To Step Forward …

Hyung-Sin Kim

Computing Foundations for Data Science

Graduate School of Data Science, Seoul National University

Congratulations!

This Course was Designed for…

- Students who do not have much computing/programming background
- To make them learn **a lot** in a condensed way: Python, Systems, and C
  - To have basic skills and knowledge to keep up with the **GSDS curriculum**
- To make that happen, our methodology was as follows:
  - 24 lectures, 10 programming assignments, 5 projects, and 1 midterm
  - Study group organization, on-class group discussion, on-class code analysis, animation on slides, after-class Q&A, ETL discussion
  - Mindset of a helper, not a judge

Special Thanks to...

Special Thanks to...

- 이인회 (데이터사이언스학과)
- 김상엽 (산업공학과)
- 이순우 (지능정보융합과)
- 진하림 (천문학과)
- 이주헌 (컴퓨터공학부)
- 전창민 (컴퓨터공학부)

Who was the most helpful peer for you?

What We have Covered So Far …

- Python programming
  - Interpreter
  - Data types, variables, and operators
  - Memory model
  - Functions
  - Control Structures and loops
  - Strings, lists, sets, tuples, and dictionaries
  - I/O
  - Modules and import
  - Classes
  - Object-oriented programming
- C programming
  - Compiler
  - Data types, variables, and operators
  - Memory model (run-time stack)
  - Functions
  - Control structures and loops
  - Strings, arrays, and pointers
  - I/O
  - Headers and #include
  - Structures
  - C++ / Classes

What We have Covered So Far …

- Algorithms
  - Linear search and binary search
  - Selection sort, insertion sort, and merge sort
  - Recursion
- Computer systems
  - Bits, data types, and operations
  - Semiconductor and logic gates
  - Von Neumann Model
  - Machine codes
  - Five great ideas in computer architecture
  - Linux (Ubuntu)
- Machine learning
  - Logistic regression
  - Gradient decent
  - Chain rule
  - Softmax
  - Multi-layer perceptron

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This seems to be too heavy for some of you? Good lesson for me… ☺

Grading

- 10%: Attendance and attitude
- 20%: 10 Assignments
- 30%: 1 Midterm
- 40%: 5 Projects

Computing Foundations for Data Science:
A Pathway toward…

To Step Forward …

To Step Forward …

- **Data structures and Algorithms**
  - GSDS: 데이터사이언스를 위한 소프트웨어 플랫폼 (1학기)
  - ECE: 자료구조의 기초 (2학년), 알고리즘의 기초 (3학년)
  - CSE: 자료구조 (2학년), 알고리즘 (3학년)

- **Computer systems**
  - GSDS: 확장형 고성능 컴퓨팅 (2학기)
  - ECE: 운영체제의 기초 (4학년)
  - CSE: 시스템프로그래밍 (2학년), 운영체제 (3학년), 멀티코어 컴퓨팅 (4학년)

To Step Forward …

- **Database**
  - GSDS: 빅데이터와 지식관리 시스템 (1학기)
  - CSE: 데이터베이스 (3학년)

- Computer architecture
  - ECE: 컴퓨터조직론 (3학년)
  - CSE: 컴퓨터구조 (2학년)

- Object-oriented programming (and c++)
  - ECE: 프로그래밍 방법론 (2학년)
  - CSE: 컴퓨터프로그래밍 (2학년)

Data Science as Liberal Arts in the 21-th Century

Berkeley
UNIVERSITY OF CALIFORNIA

The Students

2019-2020

- 2800 in Data 8
- 1600 in Data 100
- 500 in Prob 140
- 500 in Data 102

The first Data Science majors graduated in Spring 2019.

Over 300 DS majors graduated in Spring 2020, along with several hundred who got the DS minor.

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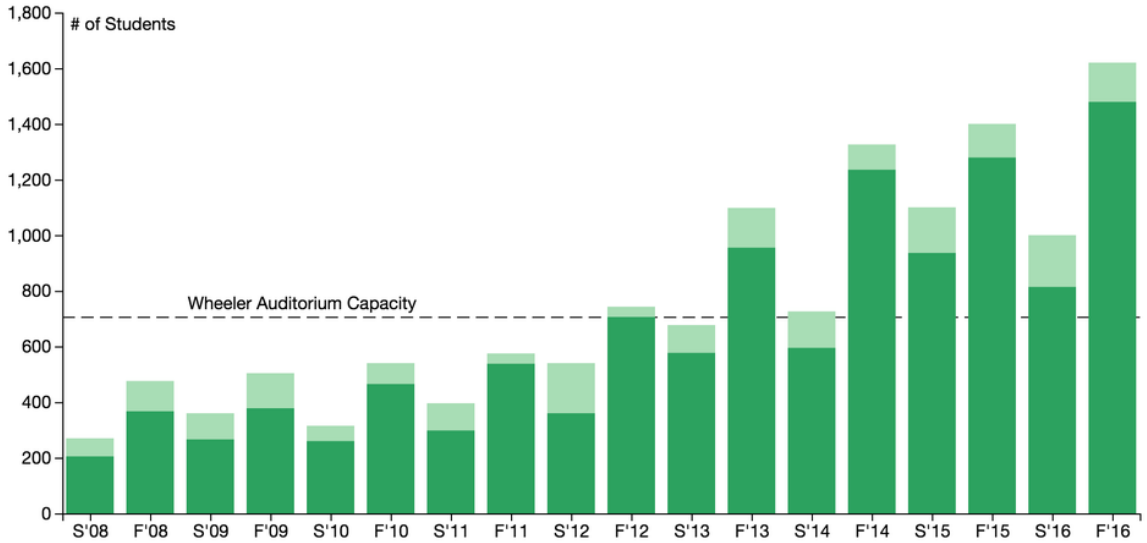

Again, Psychological Barrier is the Main Hurdle

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노력파 / 이순우
jyyp/박건휘
강동식 / 학생 /...
L2C2HK/김나연
지윤 염
x/김성익
노력파/조수빈
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이주헌 YI Juheon
x/김지훈/수리과학부