

## Question no: 1

### Pipe Junction

#### - Problem Description

A plumber wants to check whether a pipe junction where  $N$  incoming pipes and  $M$  outgoing pipes are balanced, and, if not, needs to balance the junction by adding an input pipe or an output pipe of a suitable capacity.

At the junction, there are a set of input pipes and a set of output pipes. Each pipe has a rated capacity and an actual capacity. The actual capacity for each pipe is lower than the rated capacity by a constant  $R$ , the 'rust factor', which depends on the material of the pipe, and is the same for all the pipes at the junction. For example, if the rated capacity is 65 and  $R$  is 2, the actual capacity is 63.

A junction is balanced if the sum of the actual capacities of the input pipes is the same as the sum of the actual capacities of the output pipes. If it is not balanced, the plumber adds one input pipe or one output pipe to balance the junction, and determines the rated capacity of that added pipe  $A$ .

Here we have  $N$  incoming pipes and  $M$  outgoing pipes. The incoming pipes may be of different rated capacities. Similarly, the outgoing pipes may also be of different rated capacities.

Find the rated capacity of the pipe required to make the junction balanced if the combined actual capacity of the incoming pipes is more than the combined actual capacity of the outgoing pipes; then the plumber will need to add an outgoing pipe. Conversely, if the combined actual capacity of the incoming pipes is less than the combined actual capacity of the outgoing pipes, then the plumber will need to add an incoming pipe.

If an outgoing pipe is added, then denote its rated capacity as a negative number. If an incoming pipe is added, then denote its rated capacity as a positive number.

### **-Constraints**

$1 \leq N, M, R \leq 1000$

$1 \leq \text{Incoming}[i] \leq \text{Outgoing}[i] \leq 10000$

### **Input**

The input has three lines

The first line contains three space separated integers N M R denoting the number of incoming pipes, outgoing pipes and rust factor respectively.

The second line contains N space separated integers denoting the rated capacity of each incoming pipe.

The third line contains M space separated integers denoting the rated capacity of each outgoing pipe.

### **Output**

Print the rated capacity of the pipe required to balance the junction OR print "BALANCED" if the junction is already balanced.

### **Time Limit**

1

### **Explanation**

#### **Example 1**

Input

3 3 2

85 75 95

70 80 45

### **Output**

-62

### **Explanation**

There are 3 input pipes, 3 output pipes, and the rust factor is 2.  
The rated capacities of the input pipes are 85, 75 and 95 respectively.

### **Question no : 2**

#### **WRITING BOT**

#### **Problem Description**

A scientist has created a Writing Bot which will read from one book and write into another. Both books may have different dimensions i.e. number of lines on each page and number of pages itself. Reads and writes also happen at different speed.

The Bot first reads from the first book fully, then processes the format to write into the second book (done instantaneously) and finally starts writing into the second book.

Your task is to identify, after a specified interval of time, if the Bot is reading or writing. For each of these activities how much read and write activity has happened needs to be captured in terms of number of pages and number of lines on the current page.

#### **- Constraints**

$1 \leq \text{number of lines in first book}$ ,  $\text{Number of pages in second book} < 10^3$

$1 \leq \text{Number of lines in first book}$ ,  $\text{Number of lines in second book} < 10^2$

#### **Input.**

The Input has 7 lines

The first line contains an integer denoting the number of pages in the first book.

The second line contains an integer denoting the number of lines per page of first book. The third line contains an integer denoting the number of pages in second book.

The fourth line contains an integer denoting the number of lines per page of second book.

The fifth line contains an integer denoting the reading speed in lines/second

The sixth line contains an Integer denoting the writing speed in lines/second

The seventh line contains an integer denoting the time in seconds at which the result is to be processed.

### **- Output**

On one line, print three items viz current activity performed (READ or WRITE), page number and line number . All three items should be determined by space

### **Time Limit**

1

### **- Explanation**

Example 1

### **Input**

**Question no : 3**

Auction Number

**Vechile problem**

### **-Problem Description**

Codu is fond of vehicle numbers. Codu wants to compute the number of vehicles can be registered in his state. A vehicle normally has a registration number like ST 01 AB 1234. Each registration number has four parts, separated by spaces. The first part has two letters common for all cars in the state. The next two digit number is the number of the

district where the car is registered within the state. It is always two digits, and may have a leading zero. After that, the next part consists of two letters (AB) denoting the series and the last part is a 4 digit number (this will always be four digits, even if it has leading zeroes). The entire registration number is unique to each vehicle. You have been given the number of districts in state and a range of letters and a set of digits that can be used for forming a vehicle registration number. You need to find the maximum number of vehicles that can be registered in the state with non-special numbers, subject to the rules

The state has identified some numbers as special, and will not be issued normally, but will only be available by auction. In these plates, the last part (consisting of four digits) has three or more repetitions of one digit such as 0001, 0000, 0100, 2212 so on. The output should consist of the maximum number of vehicles that can be registered in the state with non-special numbers

### **Constraints**

$1 \leq \text{Number of districts} < 100$

$A \leq \text{Range of alphabets} \leq Z$

$0 \leq \text{Range of digits} \leq 9$

Width of district columns will be always equal to 2.

Ex district 1 will be represented as 01.

### **Input**

The input has three lines

The first line contains an integer denoting the number of districts in the state.

The second line contains two space separated characters denoting the range of letters that can be used for the third part For example, if the input says BF any of the letters BCDE or F may be used in any combination for the third part

The third line contains space separated integers denoting the range of digits.

### **Output**

Print the total number of vehicles that can be registered

### **-Time Limit**

1

### **Explanation**

Example 1

### **Input**

1

AB

01

### **Output**

24

### **Explanation**

Here, only one district is present. Hence, number plate will start from ST D1 AA 0000, ST 01 AA 0001, etc. However, we need to exclude auction-able numbers. After doing so, the overay count of non special vehicle registration numbers remains 24. For example, ST 01 AA 0011, ST 01 ST 0110.. so on.

### **Example 2**

### **Input**

2

AC

12

Output

108

### **Explanation**

Here, two districts are present Number plate can start from ST121 or ST 02 Hence number plate will start from ST 01 AA 1111, ST 01 AA 1112, etc. However, we need to exclude auctionable numbers. After doing so, the overall count of non-special vehicle registration numbers remains 108 For example, ST 02 AC 2121, ST 02 BC 2112, ST 02 AA 1122 so on.

