Introduction to Algorithms

Science Honors Program (SHP)

Plenary

Christian Lim

Saturday, February 10, 2024

Christian Yongwhan Lim

Education

Stanford University

Part-time Jobs

Full-time Job

Google Research

TWO SIGMA

Workshops

Stanford ENGINEERING | Stanford Computer Forum

Coach/Judge

icpc International Collegiate Programming Contest

icpc.foundation

advancing the art and sport of competitive programming

https://www.yongwhan.io

Christian Yongwhan Lim

- Currently:
  - **Adjunct**, Columbia CS;
  - **CEO** (Co-Founder), Stealth Mode Startup;
  - **Co-Founder**, Christian and Grace Consulting;
  - **Head Coach**, Columbia ICPC;
  - **Internship Manager**, ICPC Foundation;
  - **Leadership Team**, ICPC North America (NA);
  - **Trainer**, ICPC NA Programming Camp;
  - **Judge**, ICPC NA Qualifiers and Regionals;

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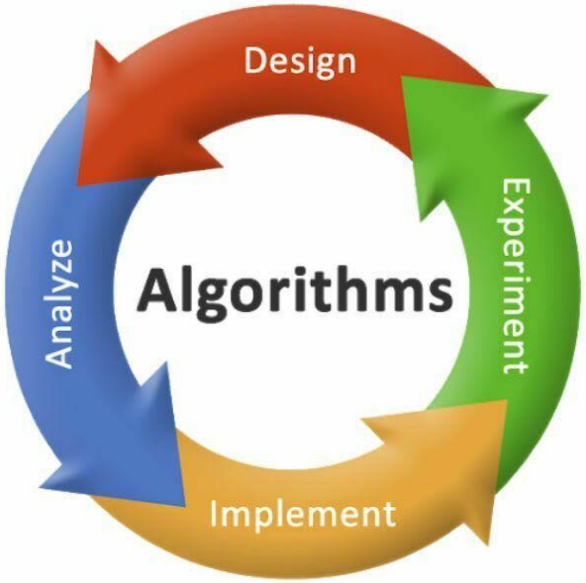
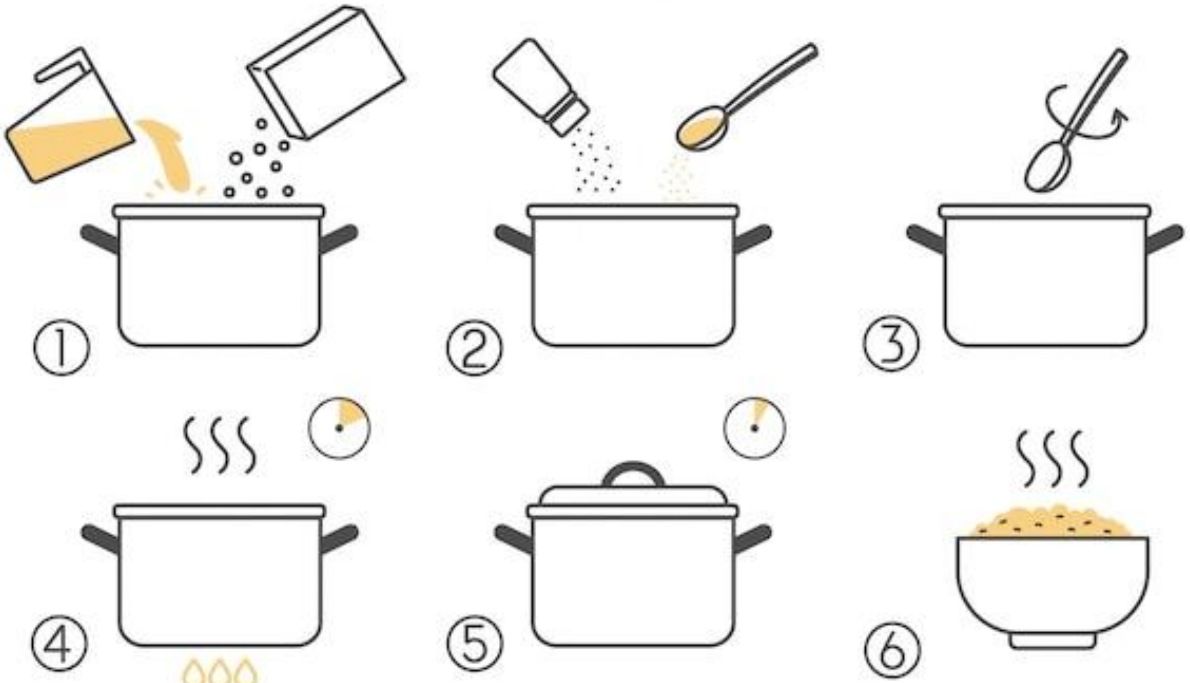
What is Algorithm?

- A set of **step-by-step procedures**, or a set of rules to follow, for completing a specific task or solving a particular problem.



HOW TO COOK PORRIDGE



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- **To become a better programmer!**
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- **But, most importantly, TO HAVE FUN!**
  - Solving problems can be fun!

