take off
Programming Contest

DIU Take-Off Programming Contest

Fall 2019

[Mock Round]

Organized By

Daffodil International University

Department of CSE

Computer & Programming Club

Problem Set

Platform Support

CodeMarshal

Index

A. Papan Al Hasan

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Shakib Al Hasan is the biggest name in the current era of Bermuda cricket. He is Arguably one of the best all-rounders ever seen in the cricket. For Sakib's extraordinary talent and good personality, he became a superstar in Bermuda. Because of love and admiration for Shakib from people all over the world, **BCB (Cricket Board of Bermuda)** president **Nimot Ullah Papan** always envies him. Papan wants to be as famous as Shakib. A few days ago, unfortunately when Shakib got banned from cricket because of keeping a connection with a gambler. Papan takes it as an opportunity. So, he came out with a plan. He plans that he will now play Cricket and become more famous than Shakib in Shakib's absence. He thinks that a new name will help him to become Famous. He thought to keep his new name matching with Shakib so that Shakib's fans start to like him.

That's why he keeps his name **"Papan Al Hasan".** He wants to declare his new name in the BCB website. He doesn't know how to print a line though he is a president. As you are a talented programmer, Papan comes to you and wants you to help him by writing a program which will print

"I am Papan Al Hasan, your new allrounder."

Here is a sample program to print the message "Take-Of Fall-2019 is on 6th December"

```
#include<stdio.h>
int main ()
{
    printf("Take-Of Fall-2019 is on 6th December\n");
    return 0;
}
```

Input

There is no input.

Output:

Print **"I am Papan Al Hasan, your new allrounder."** without quotes.

Sample Input	Sample Output
/*There is no input for this problem*/	I am Papan Al Hasan, your new allrounder.

Notes: **Don't forget to print a newline character (\n) at the end.**

Problem Setter: **Kaniz Fatima Mim**

Reviewer: **Umme Rukaya Suny**

Special Thanks: **Shah Habibul Imran**

B. The Unfortunate Gamble

Time Limit: **1.0 Second** **Memory Limit:** **1024 MB**

Description:

Taniya is a mad cricket-loving girl. Now she's in Australia to watch the **2020 ICC Men's T20 World Cup.**
She's a big fan of the England cricket team. She never misses a single match.

Yesterday was a very bad night for Taniya. The semifinal match between **England** and **New Zealand** happened. The night before the match, her friend Sam challenged her a bet on the match.

Sam challenged that England will never win the match. As Taniya is a big fan of England, she spent a huge amount of money on the bet.
Unfortunately, England lost the match, and so did Taniya. Now she's trying to calculate how much she lost in the bet. But she only remembers the amount she had before the match, and the amount she has now. **She wants to know how much money she lost in percentage**.
Taniya is very weak in math, so she's having trouble calculating. So she comes to you,

another good friend of hers. **Taniya** knows you're a good programmer, so she wants you to write a program for her that'll do the task.

You have to write a program that'll calculate the money she lost in percentage. You'll be given two numbers, the money she had before and the money she has after the match. Taniya promised that she'll buy you a drink if you help her.

Input

The input consists of two numbers, **n** and **k (1 ≤ k ≤ n ≤ 10^5)**, where **n** and **k** denotes the **amount of money** she had before and after the match.

Output:

Print a number, the percentage of loss in the gamble. **If the result is a fraction, print the integer part only.**

Sample Input	Sample Output
1000 800	20
984 256	73

Notes:

In the first case, **Taniya** had **1000** before the match, and she has **800** after the match. So she lost **(1000-800)=200**. It's **(200/1000)*100=20%** of the total amount she had. So the answer is **20**.

Note: Don't forget to print a new line (\n) at the end of the output.

Problem Setter: Shah Habibul Imran

Reviewer: Erfanul Islam Bhuiyan

Alternate Solution Writer: Erfanul Islam Bhuiyan

C. PaapOn On Bullseye

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Papi PaapOn is a gambler, who loves gambling. One day he went to a casino, which name is a trade secret, for playing dart game (one kind of gambling game, where one has to throw a type of arrow known as dart on a board). But before playing he got drunk. He thinks of himself to be a drunken master (not really the case!). Since he was drunk he was throwing darts randomly (maybe he forgot about the scoring system and hopefully he didn't hit anyone!!!). After playing a while, and getting his senses back (just a little though. Not easy getting sober eh!) he realized that to get the maximum score he had to hit the bullseye point on the board (not the eye of a real bull. Obviously casinos don't have bulls. Or maybe they do? But here Bullseye means hitting the center of the dartboard).

