

Program 90.Coin Change Problem

Program:

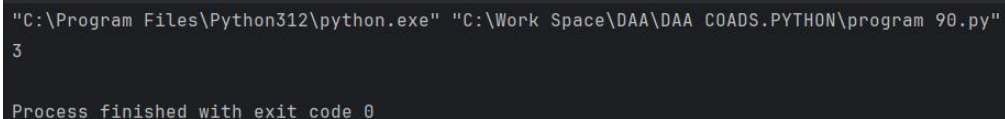
```
def coin_change(coins, amount):
    # Initialize the dp array with amount + 1, which is greater than any possible number of coins
    dp = [amount + 1] * (amount + 1)
    dp[0] = 0 # Base case: no coins are needed to make amount 0

    # Loop over each amount from 1 to amount
    for a in range(1, amount + 1):
        # Loop over each coin
        for coin in coins:
            if coin <= a:
                # If the coin is less than or equal to the amount, update the dp array
                dp[a] = min(dp[a], dp[a - coin] + 1)

    # If dp[amount] is still amount + 1, it means it's not possible to make the amount
    return dp[amount] if dp[amount] != amount + 1 else -1

# Example usage
coins = [1, 2, 5]
amount = 11
print(coin_change(coins, amount)) # Output: 3
```

Output:



```
"C:\Program Files\Python312\python.exe" "C:\Work Space\DAA\DAA COADS.PYTHON\program 90.py"
3

Process finished with exit code 0
```

Time complexity:

$O(n.k)$