Welcome to Leetcode Study Group!

Before we begin...

- Session materials:
  https://github.com/WomenWhoCode/WWCodePython

- Set your chat to “All panelists and attendees” and share your thoughts there

- Ask any questions using the Q&A button

- Have fun and make some coding friends!

WELCOME

WOMEN WHO CODE

Our Mission

Inspiring women to excel in technology careers.

WOMEN WHO CODE PYTHON

Our Vision

A world where diverse women are better represented as engineers and tech leaders

WOMEN WHO CODE PYTHON

Our Values

+ Focus on the mission
+ Live Leadership
+ Punch above your weight
+ Inclusion at the core

WOMEN WHO CODE PYTHON

Our Target

Engineers with two or more years of experience looking for support and resources to strengthen their influence and levelup in their careers.

WOMEN WHO CODE PYTHON

290,000

Members

70 networks in 20 countries
122+ countries
14K+ events
$1025 daily Conference tickets
$2M Scholarships
Access to jobs + resources
Infinite connections

WOMEN WHO CODE PYTHON

OUR MOVEMENT

As the world changes, we can be a connecting force that creates a sense of belonging while the world is being asked to isolate.

WOMEN WHO CODE PYTHON

Code of Conduct

WWCode is an inclusive community, dedicated to providing an empowering experience for everyone who participates in or supports our community, regardless of gender, gender identity and expression, sexual orientation, ability, physical appearance, body size, race, ethnicity, age, religion, socioeconomic status, caste, creed, political affiliation, or preferred programming language(s).

Our events are intended to inspire women to excel in technology careers, and anyone who is there for this purpose is welcome. We do not tolerate harassment of members in any form. Our Code of Conduct applies to all WWCode events and online communities.

Read the full version and access our incident report form at
womenwhocode.com/codeofconduct

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WOMEN WHO CODE®

/connect

CONNECT Forward 2021

Join the largest and most active community of technical women for two days of career advancement, connection, and more!

REGISTER

November 18 & November 19, 2021

Register here:

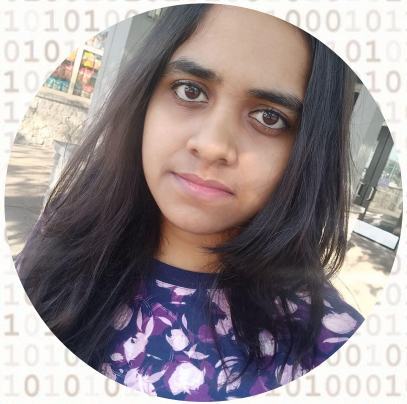
Get 50% off your Member ticket!

Promo Code: **WWCODEPYTHON**

LeetCode Study Group

WOMEN WHO CODE PYTHON

Meet Your Team!



Chethana
Lead / Associate Software Engineer

Karen
Lead / Programmer

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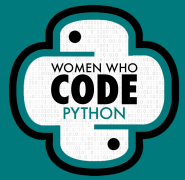
Today's Agenda

1. Introduction to greedy algorithm
2. Deep dive of Jump game
    a. Problem Discussion
    b. Test cases
    c. Approaches with time complexity
    d. Live coding
3. Next problems to tackle
4. Q&A



Greedy algorithm

Formal Definition

From CLRS

*"A **greedy** algorithm always makes the choice that looks best at the moment. That is, it makes a locally optimal choice in the hope that this choice will lead to a globally optimal solution."*

That is, the algorithm makes the best/optimal choice at each step of the process assuming that you will end up with the best solution overall

Two main elements of a greedy algorithm

Greedy choice

We make locally optimal greedy choices at each point to get to the solution - choose whatever looks best at the current subproblem* and continue

Optimal substructure

A problem is said to have an optimal substructure if the best solution we come up with to the whole problem (global optimum) contains within it best/optimal solutions to subproblems (local optima)

