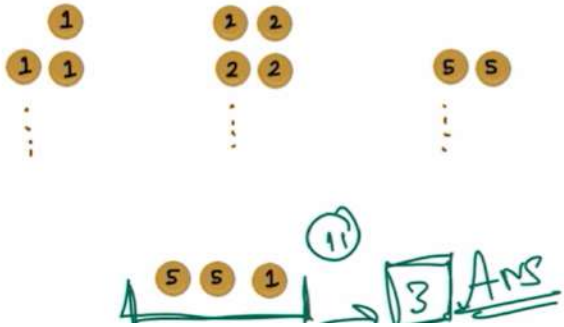
LEETCODE: COIN CHANGE

Question: Given an integer array that represents coin denominations. Determine the fewest number of coins you need to achieve a total given 'amount'.

[1 , 2 , 5]
amount = 11

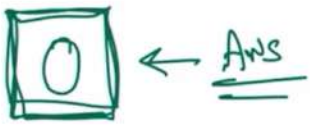


[5]
amount = 6 X

5, 10, 15

-1 ← Ans

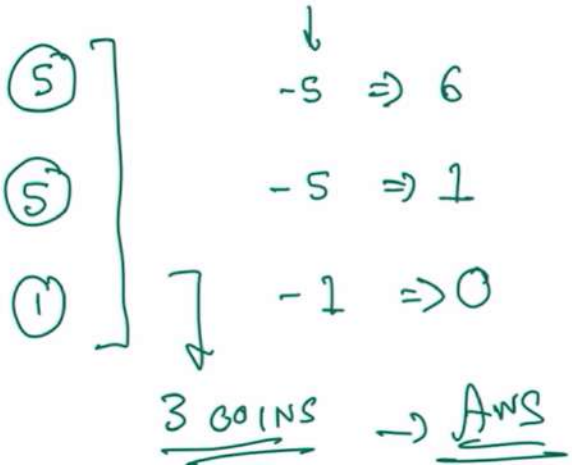
[3]
amount = 0

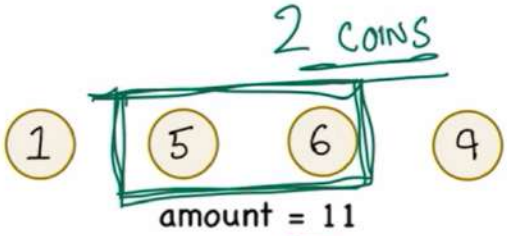


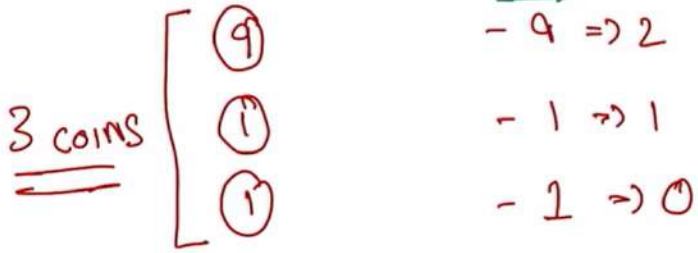
Greedy Approach Gives Wrong Answer

Greed Criteria: I want minimum coins, so I will be greedy and try to choose the coin with maximum denomination first

amount = 11







Building an Efficient Solution

amount = 11

[1 5 6 9]

amount	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
min coins needed		●	● ●	● ● ●	● ● ● ●	●	●	● ●	● ● ●	●	● ●	● ●

○ represents the coin we pick + "how many more coins we need"

amount to make = 11

coin choice = (1) +2 = 3 | (5) +1 = 2 | (6) +1 = 2 | (9) +2 = 3

remainder = 10 | 6 | 5 | 2