

# CS206 Data Structures

## Introduction

Sung-eui Yoon (윤성의)

Department of Computer Science  
KAIST

<http://sglab.kaist.ac.kr/~sungeui>

# About the Instructor

---

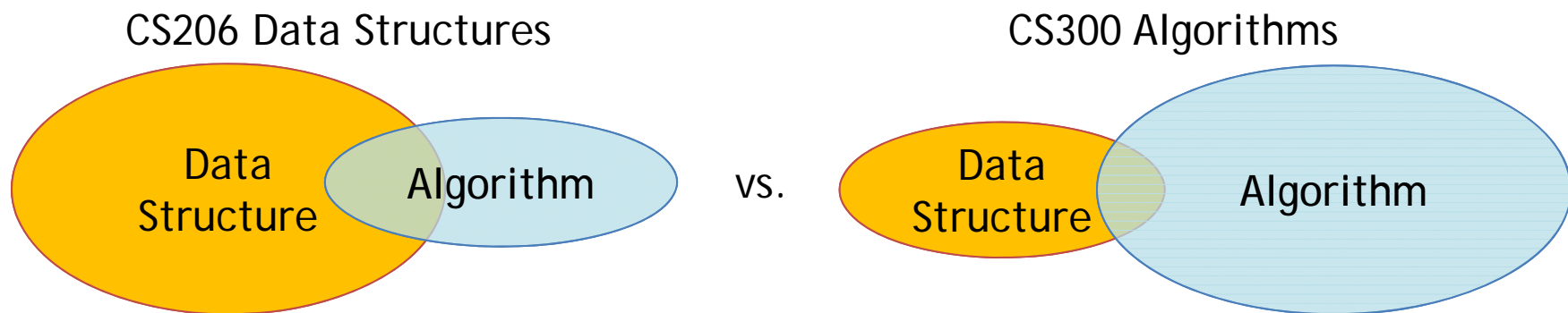
- Joined KAIST at 2007
  
- Main research focus: handle massive data for various computer graphics and geometric problems
  
- Paper and video
  - <http://sglab.kaist.ac.kr/papers.htm>
  
- YouTube videos
  - <http://www.youtube.com/user/sglabkaist>



# Course Overview

---

- Computer program = data (data structure) + instruction (algorithm)
  
- Common challenges for computer scientists
  - How do we represent real-world data for computer programs?
  - How do we write efficient programs for the data representation?
  - How do we analyze computer programs?
  
- This course offers the first essential survival skills as a computer scientist



# Course Information

---

- Instructor: Prof. Sung-eui Yoon (윤성의)
- Email: [sungeui@gmail.com](mailto:sungeui@gmail.com)
- Office: 3432 at CS building
- Hours
  - Lectures: 1:00pm-2:15pm T/Th
  - Office Hours: Right after the class, or by appointment
- Course webpage: <http://klms.kaist.ac.kr>
  
- A few lab classes helping on programming assignments
  - Will be held at 7:00pm, Mon., N1-201
  - Unless announced, no Labs

# TAs

---

- Available in a separate slide prepared by TAs

# Prerequisites

---

Basic programming skill, CS101

- We do not teach programming here at this class
- You need to learn the basic JAVA programming by yourself
- JAVA online lecture materials:

<http://www.youtube.com/playlist?list=PLFE2CE09D83EE3E28>

If you are unsure, consult the instructor at the end of this class

# Overview

---

- Computer program = data (data structure) + instruction (algorithm)
  
- Address common challenges for computer scientists
  - How do we represent real-world data for computer programs?
  - How do we write efficient programs for the data representation?
  - How do we analyze computer programs?

# Examples: Games

---



**2D game**

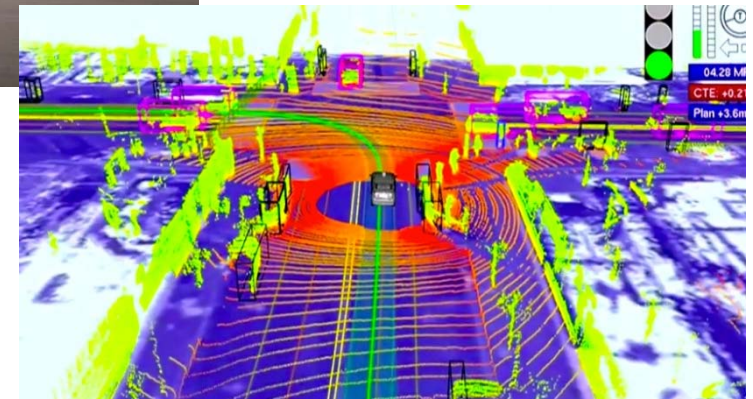


**3D shooting game**

□ How do we store these entities and interact with objects in games?

