



# Data Structure

## Lecture#1: Introduction

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# In This Lecture

- Motivation to study data structure
- Administrative information for this course



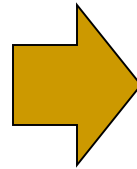
# Outline

- ➔  **Motivation**
- Course Information



# Why do we use Computer?

Is a computer just a faster and bigger calculator?





# Why do we use Computer?

- In addition to quickly computing numbers, we use computers to **access, manipulate and organize data**
  - ❑ Store PPT file
  - ❑ Sort 1 million records to look for top-10 best records
  - ❑ Online shopping mall
  - ❑ Bank account
  - ❑ Social Network Services (SNS)
  - ❑ Web



# What is Data Structure?

- Data structure
  - Any data representation and its associated operations
  - Organization or structuring for a collection of data items
    - E.g., an array containing a sorted list of exam scores
  - Using proper data structure can make a program super fast (e.g., few days => few seconds)
  - We learn data structure to design efficient algorithms to do tasks efficiently in terms of time and space



# What about using fast computers?

- Ill-designed algorithms may require super-linear running time which grows much faster than the CPU's growth rate
- E.g., an algorithm may require  $O(n^2)$  running time
  - This means if the input size increases 10 times, the running time increases 100 times.
  - To achieve the same running time, you need 100 times faster (expensive) computer to handle 10 times larger input
  - If you design an  $O(n)$  algorithm, then you need only 10 times faster computer to handle the same input!



# Goals of this Course

1. Reinforce the concept that costs and benefits exist for every data structure.
2. Learn the commonly used data structures.
  - These form a programmer's basic data structure “toolkit”.
3. Understand how to measure the cost of a data structure or program.
  - These techniques also allow you to judge the merits of new data structures that you or others might invent.





# Outline

Motivation

  **Course Information**



# Course Information

- URL:  
<http://datalab.snu.ac.kr/~ukang/courses/16F-DS>
  - Some materials and notices will be in eTL
- Office hour
  - Mon, 11:00-12:00 (also, by appointment)
  - Room 301-502
- TA: Minsoo Jung, Chiwan Park, Jaemin Yoo
  - Office Hour : see the course homepage



# Course Information

- Class meets:
  - Lecture: Mon, Wed 17:00 – 18:15 (Room 302-107)
  - Practice: Fri 15:00 – 16:50
    - Room 302-311-1: those who registered via [sugang.snu.ac.kr](http://sugang.snu.ac.kr)
    - Room 302-310-2: those who used override form (choangi)



# Textbook

- Cliff A. Shaffer, A Practical Introduction to Data Structures and Algorithm Analysis, Edition 3.2 (Java version), Mar/28/2013.
- (The e-book is freely available at <http://people.cs.vt.edu/~shaffer/Book/>)





# Prerequisites

- 4190.102A (Computer Programming) or consent of instructor
- Knowledge of the Java programming language enough to be able to design, code, and debug programs



# Grading

- 10% Attendance and Quiz
  - Quiz: at the beginning of the class (5 minutes), without notice
- 30% Homework
- 25% Midterm
- 35% Final
- +(5% Participation)



# Homework

- Written assignment
  - ~1 per week
  - May require 2~4 hours
- Programming assignment
  - ~1 per every two weeks
  - May require 4~8 hours



# Late Policy

- For all homeworks
  - No delay penalties, for medical etc emergencies (bring doctor's note)
  - Each person has 4 'slip days' total, for the whole semester. 10% per day of delay, after that





# Schedule (Tentative)

Week	Schedule
1 (Sep. 5 ~)	Chapter 1
2	Chapter 2
3	Chapter 3
4	Chapter 4
5	Chapter 4
6	Chapter 5
7	Chapter 6
8 (Oct. 24 ~)	Midterm Exam
9	Chapter 7
10	Chapter 7
11	Chapter 7
12	Chapter 9
13	Chapter 11
14	Chapter 11
15 (Dec. 12 ~)	Final Exam



# Advice

- This is an extremely important course in Computer Science and Engineering
  - The time devoted for this course will be fruitful
- If possible, read each chapter before class
  - It is ok to encounter something you don't understand. Just mark it, and later you will understand it when you come back.
- Active participation encouraged
- Use office hours (instructor and/or TA)



# Questions?