

String Pair

- Problem Description

One person hands over the list of digits to Mr. String, But Mr. String understands only strings. Within strings also he understands only vowels. Mr. String needs your help to find the total number of pairs which add up to a certain digit D.

The rules to calculate digit D are as follow

Take all digits and convert them into their textual representation

Next, sum up the number of vowels i.e. {a, e, i, o, u} from all textual representation

This sum is digit D

Now, once digit D is known find out all unordered pairs of numbers in input whose sum is equal to D. Refer example section for better understanding.

- Constraints

1 <= N <= 100



1 <= value of each element in second line of input <= 100

Number 100, if and when it appears in input should be converted to textual representation as hundred and not as one hundred. Hence number of vowels in number 100 should be 2 and not 4

- Input

First line contains an integer N which represents number of elements to be processed as input

Second line contains N numbers separated by space

- Output

Lower case representation of textual representation of number of pairs in input that sum up to digit D

Note:- (If the count exceeds 100 print "greater 100")

- Time Limit



— Time Limit

1

— Examples

Example 1

Input

5

1 2 3 4 5

Output

one

Explanation

1 -> one -> o, e

2 -> two -> o

3 -> three -> e, e

4 -> four -> o, u

5 -> five -> i, e



Thus, count of vowels in textual representation of numbers in input = $\{2 + 1 + 2 + 2 + 2\} = 9$. Number 9 is the digit D referred to in section above.

Now from given list of number {1,2,3,4,5}-> find all pairs that sum up to 9.

Upon processing this we know that only a single unordered pair {4, 5} sum up to 9. Hence the answer is 1. However, output specification requires you to print textual representation of number 1 which is one. Hence output is one.

Note: - Pairs {4, 5} or {5, 4} both sum up to 9. But since we are asking to count only unordered pair, the number of unordered pair in this combination is only one.

Example 2

Input

3

Thus, count of vowels in textual representation of numbers in input = $\{2 + 1 + 2 + 2 + 2\} = 9$. Number 9 is the digit D referred to in section above.

Now from given list of number {1,2,3,4,5} -> find all pairs that sum up to 9.

Upon processing this we know that only a single unordered pair {4, 5} sum up to 9. Hence the answer is 1. However, output specification requires you to print textual representation of number 1 which is one. Hence output is one.

Note: - Pairs {4, 5} or {5, 4} both sum up to 9. But since we are asking to count only unordered pair, the number of unordered pair in this combination is only one.

Example 2

Input

3

7 4 2

Output

zero

Explanation

7 -> seven -> e, e

4 -> four -> o, u

2 -> two -> o

Thus, count of vowels in textual representation of numbers in input = $\{2 + 2 + 1\} = 5$. Number 5 is the digit D referred to in section above.

Since no pairs add up to 5, the answer is 0. Textual representation of 0 is zero. Hence output is zero.

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Max Sum

— Problem Description

Two friends A and B are playing with an array of integers. They both agree upon the operations to be performed on the array but differ on choice of window size to perform the said operations.

The operations to be performed on the array are explained below:

- One can choose to add at the most X consecutive elements.
 - After performing the addition operation, it is mandatory to skip the next element in the array.
 - The goal is to achieve maximum sum by choosing appropriate elements in the array.
- A wants X to be W, while B wants X to be $(W + D)$. This is the only difference that they have. Your task is to find out who wins. Winner is the person whose sum is higher.
- The inputs that will be provided are values of elements of array, value of W and value of D.

Example:

Array: 4 5 6 1 2 7 8 9

Window Size (W): 3

Output: 39

Explanation

- We will choose to add elements 4, 5, 6 since window size is 3.
 - Since one addition operation is complete, we have to skip one element which is 1.
 - We choose to skip element 2 because the next three values are also higher than 2.
 - The max sum thus obtained is 39.
- Now suppose the array was: 4 5 6 1 2 3 7 8 9
- We will choose to add elements 4, 5, 6 since window size is 3.
 - Since one addition operation is complete, we have to skip one element which is 1.

