Intro to DS&A Studying

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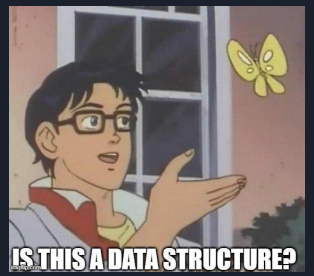
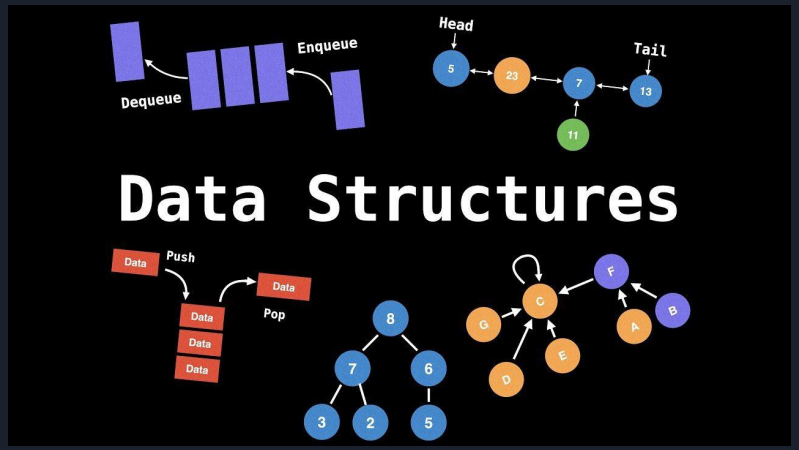
What are data structures and algorithms anyways…?



Data Structure and Algorithms

- A data structure is simply a way to to **STORE** data
  - examples:
    - Arrays
    - Hash tables
    - Hash sets
    - Linked Lists
    - Trees
    - Graphs
- Algorithms are ways to INTERACT with our data
  - The goal is to create, read, edit, or delete data in a way that is useful.
- We will look at this in the context of coding interviews
  - Design
  - Implementation
  - Trade offs



Three Different Ways to Study

1. Targeted Study
   - Choose a specific topic(s) and study problems from those topic(s)
2. Random Study
   - Choose randomly selected problems to solve
3. Mock Interviews
   - Solve a random problem under a time constraint in front of someone who asks you follow-up questions

Pros and Cons for each Study Strategy

	PROS	CONS
TARGETED STUDY	Allows you to repeat similar problems together to more easily see patterns that would indicate when to use a particular strategy.	You already have an notion of what kind of strategy to use, which isn't accurate to how a real-life interview works.
RANDOM STUDY	Forces you to read the prompt more carefully and practice noticing keywords and patterns in order to recognize what kind of strategy to use.	Many find it very difficult to see patterns for a particular topic when constantly switching around, especially when first starting out.
MOCK INTERVIEWS	Forces you to practice communicating your thoughts and manage your time, which are additional skills needed to succeed in an interview.	Can be time consuming and not time efficient when it comes to learning material.

You need to do ALL these consistently. How much time you dedicate to each one depends on what your current objectives are.

Resources and Cheat Sheets

- Decision flowchart
  - A finite number of patterns and strategies can actually solve the vast majority of problems.
  - However, one of the most difficult parts of solving random DS&A problems is figuring out when to use certain patterns. This flowchart can help you figure out what strategies to think about for problems depending on what the problem is asking for.
- DS&A Starter Templates
  - These starter templates can solve a very large number of problems
  - Try to solve the problem first
    - Only refer to these templates for when you're completely stuck
- These can be very powerful study tools, but be honest with yourself! Attempt the problems first! The goal is to eventually not be reliant on these resources.

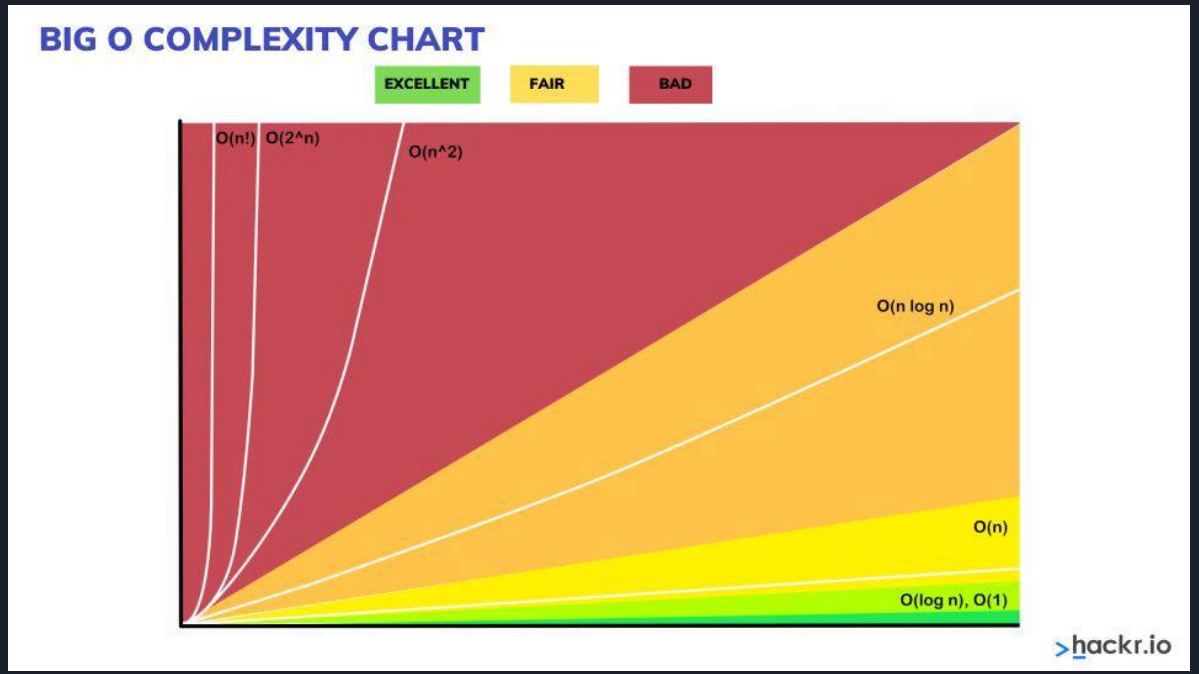
Track Progress!

- Tracking progress and reflecting upon each problem is important!!
- I recommend revisiting problems if:
  - you could not solve without looking at the solution
  - you could not solve a problem within time limits
    - 15 min for easy, 30 min for medium, 45 min for hard
    - Note that the above times are VERY difficult to achieve when starting!! If you find it difficult to solve a mediums within 30min, 45 min is a reasonable time to shoot for.
    - The ultimate goal is to be able to solve any problem with enough time to spare for follow up questions during an interview.

- There are multiple ways to track your progress. I personally like to use Notion. You can download a template of my Notion setup here:

  DS&A Tracking Notion Template
    - click “Duplicate” at the top to copy this template over to your own Notion account

Big O



- Big O is how we analyze our code
- Usually, we are concerned with the worst case scenario
- Our Big O analysis is based upon how our algorithm scales according to the input
- UNDERSTAND THIS CHART!

Questions?