Loops and Booleans

Your Assignment

For this homework you will make use of loops, if statements, and exceptions. Your program will accept a list of numbers and a target value and display how many pairs of numbers in the list add up to the target value.

For instance, if our list was [1, 2, 3, 7, 9] and the target value was 10, then our answer would be 2 (since 1 + 9 = 10 and 3 + 7 = 10).

Assignment Requirements

Three functions are required:

- `get_input():`

  This function takes no parameters, but will ask the user for input. For all inputs, you will need to use an indefinite loop and exception handling like we discussed in class. It is required to catch user input error and gracefully recover. The only error you need to consider is a ValueError.

  - First, it will ask for an integer, n (the number of element in the list)

  - Then it will ask for n numbers (if a value is given that is a bad input, do not count that as an element).

  - Finally, it will ask for a target value (as an integer), k

  The function will return the list of integers and k.

- `sum_to_k(nums, k):`

  This function will take two parameters: a list of integers (nums), and a target value (k). It then will return the number of pairs of numbers in nums that sum to exactly k.

  Hint: try nesting two loops, one keeping track of the first number, one keeping track of the second number. If you ensure that the second number is always later than the first number in the list then you won't get duplicate solutions (we should not count 3 + 7 and 7 + 3 as two separate solutions).

- `main():`

  This mostly links the two above functions together. You will call `get_input()` and `sum_to_k(nums, k)` from `main()`. It will then print out the number of pairs that sum to k

Output

A successful run:

```
Enter the number of integers in the list: 5
Enter an integer: 1
Enter an integer: 2
Enter an integer: 3
Enter an integer: 7
Enter an integer: 9
Enter the target number: 10
2 pairs sum to 10
```

A run recovering from errors:

```
Enter the number of integers in the list: foo
Bad input!
Enter the number of integers in the list: fiv
Bad input!
Enter the number of integers in the list: 5
Enter an integer: 1
Enter an integer: 2
Enter an integer: three
Bad input!
Enter an integer: 3
Enter an integer: 7
Enter an integer: 9?
Bad input!
Enter an integer: 9
Enter the target number: something
Bad input!
Enter the target number: 10
2 pairs sum to 10
```

Note: All printed strings **must** match the above output.

Submission Requirements

The title for this lab is *hw7*. Your submitted file is **required** to be named `hw7.py`.

Grading

The rubric for this assignment is available through Gradescope.