Explanation

- We will choose to add elements 4, 5, 6 since window size is 3.
 - Since one addition operation is complete, we have to skip one element which is 1.
 - We choose to skip element 2 because the next three values are also higher than 2.
 - The max sum thus obtained is 39.
- Now suppose the array was: 4 5 6 1 2 3 7 8 9
- We will choose to add elements 4, 5, 6 since window size is 3.
 - Since one addition operation is complete, we have to skip one element which is 1.
 - Now we choose to pick element 2 because we can skip element 3 and still pick up the next 3 values viz 7, 8, 9.
 - The max sum thus obtained is 41.
- Note that we picked up only one element in second selection since constraint is only on maximum number to be chosen, not minimum.
- Now suppose the array was: 4 5 6 7
- Since one can start from any index, we choose element 5, 6, 7.
- The max sum thus obtained is 18.
- The above examples illustrate the game with a fixed window size of W. Since B prefers to play the same game with the size of W+D, the steps will remain the same but the max sum output may be different. Print different output depending on whether A wins, B wins or it's a tie.

— Constraints

```
0 <= N <= 10 ^ 5
5 <= W <= 10 ^ 5
-10^5 <= D <= 10^5
0 < (W + D) <= N
0 <= elements in array <= 10 ^ 9
```

— Input

First line contains three space separated integers N and W and D respectively, which denote

- Input

First line contains three space separated integers N and W and D respectively, which denote

N - size of array

W - window size

D - difference

Second line contains of N space separated integers denoting the elements of the array

- Output

If B wins, print "Right <absolute difference>"

If A wins, print "Wrong <absolute difference>"

If it's a tie, print "Both are Right"

Refer Examples section for better understanding.

- Time Limit

1

- Examples

Example 1

Input

8 5 2



4 5 6 1 2 7 8 9

Output

Wrong 2

Explanation

Here we have given N = 8, W = 5, D = -2

A will maximize the sum of elements of the array using window size 5. Whereas B will minimize the sum of elements of the array using window size 3 (5-2).

Here we have given $N = 8$, $W = 5$, $D = -2$

A will maximize the sum of elements of the array using window size 5. Whereas B will maximize the sum of elements of the array using window size 3 (5-2).

Using logic as depicted above A will get the max sum as 41 and B will get the max sum as 39. The absolute difference is $41 - 39 = 2$.

Hence, output will be: Wrong 2

Example 2

Input

9 2 2

4 5 6 1 2 3 7 8 9

Output

Right 10

Explanation

Here we have given $N = 9$, $W = 2$, $D = 2$

A will maximize the sum of elements of the array using window size 2. Whereas B will maximize the sum of elements of the array using window size 4 (2+2).

Using logic as depicted above A will get the max sum as 33 and B will get the max sum as 43. The absolute difference is $43 - 33 = 10$.

Hence, output will be: Right 10

Example 3

Input

10 9 -3

4 5 6 3 2 3 7 8 9 2

Output

Both are right

Explanation

Here we have given $N = 10$, $W = 9$, $D = -3$

A will maximize the sum of elements of the array using window size 9. Whereas B will maximize the sum of elements of the array using window size 6 (9-3).

Input

10 9 -3

4 5 6 3 2 3 7 8 9 2

Output

Both are right

Explanation

Here we have given $N = 10$, $W = 9$, $D = -3$

A will maximize the sum of elements of the array using window size 9. Whereas B will maximize the sum of elements of the array using window size 6 (9-3).

Using logic as depicted above A will get the max sum as 47 and B will get the max sum as 47. The absolute difference is $47 - 47 = 0$.

Hence, output will be: Both are right

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Zoo Design

— Problem Description

Aman is a rich businessman who want to build a zoo. He wants to make enclosures for terrestrial and aquatic animals. Terrestrial animals will be of two types, namely herbivorous and carnivorous animals. So there will be three different enclosures.

Herbivores like Elephant, Deer are prime attractions. Similarly, Lion and Tiger are prime attractions amongst carnivores. Finally, Dolphins and Shark are prime attractions amongst aquatics for tourists.