### **Question no: 4**

#### **.GearBox**

#### **- Problem Description**

Let's say you are a mechanical engineer. Help solve the following problem statement. Given 3 mechanical gears that are connected to each other as depicted in the image below, find out how many times Gears will rotate given the radius of all three gears, and the number of times Gear1 is rotated.

**Note:** Test cases are designed in such a way that output will always be an integer value.

#### **- Constraints**

$0 < R_1, R_2, R_3 < 50$

$0 < N < 10000$

#### **- Input**

The input has 2 lines.

The first line contains 3 space separated integers  $R_1$ ,  $R_2$ ,  $R_3$  which denote the radius of Gear 1, Gear2 and Gear3 respectively. The second line contains an integer  $N$  which denotes number of times Gear1 is rotated

### - Output

Print an integer denoting number of times Gear3 will rotate.

- Time Limit

1

### Explanation

Example 1

Input

1 10 1

100

### Output

100

### Explanation:

We are given  $R_1=1$ ,  $R_2=10$ ,  $R_3 = 1$

If we rotate Gear1 100 times, Gear3 will rotate 100 times

### Example 2

Input

1 18 36

1800



## Output

50

## Explanation:

We are given  $R_1=1$ ,  $R_2=18$ ,  $R_3=36$

If we rotate Gear1 1800 times, Gear3 will rotate 50 times

## Question no :5

### Problem Description

There are two cars-one running with petrol and other running with diesel with following information:

	Petrol	diesel
Distance/Liter in kilometers/liter: (A)	A1	A2
Fuel-cost/Liter: (B)	B1	B2
Showroom Price: (C )	C1	C2
Average Monthly Run in kilometers: (D)	D1	D2
Maintenance Cost per month: (E)	E1	E2

We need to find out which car has the lowest total cost, over a horizon of 60 months.

### Constraints

$$1 < A \leq 50$$

$$1 < B \leq 100$$

$$10^5 < C \leq 10^9$$

$$1 < D < 10^4$$

$$1 < E \leq 10^4$$

### **- Input**

The input has 10 lines, with each line containing one integer

The first line contains an integer A1 denoting distance/Liter (Mileage) for petrol car

The second line contains an integer B1 denoting fuel-cost/Liter for petrol

The third line contains an integer C1 denoting showroom Price for petrol

The fourth line contains an integer D1 denoting average Monthly Run in kilometres for petrol car

The fifth line contains an integer E1 denoting maintenance Cost per month for petrol car

The sixth line contains an integer A2 denoting distance/Liter (Mileage) for diesel car  
The seventh line contains an integer B2 denoting fuel-cost/Liter for diesel car

The eighth line contains an integer C2 denoting showroom Price for diesel car  
The ninth line contains an integer D2 denoting average Monthly Run in kilometres for diesel car

The tenth line contains an integer E2 denoting maintenance Cost per month for diesel car

### **Output**

Print "petrol" if petrol car is more cost efficient or print "diesel" if diesel car is more cost efficient

### **Time Limit**

1

### **Explanation**

### **Example 1**

**Input**

1  
AB  
0 1

**Output**

petrol

**Explanation**

Here, only one district is present .hence all the vechile registration numbers will begin from ST.01.

**1)** A traveler wants to start his/her journey from Pune to Ahmedabad. Before starting the journey, he/she uses the GPS system to find all the paths to reach from the source to the destination. He/she will use the smallest or the second smallest path to start the journey. Write a logic to find the smallest and the second smallest distance from the list of all distances.

**Input**

1. The first input contains N, the total number of paths from the source to the destination..
2. The second input contains N sorted integers separated by newline A1, A2... An, representing the distance of all paths.

**Output**

Output contains two numbers separated by a single space character.

If all paths are equal, then the system should generate a message as "Equal".

If N is less than 2, then the system should generate a message as "Invalid Input".

### Constraints

$2 < N \leq 10$

$1 \leq A[i] \leq 1000$

### Example 1:

#### INPUT

4

100

400

300

250

#### Output

100 250

### Explanation

Out of the given 4 possible paths, only 100 are the smallest distances to reach the des

### Example 2:

#### Input

1

200

#### Output

Invalid Input

### Explanation

In the given constraints, the first input valu greater than 2.

### Example 3:

#### Input

3

100

2) Write a program to find the smallest Integer value for the given value of 'a'. If we multiply the digits of b, we should get the exact value of 's'. Result&mut contain more than one digit.

**Constraints:**

$1 \leq a \leq 10000$

**Examples:**

**Input:** 10

**Output:** 25

**Explanation:**  $25 - 10$ . Hence 25 is the smallest value for 10.

**Input:** 56

**Output:** 78

**Explanation :**  $7 * 8 = 56$

**Input:** 150

**Output:** 556

**Explanation:**  $5 * 5 * 6 - 150$

**Input:** 13

**Output:** Not Possible

**Instructions:**

Input must be a single integer value. Print "Not Possible" if result not found.

**3)** Write a program to find the  $N^{\text{th}}$  smallest element from a collection.

**Input Format**

The first input contains integer value  $X$ , used to define the size of an array.

The second input contains  $X$  unsorted integer numbers separated by newline, i.e.  $A[i]$ .

The third input contains the value of  $N$ , to find the  $N^{\text{th}}$  smallest element from the array.

**Output Format**

The output should be an integer value, the  $N^{\text{th}}$  smallest element in the array.

**Constraints**

$1 \leq X \leq 10$

$1 \leq A[i] \leq 1000$

$1 \leq N \leq X$

**Sample1:****Input:**

5  
10  
20  
40  
30  
60  
3

**Output:**

30

**Explanation:** Here, the first input is 5, the size of the array, 10, 20, 40, 30, 60 are the elements of array  $A[i]$ . The last input, i.e. 3. is pointing to the 3 smallest element in the given array. Hence, the 3 smallest element is 30

4) John and Linda are playing a numbers game. John asked Linda to find the number whose square ends with the number itself. The number should also be a positive integer. Write a program to implement the above logic.

- Input Format
- Input contains an integer 'N' denoting the number.
- Output Format If the number whose square ends with the number itself, print "Correct Number", otherwise print "Incorrect Number".
- If the user enters negative integer, the result should display "Wrong Input".

