Lab 5 B

Espionage

Deep undercover, you are given an encrypted message. Your job is to decrypt it. Intel tells you that a message can only consist of lowercase letters, comma, period, and space. The enemy encrypts the message as follows before transmitting it:

- Every character is converted into a number in the range 0-28. SPACE=0, a=1, b=2, ... z=26, COMMA=27, PERIOD=28.
- Then the numbers are rotated right by a secret key (k). This operation is performed modulo 29. If k=5 then 0->5, 16->21, and 26->2 (26+5 mod 29 = 31 mod 29 = 2).
- Then the numbers are converted back into characters, symmetrically to step 1. 0=SPACE, 1=a, ... 28=PERIOD. This results in the encrypted string that is transmitted.

However, the key `k` is not privy to you. Yet, decrypting the message is of utmost importance.

You also know that in all the decrypted messages, SPACE is the single most common character (This is guaranteed).

Input Format:

- The first line contains an integer `N`, representing the length of the string.
- The second line contains a string of length `N`, the encryted message.

Constraints:

- $1 \leq N \leq 1000000$
- All characters of the string are guarenteed to lie within the range of 0-28 in the converted format
- The final answer would contain SPACE as the most commonly occuring character.

Output Format:

Return a decrypted string of length `N`

Input 1:

```
  23
nodfbu,fng.kfjutkf krre
```

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Output 1:

```
hi, you have done well.
```

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Problem 2 : The Robbery

Alice and Bob just robbed n items from an antique store and want to divide the shares among themselves. The value of all the items is known to them. They will pick an item alternatively for themselves with Alice going first. Both make their picks optimally to maximize their shares. Determine how much money each of them would make in such a case.

Note: The maximum value of a single item is bounded by 1e5.

Input Format:

The input consists of 2 lines. the first line contains a single integer n, the number of items. The second line contains n space seperated integers, teh value of each item.

Output Format:

Print a single line containing 2 space seperated values, the share of Alice and Bob.

Constraints:

- $1 \leq n \leq 100000$
- $1 \leq a_i \leq 100000$, for all i in range 1 to n

Input 1:

```
5
1 1000 100 10000 10
```

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Output:

```
10101 1010
```

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Explanation:

In the example, Alice picks 10000 first, Bob then picks 1000, Alice picks 100, Bob picks 10 and finally Alice picks 1. Hence Alice picks a total of 10101 and Bob, 1010.

Problem 3: GCD++

Yash wants to do complicated mathematical calculations. For a particular calculation Yash wants to calculated the GCD {Greatest Common Divisor} of two numbers. Help him calculate the GCD of two numbers.

Input Format:

- The first line contains two integers `a` and `b`, representing the number of days.

Constraints:

- 0 ≤ `a,b` ≤ 1e10

Output Format:

Return a single integer: The GCD of a & b.

Input 1:

```
4 2
```

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Output 2:

```
2
```

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Input 2:

```
7 5
```

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Output 2:

```
1
```

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Submission Guidelines

Do not rename any files given in the handout. Only write the code in the specified C files in the respective directories.