

# [SWE2015] Introduction to Data Structures

Department of Computer Science and Engineering  
Sungkyunkwan University

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<b>Lecture Type</b>	Offline
<b>Language</b>	English
<b>Office Hours</b>	By appointment

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## Course Description

A data structure is the logical or mathematical arrangement of data in memory. It considers not only the physical layout of the data items in the memory but also the relationships between these data items and the operations that can be performed on these items. The choice of appropriate data structures and algorithms forms the fundamental step in the design of an efficient program. Thus, a thorough understanding of data structure concepts is essential for students who wish to work in the design and implementation of software systems.

The purpose of this course is to introduce the usage of various data structures necessary for solving real-world, computer-centric problems, as well as the principles and techniques required for algorithm development. The topics covered in this course may include arrays, stacks, queues, linked lists, trees, graphs, sorting, hashing, among others.

## Prerequisites

To take this course, you need to have the basic understanding of C/C++, for example, loop statements, functions, pointers, and so on.

## Teaching Materials

*Data structures using C (Second edition)*, Reema Thareja, Oxford University Press, 2014  
All lecture slides will be uploaded on [iCampus](#). You don't need to buy this book.

## Grading Policy

**Attendance (5%).** We will use [Electronic Attendance System](#) to track your attendance. Following our official policy, you will receive **F** if you are absent for more than 25% of the lectures.

**Programming Assignments (30%).** There will be six programming assignments. In the assignments, you must implement programs using appropriate data structures for solving problems.

**Midterm (30%) and Final (35%) Exams.** The exams will be conducted as closed-book tests without the use of electronic devices.

## Topics

- Arrays and Strings
- Linked Lists
- Stacks and Queues
- Trees
- Binary Search Trees (BSTs)
- Efficient BSTs: AVL and Red-Black Trees
- Heap
- Segment Trees
- Graphs
- Minimum Spanning Trees
- Sorting Algorithms
- Hash Tables