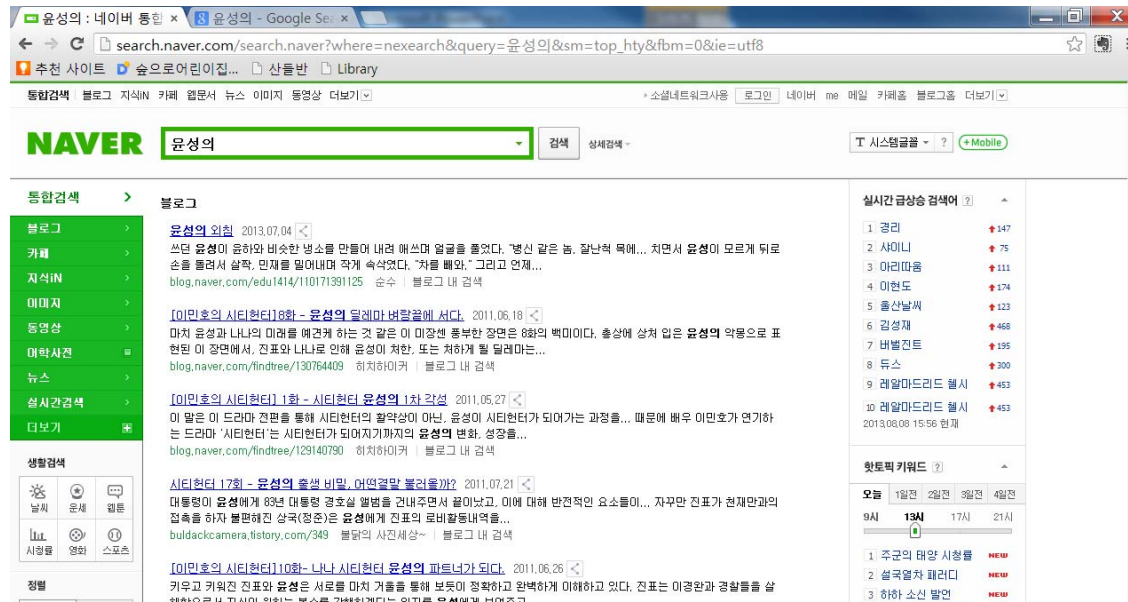


# Examples: Google Self-Driving Vehicles



□ How do we sense and represent the environment?

