Exam Strategies

Over the weekend, I sent out an email to the Fall 2014 CS103 students list and asked them to offer advice about approaching the exams. I specifically asked them these four questions:

1. What do you usually do to prepare for a theory midterm?
2. What do you do right when you first start a theory exam?
3. What do you do when you get stuck on a question on a theory exam?
4. Anything else you want to share?

I was amazed by how many responses I got within 24 hours of sending out the email and how generous your great predecessors were. This handout consists of actual advice from former CS103 students who, not that long ago, were in exactly the same position you're in now.

Thanks to the entire Fall 2014 CS103 class for this advice!

What do you usually do to prepare for a theory midterm?

Doing a practice exam in an as-close-to-real setting as possible is perhaps infinitely more helpful than anything else you can do. Also, if you get to take a sheet of notes in, handwrite them instead of just copy-pasting stuff from the slides. This way, you get to reinternalize that information as well and have to spend some time reflecting on what you really need to know

Doing practice questions is key - that's when you really learn whether you can apply your knowledge. Keith is a pretty amazing resource in providing questions and support use it.

Make sure you make your own cheat sheet, and definitely WRITE out the stuff you're unfamiliar with. Print (with the smallest print readable) the things you might benefit from referencing. If you want an A, truly do all of the provided practice material. Though the exam questions won't be identical, there are certainly patterns in proofs that you'll absorb through practice.

Review past problems...Turns out reading them wasn't enough! You have to go and see if you can write the solutions from your knowledge and logical reasoning.

Practice, practice, practice! It may seem useless to do practice problems because CS 103 problems often feel like they are based on luck or whether you happen to understand the problem. But when you do these problems over and over again, you will develop the general intuition needed to solve problems you haven't seen before.

For a theory midterm, I'd recommend reviewing all psets especially if you have worked on them with a team and didn't focus on certain problems as much as others. It's important to have a handle on the questions that appear in the problem sets since you might use one of the things your proved in a pset on a midterm!

The practice exam/extra practice problems are a really good indication of what the actual exam will be like. Taking them in a simulated exam setting was helpful. Also going through the problem sets and making sure I actually knew how to do everything, esp. problems that my partner took the lead on. Writing out the note sheet that we got to take into the midterm by hand was also helpful.

go over the solution sets!!!! and the tricks involved for each of them. and make sure you understand the phrasing and nuances of the problem.

I review both the lecture slides and my notes, focusing primarily on the concepts I least understand. I then complete as many practice midterms and problems as I possibly can. I think the key to preparing for a theory midterm is studying gradually, in chunks. Jamming everything on the night before the test is sure to turn into a disaster!

I go through all of the slides up to then and write down the key points on my 8.5x11 sheet. Then, I take the practice exam just like the normal exam.

What do you do right when you first start a theory exam?

Take a breath! You can do this! Take a moment to look through the test. Then turn back to the first problem and take the time you need to think.

Look through all of the questions first, and do them in order from easiest to hardest. You want to maximize the number of points you get, so it sucks to have minimal time to finish a problem that you could have for sure gotten full points for if you had done it earlier.

Take a deep breath, scan over all problems and then get started.

Read the questions and for each one brain-vomit all the associated definitions and approaches that seem related.

Look through the problems, start generating insights.

In approaching a theory exam, I read through all the problems first, especially for ones that ask you to prove things, and then start working through the syntax problems (propositional logic) while I think about proofs in the back of my mind. By the time I get to the proofs, I feel more ready to tackle them and usually have something to get started on.

Read all the questions. Start thinking about the ones you find more challenging while you do the ones you're more comfortable with.

Stay calm. Start at the beginning, have scratch paper to scribble on, then start writing as soon as you think you have a pretty good idea of what your answer will be. Don't start writing a proof without a sense of where it will end, but on the other hand, don't wait until you have the entire thing ironed out in your head before you start writing. You'll figure out some of the details as you go. And if you have to cross some stuff out, that's fine.

Read all of the questions and write down your initial thoughts about how you would write/ approach the proof. These don't have to be long or well thought out - I usually spend only 5-7 minutes on this.

I read all of the questions and start with the easiest one, to give myself some confidence. I usually work on the harder questions last, making sure that at least I'll have received points for the questions I knew how to solve.

