Difference of the sum of alternate digits

Problem statement:

Given a positive integer 'x' (with even number of digits in it), write an algorithm and the subsequent code to compute the difference between  the sum of the digits occuring in the alternate positions (starting from the first position) and the sum of the digits occuring in the alternate positions,starting from the last rightmost position of 'x'

For example, consider the number  8975.  The sum of the digits that occur in the alternate positions from the first position is 8+7=15.  The sum of the digits that occur in the alternate positions, starting from the rightmost position is 5+9 = 14. Difference between the two sums is 1 (=15-14).  Similarly, for the number 5798, the difference between  two sums, is 1.

**Note: Read the input as a number and do entire processing as  a number**

**C++ compilers can compile C code also**

**Input format**

First line contains the positive integer

**Output format :**

First line should contain the difference between  the sum of the digits occuring in the alternate positions (starting from the first position) and the sum of the digits occuring in the alternate positions (startting from the last rightmost position).

Solution:

**Input :** Any integer with even number of digits

**Output :** The difference between the sum of the digits that occur in alternate positions (starting from the first position) and the sum of the digits that occur in the alternate positions (starting from the rightmost position)

**Pseudocode :**

Step 1 : Read the number n

Step 2: Let sumbegin=0 and sumend=0

Step 3 : While (n not equal to zero) Do step 4, step 5.

Step 4 : sumend= sumend + n % 10 ; n = n//10

Step 5 : sumbegin = sumbegin + n % 10 ; n = n//10

Step 6 : difference = absolute value of (sumbegin - sumend)

Step 7 : Print difference

**General Case of the Problem:**

If the input of the problem contains any number of digits then we have to identify the number of digits in the number and consider odd length and even length numbers separately

If the number of digits in the given number `n’ is odd, the difference between the sum of the digits that occur in alternate positions (starting from the first position) and the sum of the digits that occur in the alternate positions (starting from the rightmost position) is zero.

Consider the number 36754.

The alternate positions (starting from the first position) are Position no 1, position no 3, and position no 5.

The alternate positions (starting from the rightmost position) are Position no 5, position no 3 and Position no 1

hence the required difference is zero.

To find the number of digits in the number n, we continue to divide the number by 10 till the number is greater than zero. Make a count of the number of possible divisions. This will give the number of digits in the number.

For example, consider the number 36754.

length = 0 ; 36754//10 = 3675; 3675//10 = 367 ; 367 //10 = 36 ; 36//10 = 3 ; 3//10 = 0. We increment the `length’ for every division by 10.

If the number of digits is odd (ie., if `length’ is odd) then we print Zero, which is the required difference.

consider the number with even number of digits in it - 5683

we initilaise two variables : ‘sumbegin’ and `sumend’

Now, we identify the digits that occur in the alternate positions.

5683%10 = 3 ; 5683 //10 = 568. The digit in position 4 is 3

568%10 = 8 ; 568//10 = 56. The digit in position 3 is 8

56% 10 = 6 ; 56//10 = 5. The digit in position 2 is 6

5%10 = 5; 5//10 = 0. The digit in position 1 is 5

We add the integers in position no 4 and position no 2 , which are 3 & 6 respectively. We store this in `sumend’ , which is the sum of the digits that occur in the alternate positions , starting from the end.

We add the integers in position no 3 and position no 1 , which are 8 & 5 respectively. We store this in `sumbegin’ , which is the sum of the digits that occur in the alternate positions , starting from the first position.

Then subtract `sumend’ from the `sumbegin’ and find the absolute value of (sumbegin - sumend), which is the required difference.