Discrete Mathematics

Chang-Gun Lee (cglee@snu.ac.kr)

Assistant Professor

The School of Computer Science and Engineering

Seoul National University

Before We Start ….
Passive vs. Active Learning

- After 2 weeks, we tend to remember

- Passive learning
  - 10% of what we read
  - 20% of what we hear
  - 30% of what we see (picture)
  - 50% of what we hear and see

- Active learning
  - 70% of what we say
  - 90% of what we say and do

Everybody! be an Active Learner

- recall prior material
- answer a question (say a lot!)
- guess the solution first (even guessing wrong will help you to remember the right approach)
- raise questions
- think of application
- imagine that you were the professor and think about how you would give a test on the subject material so that key concepts and results will be checked
- summarize a lecture, a set of homework or a lab in your own words concisely

An Active Learner will become an Independent Researcher and Engineer

Course Information

- Class meeting times: M. W. 2:30 pm (302-107)
- Office Hour: M. W. 12 - 1pm at 301-409 (Lunch will be served by appointment)
  - come to me pretty often
- Contact:
  - Chang-Gun Lee (cglee@snu.ac.kr, 880-1862, 010-6549-5605)
  - TA: JungEun Kim (deep0314@snu.ac.kr)
- Grading (Tentative)
  - Attendance: 10%
  - Homework: 30%
  - Active participation: 10%
  - Midterm: 20%
  - Final: 30%

Course Philosophy

- Understanding the theoretical base of computer systems
- Studying how concepts of discrete mathematics are applied to practical computing problems

Topics

- **Propositions and proofs**
- **Relations and functions**
- **Boolean algebra**
- **Groups and rings**
- **Graph theory**
- **Finite state machines**
- **Computability and formal languages**
- **Algorithm alnalysis**
- **Discrete probability**

Textbook

- “Mathematics: A Discrete Introduction” by Edward Scheinerman, THOMSON BOOKS/COLE
- Reference: Element of Discrete Mathematics by C. L. Liu, McGraw-Hill

Why Discrete Mathematics is Important?

- Many computing techniques are based on the concepts of discrete mathematics
  - Digital circuits and computer problems: boolean algebra
  - Network protocols: finite state machines
  - Data structures and algorithms: sets, relations, functions
  - Computing/Networking performance evaluations: discrete probability
- Discrete Mathematics will strengthen your mental ability
- Discrete Mathematics will train you with how to systematically and logically approach complex problems
- Discrete Mathematics will make you an excellent researcher and engineer not only in computer-related field but also in broader field you may jump into

Will it be an easy course?

- Easy for hard working guys
- Difficult for …

- At the end, you will learn a lot and realize that this course is useful for your future!