



Those Who Care, Teach: Tutoring at Every Stage of a Computer Science Education



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My Background

I never thought I would teach!

In High School I had no desire to tutor others. My focus was on my own understanding of the material, and I felt like my thought process skipped important steps while still arriving to the correct conclusion. While this worked for me, I didn't see how I could leverage it to work for others.

After a great first year in the Computer Science department, I was offered a position tutoring for CS111.

Today, I've tutored for 5 different classes (4 in the CS department) as well as privately for AP Computer Science... but three years ago I was nervous.

Fears and Apprehensions

Will I...

- ❖ Be patient enough?
- ❖ Put students at ease?
- ❖ Be a useful resource for my peers?
- ❖ Be able to think on my feet?
- ❖ Help in developing the confidence needed to continue with future CS classes?

Furthermore, I hadn't yet taken advantage of tutoring for my own classes. Would I be able to be a good tutor without this experience?

CS111 (F11, S12)

My first tutoring experience! A great environment for new tutors to develop their skills due to the solid infrastructure and large group of other tutors to learn from.

Tutoring Strategy:

- ❖ Most students come to this class with little to no coding background, so the focus should be on **general problem solving strategies** that can be applied to programming
- ❖ Encouraging a “**divide / conquer / glue**” mentality makes complex problems easier to grasp
- ❖ Suggesting working through **simple examples** first in an effort to **identify patterns**

CS231 (S13, S14)

A **Computer Science class where one never uses a computer**, like Fundamental Algorithms, understandably causes heightened anxiety in some students.

Tutoring Strategy:

- ❖ Those taking CS231 vary in their level of comfort with math concepts and proof writing: since math is such an important part of this course, **ensuring that all students feel comfortable to ask math questions** of all difficulties is critical
- ❖ Drawing connections with **concepts seen in past courses** (CS230) helps to ground our motivations
- ❖ By now, students are prepared to **tackle technical interviews**: encourage this!

CS230 (S12, F12)

It was gratifying to see many of my CS111 tutees choosing to take Data Structures. This enhanced my desire to **support student transitions between courses**.

Tutoring Strategy:

- ❖ **Advanced preparation** for these tutoring sessions is important, as assignment solutions have more nuance and complexity than in an introductory class
- ❖ More complicated programming assignments lead to more complicated bugs: encouraging **smart debugging practices** helps to minimize frustration
- ❖ These students have programmed before, but might be using new tools – like **Emacs** and the **command line** – for the first time.

CS235 (F13)

Programming Languages and Automata teaches many **exciting (but previously foreign) big ideas** like computability and decidability.

Tutoring Strategy:

- ❖ Many topics in this course are ones that excited me, like **countable versus uncountable infinities**: channel this excitement in a way that's infectious!
- ❖ This material is hard: **sharing your own difficulties** makes asking for help easier
- ❖ Developing a good eye to quickly **identify cases in which an automaton “breaks”** allows you to help students make steady progress while training to catch these mistakes themselves

Looking Back

What helped me the most over my tutoring career?

- ❖ **Double majoring in Mathematics** gave me lots of exposure to **proof writing, logical thinking, and problem solving**
- ❖ **A multidisciplinary background** helps to reach students with different learning styles
- ❖ **A logical progression tutoring core classes in the major**
- ❖ **Having strong, caring role models in my professors**

What's Next



Upon graduation, I'll be working at KAYAK as a software engineer focusing on **databases and backend development**.

However, **I haven't yet ruled out a career in teaching**: I hope to eventually go back to school with the goal of becoming a Computer Science professor.

No matter what I choose, I know that the **patience, ability to explain difficult concepts, and desire to mentor** that I developed through tutoring will prove to be useful.