Aman being a savvy businessman realizes that in order to minimize the cost of building the zoo without compromising on the attractions, he has to decide how much area to allocate to each animal type. Each animal type requires a certain area to thrive in. This in turn impacts the area allocation, which in turn has cost implications.

Your task is to help Aman workout the mathematics such that the zoo building cost is minimized subject to the following constraints:

- Zoo needs to have minimum of X herbivores, Y carnivores and Z aquatic animals
- Different types of animals will need different minimum area to thrive in
- For animals of a given type, the minimum area required is the same
- There is also a maximum limit for the overall area allocated for each animal type
- Cost of fencing etc. is included in cost of enclosure
- Exclude the essentials like pathways for tourists, from area and cost calculations

Consider all areas in square meters and cost in Rupees.

— Constraints

- 0 < number of animals of each type <= 20
- 0 < max area for each animal type <= 500
- 0 < total area of land on which zoo is to be built <= 1000
- 0 < min area required by individual animals <= 15
- 0 < price of each type of enclosure <= 10000

Area of each type of enclosure should be rounded off to the nearest integer

0 < price of each type of enclosure <= 10000

Area of each type of enclosure should be rounded off to the nearest integer

— Input

First line contains three space separated integers denoting the cost per square meter of building the enclosure for each type of animals viz. herbivorous, carnivorous and aquatic respectively

Second line contains three space separated integers denoting the maximum area that can be allocated to each type of animal viz. herbivorous, carnivorous and aquatic respectively

Next three lines, each will contain two space separated integers M and N, for each type of animal viz. herbivorous, carnivorous and aquatic respectively, where M denotes minimum number of animals of that type and N denotes minimum area required for that animal type

Last line contains an integer which represents the total area of land on which the zoo needs to be built

— Output

Single integer containing the minimum cost required to build the zoo

— Time Limit

1

— Examples

Example 1

Input

10000 1000 1500

250 250 300

5 5

15 5

10 10

500

Output

Output
837500

Explanation

- The cost of constructing the enclosure for herbivores is high. However, since we need to accommodate 5 herbivores.
- Since the cost of constructing the enclosure for carnivores is cheapest we are able to allocate them the maximum limit that we can allocate. Thus we are allocating 250 sq. meters for carnivores.

- The remaining 225 sq. meters can thus be allocated to aquatics without violating any constraint.

Thus the minimum cost of constructing the zoo adhering to all constraints is $(25 * 10000 + 250 * 1000 + 225 * 1500) = 837500$

Example 2

Input

100	1000	1500
250	250	300
5		
155		
10	10	
500		
Output		
325000		

Explanation

- Since the cost of constructing the enclosure for herbivores is cheapest we are able to allocate them the maximum limit that we can allocate. Thus we are allocating 250 sq. meters for herbivores.

- The cost of constructing the enclosure for aquatics is high. However, since we need to accommodate 10 aquatics as per given constraints, a 100 sq. meter land will need to be allocated for the aquatic animals.

- The remaining 150 sq. meters can thus be allocated to carnivores without violating any constraint.



1010

500

Output

325000

Explanation

Since the cost of constructing the enclosure for herbivores is cheapest we are able to allocate them the maximum limit that we can allocate. Thus we are allocating 250 sq. meters for herbivores.

The cost of constructing the enclosure for aquatics is high. However, since we need to accommodate 10 aquatics as per given constraints, a 100 sq. meter land will need to allocated for the aquatic animals.

The remaining 150 sq. meters can thus be allocated to carnivores without violating any constraint.

