# Coin-Changing problem

**Definition:**

1. The coin-changing problem finds the minimum number of coins that must be generated based on the given denominators, which adds up to the input amount.

**Coin-changing Algorithm:**

1. Firstly, the function input is called to take the amount (n cents) and the number of coin denominations (m denominators) as input. Then we further call the function “coin\_denominations” to get the denominators and the function “coin\_changing” to calculate the solution.

**Graphical user interface, text, application

Description automatically generated**

1. The function “coin\_denominations” takes all the denominators and stores it in a list. It also sorts the list in ascending order.**Graphical user interface, text, application

   Description automatically generated**
2. The function “coin\_changing” divides the amount with the highest denominator to calculate the number of coins with the highest denominator needed. The remainder is stored and is further divided by the next highest denominator to calculate the number of coins with the next highest denominator needed. This process is repeated until the remainder is zero, and the output is printed.

**Text

Description automatically generated with medium confidence**

**Pseudocode of the greedy algorithm for the coin-changing problem, with an amount n and coin denominations d1 > d2 > d3 > . . . > dm as its input. (Hint. You   
may use integer divisions in your algorithm)**

Text

Description automatically generated



**Execution/ Output:**

1. **Verify the correctness of your program by solving the problem of a greedy algorithm to make a change of the amount of 67 cents (n=67 cents) using 4-coin denominations (m=4) consisting of quarters (d1=25 cents), dimes (d2=10 cents), nickels (d3=5 cents), and pennies (d4=1 cent).**

**Chart, scatter chart

Description automatically generated**

1. **Greedy algorithm to make a change of the amount of 157 cents (n=157 cents) using 5-coin denominations (m=5) consisting of half-dollar(d1= 50 cents), quarters (d2= 25 cents), dimes (d3=10 cents), nickels (d4=5 cents), and pennies (d5=1 cent).**

**Chart

Description automatically generated with medium confidence**

1. **Greedy algorithm to make a change of the amount of 36 cents (n=36 cents) using 3-coin denominations (m=3) consisting of quarters dimes (d3=10 cents), nickels (d4=5 cents), and pennies (d5=1 cent).**

**Chart

Description automatically generated with low confidence**

1. **Greedy algorithm to make a change of the amount of 679 cents (n=679 cents) using 6-coin denominations (m=6) dollar(d1= 100 cents), half-dollar(d2= 50 cents), quarters (d3= 25 cents), dimes (d4=10 cents), nickels (d5=5 cents), and pennies (d6=1 cent).**Graphical user interface, text, application, email

   Description automatically generated