There is a point (let's define it as a starting point) where he has to stand and throw the dart for hitting the bullseye point. There is a slope between the starting point and the bullseye point. As Papi PaapOn is drunk he couldn't hit the bullseye point (maybe he could because sometimes fortune favors).

A Dart Board

You are given the slope(let's define it as **S**) between starting point and bullseye point and the starting point (x_1,y_1) where PaapOn has to stand and the point (x_2,y_2) where the dart would hit on the board if PaapOn threw it at that time.You have to find out the slope between two points, PaapOn's standing point (x_1,y_1) and dart's hitting point (x_2,y_2) . Let's denote that slope as PaapOn's slope. **If the given slope is equal to PaapOn's slope** then print a line **"Fortune favors on Papi PaapOn"**, otherwise print a line **"Fortune does not favor on Papi PaapOn"**.

For measuring PaapOn's slope you can use the following formula

$$M=(y2-y1)/(x2-x1)$$

here M denotes PaapOn's slope.

Input

You are given five integer values **S**, x_1, y_1,x_2,y_2**(1 ≤ S, x_1, y_1, x_2, y_2 ≤ 10^4)** respectively.

Where,
S is the slope between **starting point and bullseye point,**
(x_1, y_1) is the **starting point(where PaapOn has to stand)**
(x_2, y_2) is the **dart's hitting point.**

It is guaranteed that x_1, x_2, y_1, y_2 will always be such that **M** will be an positive integer.

Output:

You have to print one line **"Fortune favors on Papi PaapOn"** if the given slope and PaapOn's slope is equal, otherwise print **"Fortune does not favor on Papi PaapOn"** (without quotes)

Sample Input	Sample Output
5 10 20 15 45	Fortune favors on Papi PaapOn
5 10 45 15 20	Fortune does not favor on Papi PaapOn

Notes: **Don't forget to print a new line (\n) at the end of the output.**

Problem Setter: **Farjana Akter**

Reviewer: **Nazmus Sakib**

Alternate Solution Writer: **Umme Rukaya Suny**

Special Thanks: **Nesar Ahammed, Shah Habibul Imran**

D. Hacker In Casino

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Mr. Saga Immanuel, a private detective once was watching a cricket match of Bangladesh VS India. Bangladesh needed two runs from one ball to win. Exciting moment, isn't it? But suddenly there was a call from the casino manager of **Chandpur Parar Club (CPC)** and said it was an emergency. Duty calls, Mr. Immanuel had to leave the match there, and get to the casino.

The casino has a sector where it has three machine booths numbered 1st, 2nd and 3rd. One can play and win or lose a specific amount of money in these booths **(the amount is the same for both conditions, win or lose). The rules for playing are that the players have to play in the 1st booth first, then in the 2nd booth and after that, he will play in the 3rd booth. And they can quit the game before any booth they want**. That means they can't change the order of playing and for example, if anyone decides to quit the game before 2nd booth he/she will not be able to play in both the 2nd and 3rd booth.

Machine Booth

An unknown black-hat hacker hacked the booths of the casino. For this now if anyone plays in these booths he/she will **definitely win**. As for the casino's reputation, the authority didn't inform anyone about this except Mr. Immanuel. They don't want to close the casino in the meantime wants to minimize the loss.

So, Mr. Immanuel gave them an idea and went back to work, to catch the hacker. He told them to **set one booth in "Ekkere Shesh" mode as if anyone plays in it, he/she will definitely lose** (Shhh! Don't tell anyone. It's a secret!). As the casino manager thinks all about

business, he wonders what would be the **maximum profit** anyone can make if they play per rules in these booths. Calculating these by hand is very hard for him, so he asked for your help.

You will be given the amount of money for the 1st, 2nd and 3rd booth and an integer X indicating the booth which will be in "Ekkere Shesh" mode. Write a program to help him calculate the maximum profit.

Assume that players have 0 amount initially and can have a negative amount of money between the game.

Input

The first line of input contains three integers **A**, **B** and **C**, respectively the amount for **1st** booth, **2nd** booth and **3rd** booth. The second line contains an integer **X**, indicates the booth which will be in **"Ekkere Shesh"** mode.

$0 \le A, B, C \le 10^3$
$1 \le X \le 3$

Output:

Print one integer, the **maximum profit** can be made by playing per rules.

Sample Input	Sample Output
220 150 100 1	30
150 200 180 2	150

Notes:

In the first sample amount for 1st booth is 220, 2nd booth is 150 and the 3rd booth is 100. 1st booth is in **"Ekkere Shesh"** mode. So if a player plays in all booths he will win a total of 30.

