# Instructions:

1. A hiker has an **8 kg knapsack** and wants to pack the most valuable items for a trip. Help the hiker decide which items to take. **(Show your calculations and computation).**

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Item Name | Weight (wt i) | Value (val i) |
| 1 | Sleeping bag | 2 | 1 |
| 2 | First aid kit | 3 | 2 |
| 3 | Flashlight | 4 | 5 |
| 4 | Water Filter | 5 | 6 |

1. **If you can solve the problem using Dynamic Programming Approach:** Determine the time and space complexity of the problem (Refer to the example in the Power point)

# Submission:

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Item Name | Weight (*wt[i]*) | Value (*val[i]*) |
| 1 | Sleeping bag | 2 | 1 |
| 2 | First aid kit | 3 | 2 |
| 3 | Flashlight | 4 | 5 |
| 4 | Water Filter | 5 | 6 |

## DP Table Calculation

We initialize a table with 5 rows (4 items + 1) and 9 columns (max weight 8 + 1).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| i \ w | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 0 | 0 | 1 | 2 | 2 | 3 | 3 | 3 | 3 |
| 3 | 0 | 0 | 1 | 2 | 5 | 5 | 6 | 7 | 7 |
| 4 | 0 | 0 | 1 | 2 | 5 | 6 | 7 | 7 | 8 |

## Optimal Solution

The maximum value the hiker can carry is **8** (from row 4, column 8).

**Final selection:** **First Aid Kit** and **Water Filter**