SIMPLE ARRAY SUM

Given an array of integers, find the sum of its elements.
For example, if the array ar=[1,2,3], 1+2+3=6 so return 6.

Input: ar: array of integers.

The first line contains n space-separated integers representing the array's elements.

Constraints: 0 < n, ar[i] <= 1000

Sample input:
6
1,2,3,4,10,11
Sample output:
31

Explanation:
We print the sum of the array's elements.

Solution:

COMPARE THE TRIPLETS

Alice and Bob each created one problem for HackerRank. A reviewer rates the two challenges, awarding points on a scale from 1 to 100 for three categories: problem clarity, originality, and
difficulty.

We define the rating for Alice's challenge to be the triplet a=(a[0], a[1], a[2]), and the

rating for Bob's challenge to be the triplet b=(b[0], b[1], b[2]).

Your task is to find their comparison points by comparing a[0] with b[0], a[1] with b[1] and a[2] with b[2].

- If a[i] > b[i], then Alice is awarded 1 point.
- If a[i] < b[i], then Bob is awarded 1 point.
- If a[i] = b[i], then neither person receives a point.

Comparison points is the total points a person earned.
Given a and b, determine their respective comparison points.

For example, a=[1,2,3] and b=[3,2,1]. For elements 0, Bob is awarded a point because a[0] < b[0].
For the equal elements a[1] and b[1], no points are earned. Finally, for elements2, a[2]>b[2] so Alice receives a point. Your return array would be [1,1] with Alice's score first and Bob's second.

Function Description

Complete the function compareTriplets in the editor below. It must return an array of two integers, the first being Alice's score and the second being Bob's.
CompareTriplets has the following parameter(s):
a: an array of integers representing Alice's challenge rating
b: an array of integers representing Bob's challenge rating

Input Format

The first line contains 3 space-separated integers, a[0],a[1], and a[2], describing the respective values in triplet a. The second line contains 3 space-separated integers, b[0], b[1], b[2] describing the respective values in triplet b.

Constraints:
1<= a[i] <= 100
1<= a[i] <= 100

Sample input:
5 6 7
3 6 10
Sample output:
1 1

A VERY BIG SUM

Calculate and print the sum of the elements in an array, keeping in mind that some of those integers may be quite large.

Function Description

Complete the aVeryBigSum function in the editor below. It must return the sum of all array elements.

AveryBigSum has the following parameter(s):

- ar: an array of integers.

Input Format

The first line of the input consists of an integer n.
The next line contains n space-separated integers contained in the array.

Output Format

Print the integer sum of the elements in the array.

Constraints:

1<=n<=10
0<=ar[i]<=10^10

Sample input
5
1000000001 1000000002 1000000003 1000000004 1000000005

Sample output

5000000015

Note:
The range of the 32-bit integer is (-2^31) to (2^31 -1) or [-2147483648, 2147483647],
When we add several integer values, the resulting sum might exceed the above range.
You might need to use long long int in C/C++ or long data type in java to store such

sums.

DIAGONAL DIFFERENCE

Given a square matrix, calculate the absolute difference between the sums of its diagonals.
For example, the square matrix arr is shown below:

1 2 3
4 5 6
9 8 9

The left-to-diagonal = 1+5+9=15. The right-to-left diagonal = 3+5+9=17.
Their absolute difference is |15 – 17|=2.

Function Description

Complete the diagonalDifference function in the editor below. It must return an integer representing the absolute diagonal difference. DiagonalDifference takes the following paramenter:

- arr an array of integers.

Input Format

The first line contains a single integer, n, the number of rows and columns in the matrix arr.
Each of the next n lines describes a row, arr[i], and consists of n space-separated integers arr[i][j].

Constraints

-100 <= arr[i][j] <= 100

Output Format

Print the absolute difference between the sums of the matrix's two diagonals as a single integer.

Sample input
3
11 2   4
 4   5   6
10 8 -12
Sample Output
15

Explanation:
The primary diagonal is:
11
  5
    -12

and secondary diagonal is:
       4
    5
 10

Sum across the secondary diagonal: 4+5+10=19
Difference: |4-19|=15

Note: |x| is the absolute value of x.

PLUS MINUS

Given an array of integers, calculate the fractions of its elements that are positive, negative, and zeros.
Print the decimal value of each fraction on a new line.