**Constraints**

$*1 \leq N \leq 10^8$

**Sample 1:****Input****Output:**

Correct Number

**Sample 2:****Input**

9

**Output:**

Incorrect Number

**Sample 3:****Input**

-6

**Output:**

Wrong Input

**Explanation:**

Sample Input 1: 5 is a correct number because the square of 5 is 25. The last digit of 25 is 5, which is the same as the given number. Sample Input 2: 9 is an incorrect number because the square of 9 is 81. The last digit of 81 is 1, which is not the same as the given number. Sample Input 3: -6 is a negative number. Hence it should print "Wrong Input".

2.petrol or diesel

Problem description:

There are two cars: one running with petrol and other running with diesel with following information.

	petrol	diesel
Distance/liter in kilometers/liter(A)	A1	A2
Fuel-cost/liter (B)	B1	B2
Showroom price (c)	C1	C2
Average monthly run in kilometers:	D1	D2
Maintenance cost price per month :(E)	E1	E2

Input:

constraints

 $1 < A \leq 50$  $1 < B \leq 100$  $10^5 < C \leq 10^9$  $1 < D \leq 10^4$  $1 < E \leq 10^4$

### Input

The input has 10 lines, with each line containing one integer.

The first line contains an integer A1 denoting distance/Liter (mileage) for petrol car

The second line contains an integer B1 denoting fuel-cost/Liter for petrol car

The third line contains an integer C1 denoting showroom price for petrol car

The fourth line contains an integer D1 denoting average monthly run in kilometers for petrol car.

The fifth line contains an integer E1 denoting maintenance cost per month for petrol car

The sixth line contains an integer A2 denoting distance /Liter (mileage) for diesel car

The seventh line contains an integer B2 denoting fuel-cost/Liter for diesel car

The eighth line contains an integer C2 denoting showroom price for diesel car

The ninth line contain an integer D2 denoting average monthly run in kilometer for diesel car

The tenth line contain an integer E2 denoting maintenance cost per month for diesel car.

```
A1=int(input())
B1=int(input())
C1=int(input())
D1=int(input())
E1=int(input())
A2=int(input())
B2=int(input())
C2=int(input())
D2=int(input())
E2=int(input())
P=(D1*60)+(E1*60)+C1+(D1*60*B1)/A1
V=(D2*60)+(E2*60)+C2+(D2*60*B2)/A2
if(P<V):
    print('petrol')
else:
    print('diesel')
```

#### 1. Explanation:

The petrol car has a lower total cost over 60 months. Hence the output is “petrol”

#### Example2

##### Input

15

70

600000

1000

500

16

60

590000

1000

600

##### Output

Diesel

##### Explanation

The diesel car has a lower cost over 60 months. Hence the output is “diesel”.



Time limit

1

Explanation

Example 1

Input

30

26

28

14

345

43

Output

126

246

Explanation

In this,  $P1=30$ ,  $P2=26$ ,  $P3=8$ ,  $q=14$ ,  $e=345$ ,  $r=43$

The output shows that 126 employees solved the first question and 246 employees solved precisely one question out of three.

Example 2

Input

25

5.

Set theory

Problem description

A coding competition was conducted inside TCS campus with  $e$  employees. Data of employees who participated and who did not participate in the competition is available. There were three problems in the coding competition. Data as mentioned below is available.

2. The number of employees who have solved only the first , only the third problem are equal.
3. There are  $P1$  employees who solved the first and second problem.
4. There are  $P2$  employees who solved the second and the third problem.
5. There are  $P3$  employees who solved the third and the first problem.
6. There are  $q$  employees who solved all the 3 problems.
7. There are  $e$  employees who did not participate in the competition.

Answer the following questions on the basis of data provided above.

1. How many employees have solved the first problem?
2. How many employees have solved exactly one of the 3 problems?

Constraints

$0 \leq P1, P2, P3 < 10^5$

$P1, P2, P3 \leq e$

$r, q \leq e$

$q \leq p1, p2, p3$

Input

There are six lines in the input

The first line contains an integer  $P1$  representing number of employees who solved the first and second problems.

The second line contains an integer  $P2$  representing number of employees who solved the second and third problems.

The third line contains an integer  $P3$  representing number of employees who solved the third and first problem.

The fourth line contains an integer q representing number of employees who solved all three problems.

The fifth line contains an integer e representing number of employees in the campus.

The sixth line contains an integer r representing number of employees who do not participated in the competition.

Output:

The output should have two lines.

The first line should contain an integer x representing number of employees who have solved the first problem.

The second line should contain an integer y representing number of employees who have solved exactly one of the 3 problems.

Time limit

1

Explanation

Example 1

Input

30

26

28

## 6.Text art

Problem description

Three characters {#,\*,.} represents pixels used for printing the text art on a canvas separated by walls. The input file consists of a set of canvases separated by vertical walls.

Each wall is demarcated by # characters. Each canvas ( between the walls) may have at most one text (some canvases may have no text art, and the walls of the canvas may be adjacent to each other). The leftmost canvas will not have a left wall, and the rightmost canvas will not have a right wall.

Text art can only be in shape of vowels (A,E,I,O,U). A collection of \* in the shape of the vowels is a text art. A text art is contained in a 3\*3 block. The dot (.) character denotes empty space.

Given 3\*N matrix comprising of { # , \*, . } character , find the walls and text art within them.

Note: please pay attention to how vowel A is denoted in a 3\*3 block in the examples section below.

The output is the vowel sequence in the text art delimited by \*. Empty canvases are not shown in the output.

CONSTRAINTS:

3<=N<=10\*3

INPUT

The input has 4 lines.

The first line of the output consist of single integer N denoting number of columns.

The next 3 lines consist of the pixels which represent the text art and the columns.

Output

The first line of the output is the status . if the status is “ possible”, the second line is the count of notes in each denomination, otherwise no second line is printed.

The output consists of two parts viz status and count of denomination of different notes, where status can be {“possible”, “out of change”}.

After processing all transactions if the toll collector will not run out of change, print the status in the first line as “possible”. If at any point, exact change cannot be given, print the status as “ out of change” in the status.

Print a second line of four space separated integers (the count of notes of each denomination in the order of [5,10,50,100]) when the status is “possible”.