Thus the minimum cost of constructing the zoo adhering to all constraints is $(250 * 100 + 150 * 1000 + 100 * 150) = 325000$

Upload Solution [Question : E]

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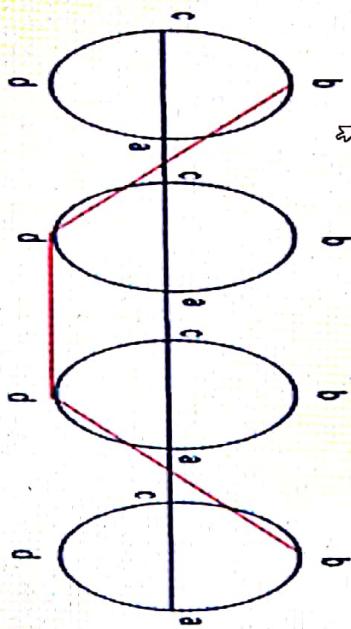
Jogging Ground

— Problem Description

There are 4 circular grounds of equal sizes. Their circumferences do not intersect. The radius and the distance of the center of each circle from the leftmost circle's center are given.

There are 4 joggers who can start at the same time from any of the points designated as $\{a, b, c, d\}$ on the circumference of all the four circles as shown in the diagram below. All 4 joggers jog in different grounds along the circumference of that ground. They could jog in either clockwise (left to right) or anticlockwise (right to left) direction. Finally they may also jog at different speeds.

Given starting position, direction of jogging and speed of jogging of all the 4 joggers, find the summation of length of 3 segments between the four joggers at a given point in time since the start of the jog.



Note: All the computation has to be accurate up to 6 digits after the decimal point.

— Constraints

$1 \leq N \leq 10^9$

$1 \leq N \leq 10^9$

- Input

First line contains 4 integers each denoting the following

- R denotes the radius of all four circles
- D1 denotes the distance centre of the second circle from left to the centre of the leftmost circle
- D2 denotes the distance centre of the third circle from left to the centre of the leftmost circle
- D3 denotes the distance centre of the last circle from left to the centre of the leftmost circle

Second line contains 4 space separated integers denoting the angle with point a of each of the 4 circles where 0 degree indicates point a itself, 90 degree indicates point b, 180 degree indicates point c and 270 degree indicates point d.

Third line contains 4 space separated integers denoting the velocity in degrees per second..

Fourth line contains 4 space separated integers denoting the direction of running for joggers (0=clockwise and 1=anticlockwise).

Fifth Line contains integer N denoting the time in seconds since the start of the jog.

- Output

Print the summation of length of 3 segments between the four joggers after N seconds, rounded to the nearest integer.

- Time Limit

1

- Examples

Example 1

Input

10 25 50 75

0 0 0

1 1 1

Input

10 25 50 75

0 0 0 0

1 1 1 1

1 1 1 1

90

Output
75

Explanation

Here every jogger is starting from point a and all have speed of 1 degree per second. So they will be at 90 degree after 90 seconds. After connecting these points we get segment lengths as $(25+25+25) = 75$

Example 2

Input

10 25 50 75

0 0 0

1 2 3 4

0 0 0

90

Output

91

Explanation

Here every jogger is starting from point a. They are jogging at the speed of 1, 2, 3 and 4 degrees per second respectively in clockwise direction. Hence after 90 seconds they will reach points where the segment length between them is $(18.027800+36.400500+36.400500) = 90.8288$. Hence, output is 91

