GREEDY ALGORITHM

G R O U P - T U R O N

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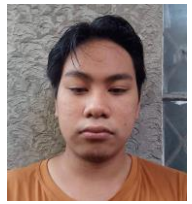

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WHAT IS GREEDY ALGORITHM ?

A Greedy algorithm is an approach to solving a problem that selects the most appropriate option based on the current situation. This algorithm ignores the fact that the current best result may not bring about the overall optimal result. Even if the initial decision was incorrect, the algorithm never reverses it.

WHAT IS GREEDY ALGORITHM ?

You can implement a greedy solution only if the problem statement follows two properties mentioned below:

Greedy Choice Property: Choosing the best option at each phase can lead to a global (overall) optimal solution.

Optimal Substructure: If an optimal solution to the complete problem contains the optimal solutions to the subproblems, the problem has an optimal substructure.

Advantages of Greedy Approach

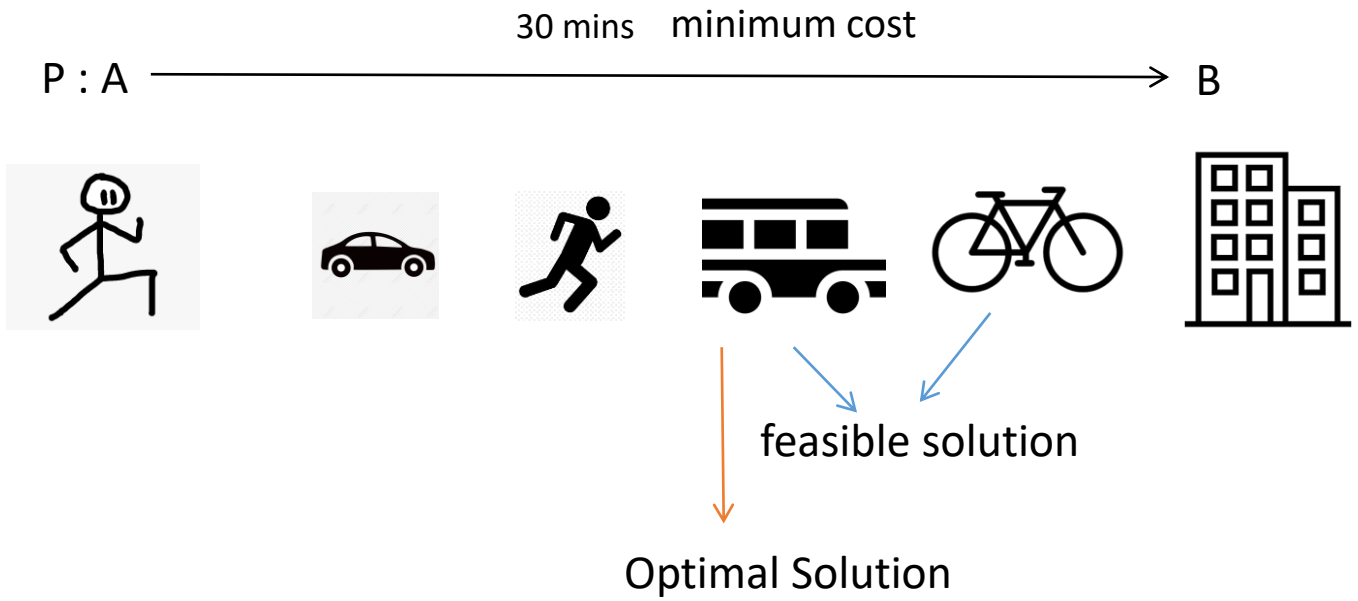
The algorithm is easier to describe.

This algorithm can perform better than other algorithms (but, not in all cases).

Greedy method

- it is simple and straight forward method
- it always chooses the solution that offers most obvious and immediate benefit.

Example:



Greedy Approach

For example find the longest path in the graph below from root to leaf.

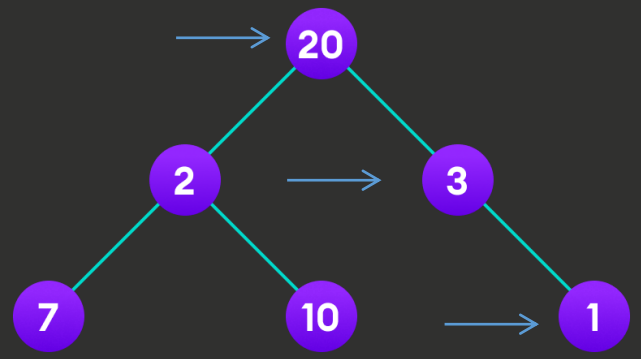
Greedy Approach

1. Let's start with the root node 20. The weight of the right child is 3 and the weight of the left child is 2.

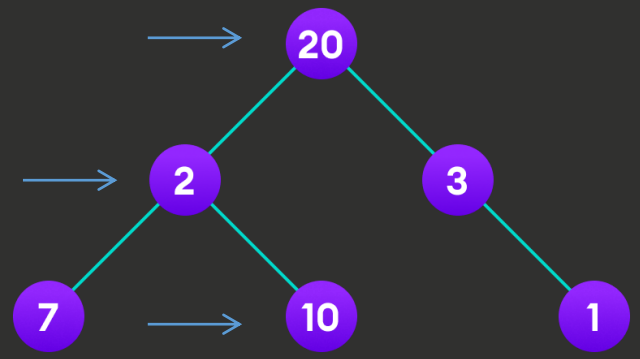
2. Our problem is to find the largest path. And, the optimal solution at the moment is 3. So, the greedy algorithm will choose 3.

3. Finally the weight of an only child of 3 is 1. This gives us our final result 20 + 3 + 1 = 24.

However, it is not the optimal solution. There is another path that carries more weight (20 + 2 + 10 = 32) as shown in the image below.



not optimal solution



Longest path

REFERENCE

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THANK YOU