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AAD Practical 9

Institute of Computer Technology
B. Tech Computer Science and Engineering

Sub: Algorithm Analysis and Design

Practical 9

Problem : You are working at the cash counter at a fun-fair, and you have three types of coins available to you in infinite quantities (coins are Rs. 1, Rs. 4 and Rs. 6). You are required to calculate the minimum numbers of coins required for changing the value of Rs. 9. Design the algorithm for the same and implement using the programming language of your choice.

Code :

```
import YSL_io


def coin_change(coins, target):
dp = [[float('inf')] * (target + 1) for _ in range(len(coins))]
combinations = [[[] for _ in range(target + 1)] for _ in
range(len(coins))]


for i in range(len(coins)):
dp[i][0] = 0


for i in range(len(coins)):
for j in range(1, target + 1):
if coins[i] > j:
```

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```
dp[i][j] = dp[i - 1][j]
combinations[i][j] = combinations[i - 1][j]
else:
if dp[i][j - coins[i]] + 1 < dp[i - 1][j]:
dp[i][j] = dp[i][j - coins[i]] + 1
combinations[i][j] = combinations[i][j - coins[i]] + [coins[i]]
else:
dp[i][j] = dp[i - 1][j]
combinations[i][j] = combinations[i - 1][j]
print('\nDP Matrix : \n')
for i in range(len(coins)):
for j in range(target + 1):
print(dp[i][j], end="\t")
print()

return dp[len(coins) - 1][target], combinations[len(coins) - 1][target]



coins = [1, 4, 6]
target = int(YSL_io.inputCYN("\n\tEnter the total target value : "))
min_coins, coin_combinations = coin_change(coins, target)
YSL_io.printORNG("\n\tCoins used for target : ", end='')
YSL_io.printRED(coins)
YSL_io.printORNG("\tMinimum coins required : ", end='')
```

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```
YSL_io.printRED(min_coins)

YSL_io.printORNG("\tCoin Combinations for target value ", end='')

YSL_io.printBLU(f'{target} : ', end='')

YSL_io.printRED(coin_combinations, end='\n')
```

Screenshot :