

## Lab 1

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Program is a solution for online judge problem:

<https://www.urionlinejudge.com.br/judge/en/problems/view/1568>

Solution is based on prime numbers and made using Eratosthenes sieve. As first step algorithm finds all prime numbers from 0 to 1 000 000, then program factorizes the input number and counts quantity of its factors, this quantity will be the answer.

#### Source code:

```
#include "stdio.h"
#include "inttypes.h"

#define N 1000000

int findPrimes(int*);

int main(int argc, char** argv)
{
    int primes[N];
    int p = findPrimes(primes);

    int64_t n;
    while (scanf("%lld", &n) != EOF) {
        if (n == 0) {
            printf("1\n");
            continue;
        }

        while (n % 2 == 0) {
            n /= 2;
        }

        int r = 1;
        int i = 0;
        while (i < p && n != 1) {
            int count = 0;

            while (n % primes[i] == 0) {
                n /= primes[i];
                count++;
            }
            r *= count + 1;
            i++;
        }
        r *= n != 1 ? 2 : 1;
        printf("%d\n", r);
    }

    return 0;
}
```

```

}

int findPrimes(int* primes) {
    char s[N] = { 0 };

    primes[0] = 2;
    int p = 1;

    int i = 2;
    while (i < N)
    {
        if(s[i] == 0) {
            primes[p++] = i;
            int j = i;
            while (j < N) {
                s[j] = 1;
                j += i+i;
            }
        }
        i++;
    }
    return p;
}

```

Program was tested using Perf profiling.

### Result:

Performance counter stats for './Isa':			
402,168465	task-clock (msec)	#	0,984 CPUs utilized
1 237	context-switches	#	0,003 M/sec
0	cpu-migrations	#	0,000 K/sec
371	page-faults	#	0,922 K/sec
<not supported>	cycles		
<not supported>	instructions		
<not supported>	branches		
<not supported>	branch-misses		
<not supported>	L1-dcache-loads		
<not supported>	L1-dcache-load-misses		
<not supported>	LLC-loads		

### Input:

```

899999640000011
899998380000053
899998200000059
899997780000073
899997660000077

```

899997060000097  
899996940000101  
899996580000113  
899996400000119  
899996160000127  
899995140000161  
899994900000169  
899994540000181  
899993700000209  
899993280000223  
899993160000227  
899992080000263  
899991840000271  
899991180000293  
899990940000301  
899990760000307  
899989860000337  
899989380000353  
899987880000403  
899987700000409  
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899987160000427  
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899986500000449  
899986440000451  
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899984280000523  
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899983260000557  
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