

In a magical kingdom, the King and the Queen each have their own set of magic cards. The King has a set of n cards numbered from 1 to n , while the Queen has a set of m cards numbered from 1 to m . They both love puzzles and want to understand the arrangement of their cards. They are particularly interested in the permutations of these cards, where:

- **For the King's set:**

- x represents the number of permutations of the King's cards such that none of the cards appear in their original position
- y represents the number of permutations of the King's cards where exactly one card is in its original position.
- They define $k = x - y$.

- **For the Queen's set:**

- a represents the number of permutations of the Queen's cards such that none of the cards appear in their original position
- b represents the number of permutations of the Queen's cards where exactly one card is in its original position.
- They define $q = a - b$.

The King and the Queen have discovered a peculiar property: the difference between k and q is exactly 2, i.e., $k - q = 2$.

Determine all possible pairs (m, n) such that this peculiar property (i.e., $k - q = 2$) holds true.
