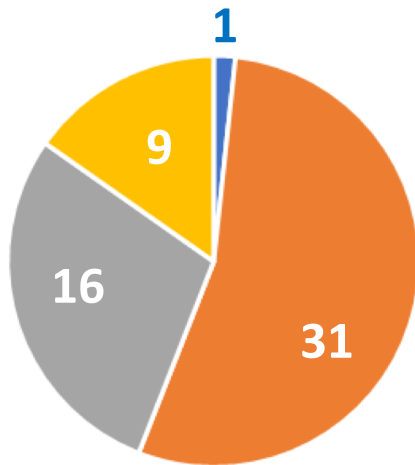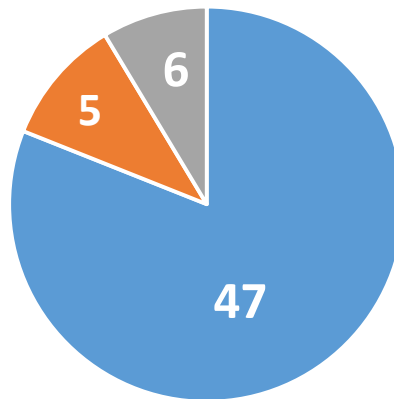ITP20002-01 Discrete Mathematics
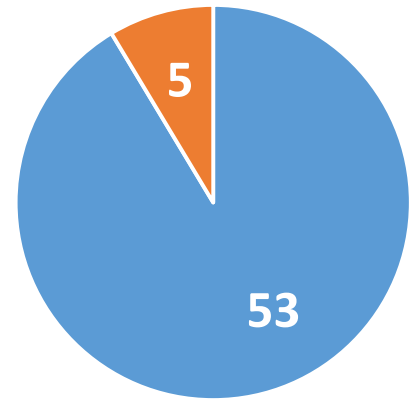
Course Overview

28 Aug, 2018

Class

- **58** students (130+ in Prof. Kun Lee's classes)
- Instructor: Shin Hong hongshin@handong.edu
- Teaching assistant: Hansol Choe hansolchoe@handong.edu

1st-year ■ 2nd-year ■ 3rd-year ■ 4th-year

CS as 1st major
CS as 2nd major
CS as minor

First ■ Retaking

Course Objectives

- To equip with foundations of all CS studies
    - how to read, write, and discuss scientific facts
    - how to count and enumerate objects
    - how to reason scientific facts with discrete structures
      (e.g., sets, relations, permutations, graphs, trees)

- To understand the fundamental ideas to solve computing problems
  in real world

Syllabus

https://github.com/hongshin/DiscreteMath

- Class settings
- Topics and Learning Materials
- Activities: meeting, team activities, tests
- Policies

Topics

- 9+ chapters from DM&A (3.5 meetings per chapter)
    - Ch.1. the foundation: logic and proofs
    - Ch.2. set, functions, sequences, sums, and matrices
    - Ch.3. algorithms
    - Ch.4. induction and recursion
    - Ch.6. counting
    - Ch.7. probability
    - Ch.9. relations
    - Ch.10. graphs
    - Ch.11. trees

Schedule (tentative)

08-28	Course overview	10-23	Ch. 6: Counting
08-31	Ch. 1: Logic	10-26	Ch. 6: Counting
09-04	Ch. 1: Logic	10-30	Ch. 7: Probability
09-07	Ch. 1: Logic	11-02	Ch. 7: Probability
09-11	Ch. 1: Proof	11-06	Ch. 7: Probability
09-14	Ch. 1: Proof	11-09	Ch. 9: Relation
09-18	Ch. 2: Set, function	11-13	Ch. 9: Relation
09-21	Ch. 2: Sum, Matrices	11-16	Ch. 9: Relation
09-25	(No class: Chooseok)	11-20	Ch. 10: Graphs
09-28	Ch. 3: Algorithm	11-23	Ch. 10: Graphs
10-02	Ch. 3: Algorithm	11-27	Ch. 10: Graphs
10-05	Ch. 4: Induction	11-30	Ch. 11: Trees
10-09	(No class: Hangul)	12-04	Ch. 11: Trees
10-12	Ch. 4: Induction	12-07	Special topics
10-16	**Midterm: 7PM**	12-11	Final exam (TBD)
10-19	(No class)	12-14	

Study Guideline

- Read, read, read textbook
    - read regularly
    - never move on once you find a unknown word/sentence
    - use your hands to repeat examples
    - memorize definitions
    - peruse stories in boxes
    - never expect that all materials will be covered at the meeting

- 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 involve in collaborative think (i.e., discuss) at meetings
    - participate or loss the time

Team

- Each team consists of 5-6 students

- 3 teams a semester: turnover at 1/3 and 2/3 points
  - First team will be announced the Friday meeting this weak

- Activities
  - Seat together at the meetings
  - Programming projects (total 3 times)
  - Homework: solve text exercises together with the team
  - Collaborative quiz (total 3 to 5 times)
    - Each student takes a quiz individually
    - Each member of a team can achieve extra points ($\leq 20\%$) if their average exceeds given challenge bars

Individual Project

- Case Study

    - Write a paper on modeling a real world phenomena (or problem) with the discrete math covered in the class

    - The paper should be in at least 4 pages in single column A4

    - The content should be a genuine result of the student's work

    - Grading policy: (A : B : C) = (40-60:% 30-40%: 0-30%)

Grading

- Weights
  - meeting attendance: 5%
  - discussion contribution: 5% (+3%)
  - midterm: 25%
  - final exam: 30%
  - quizzes: 15%
  - programming projects: 15%
  - assignment: 5%

- Proportion: (A : B : C-F) = (0-30% : 40-60% : 15-30%)

Extra Point

- Read one of the recommended books thoroughly, and then summarize the book, and discuss your thoughts on the topics (new idea, opinion, critique, etc.)
    - you can use Korean version in reading
    - no double account of the same book with the Java assignment ☺
- You should give your genuine ideas that associate the book with the discrete math and your studies in computer science

- Submission
    - Deadline: 21 Dec
    - At least 3 pages (single column in A4)

- Credit: Up to +3 pt in the final grading

Recommended Books

- 컴퓨터 과학이 여는 세상, 이광근 (Korean only)

- 역사 속의 소프트웨어 오류, 김종하 (Korean only)

- Programming Pearls, 2/e, John Bentley (생각하는 프로그래밍)

- Linked: How Everything Is Connected to Everything Else and What It Means for Business, Science and Everyday Life (링크: 21세기를 지배하는 네트워크 과학)

- The Emperor's New Mind, Roger Penrose (황제의 새마음, 상/하)

- Gödel 's Proof, Ernest Nagel et al., (괴델의 증명)

- Gödel, Escher, Bach: An Eternal Golden Braid, Douglas Hofstadter (괴델, 에셔, 바흐: 영원한 황금 노끈)

Policies

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

- Communication
- Checking meeting attendance
- Failure

Ground Rules

- A student should read textbooks

- A meeting is to support proactive learning of students

- A student is expected to spend at least 5 hours per week by himself/herself to follow-up a 3 credit class
  - excluding the time for the meetings and for doing homework

- Finding and understanding the obligations of an assignment is a crucial part of the assignment

- Each student must follow up all parts of the team work
  - each member may take a part, and must study all aspects