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Dynamic Programming

Problem: Find the minimum number of coins needed to make change.

I implemented the problem with two versions as,

- Recursive method
- Dynamic programming method

The following results were obtained as,

Recursive Method:
Input:
Money: 40
Denominations: [50, 25, 20, 10, 5, 1]
Output:
Minimum number of Coins: 2
Change: [20, 20]

Time elapsed = 0.231931209564 seconds

Dynamic Programming Method:
Input:
Money: 40
Denominations: [50, 25, 20, 10, 5, 1]
Output:
Minimum number of coins: 2
2 20 cents

Time elapsed = 0.000165939331055 seconds

For larger inputs as 76, 766 with denominations 1, 5, 6,

Recursive Method:
Input:
Money: 76 and 766
Denominations: [1, 5, 6]
Output:
(This program does not terminate in my system with inputs 76 and 766 even after running for an hour.)

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Dynamic Programming Method:

Input:
Money: 76
Denominations: [1, 5, 6]
Output:
Minimum number of coins: 13
2 5 cents
11 6 cents

Time elapsed: 0.000236988067627 seconds

Input:
Money: 766
Denominations: [1, 5, 6]
Output
Minimum number of coins: 128
2 5 cents
126 6 cents

Time elapsed: 0.0017261505127 seconds

System in which the above codes were tested:
Processor: Intel Core™ i7-5500U CPU @ 2.40GHz × 4
RAM: 7.7 GiB