USA Computing Olympiad (USACO)

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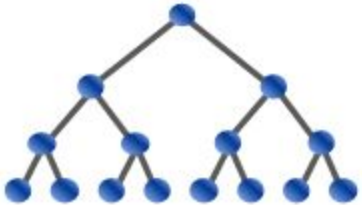

If selected, International Olympiad in Informatics (IOI)

Meta Hacker Cup

International Collegiate Programming Contest (ICPC)

Popular Contest Sites

AtCoder

CODEFORCES β
Sponsored by Telegram

topcoder ™

Popular Practice Sites

Popular Tutorial Sites

usaco.guide

cp-algorithms.com

More on Growing Short List of Useful Websites

- Please take a look as needed: **Link**

Terse Guides

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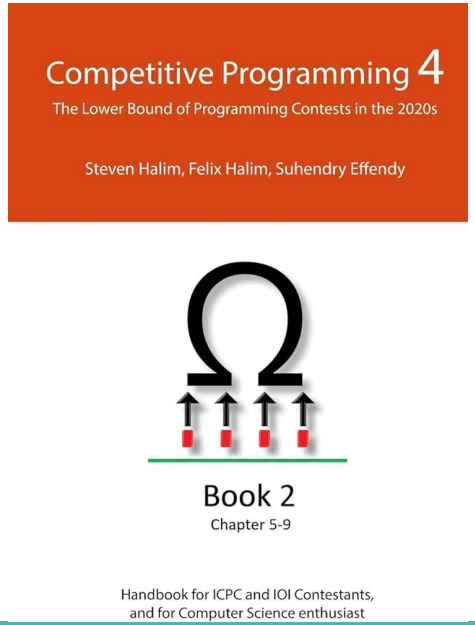
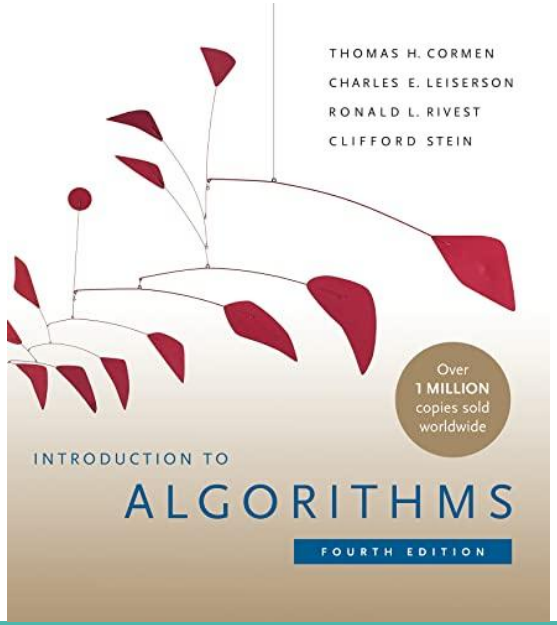
(Optional) Textbooks

- **Competitive Programming 4**, Halim, et. al.
- **Introduction to Algorithms**, Cormen, et. al.





Programming Language Choice

- You are welcome to pick one of the following languages:
  - **C++**
  - Java
  - Python

- It is the best to pick C++ if you would like to be a serious (competitive) programmer.

Programming Language Background

- Some, if not all, of you may not know how to program yet!
- **This is totally fine/expected!**
- We will build your mastery of C++ ground up.
- If you already know one of the programming languages, that's **awesome**!

Sessions

- We will meet on **Saturdays** from **10am ET** to **12:30pm ET**!

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  - String Algorithms;
  - **And, more**!

1:1 Quick Chat

- You may use https://calendly.com/yongwhan/quick-chat-blitz to sign up!

Deliverables

- Nothing!

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- But, there will be in-session, interactive exercises!

ICPC Columbia University Local Contest (CULC)

- **Time:** 2pm ET, One Saturday in April
- **Location:** Somewhere on Columbia University Campus

- Some day in April, we will hold a local contest where all of you are welcome to join, in-person!
- It will be held after lunch on Saturday when the session is held!
- This is an individual, not a team, contest.

Important Note

- Do **NOT** be AFRAID to ask!

- I **LOVE** students asking questions.

- I am here to make you all succeed.

Important Note

- You can think of me as a **coach** rooting for your success in life.

- So, let's pull this through together; I will lead you through this journey!

- **WELCOME** to the world of learning algorithms!

Practice Strategies in CodeForces

- If your goal is to get to a CodeForces rating of **X**, you should practice on problems that are **X + 300** typically, with a spread of 100. So, picking problems within the range of:

  {X + 200, X + 300, X + 400}

  would be sensible!

- So, if you want to target becoming a **red**, which has a lower-bound of 2400, you should aim to solving {2600, 2700, 2800}.
- **(Eventual) Target**: You should focus on solving it for 30 minutes or less!

Practice Strategies in CodeForces

- You should focus on solving each problem for **30 minutes or less**; if you cannot solve any problem with this range, you should consider solving a problem with a lower rating.

- You should aim to solve **10 ~ 15 problems** each day within this range to expect a rank up within a quarter (3 months).

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  - Look at accepted solutions, and try to solve the problem.
  - Make sure you look back after two weeks and see if you can solve it.

Live Contest Strategies

- A Terse Guide to Live Contests

C++ Tips and Tricks: best to learn those through practice!

- **C++ Tricks (HosseinYousefi)**
- **C++ tips and tricks (Golovanov399)**
- **Some Tips for Coding in C++ in Competitive Programming (Nea1)**

- Use "**#include <bits/stdc++.h>**" header to include **almost everything**.

ICPC World Finals (@Egypt) in April!

- **Kevin Yang (yangster67)**, **Kaiheng Dai (askd)**, and **Neal Lai (Nea1)** are representing Columbia University in ICPC World Finals at Egypt!

- Due to a travel to Egypt for ICPC World Finals, sessions on April will be substituted by another instructor.

- I will make sure to clarify how it will work closer to the dates. Thanks for your understanding!

Questions and Answers!

- **Ask me anything!**


THANK YOU