483. Smallest Good Base

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Description Submission Solutions

- Total Accepted: **1829**
- Total Submissions: **5892**
- Difficulty: **Hard**
- Contributors: **ckcz123**

For an integer n, we call k>=2 a ***good base*** of n, if all digits of n base k are 1.

Now given a string representing n, you should return the smallest good base of n in string format.

Example 1:

```
Input: "13"
Output: "3"
Explanation: 13 base 3 is 111.
```

Example 2:

```
Input: "4681"
Output: "8"
Explanation: 4681 base 8 is 11111.
```

Example 3:

```
Input: "1000000000000000000"
Output: "999999999999999999"
Explanation: 1000000000000000000 base 999999999999999999 is 11.
```

```
class Solution {
public:
    string smallestGoodBase(string n) {
    unsigned long long tn=(unsigned long long)stoll(n);
    unsigned long long x=1;
    for (int i=62;i>=1;i--) {
        if ((x<<i)<tn) {
            unsigned long long cur=mysolve(tn,i);
            if (cur!=0) return to_string(cur);
        }
    }
    return to_string(tn-1);
    }
```

```
unsigned long long mysolve(unsigned long long n,int d) {
    double tn=(double) n;
    unsigned long long right=(unsigned long long)(pow(tn,1.0/d)+1);
    unsigned long long left=1;
    while (left<=right){
        unsigned long long mid=left+(right-left)/2;
        unsigned long long sum=1,cur=1;
        for (int i=1;i<=d;i++) {
            cur*=mid;
            sum+=cur;
        }
        if (sum==n) return mid;
        if (sum>n) right=mid-1;
        else left=mid+1;
    }
    return 0;
}

};
```