SE COMPS A BATCH-C

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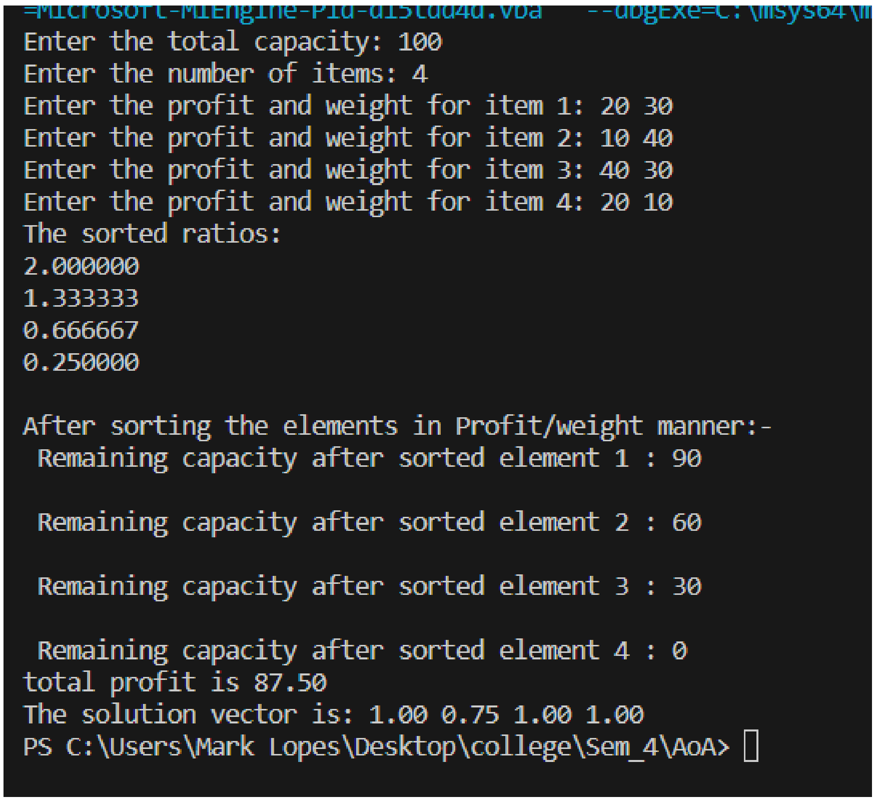
Fractional Knapsack:-

```c
#include <stdlib.h>
#include <stdio.h>

struct Item
{
    int item_no;
    int profit;
    float weight;
    float ratio;
} arr[50], arr1[50];

void sort(struct Item *arr1, int n)
{
    int swapped = 1;
    for (int pass = 1; pass <= n - 1 && swapped == 1; pass++)
    {
        swapped = 0;
        for (int j = 1; j <= n - pass; j++)
        {
            if (arr1[j].ratio < arr1[j + 1].ratio)
            {
                struct Item temp = arr1[j];
                arr1[j] = arr1[j + 1];
                arr1[j + 1] = temp;
                swapped = 1;
            }
        }
    }
}

void fractionalKnapsack(struct Item *arr, int n, int M)
{
    float total = 0;
    float x[50];
    int u = M;
    int i = 1;

    printf("\nAfter sorting the elements in Profit/weight manner:-");
    while (u != 0 && i <= n)
    {
        if (arr[i].weight <= u)
        {
            u = u - arr[i].weight;
            total = total + arr[i].profit;
            x[arr[i].item_no] = 1;
        }
        else
        {
            x[arr[i].item_no] = u / arr[i].weight;
            total = total + (arr[i].profit * x[arr[i].item_no]);
            u = 0;
        }

        printf("\nRemaining capacity after sorted element %d: %d\n", i, u);
        i++;
    }
    printf("Total profit is %0.2f\n", total);
    printf("The solution vector is: ");
    for (i = 1; i <= n; i++)
    {
        printf("%0.2f ", x[i]);
    }
}

int main()
{
    int M, n, i;

    printf("Enter the total capacity: ");
    scanf("%d", &M);

    printf("Enter the number of items: ");
    scanf("%d", &n);

    for (i = 1; i <= n; i++)
    {
        arr[i].item_no = i;
        printf("Enter the profit and weight for item %d: ", i);
        scanf("%d %f", &arr[i].profit, &arr[i].weight);
    }

    for (i = 1; i <= n; i++)
    {
        arr[i].ratio = arr[i].profit / arr[i].weight;
    }

    for (i = 1; i <= n; i++)
    {
        arr1[i] = arr[i];
    }

    sort(arr1, n);

    printf("The sorted ratios: \n");
    for (i = 1; i <= n; i++)
    {
        printf("%f\n", arr1[i].ratio);
    }

    fractionalKnapsack(arr1, n, M);

    return 0;
}
```

