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Report: CME 2204 Algorithm Analysis Assignment III
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• **Introduction**: Understanding the basics of greedy approach and to be able to use that on the problem. Finally find the solution.

• **What is Greedy Approach?**

According to the Oxford English Dictionary, "greedy" means having excessive desire for something without considering the effect or damage done. In computer science, a greedy algorithm is an algorithm that finds a solution to problems in the shortest time possible. It picks the path that seems optimal **at the moment** without regard for the overall optimization of the solution that would be formed.[1]

To summarize, greedy is an algorithmic paradigm that builds up a solution piece by piece, always choosing the next piece that offers the most obvious and immediate benefit. So, the problems where choosing locally optimal also leads to global solution are the best fit for Greedy.

• **How Greedy Approach Was Used in This Assignment?**

If we keep as many players as we need in our squad each year, we create an algorithm suitable for the greedy approach. For example,

n: 3 p: 3 c: 10
yearly demand = {9, 8, 5}

(Creating squad)
Promote: 3 Demand: 9 Coach Cost: 10
year: 1 current squad: 9 total salaries: 60

(8-3 = 5 The club have to hire 5 coaches. 5*10 = 50. 60+50 = 110)
Promote: 3 Demand: 8 Coach Cost: 10
year: 2 current squad: 8 total salaries: 110

(5-3 = 2 The club have to hire 2 coaches. 2*10 = 20. 110 + 20 = 130)
Promote: 3 Demand: 5 Coach Cost: 10
year: 3 current squad: 5 total salaries: 130

Minimum total costs to promote players for the planned 3 years: 130.

- **Greedy Approach vs Dynamic Programming?**

While dynamic programming produces hundreds of decision sequences, the greedy method produces only one. Therefore, you can achieve better results using dynamic programming than using greedy programming.

A greedy algorithm is one that tries to solve a problem by trying different solutions. It is usually faster than a dynamic program and more expensive than a greedy programming approach. Greedy programming is a programming style that involves making decisions based on the current state of the program. In contrast, dynamic programming is a programming style that involves making decisions based on the future state of the program.

- **Run Time Complexity**

This operation takes place in 1 for loop. So, run-time complexity of the code is **O (n).**

- **Run Time Complexity**

Space complexity of the code is **O (1).**

- **Conclusion**

With respect to the given assignment document, all parts are completed. The algorithm checks all years one by one and calculates minimum salary.

- **References**

[1] https://www.freecodecamp.org/news/greedy-algorithms/