**Student Name: Student ID:**

**Tutorial Exercise in Week 10**

**Question 1：Given the following knapsack problem:**

|  |  |  |
| --- | --- | --- |
| **Item** | **Value** | **Weight** |
| **1** | **1** | **1** |
| **2** | **3** | **2** |
| **3** | **2** | **1** |
| **4** | **4** | **3** |

The capacity of the knapsack is 5

Use the DP algorithm to solve it.

**Solution**:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
|  | 0 | 0 | 0 | 0 | 0 | 0 |
| {1} | 0 | 1 | 1 | 1 | 1 | 1 |
| {1,2} | 0 | 1 | 3 | 4 | 4 | 4 |
| {1,2,3} | 0 | 2 | 3 | 5 | 6 | 6 |
| {1,2,3,4} | 0 | 2 | 3 | 5 | 6 | 7 |

Backtracking: {4, 2} or {4, 3, 1}