Note: This challenge introduces precision problems. The test cases are scaled to six decimal places, though answers with absolute error of up to 10^4 are acceptable.

For example, given the array arr=[1,1,0,-1,-1] there are 5 elements, two positive, two negative and one zero. Their ratios would be 2/5=0.400000, 2/5=0.400000 and 1/5=0.200000. it should be printed as:

0.400000
0.400000
0.200000

Function Description

Complete the plusMinus function in the editor below. It should print out the ratio of positive, negative and zero items in the array, each on a separate line rounded to six decimals.

PlusMinus has the following parameter(s):

- arr: an array of integers

Input Format

The first line contains an integer, n, denoting the size of the array. The second line contains n space-separated integers, describing an array of numbers arr(arr[0], arr[1],arr[2],...,arr[n-1]).

Constraints

0<n<=100
-100<=arr[i]<=100

Output Format

You must print the following 3 lines:

1. A decimal representing of the fraction of positive numbers in the array compared to its size.
2. A decimal representing of the fraction of negative numbers in the array compared to its size.
3. A decimal representing of the fraction of zeros in the array compared to its size.

Sample Input
6
-4 3 -9 0 4 1

Sample Output
0.500000
0.333333
0.166667

Explanation

There are 3 positive numbers, 2 negative numbers and 1 zero in the array.
The proportions of ocurrence are positive:

5/6=0.166667.

STAIRCASE

Consider a staircase of size n=4:

```
   #
  ##
 ###
####
```

Observe that its base and height are both equal to n, and the image is drawn using # symbols and spaces.

Write a program that prints a staircase of size n.

Function Description

Complete the staircase function in the editor below. It should print a staircase as described above.

Staircase has the following parameter(s):

- n: an integer

Input Format

A single integer, n, denoting the size of the staircase.

Constraints
0<n<=100

Output Format

Print a staircase of size n using # symbols and spaces.

Note: The last line must have 0 spaces in it.

Sample Input
6

Sample Output

```
     #
    ##
   ###
  ####
 #####
######
```

Explanation

The staircase is right-aligned, composed of # symbols and spaces, and has a height and width of n=6.

Birthday Cake Candles

You are in charge of the cake of your niece's birthday and have decided the cake will have one candle for each year of her total age. When she blows out the candles, she'll only be able to blow the tallest ones. Your task is to find out how many candles she can succesfully blow out.
For example, if your niece is turning 4 years old, and the cake will have 4 candles of height 4,4,1,3,
she will be able to blow out 2 candles successfully, since the tallest candles are of height 4 and there are 2 such candles.

Function Description

Complete the function birthdayCakeCandles in the editor below. It must return an integer representing the number of candles she can blow out.

birthdayCakeCandles has the following parameter(s):

- arr: an array of integers representing candle heights.

Input Format
The first line contains a single integer,n, denoting the number of candles on the cake.
The second line contains n spcae-separated integers. where each integer I describes the height of candle i.

Constraints

- 1<=n<=10^5
- 1<=ar[i]<=10^7

Output Format

Return the number of candles that can be blown out on a new line.

Sample Input
4
3 2 1 3
Sample Output
2

Explanation
We have one candle of height 1, one candle of height 2, and two candles of height 3. Your niece only blows out the tallest candles, meaning candles where height=3. Because there are 2 such candles, we print 2 on a new line.

MINI-MAX SUM

Given five positive integers, find the minimum and maximum values that can be calculated by summing exactly four of the five integers. Ten print the respective minimum and maximum values as a single line of two space-separated long integers.

For example, arr=[1,3,5,7,8]. Our minimum sum is 1+3+4+7=16 and our maximum sum is 3+5+7+9=24. We would print:
16 24

Function Description

Complete the miniMaxSum function in the editor below. It should print two space-separated integers on one line: the minimum sum and the maximum sum of 4 of 5 elements.

miniMaxSum has the following parameter(s):

- arr: an array of 5 integers

Input Format

A single line of five space-separated integers.

Constraints

1<=arr[i]<=10^9

Output Format

Print two space-separated long integers denoting the respective minimum and maximum values that can be calculated by summing exactly four of the five integers. (The output can be greater than a 32-bit integer.)

