures.

¹<http://www.cs.princeton.edu/courses/archive/fall07/cos217/>

²<http://www.cs.princeton.edu/courses/archive/spring08/cos333/>

4. **Host an interactive blog about design and implementation of systems:** I wish to host a blog in which students and professors can write articles about anything pertaining to the design and implementation of new systems that they find interesting. It can be on any number of practical and theoretical challenges of realizing a particular idea; it can also be a critique about an existing system. The informal setting of a blog can also help students be more interactive and critical of each other's opinions. Such qualities are important for students wishing to design systems in the future.
5. **Organize a seminar to discuss latest academic work in system building:** The seminar would discuss the happenings in the academic world in a more formal setting when compared to a blog. Each seminar lecture can discuss one or two papers that were recently published and has aspects of novel system design and implementation. The course can be designed around the needs of an enthusiastic senior undergraduate student or a new graduate student who is looking for a broad exposure to the general area of systems.

In addition to teaching programming and system building courses interactively, I wish to take graduate students in my preferred field of research that is computer networks and systems. Here, I draw upon the wisdom that my advisor, Prof. Vivek S. Pai gave me. My goal as a graduate student advisor would simply be to pass on the same kind of support and fellowship that Vivek gave me. Vivek always told me that working on good problems is always the root to happiness in a graduate student's life – “work on high-impact problems and everything else will be fine”. Additionally, Vivek is a master of the art of customizing his guidance for each phase of a graduate student's life. He knew exactly when to give the maximum amount of freedom and when to closely evaluate progress. His timely insight and the willingness to give insane amounts of freedom always helped me make progress in a stress-free manner. I wish to emulate his style of guiding graduate students so that I can inspire them to work hard and work on important problems.