An example

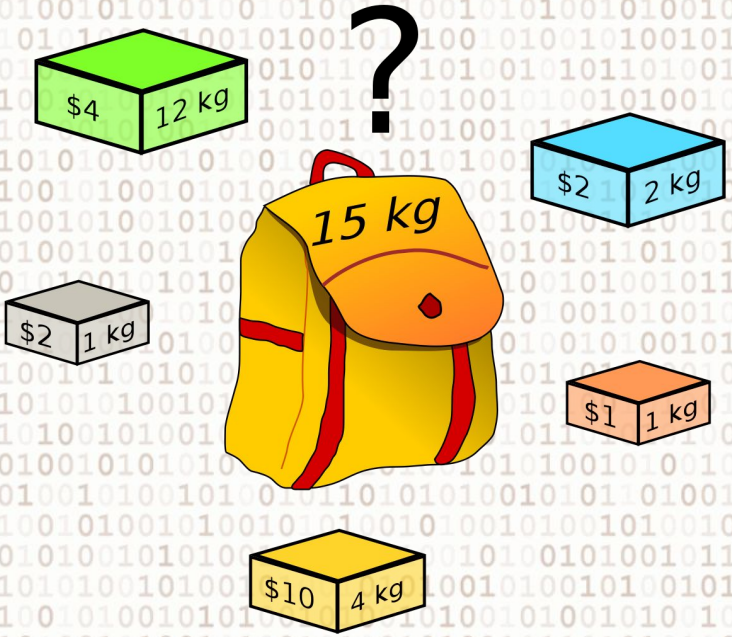
Fractional Knapsack problem

Fill up bag such that

- we maximize the value of the items we choose and,
- the total weight of the items we choose doesn't exceed capacity of the bag
-

What is the max value we get?

Condition - The items can be broken down



These items can be broken down/divided

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How to solve it using the greedy approach?

Greedy choice

- We have two lists - `weights` and `values`
- Sort by value per kg for each item (v/w) and store by value and weight pairs in an array
- At each point, we would pick the most valuable item and add that value to `max_val`

How to solve it using the greedy approach?

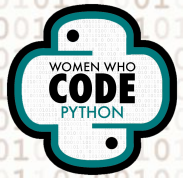
Greedy choice

- We should also make sure that we do not exceed the limit- so if we can't pick the entire item, we would need to pick a fraction of the weight and add the corresponding value of the fraction to `max_val`

How to solve it using the greedy approach?

Optimal Substructure

- Since we sort the items in terms of value/weight for each item, we know that **at each point** we are going to pick the most valuable item from the list of items
- The first item we pick will be the most valuable item of the list.
- The second item we pick will also be the most valuable item from the remaining list of items…. and so on!
- By induction, since we pick the best solution at each point, we end up with the best solution for the whole problem



When can we use it?

- Any problem asking you to find a minimum, or maximum or you see some kind of way to choose the best solution at each step
- Probably not a good idea when we need to solve subproblems to make the first choice to solve the main problem
- Also not a good idea when we need to revisit solved subproblems and optimise them or revisit and make a different decision than the one we picked (doesn't really sound greedy, does it?)

Classic examples of greedy problems

- Minimum spanning tree algorithms like Prim's and Kruskal's
- Travelling Salesman Problem (also see this)
- Greedy coloring
- Dijkstra's algorithm to find shortest path to all nodes

…. much much more!

Jump game

Link to problem

*"You are given an integer array nums. You are initially positioned at the array's first index, and **each element** in the array represents your **maximum jump length** at that position.*

Return true if you can reach the last index, or false otherwise."

Let’s talk in depth

- Given integer array, `nums`
- Each `nums[i]` is the maximum number of position jumps you can make from that position (where `i` is the index at each position in `nums`)
- Can you get to the end of the array by utilizing up to the max jump value at each position?

Let's Code!

https://replit.com/@codernewbie/WWCodePythonLeetcode

Next steps from here

Best time to buy and sell stock - very popular!

" You are given an integer array prices where `prices[i]` is the price of a given stock on the `i`th day. Return the maximum profit you can achieve from this transaction. If you cannot achieve any profit, return `0` "

Meeting rooms II - try it to get exposure to different patterns

" Given an array of meeting time intervals `intervals` where `intervals[i] = [starti, endi]`, return the minimum number of conference rooms required. "

QnA Time!

Useful Links

- Leetcode Study group repo
- Repl link
- Mock interview - Pramp
- Leetcode Weekly contest (and biweekly)

Stay Connected!

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JOIN US ON SOCIAL MEDIA!

@WWCODEPYTHON

WOMENWHOCODE.COM/PYTHON

Upcoming Sessions

- ➔ Nov 18 - Hashing
- ➔ Dec 2 - DFS and BFS
- ➔ Dec 16 - Backtracking
- ➔ ... more to come!

Upcoming Events

SAT 06 NOV	Introduction to Web Scraping with Python: Build a Job Search Scraper Online | Python | 4:30 AM - 6:00 AM IST (UTC+0530)	Register
TUE 09 NOV	Less Is More: How to Code Python in One Line *Featured, Recurring* Online | Python | 10:30 AM - 12:00 PM IST (UTC+0530)	Register
TUE 16 NOV	Less Is More: How to Code Python in One Line *Featured, Recurring* Online | Python | 10:30 AM - 12:00 PM IST (UTC+0530)	Register
FRI 19 NOV	CONNECT Forward 2021 - Day 1 *Featured* Online | Other | 5:30 AM - 9:30 AM IST (UTC+0530)	Register

Register at: https://www.womenwhocode.com/python/events

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Thank You for Joining!