Sample Input
1 2 3 4 5
Sample Output
10 14

Explanation

Our initial numbers are 1,2,3,4,5. We can calculate the following sums using four of the five integers.

1. If we sum everything except 1, our sum is: 2+3+4+5=14.
2. If we sum everything except 2, our sum is: 1+3+4+5=13.
3. If we sum everything except 3, our sum is: 1+2+4+5=12.
4. If we sum everything except 4, our sum is: 1+2+3+5=11.
5. If we sum everything except 5, our sum is: 1+2+3+4=10.

Hints: Beware of integer overflow! Use 64-bit integer.

INTERVIEW PREPARATION KIT

WARM-UP Challenges.

Counting Valleys

Gary is an avid hiker. He tracks his hikes meticulously, paying close attention to small details like topography, During his last hike he took exactly n steps. For every step he took, he noted if it was an uphill, U, or a downhill, D step. Gary's hikes start and end at sea level and each step up or down represents a 1 unit change in altitude. We define the

following terms:

- A mountain is a sequece of consecutive steps above sea level, starting with a step up from sea level and ending with a step down to sea level.
- A valley is a sequence of consecutive steps below sea level, starting with a step down from sea level and encoding with a step up to sea level.

Given Gary's sequence of up and down steps during his last hike, find and print the number of valleys he walked through.

For example, if Gary's path is:
s=[DDUUUUDD], he first enters a valley 2 units deep. Then he climbs out an up onto a mountain 2 units high. Finally, he returns to sea level and ends his hike.

Function Description

Complete the countingValleys function in the editor below. It must return an integer that denotes the number of valleys Gary traverse. CountingValleys has the following parameters(s):

- n:the number of steps Gary takes
- s:a string describing his path

Input Format
the first line contains an integer n, the number of steps in Gary's hike.
The second line contains a single string s, of n characters that describe his path.

Constraint

- 2<=n<=10^6
- s[i] element of {UD}

Output Format

Print a single integer that denotes the number of valleys Gary walked through his hike.

Sample Input
8
UDDDUDUU
Sample Output
1

Explanation

If we represent _ as sea level, a step up as /, and a step down as \, Gary's hike can be drawn as:

He enters and leaves one valley.

Stock Merchant

John works at a clothing store. He has a large pile of socks that he must pair by color for sale. Given an array of integers representing the color of each sock, determine how many pairs of socks with matching colors there are.
For example, there are n=7 socks with colors ar=[1,2,1,2,1,3,2]. There is one pair of color 1 and one of color 2. There are three odd socks left, one of each color. The number of pairs is 2.

Function Description

Complete the sockMerchant function in the editor below. It must return an integer representing the number of matching pairs of socks that are available.

sockMerchant has the following parameter(s):

- n: the number of socks in the pile
- ar: the colors of each sock

Input Format
The first line contains an integer n, the number of socks represented in ar.
The second line contains n space-separated integers describing the colors ar[i] of the socks in the pile.

Constraints

- 1<= n <= 100
- 1<=ar[i] <= 100 where 0 <=i<n

Output Format
Return the total number of matching pairs of socks that John can sell.

Sample Input

9
10 20 20 10 10 30 50 10 20
Sample Output
3

ON CLOUDS

Emma is playing a new mobile game that starts with consecutively numbered clouds. Some of the clouds are thunderheads and others are cumulus. She can jump on any cumulus cloud having a number that is equal to the number of the current cloud plus 1 or 2. She must avoid the thunderheads. Determine the minimum number of jumps it will take Emma to jump from her starting position to the last cloud. It is always possible to win the game.

For each game, Emma will get an array of clouds numbered 0 if they are safe or 1 if they must be avoided. For example, c=[0,1,0,0,0,1,0] indexed from 0...6. The number on each cloud is its index in the list so she must avoid the cloud at indexes 1 and 5. She could follow the following two paths: 0-->2-->4-->6 or 0-->2-->3-->4-->6. The first path takes 3 jumps while the second takes 4.

Function Description

Complete the onClouds function in the editor below. It should return the minimum number of jumps required, as an integer, onClouds had the following parameter(s):

- c: an array of binary integers

Input Format

The first line contains an integer n, the total number of clouds. The second line contains n space-separated binary integers describing clouds c[i] where 0 <= i < n.

