

Experiences of Successful Students

CS 105

Fall 2022

To succeed in 105, you not only have to work hard; you have to work in the right way. This document presents the study practices used by the CS 105 students who earned A grades in a previous semester. (Not every such student chose to respond.)

The biggest thing I did that helped me succeed this semester was using the TAs and office hours. Halligan obviously blows and it's nicer to work elsewhere, but there are so many office hours and the TAs are genuinely really helpful. They're there for a reason, and I'd say constantly going to office hours and asking tons of questions was the single biggest thing that helped me succeed. The small extra effort of schlepping to Halligan pays off infinitely.

One student offers this advice:

The number one ingredient for success in 105 is time—if you don't put a lot of time into the class, you shouldn't expect to do well. This doesn't mean that you should work for ten hours in a single day for assignments, but instead that you should start really early on everything and try to work for a good 1 or 2 hours every day. If you work in that fashion, you shouldn't ever find an assignment that overwhelms you.

To take best advantage of all that time, do any reading and CQ work ahead of recitation and go to every recitation. Of course, you should go to every lecture too, but recitations are the most valuable part of the whole class. The TA support structure in 105 is excellent, and making sure you use the weekly time with a small group and TA help is essential.

I was accustomed to picking up homework assignments, going home, doing them on your own, turning them in, and getting a good grade. 105 required that I learn a new approach. After spending far too many hours on the second homework trying to figure everything out on my own, I began going to office hours and meeting with TAs with questions. I stopped doing my homework in the library or at home and started working in Halligan with the help of TAs and other 105 students. I learned to be okay asking for help; when I started engage TAs and classmates with curiosity, instead of avoiding them with pride, I learned a lot.

To stay on schedule with the workload, I'd generally do the reading comprehension the day after the homework was released

and then at least *start* the coding/theory portions the following day in Halligan. When I did my work, I'd always have a tab open on my computer with the relevant lecture slides and perhaps the recitation solutions—I was surprised how many questions I could answer on my own just by using the materials Norman gave me.

I went to lectures, but didn't take notes since the slides are online. I'd recommend this approach; listen in class and ask questions, but don't waste your time writing down what's already outlined for you.

Lastly, as simple as it sounds, I had friends in 105. I honestly don't think I would have done as well without the support of my friends who were going through the same course. I had moments when I felt like everything was falling apart, or I had a last-minute question at 1am and the TAs were all asleep, or I felt like I needed some motivation to stay on track. For these moments, friends are good.

Another student who prefers to offer advice:

My biggest tip: Be consistent. For any assignment or problem that seems hard to tackle, remember how you read the textbook that last time and how it all suddenly made so much sense. You are in this class because you love coding, and you hopefully it will always stay that way. Just like 40, start the assignment on the first couple days it is assigned. There is a ridiculous amount of office hours, and the TAs are there to help you understand. However, don't get frustrated by the answers you receive on Piazza or from the TAs! If an answer to your question is not exactly what you wanted, you are probably missing some essential information already available to you. Refer to the textbook and the coursework.

For working on assignments, get your eyes off the computer and grab a pen and paper. I had a portable whiteboard that I carried everywhere, and I believe that just designing and visually seeing a problem on it really helped me to avoid simple mistakes. Speaking of simple mistakes, definitely read the dire warnings at the end of assignments! They will save you many hours. Ultimately, don't forget to have fun, and don't forget to learn! Ask questions in class, and stay focused. Good luck with 105!

I owe my success largely to two different strategies. First, I nailed down how to read and write algebraic laws quickly. A thorough understanding of algebraic laws can simplify a lot of the work for this class. Getting comfortable with them earlier makes larger problems less intimidating. They also make testing and writing clean code much easier. (Anyone who's taken 40 knows that easier testing and cleaner code can save hours or even days of time.)

Secondly, I read assignments as they came out. I rarely started homework the day they came out—time away from 105 is healthy. But reading the assignment helped with knowing where to pay the most attention. In a course with so much material, focus is crucial. But how could you understand a spec on material you haven't learned yet? Frankly, I often didn't. But that's the important part; I then knew what I had to learn in order to complete it.

My other advice, which I tried to follow as best I could, is similar to other intensive courses like 40. Things like test often, work a couple hours a day (consistently), don't throw spaghetti code at a wall and hope it sticks (i.e., think through what you're typing and why), etc.

The number best thing I did was start early. I often found myself thinking about a problem during times when I was not at a computer. I found these moments to be crucial for mastering the projects. Give the assignments enough time to marinate in your head. This is perhaps a key difference between 105 and 40; so much more of the work in 105 is conceptual and cannot be solved by hammering away at code for hours on end.

I was never afraid to be confused in front of TAs and other students. I always attended office hours whenever I had even one question. The CS 105 staff was incredibly welcoming and helpful. Lean on them. They are a fantastic resource.