Time limit

1

Explanation

Example 1

Input

2 2 0 0

2

Car 50

Jeep 50

Output

Out of change

Example 1

Input

1

A B

0 1

Output

24

Explanation

Here, only one district is present. Hence all vehicle registration numbers will begin from ST 01.

Number plate will start from ST 01 AA 0000, ST 01 AA 0001, S 01 AA 0011, ST 01 AB 0110. so on.

Example 2

Input

2

AC

1 2

Output

108

Explanation

Here, two district are present number plate can start from ST 01 or ST 02.

## 8. Tournament

Problem description

You are given the scores of a football league among a set of teams .you need to find the winner of the league and print the name of winner and points earned by them.

Each team gets 3 points for a win, 1 point for a draw and 0 for a loss. The name of the team is represented as upper case character viz. A, B....Z.

Constraints:

There will only one team which gets the highest points.

Input:

There are many lines in the input.

The first line contains an integer N, representing number of teams in the league. The next  $(N*(N-1))/2$  line contain three space separated strings < Team1, Team2,score>

Here,

Team1 is the name of the home team.

Team2 is the name of the away team.

Score represents the score of the match, (M-N), where M represents the score of the home team and N represents the score of the away team .

Output:

The output should have two lines.

#### 9. Contest set

##### Problem description

Code has data about students participating in CodeVita , a programming competition. Before the actual programming contest round 1 (R1) there are two practice contests called as Mockvita1 (M1) and Mockvita (M2).

He wants to analyze the data. Here he has been given data about

- The number of students who participated in M1, M2 and R1.
- The number of students who participated in M1 and M2.
- The number of students who participated in M1 and R1.
- The number of students who participated in M2 and R1.
- The number of students who participated in all the rounds M1,M2 and R1.

Based on the above data code wants to find out

The number of students who participated in only Round1.

The number of students who participated in Mockvita1 and Mockvita2 but not in Round1.

output

Print two integers in one line ( separated by space) where

The first integer is the number of students who participated in only R1.

The second integer is the number of students who participated in both M1 and M2 but not R1.

Time limit

1

Explanation

Example 1

Input

115 130 110

85 75 95

70

Output

10 15

Explanation

115 students participated in M1, 130 in M2 and 110 in R3.

85 students participated in M1 and M2 , 75 in M1 and R1, and 95 in M2 and R1

From the data , 10 students participated only in R1 and 15 students in M1 and M2 but not R1. Hence the output is 10 15.

Example 2

Input

55 51 61

9 26 31

8

Output

12 1

Explanation

55 students participate in M1, 51 in M2 and 61 in R3.

9 students participated in M1 and M2, 26 in M1 and R1, and 31 in M2 and R1.  
From the data 12 students participated only in R1 and 1 students in M1 and M2 but not R1.hence the output in 12 1.

## 10. Explanation

Example

Input

3

A B 2-1

B C 5-6

C A 2-1

Output

C

6

Explanation

There are 3 teams.

Team c wins both the matches hence are the leaders and the total points won by them is 6.

Example 2

Input

4

A B 3-2

A C 4-2

A D 0-2

B C 3-1

C D 2-2

Output

D

7

Explanation:

Team D wins the matches and draws one game hence are the leaders and the total points won by them is 7.

## 11. Sample input 1

4

1 2 3

Explanation

Given a single test case

N=3.

Given array elements : 1 2 3, the initial product of this array is 6.

Bit configuration of 1.01

Bit configuration of 2.10

Bit configuration of 3.11

How can we do the swapping of bits?

If we select 2 and 3 as y and x respectively, we can swap the last bit of 3 and 2.

After swapping 2(10) will turn to 3(11) will turn to 2(11).

If we select 1 and 2 as x and y. we can swap the last bit of 1 and 2, which will turn 1(01) to 0(00) while 2(10) will be turned to 3(11).

If we select 3 and 1 as x and y. we can swap the first bit of 3 and 1. Which will turn 3(11) to 1(01) will be turned to 3(11).

If we try for all possible combination it can be easily observed that the lowest product is 0.

But since the requirement is of non zero lowest product it can be achieved only if all the elements are non zero. Hence the lowest non zero product that can be achieved is 6 for the given case as no similar product is possible.

#### 12. Magic words with vowels in alphabetical order

Write a generalized function that counts the number of duplicate words which contains all vowels in alphabetical order in a given sentence, without using the in-build function. Also the case should be ignored.

Sample input1:

We resolve to be brave, we resolve to be good.

We resolve to uphold the law according to our oath.

Sample output 1

We 3 resolve 3 to 3

Note: your code must be able to print the sample output from the provided sample input. However , your code is run against multiple hidden test cases. Therefore , your code must pass these hidden test cases to solve the problem statement.

Time limit: 5.0 sec(s) for each input file

Memory limit: 256 MB

Source limit: 1024 KB

Allowed languages bash, C,C++,C++14,C++17, Clojure , C#, D, Eriang. F#, Go, Groovy ,Haskell, java 14, java Script(Rhino), JavaScript(Node.js). Julia , kotlin, lisp, lisp(SBCL),lua, objective-C, Ocaml, Octave, pascal, perl, PHP, python, python 3,python 3.8, R(Rscript), Racket,ruby,rust,scala,swift-4.1,swift, typescript, visual basic.

#### 13. Example 1

Input

500

10

600

Output

2

Explanation

Every employee gets RS.500 incentive and gives 10 percent of his incentive to his referrer. Rakesh's goal is RS.600. Rakesh has already more to achieve his target. So he refers two employees and each one of them gives RS.50 to him as per the rules. So the total amount=earned by Rakesh will be  $(500+50+50)=$  RS.600 hence, the tree will have 2 employees excluding him, and the output is 2.

Example 2

Input

500

10

607

Output

4

Explanation:

Every employee gets a RS.500 incentive and give 10 percent of his incentive to his referrer. Rakesh has a goal of RS 607. Rakesh has already earned RS.500 of his incentive. He needs RS.107 more to achieve his goal. So he refers two employees ,let us say prakash and suraj, and each one of them gives RS.50 to him as per the rules. So the total amount received by rakesh will be  $(500+50+50)=\text{RS } 600$ . Now, rakesh needs either suraj and prakash to each refer one employee or one of suraj or prakash to refer 2 employees. In either case, between them, they give him RS 10 of the incentive (2 sets of 10% of the RS.50 received from each of the new recruits). If between them, they recruit only one , rakesh will not be able to achieve his goal. so they need to hire two employees , so the total incentive receipts to Rakesh will be  $(600+10)=\text{RS } 610$ . Which exceeds his requirement of RS 607.