I typically create a list of all things (formulas, certain theorems, strategies) that I need to memorize for an exam. Then, up until 5 minutes before the exam, I read it over and over again. Then when I get the exam, I write down all the formulas, etc. at the top so I don't forget. Then, I look over all the problems once, to get a sense of the hardest problems. I then go through again, and jot down notes for the strategies. I start with the easies questions that seem the most formulaic, while thinking about strategies for harder problems in the back of my mind.

I get the first question right: my SUNetID. But seriously, you're not getting a zero if you show up to the test and can write down something - and something is infinitely (ha!) better than zero.

What do you do when you get stuck on a question on a theory exam?

Don't panic! Usually you don't see the way to prove something at first glance. Quickly go through the tools you have under your belt and consider if any of them apply. If you're in the middle of the problem and get stuck, likely you started off the wrong fit--try again! It's normal to through several paths before you find one that reaches the destination.

Everyone has the experience where they think that they will never get out of a brain freeze on an exam. Take a breath and please don't panic. Take a moment to go back to the original question and think through your strategy again. If you are still having a hard time move on to the next problem and come back later!

Write all of your thoughts out. It's impossible to evaluate several different steps for a proof in your head, and by writing out your ideas, you might actually SEE something you didn't before. Start from basic definitions. You're not going to be expected to come up with earth-shattering proofs during the exam period, so any mental jumps you'll have to make won't be gigantic. By starting with basic definitions and slowly reasoning your way through a proof, you'll find there aren't really as many possible paths to the correct answer as you might have assumed. "

Give it time. This is a very long exam. Work through stuff you have a handle on and then start throwing things at the tough ones. Try a bunch of proof sketches, draw pictures, parse everything into definitions to see what raw materials you're working with. Have faith that it is only a matter of time and conceptual iteration before you have it.

If you've been stuck on a question for a while, save it for the end. Get through the problems that you can solve relatively quickly and then come back to it. When you do come back to the question, allow yourself some quiet time to think about it. It's easy to spend the entire time frantically trying every solution until something works—and this is a valid strategy to try at some point during the problem—but it's equally important to give your brain some space to think about the question on its own terms.

Write down the facts, write down possible properties of the problem. Usually the hard question is decomposes to finding a simple property you can exploit!

I try to cycle through different example problems seen in lecture and in homework, and try to recall similar examples that could be helpful.

Write down all of the definitions that you might need. You can get a lot of information just by manipulating what the definitions give you.

Don't be afraid of completely abandoning your solution if its getting hard to work with. In my experience, CS 103 questions had really elegant, "pretty" solutions. Nothing messy. Also, re-read the problem and keep a list of "facts". Then, go through each fact and determine its implications. Also, when proving a theorem, come up with several examples and work through them. The strategy of solving specific examples can help you determine the overall strategy for the proof.

Read the question, write down some ideas, then skip it if you're stuck. Your subconscious mind can work wonders while you're working on other parts of the exam.

I sit back in my chair, put my pencil down, read the question a few times, and just think. It's really easy to get worked up and start doing a million things, but you have to just take a breather and give yourself time to think.

If you're having problems understanding new terminology in the question, write it down in your own words on a scrap piece of paper. Sometimes [stuff] you've never heard of before shows up and freaks you the [heck] out, but if you break it down it's not actually conceptually difficult. You have the toolkit to prove it - you just have to comprehend the new stuff to be able to use it.

Anything else you want to share?

This class is challenging! It's okay if you get stuck from time to time. That just means there's more to learn.

Get enough sleep! Theory is really hard if you pulled an all-nighter studying.

Go to the proctored practice test EVEN IF YOU'RE NOT READY!!!!

When you're 'done,' read everything fresh, start to finish, with a very critical eye before you hand it over. You're ready to get the [heck] out of there but it's always worth it. Don't waste all of that work on one forgotten stroke of the pen.

I found it really helpful to put some example proofs on the sheet of information that you are allowed to bring into the exam room.

Bring water and more than one pencil. And make sure to stretch every once in a while.

I would advise against comparing yourself with other students! Learning is a journey with yourself, not a competition against other people. Also, think about yourself from several weeks ago: he/she would have probably seen the exam you're taking now and thought it was written in another language! By the time you're taking midterms, you've usually learned so much already. That is awesome!

Have fun!

Good luck on the exam!