Sub problem: Maximizing Enjoyment Points without Exceeding Luggage Weight Limit

The objective is to select a combination of experiences from Planet Xanadu in such a way that the total weight of the equipment required for these experiences does not exceed the luggage weight limit of 20 units, while maximizing the total enjoyment points that the tourists will receive.

Key Points:

Luggage Weight Limit: The maximum allowable weight that can be carried is 20 units.

Experiences and Equipment: Each experience has a specific weight and corresponding enjoyment points. The goal is to choose the most valuable combination of experiences within the weight limit.

Sub problems Definition:

Let's consider each experience one by one. We have to determine whether including an experience maximizes enjoyment points while keeping the total weight within the limit.

The sub problem can be defined in terms of including or excluding each experience. First of all when including the experience, we have to add its weight to the total luggage weight and add its enjoyment points to the total enjoyment points, ensuring the total weight does not exceed 20 units. When we exclude an experience, we have to consider the next experience without adding its weight and enjoyment points to the total.

Mathematical Representation:

Let ⍰ be the luggage weight limit (20 units) and let each experience i have a weight w_i and enjoyment point vi~.

For each experience i and for each weight j from 0 to W, define the following point:

Value (Enjoyment Points) Array: V[i][j] represents the maximum enjoyment points obtainable using the first i experiences within weight limit j.

The sub problem can also be stated as:

1. If we include experience i: V[i][j] = V[i-1][j -- w_i] + v_i
2. If we exclude experience j: V[i][j] = [i-1][j]

The goal is to maximize V[n][W], where n is the number of experiences.

This formulation can be solved using dynamic programming, considering the recursive relationships outlined.