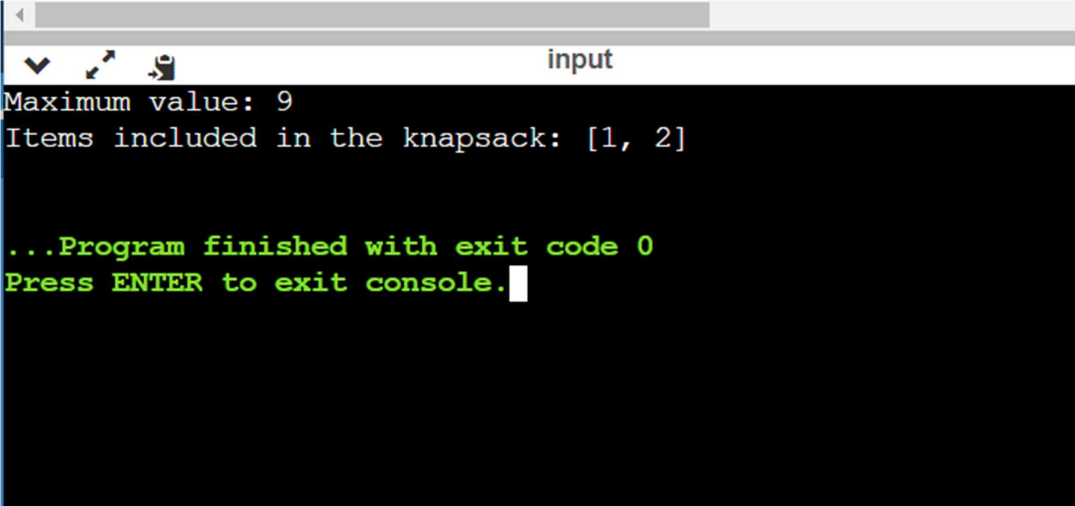


Problem – 4 0 – 1 Knapsack

```
def knapsack_01(weights, values, capacity):  
    n = len(weights)  
    dp = [[0 for _ in range(capacity + 1)] for _ in range(n + 1)]  
  
    for i in range(1, n + 1):  
        for w in range(1, capacity + 1):  
            if weights[i - 1] <= w:  
                dp[i][w] = max(values[i - 1] + dp[i - 1][w - weights[i - 1]], dp[i - 1][w])  
            else:  
                dp[i][w] = dp[i - 1][w]  
  
    knapsack_items = []  
    i, w = n, capacity  
    while i > 0 and w > 0:  
        if dp[i][w] != dp[i - 1][w]:  
            knapsack_items.append(i - 1)  
            w -= weights[i - 1]  
        i -= 1  
  
    knapsack_items.reverse()  
    return dp[n][capacity], knapsack_items  
  
weights = [1, 3, 4, 5]  
values = [1, 4, 5, 7]  
capacity = 7  
  
max_value, items = knapsack_01(weights, values, capacity)  
print("Maximum value:", max_value)  
print("Items included in the knapsack:", items)
```

A terminal window with a title bar containing a back arrow, a maximize button, and a close button. The title is "input". The terminal has a black background with white and green text. The output shows the maximum value and items in a knapsack, followed by a green message indicating the program finished successfully.

```
< input
Maximum value: 9
Items included in the knapsack: [1, 2]

...Program finished with exit code 0
Press ENTER to exit console.
```