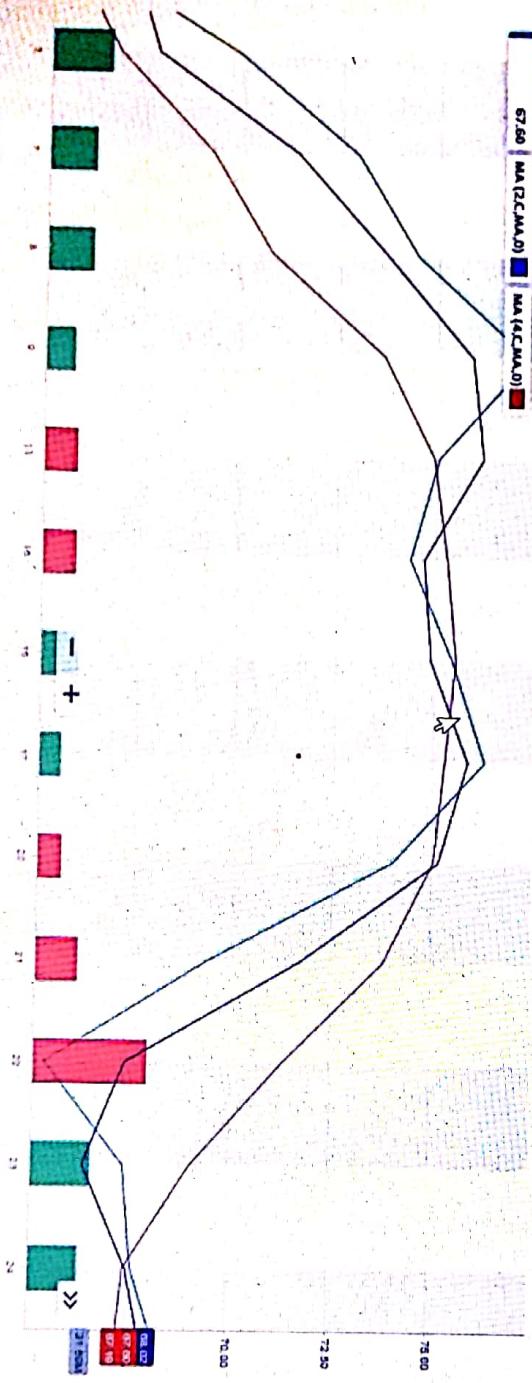
Moving Average

- Problem Description

A stock price is dynamic. Its value can change multiple times in a fraction of a second or remain unchanged for several minutes. Analyzing the dynamics of stock price change can provide an indication for forth coming uptrend or downtrend in that stock. One such indicator is simple moving averages. Now, Harry wants to analyze the price trend of the stock on the basis of moving averages (MA).

Let's consider a moving average of 2-day and 4-day respectively. A 2-day moving average is calculated by taking average of closing price of 2 consecutive days. A 4-day moving average is calculated by taking average of closing price of 4 consecutive days. Now, according to experts whenever a faster moving average curve (2-day MA) cuts the slower moving average (4-day MA) from below, then it is an indication of uptrend in the stock. Similarly, whenever a faster moving averages curve (2-day MA) cuts the slower moving average curve (4-day MA) from above, then it is an indication of downtrend in the stock.

Help Harry in computing the number of uptrends and downtrends in the given time for which the data is provided.



In this graph, there are three lines indicating stock closing price, moving average of two days and four days. Now we can see that between 13th and 15th there is an intersection. It is known as downtrend when moving average of fewer days is cutting downwards the more days moving average and vice versa.

Note1 - There will be no day1 moving average for 2-day MA. Similarly there will be no day1, day2, day3 moving average for 4-day MA. In general there will be no X-1, X-2, Y-1, Y-2, etc day

Note2 - All the computation has to be accurate up to 6 digits after the decimal point.

- Constraints

— Constraints

1 <= X, Y < 10⁴

1 <= N < 10⁵

— Input

First line contains two space separated integers which are the moving average days X and Y.

Second-line contains an integer N denoting number of stock prices.

Third line contains N space separated decimal values denoting the closing price of the stock for N days.

— Output

Print the total number of times the stock will give uptrend or downtrend.

— Time Limit

1

— Examples

Example 1

Input

3 5

11

4.55 5.4 5.65 5.4 5.2 4.85 4.95 5.05 4.9 4.9 4.95

Output

3

Explanation

Here we have two uptrends and one downtrend.

Example 2



35

11

4.55 5.4 5.65 5.4 5.2 4.85 4.95 5.05 4.9 4.9 4.95

Output

3

Explanation

Here we have two uptrends and one downtrend.

Example 2

Input

2 4

14

69.849998 72.900002 74.449997 77.300003 75.050003 74.349998 75.449997 76.300003 74.69.349998 65.349998 67.349998 67.599998 68.449997

Output

4

Explanation

This example is depicted in the image above. Here we have two uptrends (17th and 24th) and two downtrends (15th and 20th).

Upload Solution [Question : B]

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