The total number of employee in the tree will be 4, excluding Rakesh. Hence the output is 4.

#### 14. Pipe junction

Problem description

A plumber wants to check whether a pipe junction where N incoming pipes and M outgoing pipes are balanced an if not needs to balance the junction by adding an input pipe or an output pipe of a suitable capacity.

At the junction there are a set of input pipes and a set of output pipes. Each pipe has a rated capacity and an actual. The actual capacity for each pipe is lower than the rated capacity by a constant R the “rust factor”, which depends on the material of the pipe, and is the same for all the pipes at the junction. For example, if the rated capacity is 65 and R is 2, the actual capacity is 63.

A junction is balanced if the sum of the actual capacities of the input pipe is the same as the sum of the actual capacities of the output pipes. If it is not balanced, the plumber needs to add one input pipe or one output pipe to balance the junction and determine the rated capacity of that added pipe.

Here we have N incoming pipes and M outgoing pipes. The incoming pipe may be of different rated capacities. Similarly the outgoing pipe may also be of different rated capacities.

Find the rated capacity of the pipe required to make the junction balanced. If the combined actual capacity of the incoming pipes is less than the combined actual capacity of the outgoing pipes then the plumber will need to add an incoming pipe. If an outgoing pipe is added then denotes its rated capacity as a negative number. If an incoming pipe is added then denote its rated capacity as a positive number.

Constraints:

$1 \leq N, M, R \leq 1000$ .

Input

The input has three lines

The first line contains three space separated integers N M R denoting the number of incoming pipes, outgoing pipes and rust factor respectively.

The second line contains N space separated integers denoting the rated capacity of each incoming pipe.

The third line contains M space separated integers denoting the rated capacity of each outgoing pipe.

Output:

Print the rated capacity of the pipe required to balance the junction OR print "BALANCED" if the junction is already balanced.

Time limit

1

Explanation

Example 1

Input

3 3 2

85 75 95

70 80 45

Output

-62

Explanation

There are 3 input pipes, 3 output pipes, and the rust factor is 2.

The rated capacities of the input pipes are 85,75 and 95 respectively.

```
18.#include<iostream>
```

```
    Using namespace std;
```

```
    int main()
```

```
{
```

```
    int P1,P2,P3,q,e,f;
```

```
    cin>>P1>>P2>>P3>>q>>e>>f;
```

```
    int exc=(e-f)-(P1+P2+P3-(3*q))-q;
```

```
    int frst=(exc/3)+(P1+P3-(2*q))+q;
```

```
    cout<<frst<<"\n";
```

```
    cout<<exc;
```

```
}
```

```
    20.#include <iostream>
```

```
    Using namespace std;
```

```
    Void swap( int a, int b);
```

```
    int main()
```

```
{
```

```
    int a=5, b=10;
```

```
    Swap (a, b);
```

```
    Cout<<" In main " << a<<" " << b <<" "<<" ";
```

```
    return 0;
```

```
}
```

```
Void swap ( int a , int b)
```



```

{
int temp;
temp =a;
a=b;
b= temp;
cout<< "In swap " << a << " " << b<< " " << " ";
}

```

21.

100

10

500

6

8

4

145

Output

WRITE 13 2

Explanation

After 145 seconds the machine would be writing at the end of 2<sup>nd</sup> line of the 13<sup>th</sup> page of the second book .

Example 2:

Input

400

20

225

15

10

10

150

Output

READ 75 20

Explanation

After 150 seconds, the machine would be reading at the end of 20<sup>th</sup> line of 75<sup>th</sup> page of the first book.

22.first find x

$$e=3x-2(p^1+p^2+p^3)+q+r$$

then 1<sup>st</sup> ans is

$$x+p^1+p^2-q$$

23.writing bot

Problem description

A scientist has created a writing bot which will read from one book and write into another. Both books may have different dimensions i.e number of lines on each page and number of pages itself.

Reads and writes also happen at different speed.

The bot first reads from the first book fully, then processes the format to write into the second book ( done instantaneously) and finally starts writing into the second book.

Your task is to identify after a specified interval of time, if the bot is reading or writing, for each of these activities how much read and write activity has happened needs to be captured in terms of number of pages and number of lines on the current page.

Constraints:

1<= number of pages first book number of pages second book < 10<sup>3</sup>

1<= number of line in first book, number of lines in second book < 10<sup>2</sup>

Input:

The input has 7 lines

The first line contains an integer denoting the number of pages in the first book.

The second line contains an integer denoting the number of lines per page of first book.  
 The third line contains an integer denoting the number of pages in second book.  
 The fourth line contains an integer denoting the number of lines per page of second book.  
 The fifth line contains an integer denoting the reading speed in lines/second.  
 The sixth line contains an integer denoting the writing speed in lines/second.  
 The seventh line contains an integer denoting the time in seconds at which the result is to be processed.

Output

On the line, print three items viz. current activity performed (READ or WRITE), page number and line number.

24. Time limit

1

Explanation

Example 1

Input

30

26

28

14

345

43

Output

126

246

Explanation

In this  $P1=30$ ,  $p2=26$ ,  $p3=8$ ,  $q=14$ ,  $e=345$ ,  $r=43$

The output shows that 126 employees solved the first question and 246 employees solved precisely one question out of three.

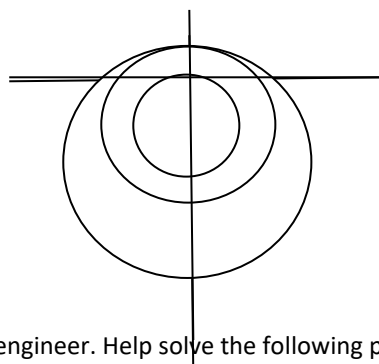
25.planets

Problem description

Code lives in a solar system consisting of three planets. These planets revolve around their sun in a circular path.