Before I took 105, the class was described to me as “cumulatively relentless”—with lots of reading and lots of work. In my general college experience, the distribution and density of course assignments often has meant cramming or working on one class a *lot* one week, and then not touching it much on another week when some other class had a fire to put out. I quickly realized I couldn't do that with 105, and it required a little scheduling. I decided early on in the semester that I needed to partition out 2–3 days for every assignment where those days would be spent *mostly* on 105, and rather than trying to find the time on the fly, I tried to schedule out my other work at the start of every week to give me those 2–3 days. Given the complexity of the specs and the reading, I would then spend just a couple hours over the week, in the leadup to my 2–3 partitioned days, where I would slowly pull together material I would need: reading through the spec and highlighting it, making sure I had all the relevant handouts and subchapters available and organized, and maybe completing the reading comprehension. That way, when it came to my allotted 105 days, I didn't necessarily know all the answers, but I had

all the resources in front of me, and I was primed to sit down and work and find answers as I went. This saved me a lot of frustration. I got conceptually stuck less often, I didn't leave things to the last minute as often, and it was much easier to follow the specs.

I completed the readings and comprehension questions as soon as possible. I learned the most by closely reading the textbook. Others might learn differently, but I'd still advise doing the readings well and early.

I went to almost every lecture and recitation and started the homework before recitation. Instead of using recitation to learn the material, I used it to fill in knowledge gaps I'd already identified and get more practice.

I came in with a strong background in proofs. CS 105 has a lot of them, so those with less experience should review and practice proof techniques.

I completed every assignment without a partner. I don't recommend this approach for most students, but I certainly learned a lot struggling through programming assignments by myself. It probably takes longer, but not so long that I was overwhelmed. I worked a steady amount most days and took a break when I got stuck.

I read all Piazza posts and answered a few. It's a nice check for understanding to see if you can answer other students' questions.

This is more about getting high grades than learning, but I did well on tests by trying to write a reasonable answer to every question and not spending too long on anything. I earned a lot of points on later questions that I suspect many people didn't get to.

CS105 can seem extremely daunting. From that first assignment, you are hit with a ton of work, but fortunately you also have plenty of time to complete it. Because the rigor of these assignments does not really decrease as the semester progresses, I had to find successful strategies for completing each problem fully and in a timely manner.

Over the semester, I learned how important it was to talk through these problems with others. Whether it was my fellow classmates, teaching assistants, or even my professor, approaching a problem by explaining my ideas out loud helped me immensely in finding potential issues and addressing difficult concepts. It was also important that I portioned out the assignment into segments. I read through the assignment on the first day that it is assigned, and I tried to approach the Reading Comprehension Questions as soon as possible after that. In addition, I set a goal for what I needed to finish by the end of each work session. If I wasn't working as well as I thought I should, I wasn't afraid to take a break or even call it a day. A good night's sleep helped a lot more than another late-night hour or two in Halligan!

Although this course is infamously known as one of the hardest in the curriculum, it is actually very thought provoking and it really helps to further your skills as a programmer. When approached correctly, it can be an extremely positive experience that really changes your perspective towards programming languages. Best of luck!

I don't consider myself a "comp sci genius" type in any sense, and so when I entered 105, I was super nervous. But what students didn't tell me is that you have a professor who cares, and an *amazing* TA course staff who are committed to not only your success and learning, but your wellbeing as well. If you've made it as far as 105 then you are totally qualified to do well in this class. When you finish an assignment, it's okay to take a couple days off if you need it. Reward yourself when you finish a homework! It's truly something to be proud of. Don't compare yourself to other students and their working and learning styles. Focus on you! (Who you know best)

I did all of my homework at office hours in Halligan. I found it so much easier to get unstuck, and I often had a much better understanding of course material after having a conversation with a TA. Plus, the kitchen is an awesome collaborative and morale-boosting space (There's free food sometimes too.) Don't let yourself be intimidated by it!

Recitation was also an incredible resource for me; I found it was usually where the concepts introduced in lecture started to make sense for me. So take it seriously and give the recitations your best shot! Before recitation, I usually felt like I didn't know where to start with the homework. But after, I felt confident and ready to dive in.

It's so easy to get sucked into working for hours and hours, but as you'll hear a lot, 105 work is much more effective in 3-4 hour bursts than an 8-hour straight marathon. I don't know if it's true that you can finish the homework with just a few hours every day though. But at least take meaningful breaks!

Also, it's okay if lecture isn't your thing! I found it super hard to focus in lecture and found that participating in recitation, reading the book, and coming to a TA with clarifying questions was a better strategy for my learning. But don't skip lecture and also slack off—it won't end well!

I got started on every assignment on or before my recitation day (5 days before the deadline). Use your tokens (it's what they're there for) and don't be afraid to use them for the first two assignments if you feel like you need them. I know I'm guilty of token hoarding and I always have leftovers at the end of the semester. For each homework I would start with the CQs and give them an honest try, at least skimming the readings that go with them. If I got too stuck on them, I would just move on to the programming or theory questions and come back to them throughout the week.

And most importantly—take care of yourself. Be honest with yourself and your partners when you need a break or a day away for your health. No class is worth your wellness. Leave Halligan sometimes! Eat! Take a shower (please)! Get some sleep!

