Discrete Mathematics

Course Overview

Shin Hong

31 Aug 2021

Our Class – ITP 20002-03

- CS only
- CS-EE
- CS-Math
- CS-Management
- CS-VCD
- Social Welfare-CS
- Bio Science-CS
- IT

- 4th year
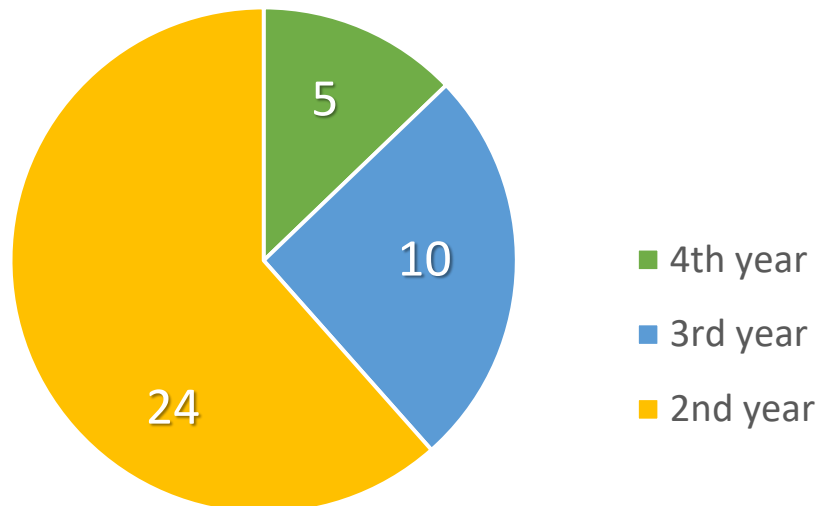- 3rd year
- 2nd year
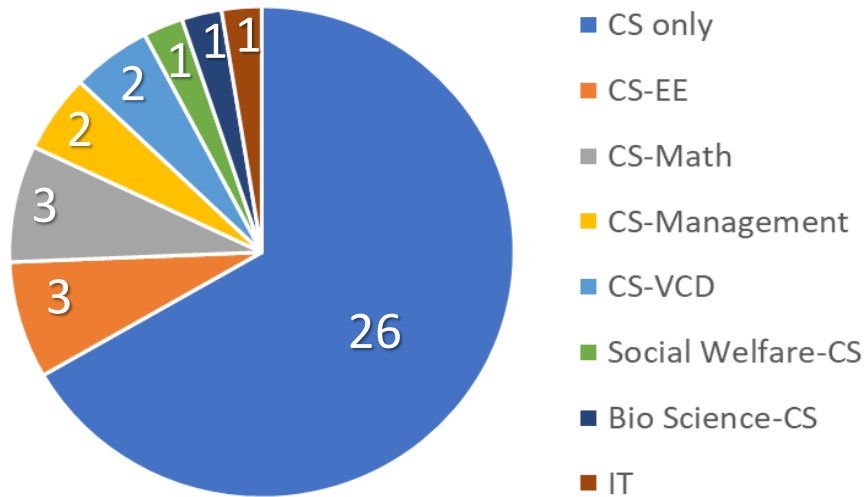
- Students: **40 students**
  - 1 retakers

- Instructor: **Shin Hong**
  - hongshin@handong.edu
  - http://hongshin.github.io

- Teaching assistants
  - Woo Sam Hwang
  - Soo-ah Lee
  - Yeh-ahn Kim
  - Yewon Nah (Zoomer)

Course overview

Discrete Math.

2021-08-31

Course Objectives

- Equip beginner-level Computer Science students with mathematical foundations for pursuing their undergraduate studies in CS
  - practice read and write scientifically (i.e., mathematically)
  - understand what is computation
  - study how to represent and reason about computational objects (e.g., sets, relations, permutations, graphs, trees)

- Understand how to apply computation to solve real-world problems

- Broaden student's interests and understanding in Computer Science

Class Setting – Distributed Class

Syllabus

- Course plan

    - https://docs.google.com/document/d/1SvZ5ODVRav9-R5h_UA3DbNs79RkzKtz9YvIrKLodTNk/edit?usp=sharing

- Course website https://github.com/hongshin/DiscreteMath

    - class policies

    - class materials

    - learning resources

Topics

- Coverage of textbook chapters

Ch. 1. The Foundations: Logic and Proofs

Ch. 2. Basic Structures: Sets, Functions, Seq ...

