CS70 Discrete Mathematics and Probability Theory
Fall 2017 CSM Week3

Midterm1 Tips

Just realize I'm a little bit ahead on the notes, also since midterm is next week, so I'll put some CS70 studying tips in this docs instead of writing math.

a. I would suggest going through the material in the following order:
discussion worksheet $->$ homework $->$ official review problems $->$ CSM Worksheet $->$ past exams.
When you go through the problems, make sure you totally understand each problem. (Maybe try asking how people come up with the solutions). If you have some misconception (i.e. you're confused about something), go back to the notes and read that particular part of the notes.

b. Manage your time well during the exam. Quickly glimpse through all of the problems at the beginning, and solve all of the 'easy' ones (or relatively easy ones, since CS70 is hard). Take you time on those problems and make sure you get all the points you can get.

c. Don't cram. Take good rest the night before. And hope intuition will come during the midterm!

A tip on modular arithmetic

Hope this sentence can make modular arithmetic easier to understand:
When you think about (mod m), don't think of it as an operation, think of it as a **comment**, and make analogy with operations in real numbers.

This is what I mean:
Say $6 \equiv 1 \pmod 5$.
Don't think of it as 'the reminder of 6 divide 5 is 1'; instead, think of it as '6 (really) **IS** 1, but under mod 5'.
If you think about it, when we move to module space, the meaning of each integer changes (By changes, I mean, again, 6 is 1 under mod 5). For example, if $2x \equiv 2y \pmod 5$. You might want to divide both side by 2, to get $x \equiv y \pmod 5$. In fact, when you are doing division, you are actually doing multiplication by its inverse.
Let's see another example: what about $2x \equiv 2y \pmod 4$? Can you say $x \equiv y \pmod 4$?
The answer is no, because 2 doesn't have a multiplicative inverse under mod 4. (Why?) Here's the analogy back to real numbers. 0 doesn't have a multiplicative inverse under real numbers. If you were given $x \times 0 = y \times 0$, can you say $x = y$?