

Practical No: - 7 Write a program to find solution of Knapsack instant.

```
#include <iostream>
#include <conio.h>
using namespace std;
int n, P[10], W[10], M;
float X[10], A[10];
class Greedy_Knapsack
{
public:
    void Getdata();
    void Sort(float A[], int P[], int W[], int n);
    void KNAPSACK(int P[], int W[], int M, float X[], int n);
};
void Greedy_Knapsack::Getdata()
{
    cout << "\nEnter the number of objects: ";
    cin >> n;
    cout << "\nEnter the Capacity: ";
    cin >> M;
    cout << "\nEnter the Profit: ";
    for(int i = 0; i < n; i++)
        cin >> P[i];
    cout << "\nEnter the Weight: ";
    for(int i = 0; i < n; i++)
        cin >> W[i];
}
void Greedy_Knapsack::Sort(float A[], int P[], int W[], int n)
{
    for(int i = 0; i < n-1; i++)
    {
        for(int j = i+1; j < n; j++)
        {
            if(A[i] < A[j]) // Descending order
            {
                swap(A[i], A[j]);
                swap(P[i], P[j]);
                swap(W[i], W[j]);
            }
        }
    }
}
```

```

        }
    }

void Greedy_Knapsack::KNAPSACK(int P[], int W[], int M, float X[], int n)
{
    int cu = M;
    for(int i = 0; i < n; i++)
        X[i] = 0;
    for(int i = 0; i < n; i++)
    {
        if(W[i] <= cu)
        {
            X[i] = 1;
            cu -= W[i];
        }
        else
        {
            X[i] = (float)cu / W[i];
            break;
        }
    }
}

int main()
{
    float maxProfit = 0, maxWt = 0;
    Greedy_Knapsack GD;
    GD.Getdata();
    for(int i = 0; i < n; i++)
        A[i] = (float)P[i]/W[i];
    GD.Sort(A, P, W, n);
    GD.KNAPSACK(P, W, M, X, n);
    cout << "\nFractional Solution:\n";
    for(int i = 0; i < n; i++)
        cout << "X[" << i << "] = " << X[i] << endl;
    for(int i = 0; i < n; i++)
    {
        maxProfit += P[i] * X[i];
        maxWt += W[i] * X[i];
    }
    cout << "\nMaximum Profit = " << maxProfit;
    cout << "\nMaximum Weight = " << maxWt << endl;
}

```

```
getch();
return 0;
}

/*OUTPUT*/
Enter the number of objects: 3
Enter the Capacity: 34 24 14
Enter the Profit: 17 15 11
Enter the Weight: 18 15 10
Fractional Solution:
X[0] = 1
X[1] = 1
X[2] = 0.444444
Maximum Profit = 45.5556
Maximum Weight = 34
```