Problem 470: Implement Rand10() Using Rand7()

Problem Information

Difficulty: Medium
Acceptance Rate: 46.11%
Paid Only: No
Tags: Math, Rejection Sampling, Randomized, Probability and Statistics

Problem Description

Given the **API** `rand7()` that generates a uniform random integer in the range `[1, 7]`, write a function `rand10()` that generates a uniform random integer in the range `[1, 10]`. You can only call the API `rand7()`, and you shouldn't call any other API. Please **do not** use a language's built-in random API.

Each test case will have one **internal** argument `n`, the number of times that your implemented function `rand10()` will be called while testing. Note that this is **not an argument** passed to `rand10()`.

Example 1:

Input: n = 1 **Output:** [2]

Example 2:

Input: n = 2 **Output:** [2,8]

Example 3:

Input: n = 3 **Output:** [3,8,10]

Constraints:

* `1 <= n <= 105`

Follow up:

* What is the [expected value](https://en.wikipedia.org/wiki/Expected_value) for the number of calls to `rand7()` function? * Could you minimize the number of calls to `rand7()`?

Code Snippets

C++:

```
// The rand7() API is already defined for you.
// int rand7();
// @return a random integer in the range 1 to 7

class Solution {
public:
int rand10() {

}
};
```

Java:

```
/**
* The rand7() API is already defined in the parent class SolBase.
* public int rand7();
* @return a random integer in the range 1 to 7
*/
class Solution extends SolBase {
public int rand10() {

}
}
```

Python3:

```
# The rand7() API is already defined for you.
# def rand7():
# @return a random integer in the range 1 to 7

class Solution:
def rand10(self):
```

```
"""
:rtype: int
"""
```