

Experiment No: 3

Name: Aniket Balendra Tiwari

Roll No: 21143285

Program:

KnapSack Using Greedy:

```
#include <bits/stdc++.h>
using namespace std;
struct Item {
    int value, weight;

    void input() {
        cout << "Enter Value : ";
        cin >> value;
        cout << "Enter weight : ";
        cin >> weight;
    }
};

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;

    for (int i = 0; i < N; i++) {
        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;
}

int main()
{
    cout << "Name: Aniket Tiwari \nRoll No : 21143285\n";
    int W;

    cout << "Enter Weight limit : ";
    cin >> W;

    cout << "Enter no of items you want to insert : ";
    int N;
    cin >> N;
    Item arr[N];

    for (int i = 0; i < N; i++) {
        arr[i].input();
    }
    cout << "Maximum value we can obtain = " << fractionalKnapsack(W, arr, N);
    return 0;
}

```

Output:

PROBLEMS OUTPUT **TERMINAL** JUPYTER DEBUG CONSOLE

Microsoft Windows [Version 10.0.22621.521]
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```
D:\Programming\College Experiments\TY 5 Sem\DAA Lab>cd "d:\Programming\College Experiments\TY 5 Sem\DAA Lab\"
Name: Aniket Tiwari
Roll No : 21143285
Enter Weight limit : 50
Enter no of items you want to insert : 3
Enter Value : 100
Enter weight : 10
Enter Value : 150
Enter weight : 30
Enter Value : 240
Enter weight : 30
Maximum value we can obtain = 390
d:\Programming\College Experiments\TY 5 Sem\DAA Lab>
```