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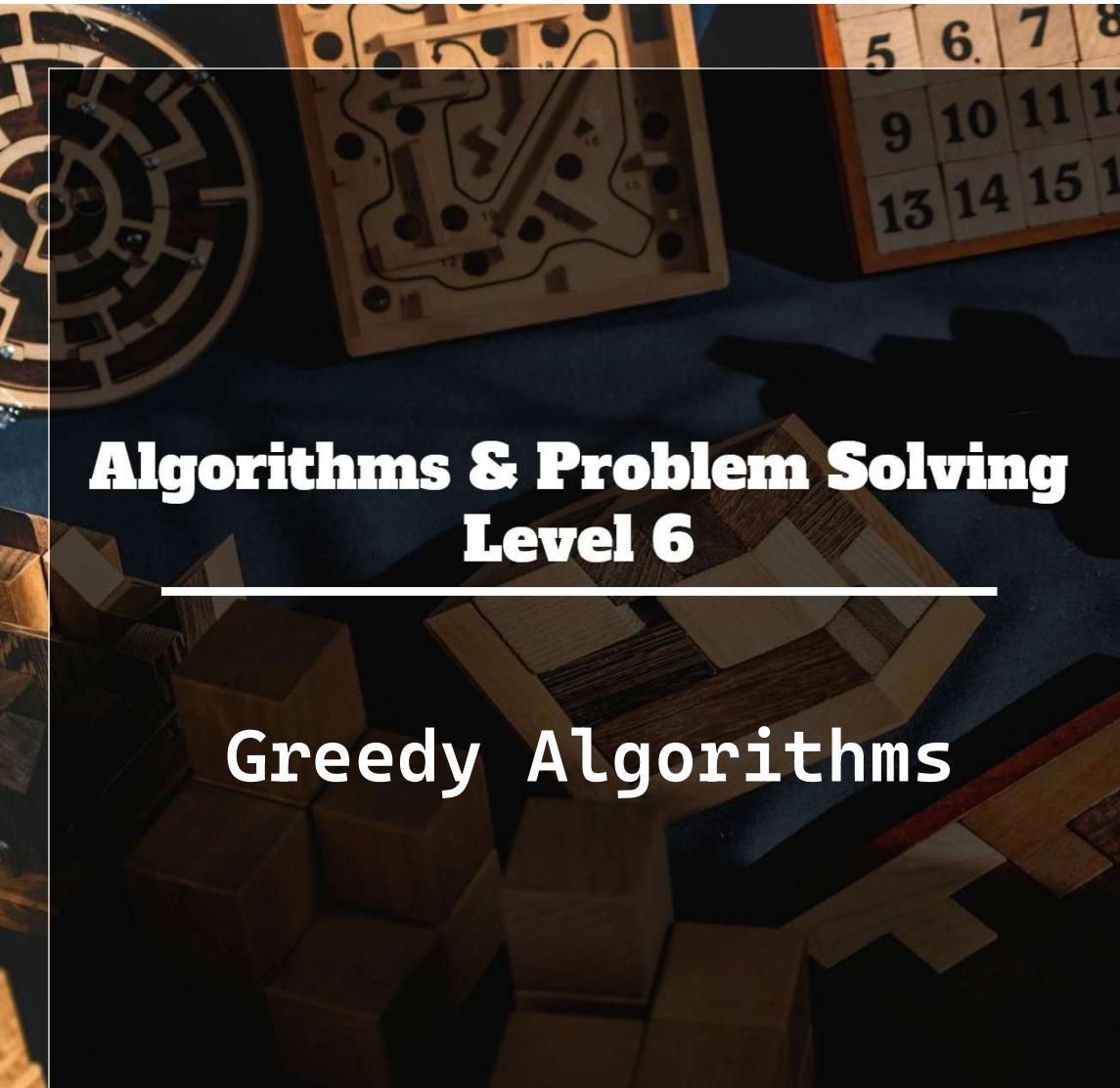www.ProgrammingAdvices.com

مهم جداً

هذا الملف للمراجعة السريعة واخذ الملاحظات عليه فقط ،لانه يحتوي على اقل من 20٪ مما يتم شرحه في الفيديوهات

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Algorithms & Problem Solving
Level 6

Greedy Algorithms

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Greedy Algorithms

- Greedy algorithms are a class of algorithms that make the locally optimal choice at each stage with the hope of finding the global optimum.

- Example: Shortest Path Algorithms such as Dijkstra's algorithm.

- In simpler terms, they choose the best option available at the moment without considering the broader consequences.

- This approach can be very efficient for certain problems where choosing locally optimal also leads to global solution.

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How Do Greedy Algorithms Work?

1. Start with an Empty Solution: The algorithm starts with an empty solution and builds it step by step.

2. Choose the Optimal Item: At each step, it chooses the best available option.

3. Update the Solution: The choices are added to the solution and are <u>not reconsidered</u>.

4. Repeat Until Complete: The process continues until the solution is fully formed.

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Advantages of Greedy Algorithms

- **Simplicity of Implementation**: They are generally easy to understand and implement.

- **Time Efficiency**: They make fast, straightforward decisions, making them time-efficient.

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Disadvantages of Greedy Algorithms:

- **Shortsightedness**: They may not guarantee an optimal global solution because they do not consider the long-term outcomes of current decisions.

- **Dependence on Initial Conditions**: They can lead to poor results if the initial data is not representative of the overall problem.

Common Applications

- Dijkstra's algorithm for shortest paths
- Activity Selection
- Huffman Coding
- Prim's and Kruskal's algorithm for Minimum Spanning Tree

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Thank You

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