	Marwadi University **Faculty of Engineering and Technology** **Department of Information and Communication Technology**
Subject: Design and Analysis of Algorithm	**Aim: : Implementing 0/1 Knapsack Problem using Dynamic Programming Approach**
Experiment No: 09	**Date: 13/09/2025**	**Enrollment No: 92301733049**

AIM: Implementing 0/1 Knapsack Problem using Dynamic Programming Approach

```cpp
#include <iostream>
#include <algorithm>
using namespace std;

// Function to solve 0/1 Knapsack Problem using DP
int knapSack(int W, int wt[], int val[], int n) {
    int dp[n + 1][W + 1];

    // Build dp table in bottom-up manner
    for (int i = 0; i <= n; i++) {
        for (int w = 0; w <= W; w++) {
            if (i == 0 || w == 0)
                dp[i][w] = 0;
            else if (wt[i - 1] <= w)
                dp[i][w] = max(val[i - 1] + dp[i - 1][w - wt[i - 1]],
                        dp[i - 1][w]);
            else
                dp[i][w] = dp[i - 1][w];
        }
    }

    return dp[n][W]; // Maximum value that can be put in knapsack
}

int main() {
    int n, W;
    cout << "Enter number of items: ";
    cin >> n;

    int val[n], wt[n];

    cout << "Enter values of items:\n";
    for (int i = 0; i < n; i++)
        cin >> val[i];
```

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```cpp
    cout << "Enter weights of items:\n";
    for (int i = 0; i < n; i++)
        cin >> wt[i];

    cout << "Enter capacity of knapsack: ";
    cin >> W;

    int maxValue = knapSack(W, wt, val, n);
    cout << "\nMaximum value in Knapsack = " << maxValue << endl;

    return 0;
}
```
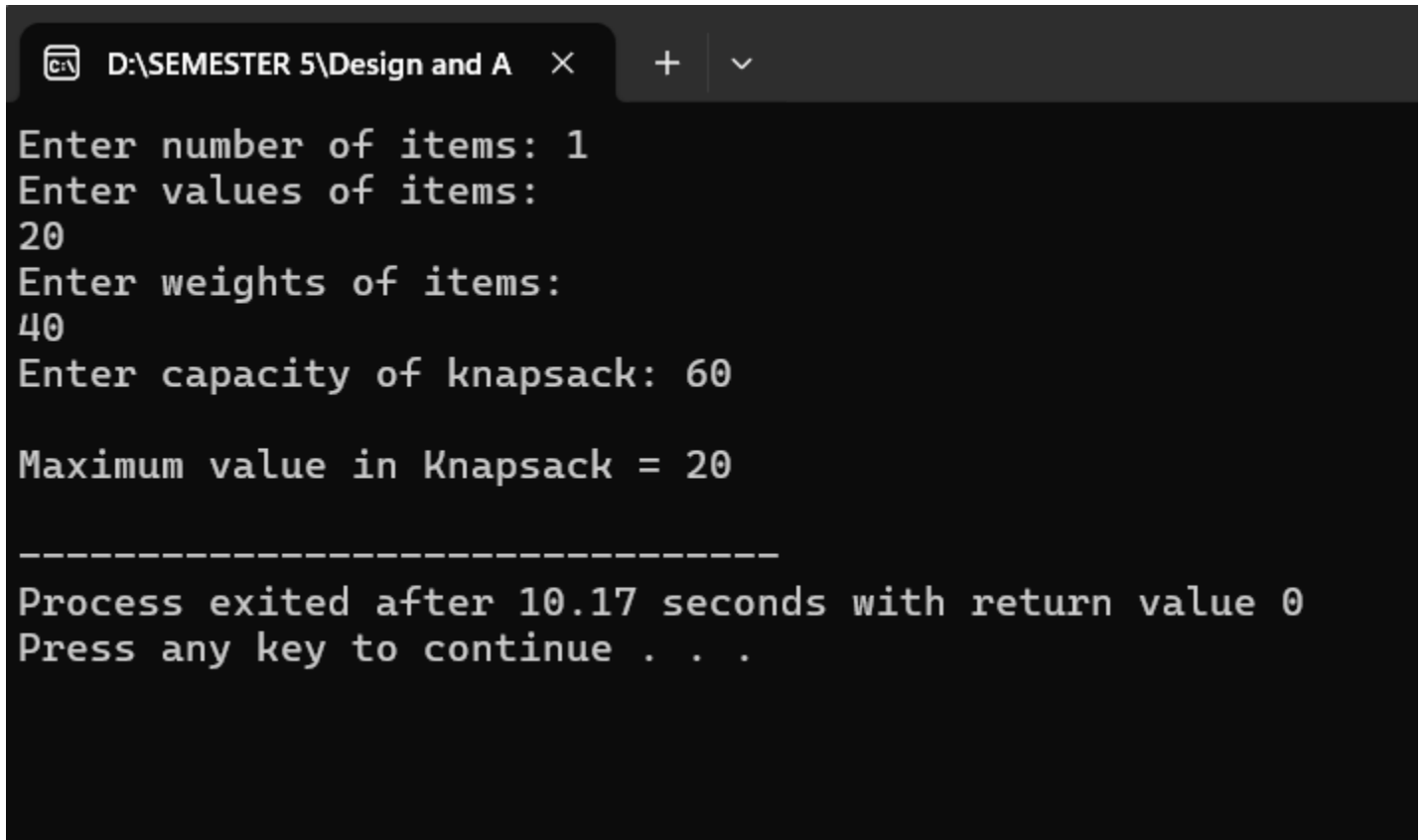
```
Enter number of items: 1
Enter values of items:
20
Enter weights of items:
40
Enter capacity of knapsack: 60

Maximum value in Knapsack = 20

---------------------------------
Process exited after 10.17 seconds with return value 0
Press any key to continue . . .
```