Ch. 3. Algorithms

Ch. 4. Number Theory and Cryptography

Ch. 5. Induction and recursion

Ch. 6. Counting

Ch. 7. Discrete Probability

Ch. 8. Advanced Counting Techniques

Ch. 9. Relations

Ch. 10. Graphs

Ch. 11. Trees

Ch. 12. Boolean algebra

Ch. 13. Modeling Computation

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Reading Groups

- What you need to do
  - study the given book chapters before meeting
    - assigned at every Tue class
  - have a meeting (online or offline) for at least 30 min in the week
  - solve the exercise problems together
  - write a meeting report at the Google Doc (shared with the instructor) by 4 PM Tue

- The reading groups will be re-formed twice
  - peer evaluation will follow right after the reformation

Reading Group Assignment – Week 1

- assignments

  - read Chapters 1.1-1.3.4 (pp. 1—32)

  - solve the following exercise problems

    - Ch.1.1: Exercises 18, 29 and 40

    - Ch. 1.2: Exercise 5

    - Ch.1.3: Exercises 9 and 11

Class Policies

https://github.com/hongshin/DiscreteMath/blob/master/POLICY.md

Homework

- Entrance survey (due: 11PM, 2 Sept)

- Programming assignments

  - 3 times throughout the semester

  - 2-persons (or 3-persons) teamwork

- One essay writing assignment may be given

Test

- Big two exams are distributed into 4 small tests

- Schedule

  - Test #1. 17 Sep (Fri): Chapter 1

  - Test #2. 19 Oct (Tue): Chapters 2, 3 and 5

  - Test #3. 16 Nov (Tue): Chapters 6 and 9

  - Test #4. 14 Dec (Tue): Chapters 7 and 10

Class Contribution

- Any verbal interaction with an instructor in classtime is counted as a discussion point

- You need to declare your discussion point by adding a comment on a Google spreadsheet

Grading

- Evaluation points
  - Attendance: 5%
  - Discussion and class contribution: 5%
  - Reading group: 10%
  - Test: 45% (= 9% + 12% + 12% + 12%)
  - Homework: 35%
    - programming: 30%
    - others: 5%

- Grade proportion: A : B : C+D+F ~ 25--30% : 40--60% : 10--30%

- Professor to the rescue
  - Professor may contact to those who are suspected to fail to get a score for make-up classes or extra homework (at around the 14-th week)

Study Guidelines

- Read, read, read textbook
  - buy the textbook and keep it near you
  - read regularly
  - use a dictionary if you find an unfamiliar word
  - use your hands to repeat examples
  - memorize definitions
  - peruse stories in boxes
  - never expect that all materials will be covered at class time

- Solve exercise problems by yourself
  - read the problem sentence carefully
  - write down an answer completely, and never stop at a middle
  - do have a group study

- Try best to think together (i.e., discuss) at a meeting time
  - participate or loss the time

Ground Rules

• Students learn course subjects primary by reading textbooks, solving exercise problems and doing homework

   - not by taking things at class meeting

   - the primary purpose of a class meeting is interactive discussion

• Students are expected to spend at least 6 hours per week to follow up what's covered in the classes (3 hours) of the week

   - beside the time for homework and meetings

• In doing homework, finding and understanding requirements is a crucial task that each student needs to accomplish by oneself

Ground Rules for Successful Distributed Class

- Online attendees must not do other things in class time
    - not mandatory, but highly recommend to turn your camera on

- Online attendees must put their best efforts to prepare remote class environment
    - time, place, equipment, network status, etc.
    - prepare for interactive in-class communication

- All class members must try best to be considerate of the other class member's circumstances and their right to study
    - should accept that we have a variety in our study circumstasnces
    - should not do any activity that possibility hurt the others' privacy

- Students must not record video/audio of lectures without prior permission

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Book Review Assignment (due: 11:59 PM, 24 Dec)

- https://github.com/hongshin/DiscreteMath/blob/master/assignments/book.md

- Read one of the recommended books and then write an essay
  - You must select one that you have not read before
  - You must the selected book thoroughly before writing an essay
  - The write up should be at least 3 pages
  - You should give your genuine ideas that associate the book with the discrete math and your studies in computer science.

- This is an optional assignment (the credit is counted as extra point)
  - upto 3 points can be added to the final grading score
  - grading policy: (A: B: C) = (20-30 : 30-50 : 30-50)

Homework 1 (Due: 11 PM, 2 Sep Thur)

- submit an class entrance survey

  - a Google Form link will be given

- sign in the class Slack channel

  - change Full name into your real name

  - update What I do as ITP 20002-01

  - upload a profile photo image