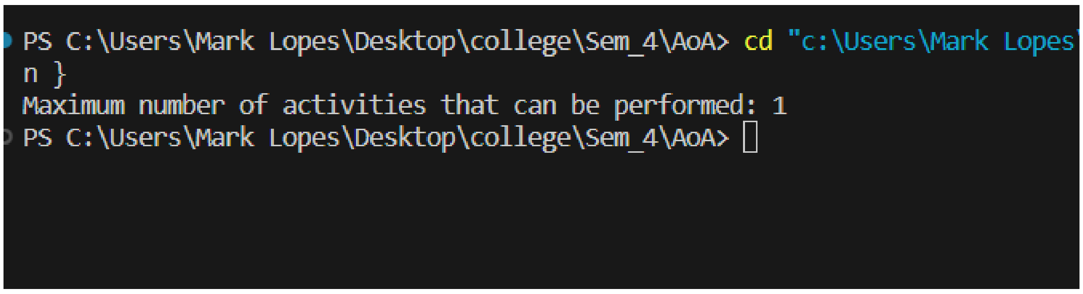


```
=Microsoft-MIEngine-Pid-d15tdd4d.vba   --dbgExe=C:\msys64\m
Enter the total capacity: 100
Enter the number of items: 4
Enter the profit and weight for item 1: 20 30
Enter the profit and weight for item 2: 10 40
Enter the profit and weight for item 3: 40 30
Enter the profit and weight for item 4: 20 10
The sorted ratios:
2.000000
1.333333
0.666667
0.250000

After sorting the elements in Profit/weight manner:-
 Remaining capacity after sorted element 1 : 90

 Remaining capacity after sorted element 2 : 60

 Remaining capacity after sorted element 3 : 30

 Remaining capacity after sorted element 4 : 0
total profit is 87.50
The solution vector is: 1.00 0.75 1.00 1.00
PS C:\Users\Mark Lopes\Desktop\college\Sem_4\AoA> 
```

Activity selection problem:-

```
import java.util.*;

class Solution {
    public static class Pair implements Comparable<Pair> {
        int start;
        int end;
        public Pair(int s, int e) {
            this.start = s;
            this.end = e;
        }

        public int compareTo(Pair o) {
            if (this.end < o.end) {
                return -1;
            } else if (this.end > o.end) {
                return 1;
            } else {
                return 0;
            }
        }
    }

    public static int activitySelection(int start[], int end[], int n) {
        Pair[] activities = new Pair[n];
        for (int i = 0; i < n; i++) {
            activities[i] = new Pair(start[i], end[i]);
        }

        Arrays.sort(activities);

        int ans = 0;
        int lastActivityEnd = 0;

        for (int i = 0; i < n; i++) {
            Pair activity = activities[i];
            if (activity.start > lastActivityEnd) {
                lastActivityEnd = activity.end;
                ans++;
            }
        }
        return ans;
    }

    public static void main(String[] args) {
        int[] startTimes = {2, 1};
        int[] endTimes = {2, 2};
        int n = startTimes.length;

        int maxActivities = activitySelection(startTimes, endTimes, n);

        System.out.println("Maximum number of activities that can be
performed: " + maxActivities);
    }
```

```
}
```



```
PS C:\Users\Mark Lopes\Desktop\college\Sem_4\AoA> cd "c:\Users\Mark Lopes
n }
Maximum number of activities that can be performed: 1
PS C:\Users\Mark Lopes\Desktop\college\Sem_4\AoA> 
```