In the second example amount for 1st booth is 150, 2nd booth is 200 and 3rd booth is 180. 2nd booth is in **"Ekkere Shesh"** mode. If we quit before 2nd booth the profit will be maximum 150.

Don't forget to print a newline (‘\n’) at the end of the output.

Problem Setter: **Md. Erfanul Islam**

Reviewer: **Farjana Akter**

Alternate Solution Writer: **Tanima Hossain**

E. The Casino Beauty

Time Limit: **1.0 Second** **Memory Limit:** **1024 MB**

Description:

We all know **SinOn**, the president of BCB (Bangladesh Cricket Board). There is a secret about him, that he is much concerned about his beauty. For this, he always uses some beauty products which he purchases from a specific shop named **“KeChino”**. You may wonder why he always buys products from this shop. Because it gives him a special offer whenever he purchases the products.

They give him a box having **N** beauty products. The price of each product is between 1 to 10 taka (so low in price. Right!!). So the offer is, **he can choose one product of "X" taka (X is between 1 to 10 inclusive) and get all the products for free whose prices are equal to "X". But he has to pay for the rest of the products.** As SinOn is clever enough, he always chooses the product in such a way that the amount he has to pay for N products is minimum, in other words, **maximize the value of the products he’s getting for free.**

Since he’s very bad at math, it's too difficult for him to determine it all the time. So he wants you to write a program for him. He will give you **N**, the number of products in the box and the prices of the products. You have to determine **the maximum value of the products he’s getting for free.**

Input

The input consists of two lines. First-line contains a single integer **N**, the total number of products in the box. Next line contains **N** integers **the price of each product**.

$2 \leq N \leq 10^4$
1 ≤ price of each product ≤ 10

Output:

Print a single line **the maximum value of the products he's getting for free** from the offer. Check out the samples for clarification.

Sample Input	Sample Output
7 1 2 2 3 4 6 2	6
5 3 3 3 3 4	12

Notes:

In the first example, he can choose either 2 or 6 to maximize his profit. Because if he chooses 2, the total price of all the free products will be (2+2+2)=6 and if he chooses 6, it will be 6. But if he chooses 1 or 3 or 4, it will be 1,3 and 4 respectively which are not maximum.

In the second example, he will choose 3 and maximum profit will be (3+3+3+3)=12.

Be careful about the newline (\n) at the end.

Problem Setter: **Umme Rukaya Suny**

Reviewer: **Tanima Hossain**

Alternate Solution Writer: **Tanima Hossain**

F. Habibi's Cricket Craze

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

It's world cup time. Thousands of worldwide cricket fans are gathering at the cricket stadium during every match day. Taking advantage of the cricket world cup, **Casino Habibi**, the biggest casino of this city has started a new game called **Cricket Craze**. This is one kind of roulette game.

There are 20 rounds in this game(For this some people call it T-20 Roulette). There are 6 spins in each round. In each spin, each player bets on a number. A white small ball is sent into the wheel. It spins and the ball stops landing on a number. The player who selected that number is the winner of that spin.

T-20 Roulette

Winning a spin gives a player three points. The winner of a round is selected by maximum points. And the player who wins a maximum round is selected as the champions.

The great gambler **Mr. Naim Haque Apon AKA Casino Apon** is very excited today. He is very confident that today he will become the champion of **Cricket Craze**. He has got a device from his programmer friend. This device correctly predicts the result of the roulette game. This device has two parts; one is Predictor and another one in Solver. The predictor will give the clue of the prediction. The solver will solve that clue.

Predictor gives a string **S** consisting only lowercase letters(a-z), a character **C** and a number **X**.

Solver works as follow-

- Selects a substring from the given string S
- The substring must start with the character C.
- The maximum absolute difference between any two consecutive characters in that

substring is X.

- Among all the substrings it can generate by above mentioned rule, it chooses the one that has maximum length. Let that maximum length be Y.

Substring is a part of a string consisting of some consecutive characters of that string. The whole string(with all characters) is also a substring. As well as the null string(with no character) is also a substring. For example, “bcdef” is a substring of “abcdefgh”. But “abdf” is not a substring of “abcdefgh”. ASCII distance is the difference between the ASCII values of the two characters. ASCII value of a is 97 and d is 100. So ASCII distance of a and d is 3.

Reaching the casino, Apon realized that he has forgotten the Solver in his hotel room. The game is about to start and Apon doesn’t have enough time to go back to the room and bring the Solver. So, he is looking for someone to help.

Can you write a program that will do the job of solver?

