

Practical No. 4

Code :

```
def knapsack_01(n, values, weights, W):
    dp = [[0] * (W+1) for _ in range(n+1)]

    for i in range(n+1):
        for w in range(W+1):
            if i == 0 or w == 0:
                dp[i][w] = 0
            elif weights[i-1] <= w:
                dp[i][w] = max(dp[i-1][w], dp[i-1][w-weights[i-1]] + values[i-1])
            else:
                dp[i][w] = dp[i-1][w]

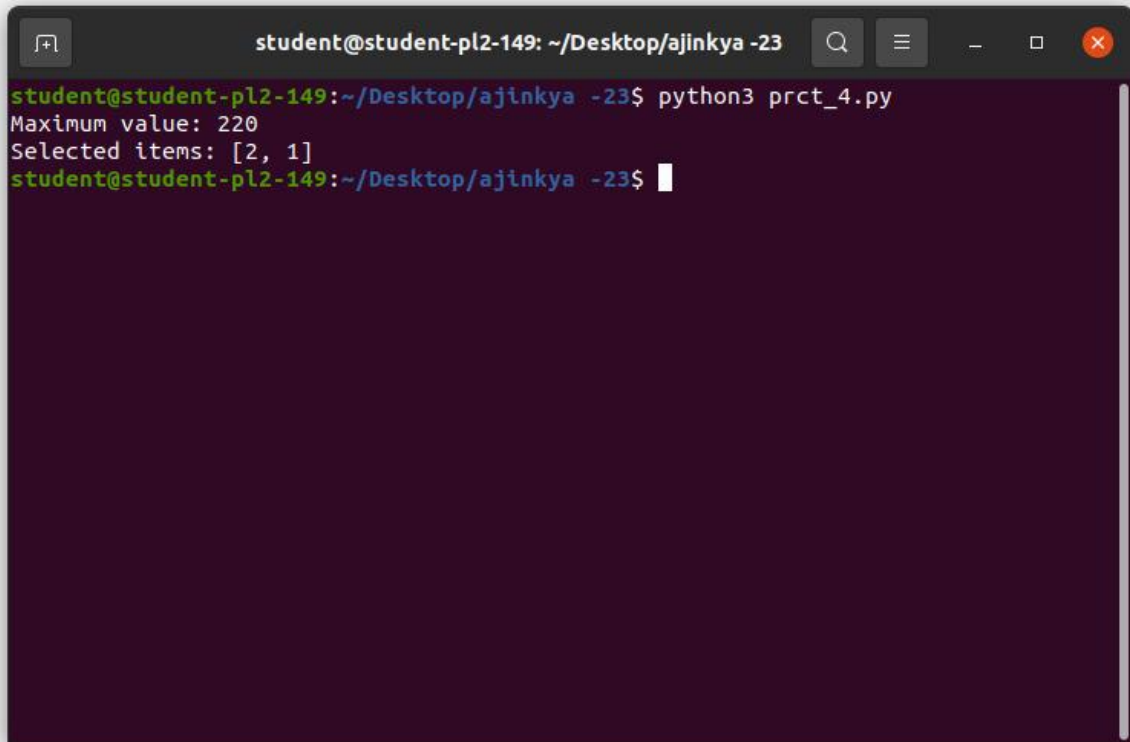
    selected_items = []
    i, w = n, W
    while i > 0 and w > 0:
        if dp[i][w] != dp[i-1][w]:
            selected_items.append(i-1)
            w -= weights[i-1]
        i -= 1

    return dp[n][W], selected_items

if __name__ == "__main__":
    n = 3
    values = [60, 100, 120]
    weights = [10, 20, 30]
    W = 50

    max_value, selected_items = knapsack_01(n, values, weights, W)
    print("Maximum value:", max_value)
    print("Selected items:", selected_items)
```

Output :



```
student@student-pl2-149: ~/Desktop/ajinkya -23
student@student-pl2-149:~/Desktop/ajinkya -23$ python3 prct_4.py
Maximum value: 220
Selected items: [2, 1]
student@student-pl2-149:~/Desktop/ajinkya -23$
```

The image shows a terminal window with a dark purple background. The window title is "student@student-pl2-149: ~/Desktop/ajinkya -23". The terminal displays the command "python3 prct_4.py" and its output: "Maximum value: 220" and "Selected items: [2, 1]". The prompt "student@student-pl2-149:~/Desktop/ajinkya -23\$" is shown at the end of the output line.