Assignment 2 - Coin Changing

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May 1, 2018

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1 Objectives

Consider the problem of making change for n cents using the fewest number of coins. Assume that each coin's value is an integer. Describe a greedy algorithm to make change consisting of quarters, dimes, nickels, and pennies.

Use Python for the implementation for your Algorithm. Adhere to the code guidelines mentioned below.

2 Greedy Algorithms

A **greedy algorithm** is an algorithmic strategy that makes the best optimal choice at each small stage with the goal of this eventually leading to a globally optimum solution. This means that the algorithm picks the best solution at the moment without regard for consequences. It picks the best immediate output, but does not consider the big picture, hence it is considered greedy.

2.1 Explanations

A greedy algorithm works by choosing the **best possible answer in each step** and then moving on to the next step until it reaches the end, without

regard for the overall solution. It only hopes that the path it takes is the globally optimum one, but as proven time and again, **this method does not often come up with a globally optimum** solution. In fact, it is entirely possible that the most optimal short-term solutions lead to the worst possible global outcome.

3 Greedy Algorithms in Finance

Here there is a paper where greedy algorithm are used to solve the study case for the **investment portfolios optimal selection**.

The solution to the Binary Knapsack Problem can be obtained using greedy algorithms. Finance application of the problem is described for instance here. Shortly, the algorithms can be used to bet a subset of assets which give the greatest possible return.