It is guaranteed that such a substring exists.

Input

Each input starts with a number **T** (**T ≤ 10**) denoting the number of test cases.

Each test case consists of two lines. There is a string **S** consisting of lowercase letters on the first line. The maximum length of the string is **1000**. On the second line there is a character **C** and a number **X (0 ≤ X ≤ 26)**.

Each test case is separated by a blank line.

Output:

For each test case print the case number and the length (**Y**) of maximum substring.

Sample Input	Sample Output
2 abdacdcbef a 2 cdbacadfchcbedfcadcbg	Case 1: 5 Case 2: 9

b 3	

Notes:

In the first case we get two different substring which matches the conditions. They are “abd” and “acdcb”.

Substring starts with character ‘a’. So we take first character of string. Next character is ‘b’. ASCII distance of ‘b’ and ‘a’ is 1. So we take ‘b’. Next character is ‘d’. ASCII distance of ‘d’ and ‘b’ is 2. So we take ‘d’. Next character is ‘a’. ASCII distance of ‘d’ and ‘a’ is 3. So we can not take a. So, we get a substring “abd”.

In the same way we get another substring. Here second substring is the maximum substring. So, ans is the length of the second substring.

Problem Setter: **Mehedi Hasan Shesher**

Reviewer: **Shah Habibul Imran**

Alternate Solution Writer:

Special Thanks:

G. Amar Iccha Moto! 😋

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Do you know? **AmraPari** built a new casino named **"Gorechi Casino, Peyechi Koen"** (Koen is the currency of THian Land) in **THian land** where they secretly gamble on Cricket. But the people of THian Land are very honest and as Cricket Lovers they don't want this casino to pollute the environment of **THian Cricket** at all and so they are protesting against it. So, they've sent **Mr.SweetcAndy** to shut the casino down. When he tried to do so, AmraPari challenged him with one of their casino games "**Amar Iccha moto**" and said, "If you win all the rounds of this game, we will shut the casino down and go away forever".

The game is very simple. In each round, the machine will show an integer N. Then it will pick some(zero or more) random digits by its choice from N and generate another integer X which is the summation of those chosen digits (All the occurrences of those digits should be counted). Mr.SweetcAndy wins the round, if he correctly guesses the number X which the machine-generated.

While Mr.SweetcAndy was thinking how he can know which digits the machine has chosen from **N**, he hears a sound. He turns back and guess what??? he sees **Jhunjhuni** standing there. You might be wondering why her name is Jhunjhuni?. Well it's because she always wears a hair-pin that makes beautiful sounds. But that is not an ordinary hair-pin. It has magical powers, one of them is predicting anything. But only Jhunjhuni could understand what her hairpin is trying to say by making beautiful sounds. Jhunjhuni came to Mr.SweetcAndy and said, "I can tell you the numbers the machine has picked but as I'm angry with you, I am not going to do the calculations for you and I might give **some extra digits as well that doesn't even belong to N**".

So, Basically, **in every round the machine shows an integer N, Jhunjhuni gives K digits to Mr.SweetcAndy, that the machine might have chosen from N. Mr.SweetcAndy has to calculate the summation of the chosen digits of N (All the occurrences of those digits should be counted as well).** Then give it back to the Machine.

Recently, **Mr.SweetcAndy** has become very busy in his work. So, he wants you to write a program that can calculate the value of **X**, the summation of the chosen digits which he has to give the machine from the given **K** digits and **N**.

Input

Given an integer **R**, **the number of rounds.**
Each case starts with a line having two integers **N** and **K**. **N is the number the machine gave**, **K is the number of digits Jhunjhuni gives**.
The next line contains **K unique digits** that Jhunjhuni gave.
1 ≤ R ≤ 10000
1 ≤ K ≤ 10
1 ≤ N ≤ 10^{18}
0 ≤ value of each digit ≤ 9

Output:

Print "**Round #r: X**", here **r** is the round number, **X** is the number **Mr.SweetcAndy** will give to the machine.

Sample Input	Sample Output
3 1368784321 2 8 6 368978 3 5 7 1 1236547890 10 0 1 2 3 4 5 6 7 8 9	Round #1: 22 Round #2: 7 Round #3: 45

Notes:

In the first round, **Jhunjhuni** gave the digits **8,6**. In the number **N=1368784321**. We have **8** two times and **6** once. So the summation is **8+8+6=22**.
In the second round, Only **7** appeared in **N** so value of **X** is **7**.

Problem Setter: **Tanima Hossain**

Reviewer: **Nazmus Sakib**

Alternate Solution Writer: **Nazmus Sakib**