
Assignment No: 3

Title Name: Solve a fractional Knapsack problem using a greedy method.

Name: Mitali Chhipa

Class : BE

Div: B

Batch: B

Exam Seat No/Roll No: 405B052

Program:

```
/*
```

```
    DAA: Assignment No - 3
```

```
    Title : Solve a fractional Knapsack problem using a greedy method.
```

```
*/
```

```
#include <bits/stdc++.h>
```

```
using namespace std;
```

```
// Structure for an item which stores weight and corresponding value of Item
```

```
struct Item
```

```
{
```

```
    int value, weight;
```

```
    // Constructor
```

```
    Item(int value, int weight)
```

```
    {
```

```
        this->value = value;
```

```
        this->weight = weight;
```

```
    }
```

```
};
```

```
// Comparison function to sort Item according to val/weight ratio
```

```
bool cmp(struct Item a, struct Item b)
```

```

{
    double r1 = (double)a.value / (double)a.weight;
    double r2 = (double)b.value / (double)b.weight;
    return r1 > r2;
}

```

```

double fractionalKnapsack(int W, struct Item arr[], int N)
{
    sort(arr, arr + N, cmp);
    double finalvalue = 0.0; // Result (value in Knapsack)
    for (int i = 0; i < N; i++)
    {
        // If adding Item won't overflow, add it completely
        if (arr[i].weight <= W)
        {
            W -= arr[i].weight;
            finalvalue += arr[i].value;
        }
        else
        {
            finalvalue += arr[i].value * ((double)W / (double)arr[i].weight);
            break;
        }
    }
    return finalvalue;
}

```

// Driver code

```
int main()
```

```
{
```

```

int W = 50; // Weight of knapsack

Item arr[] = {{60, 10}, {100, 20}, {120, 30}};

int N = sizeof(arr) / sizeof(arr[0]);

// Function call

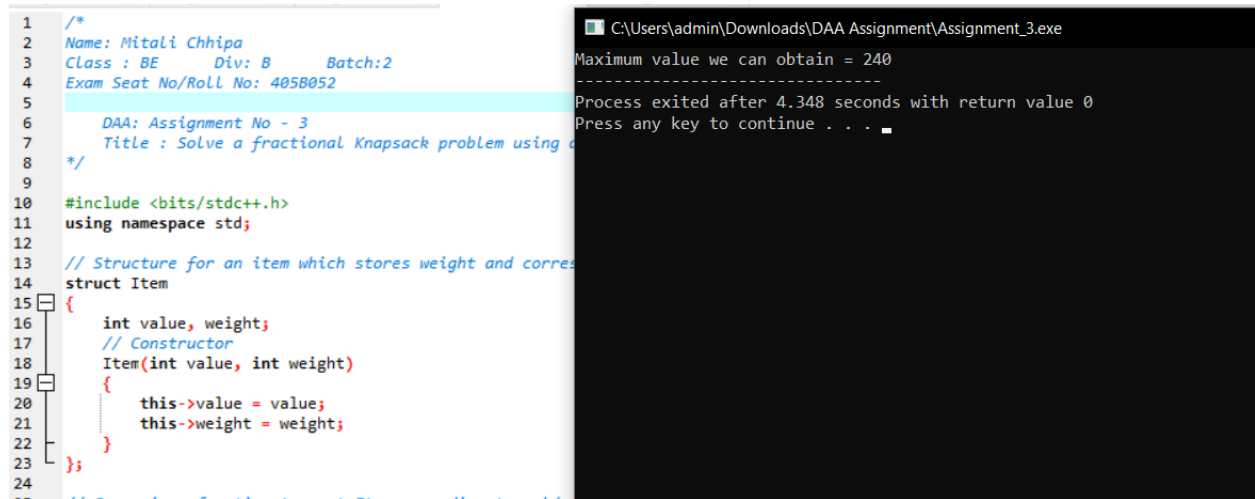
cout << "Maximum value we can obtain = "

    << fractionalKnapsack(W, arr, N);

return 0;
}

```

Output:



The image shows a C++ IDE with a code editor on the left and a console window on the right. The code editor displays a C++ program for a fractional knapsack problem. The console window shows the output of the program, which is "Maximum value we can obtain = 240". Below the output, it says "Process exited after 4.348 seconds with return value 0" and "Press any key to continue . . .".

```

1  /*
2  Name: Mitali Chhipa
3  Class : BE    Div: B    Batch:2
4  Exam Seat No/Roll No: 4058052
5
6  DAA: Assignment No - 3
7  Title : Solve a fractional Knapsack problem using C++
8  */
9
10 #include <bits/stdc++.h>
11 using namespace std;
12
13 // Structure for an item which stores weight and corresponding value
14 struct Item
15 {
16     int value, weight;
17     // Constructor
18     Item(int value, int weight)
19     {
20         this->value = value;
21         this->weight = weight;
22     }
23 };
24
25 // Function to calculate the maximum value we can obtain

```

```

C:\Users\admin\Downloads\DAA Assignment\Assignment_3.exe
Maximum value we can obtain = 240
-----
Process exited after 4.348 seconds with return value 0
Press any key to continue . . .

```