I read the book a lot. I found reading the book right after lecture very helpful because certain ideas that I felt clueless about made at least a little more sense. If I was stuck on something for a longer time, I followed the advice given to me and just slept on it. I realized in the first few assignments that just devoting a huge chunk of time and effort to just this class didn't always translate into results, so whenever I got to a point where I didn't want to do it anymore, I always made sure to stop. I found that ignoring the myths and legends of 105 and treating it like a normal but slightly workload heavy college class also helped me learn better.

In my experience, the most helpful part of CS105 was the homework. Lectures were helpful for me, but sometimes it felt like a lot to digest in an hour or I wasn't paying attention. (I have ADHD.) I read the textbook, let it sink in and thought about it, and consulted TAs and peers if I was confused with concepts. If I was still confused, I watched a YouTube video or read about it online.

I started homework about three days after it was assigned, but I briefly skimmed the assignment and would discuss the problems before I began it. This helped a lot as opposed to the times I tried jumping in right away. I always wrote algebraic laws, and I followed the hints and suggestions. I always tried to break problems into smaller parts and made sure to take breaks if I was tired. I spent a lot of time on reading comprehension. It's easy to read the question and just copy answers from the textbook, but I made sure that I understood what I was writing down.

The extra credit I did helped reinforce the concepts I was learning, and it definitely helped my grade in the end. Spending time to understand the material when it was assigned helped me a lot for reviewing for the midterm and final exam. There were concepts that I didn't study that well, and when it came to exam preparation, it felt like I was teaching myself it for the first time.

For the final, I reviewed my homework solutions, the slides, and I followed the study guide to a T. I went through the study guide bullet by bullet, and found the topic in the slides and textbook and skimmed to see if there was any big concept I didn't get. I looked through reading-comprehension questions to see if I still understood how to answer questions. I also studied with a friend, so if I didn't understand anything, she helped me out and vice versa. The study guide doesn't have any tricks. It tells you exactly what to study for.

I would try things by myself, but I was not afraid to ask for help. Many of my classmates were also struggling in the class, and understood things I didn't. There were some concepts that I simply did not get, and I would not have figured it out without

the help of my peers and the TAs. I always put in my 100%, and if I wasn't feeling it, I would take a break until I was motivated to succeed.

I could not have succeeded in this class alone. I did most of my work in Halligan and sought out help from TAs and peers very often.

I also started every assignment as early as possible and worked until I felt burnt out almost every day, usually for about an hour or two.¹ I did not push myself to continue when I felt that I was losing focus, so sometimes I took days off.

I attended every recitation, as they were extremely helpful and relevant to the homework assignments.

I did not attempt to read everything in detail, since the sheer volume and density of reading material in this class can be overwhelming. I did, however, read the entire spec before jumping into each assignment, as it often contained hints towards the end.

One area that I spent a lot of time on when completing the homework assignments was figuring where to get started, where to write my code (especially in some later assignments), and what that code should look like. My first suggestion in this area is reading the homework spec carefully and completely before beginning the assignment so as to have a good idea of how to begin. The section in the homework specs on what files to submit helped me with figuring out how the code should be structured, especially when working with pre-written course code. If you still have troubles figuring out what to do, I recommend speaking to a TA. They're very helpful! It's also important to make sure that you and your partner have the same idea of what code to write and where to write it as you go along.

Another area that I struggled with was following along with some of the more abstract topics that arose in lectures during the latter half of the semester. To help with this, I recommend reading the textbook sections prior to coming to class. This helped me immensely with understanding some topics during lecture, where you may not have the time to go at your own pace in terms of understanding the material.

I read the textbook carefully. You do not have to read every single page to do well, just enough that whenever you are struggling to understand some concepts covered in class or appeared in the homework, you know where to look for answers. They *are* in the book, somewhere. Dedicating just two hours of textbook-reading for each assignment saved me at least five to ten hours of coding (debugging) later on, plus I didn't have to ask simple questions on Piazza or go to the TAs.

¹Your instructor thinks working for an hour or two is fine. But working until burnout is a bad plan. This particular student was taking four other classes on top of 105 and was also working as a TA. Perhaps also a bad plan, but the student reports, "I made it out on the other end and would do it all again!"

On the larger assignments, I reused code from the book whenever possible. Reusing code is generally a good practice and it applies to 105 and beyond.

My attempt to succeed in CS 105 was largely based off of the study strategies I received in the first week of class. I read other students' advice and compiled a list of the common themes:

1. *Make a little bit of progress every day.* By doing a little bit of work each day, I rarely had moments of extreme stress and I felt that I worked through the assignments more efficiently. I got into a rhythm of long periods of rest and short bursts of hard work, so the workload was almost always manageable.
2. *Do the readings before recitation.* Doing the readings before recitation meant that during recitations, I was working through the practice problems and preparing for the homework rather than trying to begin to understand the subject material.
3. *Work in Halligan or near TAs, especially early on in the assignment.* Working in near TAs expedited the process of getting through mental roadblocks. The TAs are an amazing resource and they can help save you time if you talk to them early about conception questions you may have.