In that solar system, all the three planets have a common time measures called a "click" and a distance measure "dist". The planets revolve in an anti-clockwise direction with angular velocity  $V1, V2$  and  $V3$  degrees/click respectively. The radii of the circular paths are  $R1, R2$  and  $R3$  dists respectively. Initially all planets start from position (given in figure)  $S1, S2$  and  $S3$  respectively. Could wants to know if they would be aligned in a straight line after a time period of  $N$  clicks.

$S1, S2, S3$



Constraints:

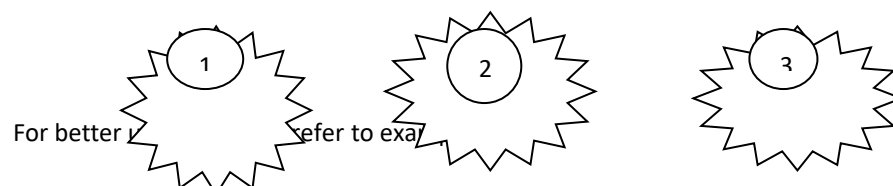
$0 \leq R \leq 10^8$

$0 \leq V \leq 10^8$

26.Gear box

Problem description

Let's say you are a mechanical engineer. Help solve the following problem statement. Given 3 mechanical gears that are connected to each other as image below, find out how many times Gear3 will rotate given the radius of all three gears, and the number of times gear 1 is rotated.



For better v

refer to exa

Note: Test case are designed in such a way that output will always be an integer value.

Constraints:

$0 < R1, R2, R3 < 50$

$0 < N < 10000$

Input

The input has 2 lines.

The first line contain 3 spaces separated integers R1,R2,R3 which denote the radius of Gear1, Gear2 and Gear3 respectively.

The second line contain an integer N which denotes number of times Gear 1 is rotated.

Output

Print an integer denoting number of times Gear3 will rotate.

Time limit

1

Explanation

Example 1

Input

1 10 1

100

Example 2

Input

1 18 36

1800

Output

50

Explanation:

We are given  $R1=1, R2=18, R3=36$

If we rotate gear1 1800 times, gear3 will rotate 50 times.

```
27. #include<stdio.h>
int main()
long int n;
int r1,r2,r3;
scanf("%d %d %d",&r1,&r2,&r3);
scanf("%ld",&n);
int x=(int)(n/r3);
printf("%d",x);
}
```

28. Example 2

Input

11

\*.\*###\*#.\*.

\*.\*###.\*###

\*\*\*###\*#\*.\*

Output

U\*E\*A

Explanation:

11

\*. \* # \* \* \* # . \* .

\*. \* # \* \* . # \* \* \*

\* \* # \* \* \* # \* . \*

As it can be seen that the \* character corresponds to the vowels U,E and A respectively, the output is U\*E\*A.

29. public class HackerEarth

{

```

Public void code (String s)
{
System.out.print(" java");
}
Public void write (Object o)
{
System.out.print("language");
}
Public static void main (String[] args)
{
HackerEarth r= new HackerEarth();
r.code("Object");
r.write(555);
}
}
30. 1=list(map(int , input().split()))
n=int(input())
r1=1[0]
r2=1[2]
ans=(n*r1)/r2
print(ans)
31. constraints:
0<=R<=10*8
0<=V<=10*8
0<=N<=10*8
1<=T<=10

```

#### Input

The input consists of multiple test cases in the same file, and each test case must have an output in the output file.

This first line contains integer T denoting the number of test cases.

This is followed by a set of three lines of each of the T test cases.

The first line of each test case contains three spaces separated integers R1,R2 and R3 denoting the radius of the circular paths in dists.

The second line of each test case contains three spaces separated integers V1 ,V2,V3 denoting the angular velocity of the planets in degrees click.

The third line of each test case contains time N (in clicks) after which the condition of alignment of the planets in a straight line is to be checked.

#### Output:

Print TRUE if all of them are aligned in same line after N clicks, else print FALSE .

#### Time limit

1

#### Explanation

#### Example 1

#### Input 2

2

10 7 30

5 15 36

12

5 10 15

1 2 4

360

#### Output

FALSE

TRUE

#### Explanation

There are 2 test cases.

The first test cases gives R1=10, R2=7, R3=30. It also gives V1=5, V2=15, V3=36. N is given as 12 clicks. Test case #1. Here, none of the planet will be in the aligned in straight line. Hence the output is FALSE. The second test case gives R1=5, R2=10, r3=15. It also gives V1=1, V2=2, V3=4. N is given as 360 clicks. Test case #2- Here all the planets will be at location S1,S2,S3 respectively after completing the 360 clicks, and hence will be aligned.

31.

```
Scanner sc= new Scanner(System.in);
int inp=sc.nextInt();
int op=sc.nextInt();
int rust=sc.nextInt();
int inparr[]=new int[inp];
int oparr[]=new int[op];
int sum=0;
int sum1=0;
for(int i=0;i<inp;i++)
{
    Inparr[i]=sc.nextInt();
    Sum=sum+inparr[i];
}
for(int i=0;i<op;i++)
{
    Oparr[i]=sc.nextInt();
    Sum1=sum1+oparr[i];
}
int d =sum1-sum;
int e =d-rust;
if ( e!=0)
{
    System.out.println(e);
}
Else
{
    System.out.println("BALANCED");
}
}
```

32. vehicle number

Problem description

Code is fond of vehicle numbers. Code wants to compute the number of vehicle can be registered in his state. A vehicle normally has a registration number like ST 01 AB 1234. Each registration number has four parts, separated by spaces. The first part has two letters common for all cars in the state. The next two-digit number is the number of the district where the car is registered within the state. It is always two digits, and may have a leading zero. After that, the next part consists of two letters(AB), with each letter selected from a range, denoting the number of districts in state and a range of letters ( to be used in the series) and a set of digits that can be used for forming a vehicle registration number. You need to find the maximum number of vehicles that can be registered in the state subject to the rules.

The state has identified some numbers as special and will not be issued normally but will only be available auction in these plates the last part (consisting of four digits) has three or more repetitions of one digit such as 0001,0000,0100,2212,...so on. The output should consist of the maximum number of vehicle that can be registered in the state with non-special numbers.

Constraints:

1<=number of district <100  
A<= Range of alphabets <=Z  
0<=Range of digits<=9.

Width of district column will always be equal to 2.

Ex-district 1 will be represented as 01.

Input

The first line contains an integer denoting the number of district in the state.

The second line contains two space separated characters denoting the range of alphabetical series.

