**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++;

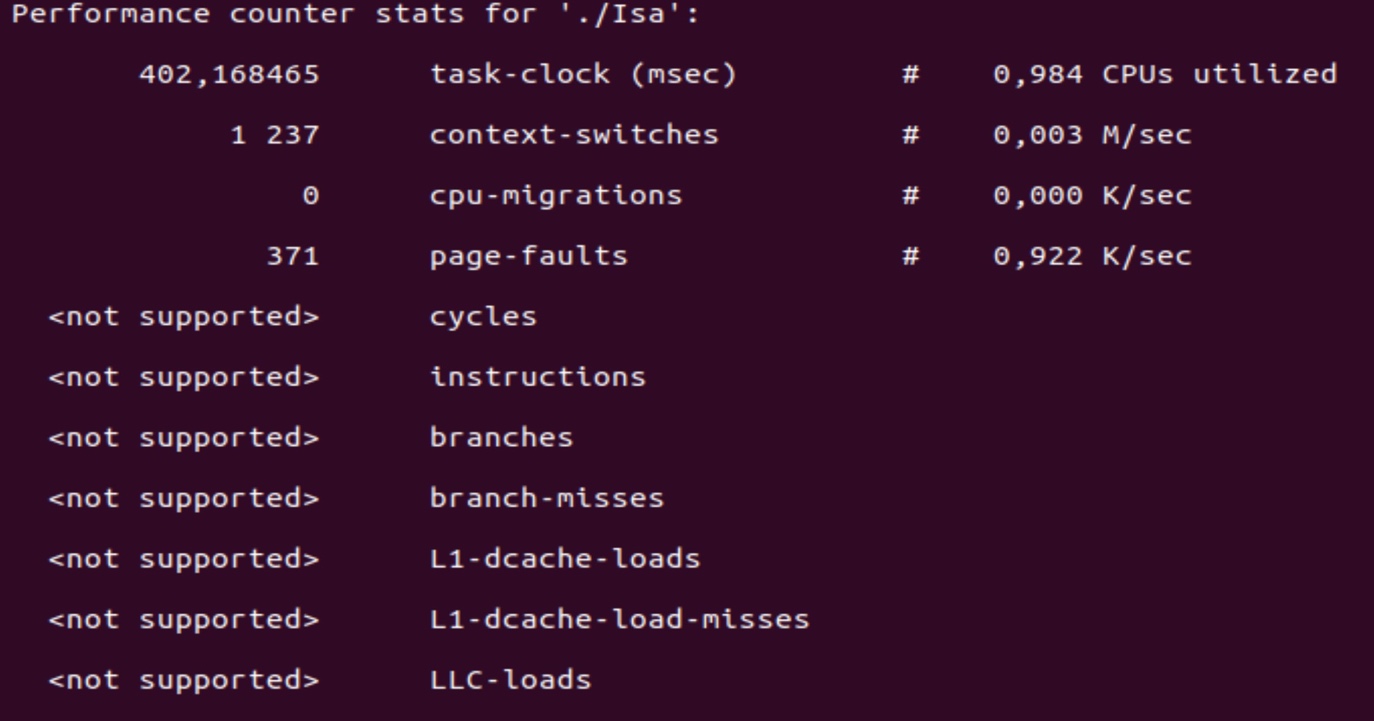
}

**return** p;

}

Program was tested using Perf profiling.

**Result:**



**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

899987400000419

899987160000427

899986800000439

899986500000449

899986440000451

899985960000467

899985900000469

899985360000487

899985180000493

899985060000497

899984340000521

899984280000523

899983980000533

899983380000553

899983260000557

899982000000599

899981940000601

899980860000637

899979840000671

899979780000673

899978880000703

899978760000707

899978160000727

899977800000739

899977140000761

899976000000799

899972580000913

899972460000917

899972040000931

899971860000937

899998080000583

899997900000649

899997480000803

899997360000847

899996760001067

899996640001111

899996280001243

899996100001309

899995860001397

899994840001771

899994600001859

899994240001991

899993400002299

899992980002453

899992860002497

899991780002893

899991540002981

899990880003223

899990640003311

899990460003377

899989560003707

899989080003883

899987580004433

899987400004499

899987100004609

899986860004697

899986500004829

899986200004939

899986140004961

899985660005137

899985600005159

899985060005357

899984880005423

899984760005467

899984040005731

899983980005753

899983680005863

899983080006083

899982960006127

899981700006589

899981640006611

899980560007007

899979540007381

899979480007403

899978580007733

899978460007777

899977860007997

899977500008129

899976840008371

899975700008789

899972280010043

899972160010087

899971740010241

899971560010307

899996640003127

899996220003869

899996100004081

899995500005141

899995380005353

899995020005989

899994840006307

899994600006731

899993580008533

899993340008957

899992980009593

899992140011077

899991720011819

899991600012031

899990520013939

899990280014363

899989620015529

899989380015953

899989200016271

899988300017861

899987820018709

899986320021359

899986140021677

899985840022207

899985600022631

899985240023267

899984940023797

899984880023903

899984400024751

899984340024857

899983800025811

899983620026129

899983500026341

899982780027613

899982720027719

899982420028249

899981820029309

899981700029521

899980440031747

899980380031853

899979300033761

899978280035563

899978220035669

899977320037259

899977200037471

899976600038531

899976240039167

899975580040333

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899971020048389

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899970300049661

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899995200005959

899994840006667

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