ACM-ICPC AFGHANISTAN

ACM-ICPC First Training BootCamp

Hosted by Gharjistan University

Fifth Session

Greedy Algorithms

Location: Gharjistan University

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1. **sum of array[index] * index**

you are giving an array of integers; your job is to find the maximize value of sum of array[index] * index.

Input format:

The input will be two lines, first line will contain the n, length of the array, and second line will contain the n coma separated integers.

Output Format: Print the maximize value of ∑array[index] * index.

Input: 3,5,6,1

Output:

31

2. **subset of an array**

you are giving an array of integers; you task is to find the minimum product of subset of this array.

Input Format:

The input is a single line that contains the n space separated integers.

Output Format:

Print the minimum product of this array's subsets.

Input:

-1 -1 -2 4 3

Output:

-24

3. **Products of two arrays**

You are giving two arrays of same size, you are allowed to bring n changes to the only one element of the first array (you can increase or decrease just one element of first array by 2 for n times), your task is to find the minimum sum of product of this two arrays. Input format:

The first line of the input will contain n (the number of modification allowed), second line of input will contain the k (array size) space separated integers (elements of the first array), and on the third line, you will have k space separated integers for the second array elements.

Input: 5 1 2 -3 -2 3 -5

Output: -31

4. **Consecutive differences**

You are giving a circular array, (after an is a1). Write a program to calculate the maximum sum of differences between consecutive elements with rearrangement of array element allowed i.e after rearrangement of element find |a1 – a2| + |a2 – a3| + …… + |an – 1 – an| + |an– a1|.

Input Format: Input format is a single line that contains the n space separated integers. Output Format: Print the maximum sum of consecutive sequence.

Input: 4 2 1 8

Output: 18

5. **Using scarecrows to avoid birds on fields**

Ali owns a very long field. He plans to grow different types of crops in the upcoming growing season. The area, however, is full of crows and Ali fears that they might feed on most of the crops. For this reason, he has decided to place some scarecrows at different locations of the field. The field can be modeled as a 1×N grid. Some parts of the field are infertile and that means you cannot grow any crops on them. A scarecrow, when placed on a spot, covers the cell to its immediate left and right along with the cell it is on. Given the description of the field, what is the minimum number of scarecrows that needs to be placed so that all the useful section of the field is covered? Useful section refers to cells where crops can be grown.

Input format:

Input starts with an integer T (≤ 100), denoting the number of test cases. Each case starts with a line containing an integer N (0 < N < 100). The next line contains N characters that describe the field. A dot (.) indicates a crop-growing spot and a hash (#) indicates an infertile region.

Output Format:

For each case, output the case number first followed by the number of scarecrows that need to be placed.

Input

3

3

.#.

11

...##....##

2

##

Output

Case 1: 1

Case 2: 3

Case 3: 0

6. **Cashier**

A man has a grace store, his mathematic is not good, when a customer is buying something, the cashier needs to pay the remaining money back to the customer. The cashier needs to have the fractional currency for himself and bigger changes to pay to customer. Your task to help the cashier to do this operation when a customer comes for shopping.

Input format:

Read the Inputs from the file called “cashier.in”, the first line of the file is the number of test cases, second line will contain the values of cashes that the cashier has, the third line of the input will be the money that customer will pay to the cashier, and last line of input is the amount of money that the customer needs to pay for the products he/she bought.

Output format:

Print the biggest changes that the cashier should give to customer.

Inputs:

2

500,100,100,50,20,100 ,20,10

500

250

500,100,50,50,20,20,20,10,10,10,5,5,5

1000

310

Outputs:

100,100,50

500,100,50,20,20

7. **Activities**

Given a set S = {a1,a2,…,an} of n activities that wish to use a resource, each activity ai has a start time si and finish time fi, where 0 ≤ si ≤ fi < ∞ , if selected, activity ai takes place during the time interval[si,fi).

Activities ai and aj are compatible if the intervals [si,fi) and [sj,fj) do not overlap (i.e s si ≥ fj or sj≥fi).

The activity selection problem is to select a maximum size subset of compatible activities.

Consider the following activities:

Activities

1 2 3 4 5 6 7 8 9 10 11

Start time

1 3 0 5 3 5 6 8 8 2 12

Finish time

4 5 6 7 8 9 10 11 12 13 14

Some of the compatible activities are as follow:

{a3,a9,a11}

{a1,a4,a8,a11}

{a2,a4,a9,a11}

Input format:

We have t, a, s, f lines, t is the test case, a is the number of activities, s is the values of starting time of each activities and f is the values of finish time of each activity.

Output format:

Find the maximum compatible activities.

Input:

1

1 2 3 4 5 6 7 8 9 10 11

1 3 0 5 3 5 6 8 8 2 12

4 5 6 7 8 9 10 11 12 13 14

Output:

4