

# Identify Smith Numbers

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## Divisors

Divisors of a number  $N$  are numbers  $x \leq N$ , where  $x \geq 1$  and  $N \% x == 0$ . Depending on the requirement of the challenge, we have two good methods to calculate divisors.

When we have  $N \leq 10^{12}$ , and we have few numbers to calculate the divisors of, we can check every number from  $i = 1$  to  $\sqrt{N}$ , and if  $N \% i == 0$ , we add  $i$  and  $N/i$  to our set of divisors.

```
set<int> arr;
for (int i = 1; i < sqrt(N) + 1; i++) {
    if (N % i == 0) {
        arr.insert(i);
        arr.insert(N / i);
    }
}
```

If  $N \leq 10^6$  and we have a lot of queries, we can build a sieve such that Ar[x] contains the divisors.

```
vector <vector <int> > divisors(1000001, vector<int> ());
for (int k = 1; k < 1000001; k++) {
    for (int i = 1; i < 1000001/k; i++) {
        divisors[i * k].push_back(k);
    }
}
```

Now for each query Q, divisors[Q] contains all the divisors.

Related challenge for Divisors

Unfriendly Numbers

Success Rate: 30.04%   Max Score: 80   Difficulty:

Solve Challenge