

Week Eight Reading Notes

This very slick lecture sequence begins normally by simply continuing on with the use of randomness. A gentle refresher session on probability theory might make some students forget about Python error codes (yeah!) but remind them of high school math (no comment). You may wonder – since this is not a course about probability, why are we spending time on the subject? Sure, stochastic programming is challenging – but is it that useful?

The second video segment continues with randomness. In this segment, it should suddenly become clear how Python might be implementing its dictionary data structure. Not only that, you should start to be able to doubt any past confusion about calculating probabilities. I bet many will say to themselves: Hey, that was easy! Why didn't Professor Guttag teach probability in my high school?

The lecture ends up discussing the basics of Monte Carlo Methods. I first learned about these methods in graduate school when my officemate was running simulations of the heart. He was trying to predict which people might get heart attacks based on the shape of their heart. His simulations utilized methods based on gambling. I bring this up because the main point of this lecture – and of the rest of this course – is to raise awareness about the different sorts of computational methods that computer scientists have in their toolkits. A computer scientist might not think of using Monte Carlo methods to predict heart attacks, but a medical professional might learn about these types of simulations and realize what else they could be used for. Similarly, 6.00x students of varying backgrounds will benefit from learning about different types of computational methods and dream up a new and innovative way to apply a method to a different, non-computer science field.

Facebook, email, and word processing may be the first applications that come to mind when you think of computers, but when you think a bit deeper, you will see computer simulations everywhere. Video games are simulations, as is weather forecasting. Modeling is something that is done in nearly all fields, and we use simulations to make the modeling come to life.

Python is a wonderful tool for fast prototyping, even for fancy simulations. With high probability, by the end of this week's lectures, you will appreciate using computers to help gain insight into probabilistic simulations.

-Larry Rudolph