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B.Tech CSE

Batch 52

Institute of Computer Technology
B. Tech Computer Science and Engineering

Sub: Algorithm Analysis and Design

Practical 5

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. Make comparative analysis for various use cases & input size.

```
import streamlit as st


def min_coins(target, coins):
    dp = [float('inf')] * (target + 1)
    dp[0] = 0
    coin_used = [0] * (target + 1)  # To store the coin used to reach each amount

    for i in range(1, target + 1):
        for coin in coins:
            if i - coin >= 0 and dp[i - coin] + 1 < dp[i]:
                dp[i] = dp[i - coin] + 1
                coin_used[i] = coin  # Store the coin used at this step



    if dp[target] == float('inf'):
```

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```python
        return -1, []

    result_coins = []
    current_amount = target
    while current_amount > 0:
        result_coins.append(coin_used[current_amount])
        current_amount -= coin_used[current_amount]

    return dp[target], result_coins

st.title("Minimum Coins Calculator")
target = st.number_input("Enter the target amount (in Rs):", min_value=1, step=1, value=9)
coins = [1, 4, 6]

if st.button("Calculate"):
    result, coins_used = min_coins(target, coins)
    if result != -1:
        st.success(f"The minimum number of coins required to make Rs. {target} is: {result}")
        st.write(f"Coins used: {coins_used}")
    else:
        st.error(f"It's not possible to make Rs. {target} with the given coin denominations.")
```

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Minimum Coins Calculator 🔗

Enter the target amount (in Rs):

| 50 | − + |

Calculate

The minimum number of coins required to make Rs. 50 is: 9

Coins used: [4, 4, 6, 6, 6, 6, 6, 6, 6]