

Practical No 4

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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 :-

A screenshot of a Python IDE's Run console. The console window is titled 'Run' and 'main'. It shows the execution of a Python script. The output is as follows:

```
C:\Users\USER\AppData\Local\Programs\Python\Python312\python.exe "C:\Users\USER\Desktop\Final"
Maximum value: 220
Selected items: [2, 1]
Process finished with exit code 0
```

The console also features a vertical toolbar on the left with icons for running, stopping, and other debugging actions.