The third line contains space separated integers denoting the range of digits.

Output

Print the total number of vehicles that can be registered in the state with non-special numbers.

Time limit

1

Explanation

Example 1

Input

1

A B

0 1

Output

24

```
33. #include<stdio.h>
int main ()
{
    int n,mr;
    scanf("%d%d%d",&n,&m,&r);
    int a[n],b[m],asum=0,bsum=0,bal=0;
    for( int i=0;i<n;i++)
    {
        Scanf("%d",&a[i]);
    }
    for (int i=0;i<m;i++)
    {
        Scanf("%d",b[i]);
    }
    for(int i=0;i<n;i++)
    {
        asum=asum+a[i];
    }
    for(int i=0;i<m;i++)
    {
        bsum=bsum+b[i];
    }
    bal=bsum-asum-r;
    if(bal!=0)
    {
        Printf("%d",bal);
    }
    else if(bal==0)
    {
        Printf("BALANCED");
    }
}
```

34.

1. city and concert
2. ways of coloring
3. The necklace problem
4. Bheem and permutation
5. bob hates xors

## 6. indumati and fraction

35. The first line contain T denoting the number of test cases.

The first line of test case of test case contain N denoting the number of candidates.

The second line of each test case contains N space separated integers where  $P_i$  Denotes the power of the  $i^{\text{th}}$  candidate.

Output format:

For each test case, print two space-separated integer denoting the best time and worst time taken by you to select all the candidates.

Constraints:

$$1 \leq T \leq 20$$

$$1 \leq N \leq 1000$$

$$1 \leq P_i \leq 10^9$$

Sample input 1

2

3

1 2 3

4

10 1 1 10

Explanation:

For test case 1

Best case: you will choose candidates 2 and 3 from the queue and select them for 3 units of time.

Then, you will choose candidate 1 from the queue and assess him or her for 1 unit of time. So, you will take 4 units of time to select all the zombies.

Worst case: you will choose candidate 1 and 3 from the queue and select them for 3 units of time.

Then, you will choose zombie 2 from the queue and assess him or her for 2 units of time. So, you will take 5 units of time to select all the zombies.

36. In algorithm which of the following statements about graphs are correct.

1. when an edge connects two vertices, the vertices are said to be adjacent to each other and the edge is incident on both the vertices.

2. A cyclic is a path where the first and the last vertices are the same. A simple cycle is a cycle with no repeated vertices or edges.

3. A graph with no cycles is called a tree. A tree is an acyclic connected graph.

4. Two edges are parallel to each other if they connect the same pair of vertices.

Options:

A. 1,2 and 4

B. 2,3 and 4

C. 1,3 and 4

D. All of these

37. In data structures, you are given a segment array. which of the following statements about this scenario are correct.

1. for each element at index i of the segment array. Its parent is located at index  $\text{floor}((i-1)/2)$

2. for each element at index i of the segment array. Its left child is located at index  $2i-1$

3. for each element at index i of the segment array. its right child is located at index  $2i-2$

4. for each element at index i of the segment array. its left child is located at index  $2i-2$

5. for each element at index i of the segment array. Its right child is located at index  $2i-1$ .

Options:

A. 1,2,3

B. 1,3,4

C. 1,3,5

D. 1,4,5

38.

```
P1=int(input())
P2=int(input())
P3=int(input())
q=int(input())
r=int(input())
k=(e-r+q+q-P1-P2-P3)/3
e1=(K+P1+P3-q)
print(int(e1))
print(int(3*k),end=" ")
```

39. #include<iostream>

#include<string>

#include<algorithm>

Using namespace std;

int main()

{

String s =" Hacker Earth";

s.erase(remove(s.begin(),s.end(), ' '),s.end());

cout<<s<<endl;

}

Options:

1. Hacker
2. Earth
3. Hacker earth
4. Error code

40. output

690000

Explanation

Given N=3 and M=2

After observing the second list, we can decrease the count of metal and fertilizers to be imported by 100 and 20 respectively. Thus , total cost of items which do not need to be imported from the other nations is:

Cost 1=(100\*2000)+(20\*1500)=230000

However the locally manufactured items do not fulfill the entire requirement. Hence the residual quantity will still need to be imported.

We already have 100 units of metals and 20 units of fertilizers so for matching our requirement.

Thus , we will import (200-100)=100 units of metals (50-20)=30 units of fertilizers and 100 units of computers. Total cost of items which still needs to be imported is:

Cost2=(100\*3000)+(30\*2000)+(100\*1000)=460000

Total cost of procuring all needed items will be:

Cost1+cost2=230000+460000=690000

So, the output is 690000

Example 2

Input

2

Machinery 903000

Chemicals 40500

41. table employee

ID	NAME	AGE	SALARY
01	BEN	24	15000



03	BOB	23	10000
05	MIKE	28	15000
02	ALICE	26	30000
04	TARA	29	20000

Queries:

SQL> INSERT INTO EMPLOYEE(ID,NAME)VALUES(10,'ANITA');

Options:

- A. Error
- B. It adds the value '10 Anita NULL NULL' to the last row of the table.
- C. It adds the value '10 Anita NULL NULL' to the first row of the table.
- D. It does not add any value to the table.

42. In data structures, you are given the following code statements. Which of these are valid array initialization array.

- 1. int num[6]={ 2, 4,12,5,45,5};
- 2. int n[]={ 2,4,12,5,45,5};
- 3. float press[]={12.3,-34.2};
- 4. long int gdp[10];

Options:

- A. 1 and 2
- B. 2 and 3
- C. 2 and 4
- D. 3 and

43. import java.util.\*;

Import java.lang.\*;

Class main

{

Public static void main(string []args)

{

Scanner sc=new Scanner(System.in);

int d=sc.nextInt();

char a1=sc.next().charAt(0);

char b1=sc.next().charAt(0);

int a=(int)a1;

int b=(int)b1;

int e=sc.nextInt();

int f=sc.nextInt();

int g=((b-a)+1)\*((b-a)+1);

int s=(f-e)+1;

double r=math.pow(s,4);

double result=(d\*g)\*r;

system.out.println(result);

}

}

44. In C and C++, which of the following statements about the memcpy() function are correct:

- 1. It is used to copy a block of memory from one location to another.
- 2. It is declared in string.h.
- 3. It does not check for overflow.
- 4. The source and destination cannot overlap.