# Examples: Naver

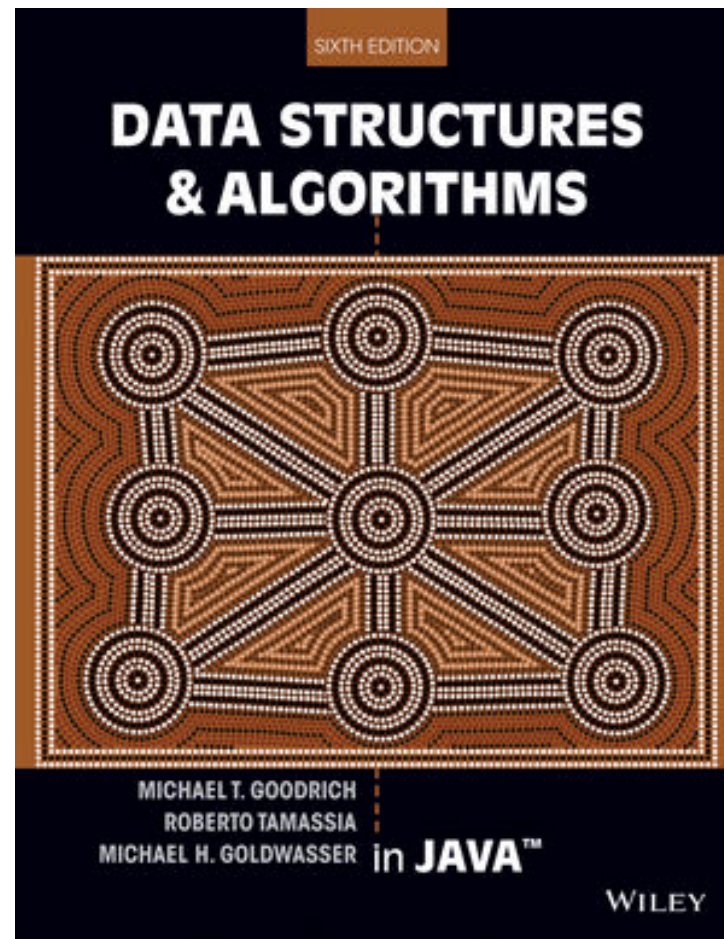


□ How do they search through billions of web-pages?

# Textbook

---

- Data Structures & Algorithms in JAVA (6<sup>th</sup> edition): Ordered in KAIST bookstore & library



# Topics and Schedule (Tentative)

---

Date	Topic	Reading Assignments
Week #1	Introduction Java Programming Review	Chapter 1,2
Week #2	Arrays, Linked Lists, and Recursion	Chapter 3
Week #3	Analysis Tools	Chapter 4
Week #4	Stacks and Queues	Chapter 6
Week #5	Lists and Iterators	Chapter 7
Week #6	Trees	Chapter 8
Week #7	Priority Queues	Chapter 9
Week #8	Midterm Exam Period	
Week #9	Maps and Dictionaries	Chapter 10
Week #10	Search Trees #1	Chapter 11
Week #11	Search Trees #2	
Week #12	Sorting, Sets, and Selection #1	Chapter 13
Week #13	Sorting, Sets, and Selection #2	
Week #14	Graphs #1	Chapter 14
Week #15	Graphs #2	
Week #16	Final Exam Period	

# Other Reference

---

- Course homepage
- Google and wiki



- Code fragments of the text book
  - <http://ww0.java4.datastructures.net/source/>
- JAVA online lecture materials
  - <http://www.youtube.com/playlist?list=PLFE2CE09D83EE3E28>
  - Short video segments on basic JAVA concepts and programming
- JAVA materials
  - Tutorial: <http://docs.oracle.com/javase/tutorial/>
  - Reference: <http://docs.oracle.com/javase/7/docs/api/>

# Program Assignments (PAs)

---

- 6 PAs to cover major parts of the lecture materials
  - Priority queue based on linked-lists
  - Binary search trees
  - Shortest paths
  - Etc.
  
- All of them are based on JAVA

# Grading

---

- Mid-term: 30%
- Final-term: 30%
- Homework assignments: 40%
  
- Late policy
  - No score for late submissions
  - Submit your work before the deadline!
  
- Maximum grade for re-taking this course will be A-

# Class Attendance Rule

---

- Late two times → count as one absence
- Every two absences → lower your grade (e.g., A- → B+)
  
- To check attendance, I'll call your names or take pictures
  
- If you are in situations where you should be absent, notify 진희성 (Attendance checking TA) and me earlier
  - Official documents (e.g., medical document) are required for your allowed absence



# Honor Code

---

- Collaboration encouraged, but *assignments must be your own work*
  - If you copy someone else's codes, you will get F
  - If your codes are copied by someone else, you will also get F
  
  - Make sure that your codes are not stolen
  - We can use a code copy checking tool to find any copy

# Official Language in Class

---

## English

- I'll give lectures in English
- I may explain again in Korean if materials are unclear to you
- You are also recommended to use English, but not required

## To non-native Korean speakers

- Many Korean students prefer to use Korean for deeper discussions
- In these cases, we will use Korean, but I will summarize main points in English

# Any Questions? (Question HW)

---

- Come up with one question on what we have discussed in the class and submit at the end of the class
  - 1 for typical questions (that have been already answered in the class)
  - 2 for questions with thoughts or that surprised me
- Write questions at least 4 times
  - Write a question about one out of every four classes
  - Multiple questions in one time will be counted as one time
- Common questions are compiled at [the Q&A file](#)
  - Some of questions will be discussed in the class
- If you want to know the answer of your question, ask me or TA [on person](#)

# About You

---

- Name
- Your (non hanmail.net) email address
  
- What is your major?
- Previous experience on programming and computer science courses
  
- Any questions/comments?

# Homework

---

- Go over the next lecture slides before the class
  - Just 10 min ~ 20 min should be okay

# Next Time

---

Brief intro. to JAVA