CSE-221 Section-2: Quiz-3

Time: 30 minutes

Marks : 30

Attempt all the questions.

1. Write down the formula for computing the optimal solution for 0-1 knapsack problem. The first 2 rows of 2D Matrix P are done for you. Assume that W=5 and the set of items with their corresponding values are listed in the Figure 1.

|  |  |  |
| --- | --- | --- |
| Item | Weight | Value |
| 1 | 2 | 15 |
| 2 | 4 | 25 |
| 3 | 2 | 10 |
| 4 | 1 | 20 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 15 | 15 | 15 | 15 |
| 0 | 0 | 15 | 15 | 25 | 25 |
| 0 |  |  |  |  |  |
| 0 |  |  |  |  |  |

1. Complete the bottom two rows of P.
2. Find out the maximum benefit? Which items are finally taken to obtain that benefit?
3. If there are multiple optimal solutions (the items may vary), mention the other solution too. How you can determine this?

**Question 2**: **[5+10 = 15]**

Find out the length of longest decreasing subsequence (LDS) in the following array. Solve the problem using DP approach.

A = {3, 14, 12, 9, 16, 13, 11, 18}

i. Write down the basic DP formula that you will be used to compute the solution.

ii. **Print the LDS**. Note that there might be multiple LDS of same length. You need to determine all of them.