Teaching Statement

Dennis Shasha

The philosophy of the Problem Solving seminar is that freshmen can understand even the most complex ideas if they feel motivated to use them. To that end, I ask them to work on mathematical and logical puzzles to enhance their ability to break down complex problems, and help them investigate case studies in behavioral economics to understand the kind of fallacies people commit when faced with choices. Next, I ask the students to design and carry out their own experiments, while teaching them enough statistics so they can evaluate the generality of those experiments. Finally, I teach them programming up to a level where they can program a strategic bot that bids on a series of auctions.

I have gotten to know many students from this seminar who have gone on to do research with me later in their undergraduate careers, sometimes as soon as the next semester or the following summer. These include projects in robotics, wireless, computational biology, and graph theory. The students often use problem-solving techniques in their efforts. For example, one student designed a robot to measure the strength of wireless signals in a room. The robot consisted of an iPhone mounted on a Roomba along with an algorithm to explore a room. Though this project occurred the summer after the course, the approach was very much in the spirit of problem-solving in a setting where there was no pre-existing solution.

My philosophy of teaching and mentoring are similar: I like to see students learn by creating experiments, computer programs, and more generally, solutions to problems. Sometimes the students solve puzzles that I have designed even better than I do. When that happens, I throw them a Kit-Kat. To me, smart students should be given as much autonomy as possible while being given sufficient guidance so they don’t get lost. I encourage them to think of themselves as future creators and researchers.