

Euler's project problem 3

John Fox

January 24, 2023

Problem statement

The prime factors of 13195 are 5, 7, 13 and 29.

What is the largest prime factor of the number 600851475143 ?

Answer

The largest prime factor of 600851475143 = 6857

Idea

Iterating up from factors starting at 2. If a number is divisible by the factor then we can divide the number by that factor before checking the next factor because the range $[\text{number}/2 + 1, \text{number}]$ will not be divisible by anything.

Python code

```
def lrgstPrimeFac(num):  
    list = []  
    fac = 2  
    while num > 1:  
        while num % fac == 0:  
            list.append(fac)  
            num = num // fac  
        fac = fac + 1  
    return list  
print(lrgstPrimeFac(600851475143))
```