Problem Set 1

September 18, 2018

Integer Products

Given a string of N space-separated integers A, output a single string of space-separated integers that represent the product of every pair of consecutive integers.

Input Format:

The first line contains the quantity N ($1 \leq N \leq 15$), denoting the amount of integers.
The second line contains the aforementioned string of N space-seperated integers A ($-10 \leq A_i \leq 10$).

Output Format:

Print one string of space-seperated integers that represent the product of every pair of consecutive integers.
I.e: $A_0A_1 \;\; A_1A_2 \;\; A_2A_3 \cdots$

Sample 1:

Input:

```
6
5 2 10 0 6 3
```

Output:

```
10 20 0 0 18
```

Sample 2:

Input:

```
4
-10 -5 3 10
```

Output:

50 −15 30

White's Burgers

The White family is selling burgers but since they're in crazy demand they can't serve everybody! Based on how much time they'll stay open for and how much time it takes to make each customer's meal, find the maximum amount of customers they can serve before they have to close.

Input Format:

The first line contains the N, the amount of customers and T, the amount of time before closing (space seperated). The second line contains each customer's meal making time, A. $1 \leq N \leq 20$
$1 \leq T \leq 10000$
$1 \leq A_i \leq 1000$

Output Format:

An integer showing the maximum amount of customers that can be served.

Sample 1:

Input:

```
5
100
100 20 50 30 80
```

Output:

```
3
```

Explanation:

The max amount of customers we can server is 3 by serving the customers who need 20, 30, and 50 minutes.

Sample 2:

Input:

```
7
20
20 30 40 20 100 500 50
```

Output:

```
1
```

Explanation:

We can only serve 1 customer who takes takes 20 minutes before we have to close.

101010101010

Given a string of 1's and 0's, find the minimum amount of characters we need to delete before no 1's are adjacent to other 1's and no 0's are adjacent to other 0's (a.k.a make a string of alternating 1's and 0's).

Input Format:

First line contains N ($1 \leq N \leq 1000$) which denotes the amount of characters in the string.
Second line contains a string N characters long of 1's and 0's

Output Format:

Print a single integer denoting the amount of deletions required such that no 1's are adjacent to any 1's and no 0's are adjacent to any other 0's

Sample 1:

Input:

```
5
11100
```

Output:

```
3
```

Explanation:

We need to delete the first two 1's and one of the 0's to get '10'.

Sample 2:

Input:

```
6
010101
```

Output:

```
0
```

Explanation:

No 1's are adjacent to any 1's and no 0's are adjacent are adjacent to any 0's so no deletions are needed.

Difference of the Pairs

Given an array of unique integers find the amount of pairs in a list of space separated integers that have a difference T

Input Format:

First line N denotes the amount of integers in the array Second line T denotes the target sum we need the pairs to add up to Third line contains N space separated integers, A
$1 \leq N \leq 5000$
$0 \leq T \leq 10^4$
$0 \leq A_i \leq 10^6$

Output Format:

Print a single integer representing the amount of pairs of integers who have a difference of T

Sample 1:

Input:

```
6
3
7 2 4 5 1 9
```

Output:

```
3
```

Explanation:

(7,4),(4,1),(5,2) are all the pairs that have a difference of 3

Sample 2:

Input:

```
10
5
0 10 4 5 9 6 3 2 15 21
```

Output:

```
4
```

Explanation:

(10,5),(5,0),(15,10),(9,4) are all the pairs that have a difference of 5

Minimum Palindrome

Given a string S, find the minimum amount of characters needed to be added to the end of S to form a palindrome (a word which reads the same backwards as forwards).

Input Format:

First line contains integer N ($1 \leq N \leq 10$) which denotes the length of string S.
The second line contains the string S.

Output Format:

Print a single integer which represents the minimum amount of characters needed to be added the the end of S to make S a palindrome.

Sample 1:

Input:

```
6
AACDCD
```

Output:

```
3
```

Explanation:

Adding CAA to the end makes AACDCDCAA which is a palindrome.

Sample 2:

Input:

```
6
AADDAA
```

0.0.1 Output:

```
0
```

0.0.2 Explanation:

AADDAA is already a palindrome.