Computer Programming (CS0.101)

[Monsoon 2021-22]

Coding Quiz - 1

Q. Write a program to find the nth positive integer having "k" unique factors. *It is guaranteed that the test cases are such that the answer will be a positive integer <= 1e5. It is guaranteed that for 2/3rd of the test cases, answer will be a positive integer <= 1e4.*

NOTE : If you get TLE Verdict on some of the test cases, think of a better solution of how to find the factors of a number.

For eg :

- 1 has 1 factor.
- 2 has 2 factors.
- 3 has 2 factors.
- 4 has 3 factors.
- 5 has 2 factors.
- 6 has 4 factors.
- 7 has 2 factors.
- 8 has 4 factors.
- 9 has 3 factors.

So, the 3rd integer having 2 factors is `5` . So, the 2rd integer having 3 factors is `9` .

Input Format The first line will have 2 integers "n" & "k" separated by a single space.

Constarints

- 1 <= n <= 1000.
- 1 <= k <= 200.
- Time : 1s
- Memory : 64 MB.

Output Format Print a single integer as the answer.

Sample Test Cases

1. Test Case 1 *INPUT* `3 108` *OUTPUT* `70560`

2. Test Case 2 *INPUT* `7 8` *OUTPUT* `66`

Sample Code Answer

1. Code 1

```
#include <stdio.h>
#include <math.h>

int Factor(int n, int k)
```

```c
{
    int d = 1;
    while (d * d <= n)
    {
        if (n % d == 0)
        {
            if (--k == 0)
                return d;
        }
        ++d;
    }

    while (--d >= 1)
    {
        if (d * d == n)
            continue;
        if (n % d == 0)
        {
            if (--k == 0)
            {
                return n / d;
            }
        }

    }
    return -1;
}

int main()
{
    long int n, k;
    scanf("%ld %ld", &n, &k);
    long int i = 1;
    do
    {
        int a = Factor(i, k);
        if (a == i)
        {
            n -= 1;
        }

        if (n == 0)
        {
            printf("%ld\n", i);
            return 0;
        }
        i++;
    } while (1);

    return 0;
}
```

2. Code 2

```c
//the following code is >100x facter than traditional method, should be on fingertips
#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>
#include <string.h>
#include <math.h>

int main(int argc, char *argv[])
{
    int x,k,n;
    x=scanf("%d %d",&n,&k);
    if(x<0)
        {
            return 1;
        }
    int value=0,count=0;
    for(int i=1;i<=100000;i++)
        {
            int factors=0;
            for(int j=1;j<=sqrt(i);j++)
                {
                    if(i%j==0)
                        {
                            if(i/j==j)
                                {
                                    factors++;
                                }
                            else
                                {
                                    factors+=2;
                                }
                        }
                }
            if(factors==k)
                {
                    count++;
                }
            if(count==n)
                {
                    value=i;
                    break;
                }
        }
        printf("%d",value);
}
```