5427. Probability of a Two Boxes Having The Same Number of Distinct Balls

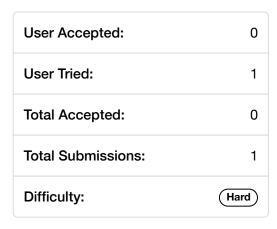
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Given 2n balls of k distinct colors. You will be given an integer array balls of size k where balls[i] is the number of balls of color i.

All the balls will be **shuffled uniformly at random**, then we will distribute the first n balls to the first box and the remaining n balls to the other box (Please read the explanation of the second example carefully).

Please note that the two boxes are considered different. For example, if we have two balls of colors a and b, and two boxes [] and (), then the distribution [a] (b) is considered different than the distribution [b] (a) (Please read the explanation of the first example carefully).



We want to calculate the probability that the two boxes have the same number of distinct balls.

Example 1:

Input: balls = [1,1]
Output: 1.00000

Explanation: Only 2 ways to divide the balls equally:

A ball of color 1 to box 1 and a ball of color 2 to box 2A ball of color 2 to box 1 and a ball of color 1 to box 2

In both ways, the number of distinct colors in each box is equal. The probability is 2/2 =

Example 2:

Input: balls = [2,1,1]

Output: 0.66667

Explanation: We have the set of balls [1, 1, 2, 3]

This set of balls will be shuffled randomly and we may have one of the 12 distinct shuffle [1,1/2,3], [1,1/3,2], [1,2/1,3], [1,2/3,1], [1,3/1,2], [1,3/2,1], [2,1/1,3], After that we add the first two balls to the first box and the second two balls to the sec We can see that 8 of these 12 possible random distributions have the same number of disting Probability is 8/12 = 0.66667

Example 3:

Input: balls = [1,2,1,2]
Output: 0.60000
Explanation: The set of balls is [1, 2, 2, 3, 4, 4]. It is hard to display all the 180 pos
Probability = 108 / 180 = 0.6

Example 4:

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Input: balls = [3,2,1]
Output: 0.30000
Explanation: The set of balls is [1, 1, 1, 2, 2, 3]. It is hard to display all the 60 poss
Probability = 18 / 60 = 0.3
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Example 5:

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Input: balls = [6,6,6,6,6]
Output: 0.90327
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Constraints:

- 1 <= balls.length <= 8
- 1 <= balls[i] <= 6
- sum(balls) is even.
- Answers within 10^-5 of the actual value will be accepted as correct.