**Assignment No: 3**

**Code:**

import java.util.Arrays;

import java.util.Scanner;

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

class Item {

    int profit, weight;

    // Constructor

    public Item(int profit, int weight) {

        this.profit = profit;

        this.weight = weight;

    }

}

public class FractionalKnapsack {

    // Comparison function to sort Item according to profit/weight ratio

    static class ItemComparator implements java.util.Comparator<Item> {

        @Override

        public int compare(Item a, Item b) {

            double r1 = (double) a.profit / (double) a.weight;

            double r2 = (double) b.profit / (double) b.weight;

            return Double.compare(r2, r1);

        }

    }

    // Main greedy function to solve problem

    public static double fractionalKnapsack(int W, Item[] arr, int N) {

        // Sorting Item on basis of ratio

        Arrays.sort(arr, new ItemComparator());

        double finalValue = 0.0;

        // Looping through all items

        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].profit;

            } else {

                finalValue += arr[i].profit \* ((double) W / (double) arr[i].weight);

                break;

            }

        }

        // Returning final value

        return finalValue;

    }

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the maximum weight capacity of the knapsack: ");

        int W = scanner.nextInt();

        System.out.print("Enter the number of items: ");

        int N = scanner.nextInt();

        Item[] arr = new Item[N];

        for (int i = 0; i < N; i++) {

            System.out.print("Enter the profit and weight of item " + (i + 1) + ": ");

            int profit = scanner.nextInt();

            int weight = scanner.nextInt();

            arr[i] = new Item(profit, weight);

        }

        // Function call

        double result = fractionalKnapsack(W, arr, N);

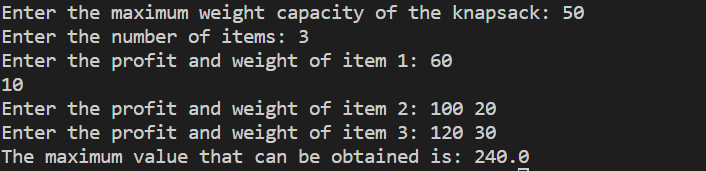
        System.out.println("The maximum value that can be obtained is: " + result);

        scanner.close();

    }

}

**Output:**

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