Constraints:

- 2<=n<=100
- c[i] is element of {0,1}
- c[0]=c[n-1]=0

Output Format

Print the minimum number of jumps needed to win the game.

Sample Input 1
7
0 0 1 0 0 1 0

Sample Output 1
4

Sample Input 2
6
0 0 0 0 1 0

Sample Output 2
3

REPEATED STRING

Lilah has a string s, of lowercase English letters that she repeated infinitely many times. Given an integer, n, find and print the number of letter a's in the first n letters of Lila's infinite string.

For example, if the string s='abcac' and n=10, the substring we consider is abcacabcac, the first 10 characters of her infinite string. There are 4 ocurrences of a in the substring.

Function Description

Complete the repeatedString function in the editor below. It should return an integer representing the number of occurrences of a in the prefix of length n in the infinitely repeating string.

repeatedString has the following parameter(s):

- s: a string to repeat
- n: the number of characters to consider

Input Format

The first line contains a single string, s.
The second line contains an integer, n.

Constraints

- 1<=|s|<=100
- 1<=n<=10^12
- For 25% of the test cases, n<=10^6

Output Format

Print a single integer denoting the number of letter a's in the first n letters of the infinite string created by repeating s infinitely many times.

Sample Input
aba
10
Sample Output
7
Explanation
The first n=10 letters of the infinite string are abaabaabaa. Because there are 7 a's, we print 7 on a new line.

Sample Input II
a
10000000000000
Sample Output II
10000000000000

Explanation

Because all of the first n=1000000000000 letters of the infinite string are a, we print 1000000000000 on a new line.

1: What is Python?

Python is a high-level, interpreted, interactive, and object-oriented, scripting language. Python is designed to be highly readable. It uses English words frequently, whereas the other languages use punctuation, and it has fewer syntactical constructions than the other languages.

2: What are the key features of Python?

- Python is an interpreted language, so it doesn't need to be compiled before execution, unlike languages such as C.
- Python is dynamically typed, so there is no need to declare a variable with the

data type. Python Interpreter will identify the data type on the basis of the value of the variable.

For example, in Python, the following code line will run without any error:
a=100
a=”Intellipaat”

- Python follows an object-oriented programming paradigm with the exeption of having access specifiers (public and private keywords), Python has classes, inheritance, and all other usual OOPs concepts.
- Python is a cross-platform language, i.e, a Python program written on a Windows system will also run on a Linux system with little or no modifications at all.
- Python is literally a general-purpose language, i.e, Python finds its way in various domains such as web application development, automation, Data Science, Machine Learning, and more.

4: What is the purpose of PYTHONPATH environment variable?

PYTHONPATH has a role similar to PATH. This variable tells Python interpreter where to locate the module files imported into a program. It should include Python source library directory and the directories containing Python sourcecode. PYTHONPATH is sometimes preset by python installer.

5: What is the purpose of PYTHONSTARTUP, PYTHONCASEOK, and PYTHONHOME environment variables?

- PYTHONSTARTUP: It contains the path of an initialization file having Python source code. It is executed every time we start the interpreter. It is named as .pythonrc.py in Unix, and it contains commands that load utilities or modify PYTHONPATH.

- PYTHONCASEOK: It is used in Windows to instruct Python to find the first case-insensitive match in an import statement. We can set this variable with any value to activate it.

- PYTHONHOME: It is an alternative module search path. It is usually embedded in PYTHONSTARTUP or PYTHONPATH directories to make switching of module libraries easy.

6: Which data types are supported in Python?

Python has 5 standard data types:

- Numbers
- Strings
- Lists
- Tuples
- Dictionaries

7: Explain Inheritance in Python with an example.

As Python follows an object-oriented programming paradigm, classes in Python have the ability to inherit the properties of another class. This process is known as inheritance. Inheritance provides the code reusability feature. The class that is being inherited is called a **superclass** and the class that inherites the superclass is called a **derived** or **child class**. Following types of inheritance are supported in Python:

- **Single Inheritance:** When a class inherits only one superclass.
- **Multiple Inheritance:** When a class inherits multiple superclasses.
- **Multilevel Inheritance:** When a class inherits a superclass and then another class inherits this derived class forming a parent, child, and grandchild class structure.
- **Hierarchical Inheritance:** When one superclass is inherited by multiple derived classes.