CS 602
Algorithm Design and Implementation

Assignment 4

[Question 1] No-less-than-10 Queens Puzzle

The eight queens puzzle is the problem of placing eight chess queens on an 8×8 chessboard so that no two queens threaten each other; thus, a solution requires that no two queens share the same row, column, or diagonal (including all diagonals running from upper left corner to lower right corner and running from upper right corner to lower left corner). In this question, you are to count the number of ways to place $(14 - x)$ queens on a 14×14 chessboard where the positions of $x \in \{2,3,4\}$ queens are already known.

Test inputs begin with the number of test cases. Each test case contains pairs of positions of the x known queens. For example, "1 1 2 9 3 6 4 10" contains the positions of 4 queens, where the first queen is at first row first column, the second queen is at second row ninth column, and so on.

For each test case, output one integer representing the number of ways to replace the remaining $(14 - x)$ queens.

Sample Input

```
3
1 1 2 9 3 6 4 10
1 9 12 8 8 5 2 7
2 10 10 3
```

Sample Output

```
39
32
2414
```

Grading Rubrics:

1. There are 10 marks for each question.
2. There are 10 test cases for question 1 and 2, where the first test case is the sample input A4Q1.in and A4Q2.in respectively. You get 1 mark for each test case if your code does not produce errors including wrong answer or time limit exceeded.

Running python skeleton with sample input:

1. Open "Anaconda Prompt"
2. Go to the directory where you put the file **A4Q1.py** and **A4Q1.in**, using command **`cd`**
3. Run command **python A4Q1.py < A4Q1.in**
4. You may want to create a test input called **my_own_test.in** to design a test case for your own program, the command would then be **python A4Q1.py < my_own_test.in**
5. Same applies to Question 2, so you may run **python A4Q2.py < A4Q2.in**
6. Make sure your program read input from **`sys.stdin`**. If you find it difficult to work with **`sys.stdin`**, you might write the function that your need to modify with your own input and output, and then copy and paste to the function itself to the code skeleton provided. Please test with the command in item 3 to ensure it produces the right output.