1) Advance sub array problem

You are competing in a basketball contest. In this contest the score for each successful shot depends on both the distance from the basket and the player's position. The ball is shot N times, successfully. You are given an array A containing the distance of a player from basket for N shots. The index of array represents the position of the player. Score is calculated by multiplying the position with the distance from the basket.

Your task is to find and return an integer value, representing the maximum possible score you can achieve by choosing a contiguous subarray of size K from the given array.

Note:

* A subarray is a contiguous part of array.

* Assume 1 based indexing.

* The array contains both negative and positive values.

* Assume the player is standing on a cartesian plane.

Input Format

- **input1**:An integer value N representing the number of shots made by the player

- **input2** : An integer K representing the size of subarray

- i**nput3 :** An array of integers

Sample Input

5
2
1 2 3 4 5

Sample Output

14

Solution:

```
inp1 = int(input())
inp2 = int(input())
arr = list(map(int, input().split()))

mx = -1
for i in range(0, len(arr)-inp2+1):
```

```
    temp = arr[i:i+inp2]
    k,s = 1,0
    for j in temp:
        s += (j*k)
        k += 1
    if s > mx:
        mx = s
print(mx)
```

---

2) Ant on Rail

There is a ant on your balcony.It wants to leave the rail so sometimes it moves right and sometimes it moves left until it gets exhausted.Given an integer array A of size N which consists of integer 1 and -1 only representing ant's moves.

Where 1 means ant moved unit distance towards the right side and -1 means it moved unit distance towards the left .Your task is to find and return the integer value representing how many times the ant reaches back to original starting position.

Note:

- Assume 1-based indexing
- Assume that the railing extends infinitely on the either sides

Input Format:

input1 : An integer value N representing the number of moves made by the ant.

input2 : An integer array A consisting of the ant's moves towards either side

Sample Input

5

1 -1 1 -1 1

Sample Output

2

Solution:

```
 n= int(input())
arr = list(map(int, input().split()))

c = 0
for i in range(n):
```

```
    if sum(arr[:i+1]) == 0:
        c += 1
print(c)
```

---

3) Chocolate jar

You are given an integer array of size N, representing jars of chocolates. Three students A, B, and C respectively, will pick chocolates one by one from each chocolate jar, till the jar is empty, and then repeat the same with the rest of the jars. Your task is to fine and return an integer value representing the total number of chocolates that student A will have, after all the chocolates have been picked from all the jars.

Note: Once a jar is done A will start taking the chocolates from the new jar.

Input Format :

input1: An integer array representing the quantity of chocolates in each jar.

input2: An integer value N representing the number of jars.

Output Format:

Return an integer value representing the total number of chocolates that student A will have, after all the chocolates are picked.

Example:

Input:

10 20 30

3

Output:

21

Explanation:

Jar 1: 10 chocolates -> A-4, B-3,C-3

Jar 2: 20 chocolates -> A-7, B-7, C-6

Jar 3: 30 chocolates -> A-10, B-10,C-10

so A gets a total of 4+7+10=21 chocolates.

Solution

```
 arr = list(map(int, input().split()))
n = int(input())

c = 0
for i in arr:
    if i == 0:
        continue
    if i <= 3:
        c += 1
    else:
        if i%3 == 0:
            c += (i//3)
        else:
            c += (i//3) + 1
print(c)
```

---

4) Diwali Contest

Max is planning to take part in a Diwali contest at a Diwali Party that will begin at 8 PM and will run until midnight (12 AM) i.e., for 4 hours. He also needs to travel to the party venue within this time which takes him **P** minutes. The contest comprises of **N** problems that are arranged in order of difficulty, with problem 1 being the simplest and problem N being the most difficult. Max is aware that he will require 5*i minutes to solve the i^{th} problem.

Your task is help Max find and return an integer value, representing the number of problems Max can solve and reach the party venue within the given time frame of 4 hours.

Note: Max will leave his home at exactly 8 PM to reach the party venue.

Input Format:

input1: An integer value N, representing the total number of problems.

input2: An integer value P, Representing the time to travel in minutes from his home to the party venue.

Example:

Input:

6

180

Output:

4

Explanation:

The amount of time left to solve the problems is 4*60-180=60 mins.

1st Problem - 5 mins, Time left = 60-5=55 mins

2nd Problem - 10 mins, Time left = 55-10=45 mins

3rd Problem - 15 mins, Time left = 45-15=30 mins

4th Problem - 20 mins, Time left = 30-20=10 mins

5th Problem - 25 mins

So he can solve only 4 problems as he is not left with 25 mins to complete 5th problem.

Solution

```
n = int(input())
p = int(input())

x = 240-p
c = 0
for i in range(1, n+1):
    if x > 0 and x>5*i:
        x = x-5*i
        c += 1
    else:
        break
print(c)
```

---

5) Dog Age

Max has a dog, which is an integer N years old. Now he wants the age of his dog in human years. The internet says that 1 dog year equals to 7 human years. Your task is to find and return an integer value representing the age of Max's dog in human years.

