L00
Introduction

50.004 Introduction to Algorithm

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(slides adapted from Dr. Simon LUI)
ISTD, SUTD

Why study algorithm

- Simon was a consultant of a company
- One day, their manager came to me….

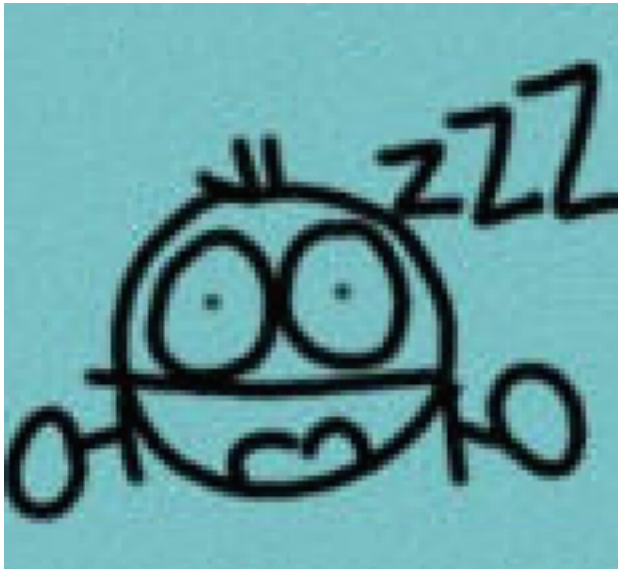
manager

Simon, why my stock analysis program runs so slow?
It need 157 years to complete the calculation!

Why study algorithm

- Simon was a consultant of a company
- One day, their manager came to me….

Because you used the brute force algorithm!
You should use a divide and conquer algorithm instead.



Simon Lui

Why study algorithm

- Simon was a consultant of a company
- One day, their manager came to me….

After one day of re-coding,
the program can complete any computation in 10 minutes….

- 157 years → 10 minutes
- Save more time for a happy life ☺️

What is algorithm

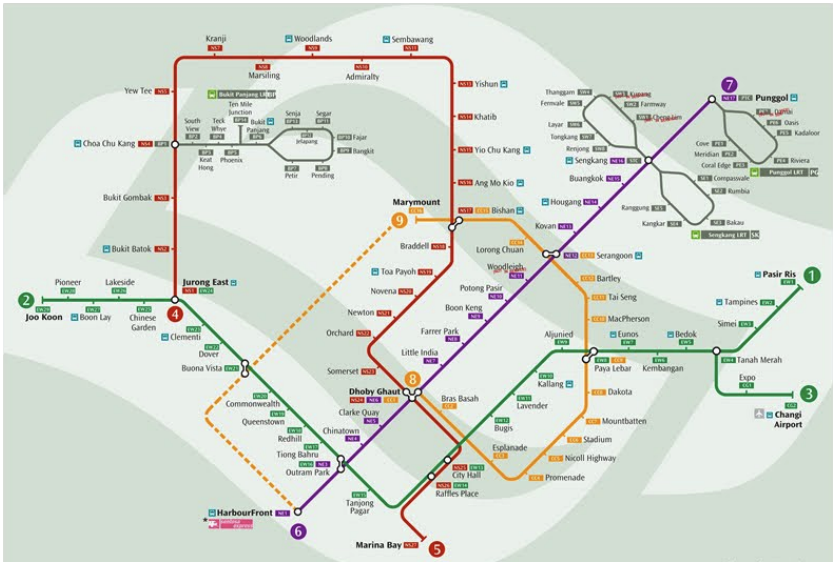
- Algorithm is a procedure for solving problem

e.g. how do you sort a cart of books in increasing order of the volume number? (i.e. volume 1, volume 2, volume 3….)

- Bad algorithm: compare every books
- Clever algorithm: divide the cart into two, sort the first half, sort the second half, merge them.

What is algorithm

- Algorithm is a procedure for solving problem



e.g. How to find the best travelling time between any station?

- Bad algorithm: manually find the travelling between each station.
- Clever algorithm: just record the travelling time between consecutive stations, then use the Dijkstra shortest path algorithm.

Course material

Everything are on this link

- goo.gl/ED3nSQ

Textbook

- Introduction to Algorithms
  - by Cormen, Leiserson, Rivest, and Stein (CLRS)
- Very very useful, almost the whole world is using this book
- For pre-reading and revision, I won't go through the book in class
- But most of materials are all based on this book
- Highly recommend to read the whole chapter of the course related topics.

Grading

- 7 weekly homework: 15%
  - Review the basic content of the week
  - I expect everyone spend 10min per week on that and all should get full marks
- 2 Problem sets: 20%
  - A more difficult homework
- 2 Quizzes: 20%
  - The first one at week 4.
- Project 2D: 5%
  - A joint project with the other ISTD courses
- Final Exam: 40%

The teaching team (you can ask them QS about the course)

Instructors

- Gemma Roig (Lecture Week 1,2,3,4)
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- Subhajit Datta (Lecture Week 10,11,12,13)
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The teaching team (course materials preparation)

Teaching Assistants

- Penny Chong (homework 3 and 11, problem set 1)
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- Sakshi Udeshi (quiz 1, quiz 2, homework 10)
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- Jingyu Koh (homework week 4)
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