Options:

- A. 1 and 2
- B. 1 and 3

- C. 2 and 4
- D. All of these

45. How to attempt?

Question:

Message controlled robot movement with 90 deg and 45 deg turning capability and 1 unit moving capability.

Harish an engineering student needs to submit his final year project. He decides to create Robot which can be controlled by a set of instructions. He also decide that a grid (of X and Y axis) should be defined and the robot should move only within that grid. The set of instructions to move the robot should be given as a single message (string ) and the Robot should accordingly move and reach the expected location. If the given instructions lead to a position which is out of the given grid the Robot should stop at the last valid instruction.

Harish decides to write a function named move Robot that should process the given inputs and return a string representing the final position of the Robot.

46. mines game

Rohan want to design a mines game in such a way that if he enters positive and negative integers than mines are plotted in columns as per the integers entered. Here x represent a Mine and represent missing mine.WAP to help Rohan.

EX: if input: 2 4 -3 2 3

Output:

```
-X - - -
-X - - X

X X - X X
X X -X X
--X- -
--X- -
- - X - -
```

47. A simple string

You are given a string S. you can select any two consecutive characters that are not equal and replace it with any other single Character you can repeat this process at most K times.

You are required to print the length of the smallest possible string that can be obtained

Input format

The first line contains T denoting the number of test cases.

The first line of each test case contains two space separated integers N and K denoting the length of the string and the number of times you can replace character.

The second line of each test case contains string S.

Output format

For each test case, print the length of the smallest possible string that can be obtained .

Constraints

$1 \leq T \leq 100$

$1 \leq N, K \leq 10^5$

S contains lower case English characters.

48. what is the output of the following SQL query

SELECT ABS(-20) " ABSOLUTE" FROM DUAL;

Options:

- A. 20 is displayed with the heading ABSOLUTE
- B. -20 is displayed with the heading ABSOLUTE
- C. -20 is displayed without any heading
- D. 20 is displayed without any heading

49.

Point 3-K and H are siblings.

Point 4-E is B and A's predecessor.

2.

Point 1-A represents the root of the tree.

Point 2-C is A's only children.

Point 3-K is G's only child and a leaf node.

Point 4-E is D and F's predecessor.

3.

Point 1-A represents the root of the tree.

Point 2-C is A's only child.

Point 3-K is G's only child and a leaf node.

Point 4-E is D and F's predecessor.

4.

Point 1-A represents the root of the tree.

Point 2-C is A's ancestor.

Point 3-K is not a leaf node.

Point 4-E is B and A's predecessor.

Options:

A. 1 and 2

B. 2 and 3

C. 3 and 4

50. import math

Import os

Import random

Import sys

def smallestString (s);

if \_\_name\_\_=='\_\_main\_\_':

fptr=open (os.environ['OUTPUT\_PATH'],'w')

s=input()

result=smallestString(s)

51. n=list(map(int, input().strip().split(" ")))

P=int(input())

Z=p//n[2]

Print(z)

52. Explanation

Robot 3 will transfer its 1.25 intelligence to robot 1. So the new intelligence of robot 3 is 1.75 and

robot 1 is 1.625 (1+0.5.1.25)

Robot 2 will transfer its 0.25 intelligence to robot 1. So the new intelligence of robot 2 is 1.75 and

robot 1 is 1.75 (1.625+0.5.0.25)

So the intelligence of each robot is 1.75. which is maximum possible.

53. int main()

{

String str, result;

Int max=-1;

getline( cin,str);

int len=str.length();

int freq[256]={0};

for(int i=0; i<len;i++)

{

freq [str[i]]++;

}

for(int i=0;i<len;i++)

{

if (max<freq[str[i]])

{

max =freq[str[i]]

```

result=str[i];
}
}
Cout<<result;
return 0;
}

```

54. DBMS which of the following statements about the WOUND-WAIT scheme are correct.

1. An older transaction is allowed to wait on a younger transaction.
2. A younger transaction is allowed to wait on an order transaction.
3. If an order transaction requests an item that is held by a younger transaction, then the older one preempts the younger transaction by aborting the younger one.
4. If a younger transaction requests an item is held by an older transaction, then the younger transaction is aborted and restarted.

Options:

- A. 1 and 2
- B. 2 and 3
- C. 1 and 3
- D. 2 and 4

55. Security problem

Problem description:

A security company sends and receives the location coordinates in encrypted manner. The encrypted coordinates will be in the form of two strings, one denoting the latitude and other denoting the longitude.

The decryption rules are as follows:

The last character of the encrypted string denotes the direction. If it is a latitude string it will have characters, n for north and s for South. Similarly if it is a longitude string it will have character , e for East and w for west.

Except last character the string denotes an integer value irrespective of whether it a latitude string or a longitude string.

The integer part of the coordinate can be decoded as (count of letter with maximum occurrences- count of letter with minimum occurrence in the string)

All the letters are in lower case.

You will be given two encrypted strings one each of a latitude and a longitude. You need to decrypt those and find the coordinates and print them

Constraints:

4<length of encrypted string <=1000

Input:

The input has two lines

The first line contains a string representing the encrypted latitude. The second line contains a string representing the encrypted longitude.

56. t=int (input())

While(t>8)

list1=list(map(int,input().strip().split()))

list2=list(map(int,input().strip().split()))

n=int(input())

r1=list1[0]

r2=list1[1]

r3=list[2]

v1=list2[0]

v2=list2[1]

v3=list2[2]

if(v1\*n\*r1==v2\*n\*r2==v3\*n\*r3):

print("true")

else:

```
print("false")  
t=t-1
```

57. The king's summer house is being rewired .The house has 11 rooms. To avoid wires getting entangled and creating short circuits the electricians have been asked to observe the following rules.

1. room 1 must be rewired before rooms 3 and 4
2. room2 must be rewired before room 6.
3. room3 must be rewired before room 5.
- 4.room5 must be rewired before rooms 8 and 9
- 5.room6 must be rewired before room 7
- 6.room7 must be rewired before room 5
- 7.room8 must be rewired before room 10
- 8.room9 must be rewired before room 11

It takes one full day to rewire a room. There are enough electricians to rewire as many rooms as can be rewired in parallel. Keeping in mind the constraints above what is the minimum number of days required to complete the job?