Input Format:

input1: An integer value N representing the age of Max's dog

Output Format:
Return an integer value representing the age of Max's dog in human years

Example:
Input:
4
Output:
28

Solution

```
 n = int(input())
print(n*7)
```

---

6) Elections

You are the head of the election committee in your village. Each Political party is associated with a unique number and the votes are represented as an integer array A. where each element contains the party number voted for by the villagers. For a party to win, they must have a majority of votes. our task is to find and return an integer value denoting the winning party's number. Return -1 if there is no party with a majority.

Note: If only one vote is there he is the winner.

Input Format :

input1: An integer value representing the number the number of voters

input2: An integer array A representing the votes of the voters.

output Format:

Return an integer value denoting the winning party's number.Return -1 there is no party with a majority

Example 1:

Input:

6

1 1 2 2 2 3

Output:

2

Explanation:

As 2 got the most number of votes i.e 3.

Example 2:

Input:

6

1 2 1 1 2 2

Output:

-1

Explanation:

As both the contestants got same votes there is no majority.

Solution :

```
n = int(input())
arr = list(map(int, input().split()))
d = {}
if n == 1:
    print(arr[0])
else:
    mx,mc = -1,-1
    for i in arr:
        if i in d:
            d[i] += 1
        else:
            d[i] = 1
    ans = -1
    vals = list(d.items())
    vals.sort(reverse=True, key=lambda x: x[1])
    if len(vals) == 1:
        ans = vals[0][0]
    else:
        if vals[0][1] == vals[1][1]:
            ans = -1
        else:
            ans = vals[0][0]
    print(ans)
```

---

7) Space Counter

You have been given the task of making the content on a social media platform more user-friendly. Your task is to find and return an integer value representing the count of the number of spaces in a given string S.

Input:

A string S

Output :

Return an integer value representing the count of the number of spaces in a given string S.

Example:

Input:

Hello World Hey

Output:

2

Solution

```
s=input().split()
print(len(s)-1)
```

---

8) Minimum Array sum

Paul is given an array A of length N. He must perform the following Operations on the array sequentially:

* Choose any two integers from the array and calculate their average.

* If an element is less than the average, update it to 0. However, if the element is greater than or equal to the average, he need not update it.

Your task is to help Paul find and return an integer value, representing the minimum possible sum of all the elements in the array by performing the above operations.

Note: An exact average should be calculated, even if it results in a decimal.

Input Format:

input1: An integer value N, representing the size of the array A.

input2: An integer array A.

Output Format:

Return an integer value, representing the minimum possible sum of all the elements in the array by

Sample Input

5
1 2 3 4 5

Sample Output

5

Solution

```
n = int(input())
arr=list(map(int, input().split()))
arr.sort()
m1,m2=arr[-1],arr[-2]
av=(m1+m2)/2
s=0
for i in range(len(arr)):
   if arr[i]>=av:
      s+=arr[i]
print(s)
```

---

9) Math test

Alice has a mathematics test for which she is underprepared. She has to do at least one question correctly to pass the test. He decides to do a question which needs her to find the smallest prime number which is larger than a given integer N. Your task is to find and return an integer value representing the smallest prime number larger than N.

Input Format:

input1: An integer value N

Output Format:

Return an integer value representing the smallest prime number larger than N.

Sample Input

6

Sample Output

7

Solution

```
def isPrime(num):
   if num in(0,1):
      return False
   else:
      for i in range(2,int(num**0.5)+1):
         if num%i==0:
            return False
      return True

inp = int(input())
found=False
k=inp+1
while not found:
   if k%2 !=0 or k%3 !=0 or k%5 !=0:
      if isPrime(k):
         found=True
         print(k)
   k+=1
```

---

10) Magic String

Eva has a string S containing lowercase English letters. She wants to transform this string into a Magic String, where all the characters in the string are the same. To do so, she can replace any letter in the string with another letter present in that string. 6

Your task is to help Eva find and return an integer value, representing the minimum number of steps required to form a Magic String. Return 0, if S is already a Magic String.

Input Specification:

input1: A string S, containing lowercase English letters.

Output Specification:

Return an integer value, representing the minimum number of steps required to form a Magic String. Return 0, if S is already a Magic String.

Sample Input:

aaabbbccdddd

Sample Output:

8

Solution

```
from collections import defaultdict
arr = input()

d=defaultdict(int)
for i in arr:
   d[i] +=1
maxEle=max(list(d.items()), key=lambda x:x[1])
print(sum(d.values()) - maxEle[1])
```

---

11) Encode The Number

You work in the message encoding department of a national security agency. Every message that is sent from or received in your office is encoded. You have an integer N, and each digit of N is squared and the squares are concatenated together to encode the original number. Your task is to find and return an integer value representing the encoded value of the number.

input1: An integer value N representing the number to be encoded.

Output :

Return an integer value representing the encoded value of the number.

Sample Input:

167

Sample Output:

13649

Solution

```
num=str(input())
res=""
for i in num:
   res+=str(int(i)*int(i))
print(int(res))
```

---

12) Arduino

Tom is an Arduino Programmer. He has designed a program to run his robocar on a horizontal number line. Initially, the car is parked at: 0.

