Modern Education Society's
Wadia College of Engineering, Pune

NAME OF STUDENT:	CLASS:
SEMESTER/YEAR:	ROLL NO:
DATE OF PERFORMANCE:	DATE OF SUBMISSION:
EXAMINED BY:	EXPERIMENT NO: LP-III(DAA)-04

TITLE: 0/1 Knapsack

AIM: - 0/1 Knapsack Problem using Dynamic Programming.

OBJECTIVES:

- To study dynamic programming.
- To implement 0/1 knapsack problem.
- Calculate time complexity of algorithm.

THEORY:

In the Dynamic programming we will work considering the cases as:-

Case 1: The item is included in the optimal subset.

Case 2: The item is not included in the optimal set.

In a DP[][] table let's consider all the possible weights from '1' to 'W' as the columns and weights that can be kept as the rows. The state DP[i][j] will denote maximum value of 'j-weight' considering all values from '1 to ith'. So if we consider 'wi' (weight in 'ith' row) we can fill it in all columns which have 'weight values > wi'. Now two possibilities can take place:

Fill 'wi' in the given column.

Do not fill 'wi' in the given column.

Now we have to take a maximum of these two possibilities, formally if we do not fill 'ith' weight in 'jth' column then DP[i][j] state will be same as DP[i-1][j] but if we fill the weight, DP[i][j] will be equal to the value of 'wi'+ value of the column weighing 'j-wi' in the previous row. So we take the maximum of these two possibilities to fill the current state.

CONCLUSION: Implemented 0/1/ knapsack using dynamic programming successfully.

QUESTIONS FOR REVIEW:

1.Write time & space complexity of 0/1 knapsack algorithm using dynamic programming.
2.Write realistic applications of this experiment in brief (at least two applications).
3. The weight limit for this knapsack is 10 find solution using dynamic programming?

Item	0	1	2	3
Weight	2	2	4	5
Benefit	3	7	2	9