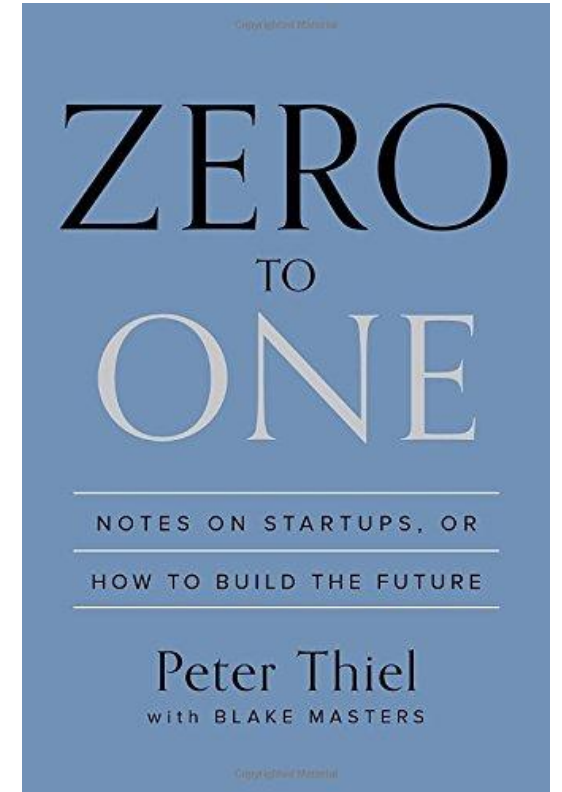Lecture 1

Motivating Examples

Teera Siriteerakul

Imagine if you have only one book.

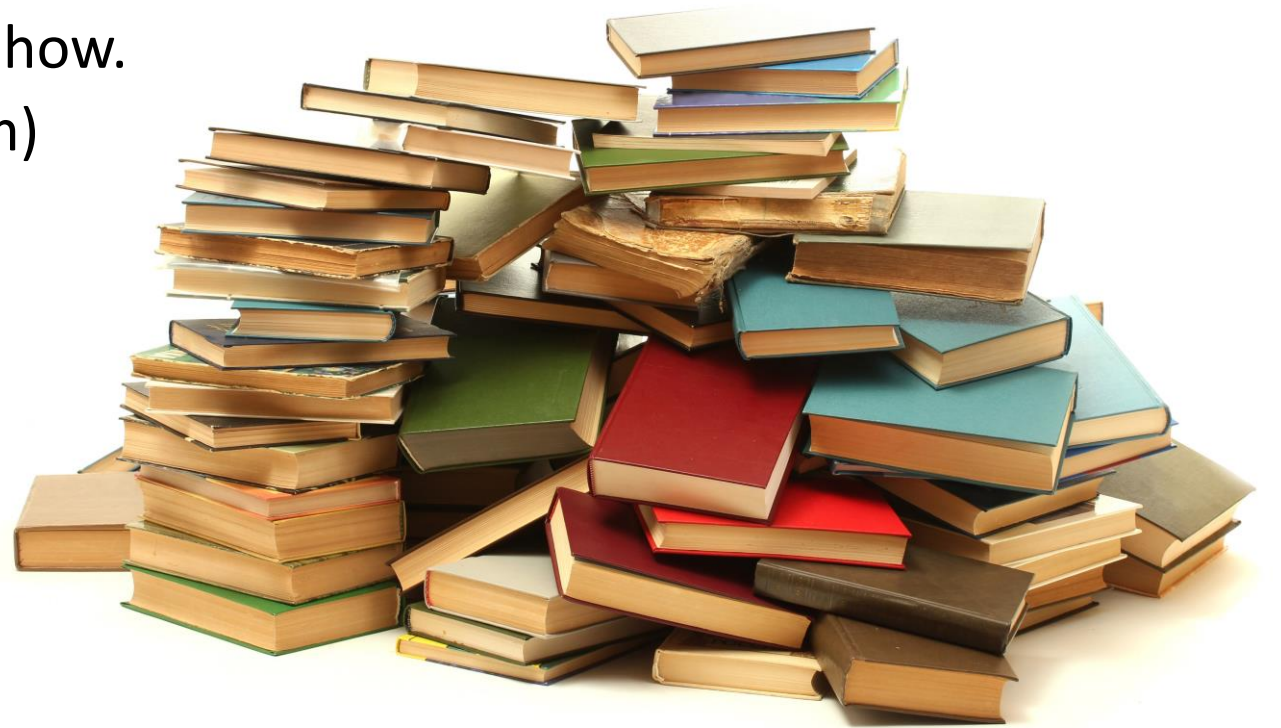- You don't need any structure or algorithm for your data (book)

How about seven books

- Well, still manageable.

Make it a hundred

- Now, I think we need some order!
  - We need to structure them somehow.
  - We also need a way (an algorithm) to deal with them.

Structured them

- Alphabetical order seems to be a smart choice
- Binary search can be used to find a book quickly
- Data structure → ordered array
- Algorithm → binary search

- What other algorithms are involved?

Let keep going..

- Is alphabetical order still enough?
- Any good idea?

Let structure them!

- Dewey Decimal Classification – DDC
  - a.k.a. Library System
  - Using hierarchy classification

- For example

  500 Natural sciences and mathematics

  510 Mathematics

  516 Geometry

  516.3 Analytic geometries

  516.37 Metric differential geometries

  516.375 Finsler geometry

** Cuypers Library, Amsterdam, Netherlands

Beyond Data Structures & Algorithms

- Where to physically store the books?

- How to connect an alphabetical order to the DDC?

- How to add/take out/return/remove books?

- What is the function of librarian, comparing to computer system?