Given an array A of N integers which can be A. B. C... the robocar runs as follows as per the designed program

First the robocar moves A units in specified direction(right in case the integer is positive and left if the integer is negative).

Then robocar first moves A units and then B units in a specified direction.

In the next step, the robocar moves A units. B units, and then C units in a specified direction.

This process keeps on repeating as per the number of integers in the sequence..

Your task is to find and retum an integer value, representing the farthest coordinate reached by the robocar from the beginning to the end of the process.

Sample Input:

1 -2 3 4

Sample Output:

6

Solution

```
arr = list(map(int, input().split()))
n=len(arr)
d=0
s=0
for i in range(n):
   s+=arr[i]
   if abs(s)>d:
      d=abs(s)
print(d)
```

---

13) Minimum Number of Key Presses

George has a setup which includes a special keyboard and a monitor , that initially displays 0. The special keyboard has 11 numeric keys (0,1,2,3,4,5,6,7,8,9,00). If he presses 00, the previously displayed value will be multiplied by 100. Whereas, if he presses any other numeric key, the previously displayed value will be firstly multiplied by 10 and then the number on the key will be added to it

You are given a numeric string S. Your task is to help George find and return an integer value, representing the minimum number of key presses to reach the number.

Input Specification:

input: A numeric string s. representing the final number,

Output Specification:

Return an integer value, representing the minimum number of key presses to reach the number.

Sample Input:

100

Sample Output:

2

Solution

```
s = input()
i = 0
res = 0
while i<len(s):
   try:
```

```
      if s[i]=="0" and s[i+1]=="0":
         i+=2
      else:
         i+=1
   except:
      i+=1
   res+=1
print(res)
```

---

14) Special String

Alice has a string A consisting of lowercase English letters. Her friend gives her another string S and asks her to modify string A and replace its characters with the characters present in string S.

But, to achieve the above task, Alice must follow the below steps:

1. Choose a character from string S that has the minimum ASCII distance from the ith character in string A

Replace the ith character in string A with the chosen character in string S

Your task is to find and return an integer value, representing minimum total ASCII distance that is required to modify string A to the characters in string S. Return 0, if all the characters in string S are already present in string A

Sample Input:

abcd

xyz

Sample Output:

86

Solution

```
a = input()
s = input()
total = 0
for i in a:
   if i not in s:
      temp = 125
      for j in s:
         d = abs(ord(i) - ord(j))
         if d < temp:
            temp = d
      total += temp
print(total)
```

15) Finding commas

Liam works as a data analyst for a company that stores massive amounts of numerical data. He has been tasked with determining how many commas are used when writing numbers in the range of 1 to N (inclusive) in a specific format

In this format, if numbers are more than four digits long, commas are used to separate the numbers into groups of three, starting from the right for the representation of the number. Your task is to help Liam find and return an integer value, representing the total number of commas used when writing each integer in the range of 1 to N

Input Specification:

Input: An integer value N. representing the number range.

Output Specification:

Return an integer value, representing total number of commas used when writing each integer in the range of 1 to N.

Sample Input:

5000

Sample Output:

4001

Solution

```
n = int(input())
cur = 1000
res = 0
comma = 1
while cur<=n:
   next=cur*1000
   numbers = min(n-cur+1, next-cur)
   res += numbers*comma
   cur=next
   comma+=1
print(res)
```

16) Toss and score

You are playing a game of Toss and Score in the Hillwood City Mall with your friends. The game consists of the following rules:

Toss an unbiased coin multiple times.

For each heads you get 2 points and for each tails you lose 1 point.

The game ends as soon as you get 3 heads in a row, or you toss the coin throughout the length of string S.

You have been given a string 5 consisting of letters H (for heads) and T (for tails) denoting the sequence results you get on the tass of coin N times. Your task is to find and return an integer value representing the final score you get once the game ends.

Note: The final score can be negative too.

Input Specification:

Input1: A string s. representing the sequence of results you get on the toss of coin N times.

Sample Input:

HHHTT

Output:

6

Solution

```
inp = input()

hc = 0
score = 0
for i in inp:
   if i == "H":
      hc += 1
      score += 2
      if hc == 3:
         break
   else:
      score -= 1
      hc = 0
print(score)
```

---

17) Best Grade

Andrew has a string N consisting of lowercase English letters representing respective grades of N students in his class. His grade is at Pth index. He can swap any two adjacent grades.

Your task is to help Andrew find and return a string value, representing maximized grade by bringing lexicographically smallest character on the Pth index after doing at most K swaps

Sample Input:

abcdefg

3

2

Sample Output:

a

Solution

```
input1 = input()
input2 = int(input())
input3 = int(input())

grade = input1[input2-1]
if(input2-input3>1):
   start=input2-input3-1
else:
   start = 0
if(input2+input3<=len(input1)):
   end=input2+input3
else:
   end=len(input1)
return min(input1[start:end],key=lambda x:ord(x))
```
