

5891. Find Missing Observations

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You have observations of  $n + m$  **6-sided** dice rolls with each face numbered from 1 to 6.  $n$  of the observations went missing, and you only have the observations of  $m$  rolls. Fortunately, you have also calculated the **average value** of the  $n + m$  rolls.

You are given an integer array `rolls` of length  $m$  where `rolls[i]` is the value of the  $i^{\text{th}}$  observation. You are also given the two integers `mean` and `n`.

Return an array of length  $n$  containing the missing observations such that the **average value** of the  $n + m$  rolls is **exactly** `mean`. If there are multiple valid answers, return *any of them*. If no such array exists, return an *empty array*.

The **average value** of a set of  $k$  numbers is the sum of the numbers divided by  $k$ .

Note that `mean` is an integer, so the sum of the  $n + m$  rolls should be divisible by  $n + m$ .

User Accepted:	0
User Tried:	0
Total Accepted:	0
Total Submissions:	0
Difficulty:	Medium

Example 1:

**Input:** `rolls = [3,2,4,3]`, `mean = 4`, `n = 2`  
**Output:** `[6,6]`  
**Explanation:** The mean of all  $n + m$  rolls is  $(3 + 2 + 4 + 3 + 6 + 6) / 6 = 4$ .

Example 2:

**Input:** `rolls = [1,5,6]`, `mean = 3`, `n = 4`  
**Output:** `[2,3,2,2]`  
**Explanation:** The mean of all  $n + m$  rolls is  $(1 + 5 + 6 + 2 + 3 + 2 + 2) / 7 = 3$ .

Example 3:

**Input:** `rolls = [1,2,3,4]`, `mean = 6`, `n = 4`  
**Output:** `[]`  
**Explanation:** It is impossible for the mean to be 6 no matter what the 4 missing rolls are.

Example 4:

**Input:** `rolls = [1]`, `mean = 3`, `n = 1`  
**Output:** `[5]`  
**Explanation:** The mean of all  $n + m$  rolls is  $(1 + 5) / 2 = 3$ .

Constraints:

- $m == \text{rolls.length}$
- $1 \leq n, m \leq 10^5$
- $1 \leq \text{rolls}[i], \text{mean} \leq 6$

JavaScript

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```
1 const sm = (a) => a.reduce(((x, y) => x + y), 0);
2
3 /**
4  * x * start + y * end = rsum
5  * x + y = n;
6  *
7  *
8  * x * start + y * start = n * start
9  * y = rsum - (n * start)
```

```

10  *
11  * x * start + (n - x) * end = rsum;
12  *   x * start + n * end - x * end = rsum;
13  *   x * (start - end) = rsum - n * end;
14  *
15  */
16  const missingRolls = (rolls, mean, n) => {
17    let m = rolls.length, tot = m + n, tsum = tot * mean;
18    let rsum = tsum - sm(rolls);
19    // pr(rsum, n)
20    let min = n, max = n * 6;
21    if (rsum < min || rsum > max) return [];
22    let avg = rsum / n;
23    // pr(avg)
24    if (avg == parseInt(avg)) return Array(n).fill(avg);
25    let start = parseInt(avg), end = Math.ceil(avg);
26    // pr(start, end)
27    let x = (rsum - n * end) / (start - end);
28    let y = n - x;
29    // pr("x", x, "y", y);
30    if (x == parseInt(x) && y == parseInt(y) && x >= 0 && y >= 0) return
    Array(x).fill(start).concat(Array(y).fill(end));
31    return [];
32    // return dfs(0, rsum, [], n, start, end);
33  };


```

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