RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

LAB REPORT - 05

COURSE NAME: SESSIONAL BASED ON CSE-2101

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Problem Title: A solution to Greedy knapsack problem for finding the optimal subset of the input data.

Theory: There are two types of knapsack algorithm. They are (1) fractional or greedy knapsack algorithm & (2) 0/1 knapsack algorithm which so is used in dynamic programming. In fractional knapsack problem, it is allowed to break the items for maximizing the benefit to fill the knapsack bag. In this type of problem the profit and weights are positive.

summation of profit, $\sum_{1 \le i \le n} p_i x_i$

summation of weight, $\sum_{1 \le i \le n} w_i x_i$

Description:

Algorithm:

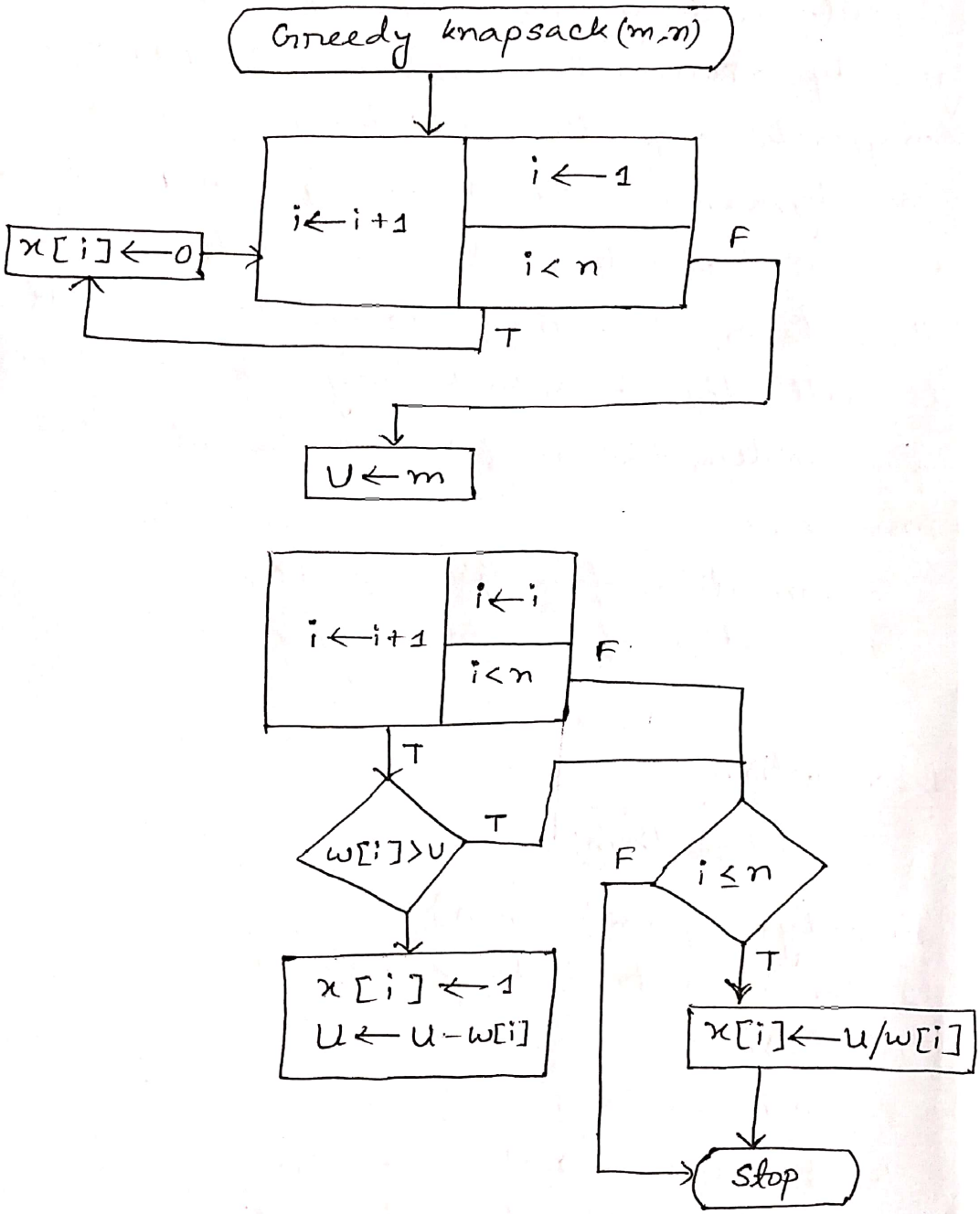
Greedyknapsack (m,n)

1. for i→0 to n do x[i] →0.
2. U=m;
3. for i →1 to n do
4. if (w[i] > U) then break;
5. x[i]← 1.0; U← U-w[i];
6. if (i≤n) then x[i] ← U/w[i];

P. T. O

Here, m is knapsack size, p[1:n] and w[1:n] contain the profits and weight respectively x[1:n] is the solution array

Flowchart:



## Output of the implemented code:

| Solution no | Fractional amount | Total weight | Total profit |
|---|---|---|---|
| Solution 1: | 1.50 1.25 1.60 1.33 1.11 | 5 2 3 4 6 | 26.667 |
| Solution 2: | 3.00 2.33 3.20 3.33 3.50 | 8 6 | 49 |
| Solution 3: | 2.33 1.50 5.00 2.00 1.67 | 1 3 2 5 | 24.3333 |
| Solution 4: | 2.00 1.50 1.33 1.25 1.20 | 5 10 15 5 | 31.6667 |
| Solution 5: | 6.00 5.00 5.00 2.67 1.00 | 5 20 10 30 35 | 295. |

## Conclusion:

Here, we have used fractional knapsack algorithm to solve the problem and maximize the profit. We take input from "greedy.txt" file.