`PrimeOmega` gives how many multipled primes there are in total in a prime factorization.

In[∘]:=
```
FactorInteger@12
```
Out[∘]=
```
{{2, 2}, {3, 1}}
```

The primes are 2, 3, the quantities are 2, 1.

In[∘]:=
```
PrimeOmega@12
```
Out[∘]=
```
3
```

`PrimeOmega` is the sum of the quantities.

In[∘]:=
```
FactorInteger@327
```
Out[∘]=
```
{{3, 1}, {109, 1}}
```

In[∘]:=
```
PrimeOmega@327
```
Out[∘]=
```
2
```

How many primes there are in the factorization itself can be inferred from the size of the resulting list.

In[∘]:=
```
FactorInteger@330
```
Out[∘]=
```
{{2, 1}, {3, 1}, {5, 1}, {11, 1}}
```

In[∘]:=
```
Length@FactorInteger@330
```
Out[∘]=
```
4
```

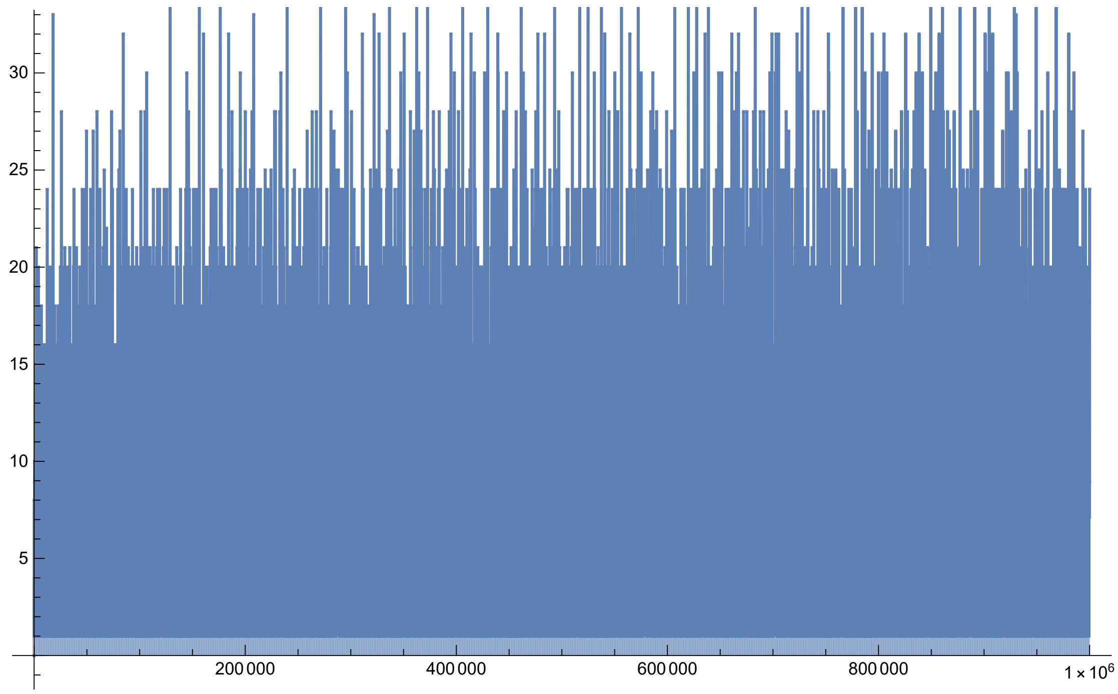
Let’s create an index from the quantity of primes in a factorization together with the multiplicity of primes in the factorization, to create a rough “size” for each factorization.

In[∘]:=
```
Clear[FacSize];
FacSize=Function[{n},Length@FactorInteger@n*PrimeOmega@n];
```

In[∘]:=
```
{FacSize@12, FacSize@327, FacSize@330}
```
Out[∘]=
```
{6, 4, 16}
```

Which agrees with the prior observations.
Let’s plot the “factorization size” as a function of each integer:

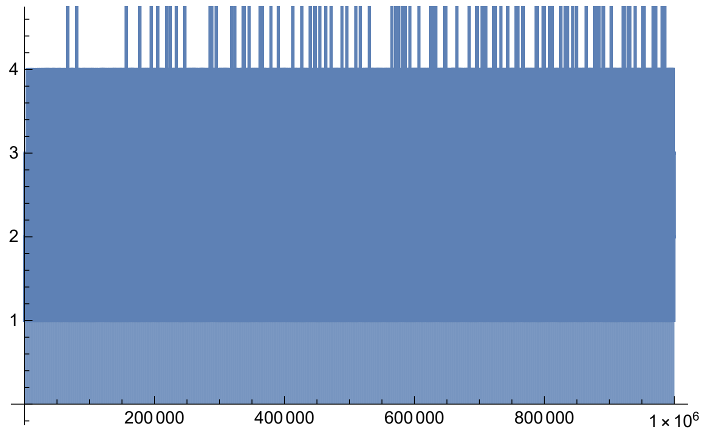
In[∘]:=
```
DiscretePlot[FacSize@x, {x, 1, 1000000, 99}, ExtentSize → Full]
```

Out[∘]=


This tells there is a ceiling of approximately 35.

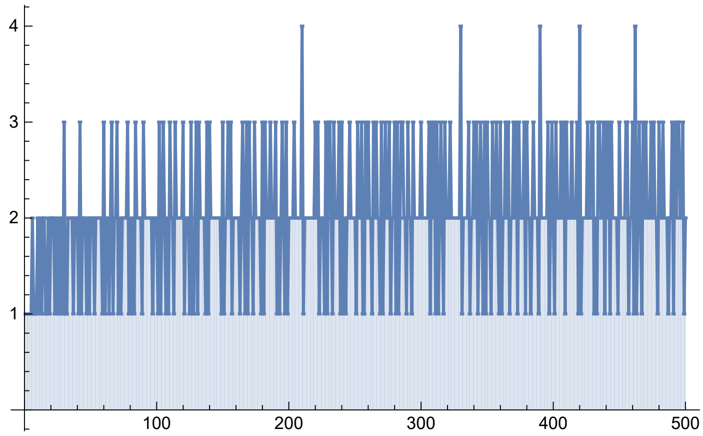
If only the number of primes is plotted,

In[∘]:=
```
DiscretePlot[Length@FactorInteger@x, {x, 1, 1000000, 99}, ExtentSize → Full]
```

Out[∘]=


Let’s zoom in to the graph.

In[ ]:=
```
DiscretePlot[Length@FactorInteger@x, {x, 1, 500}, ExtentSize → Full]
```

Out[ ]=


This seems to indicate no matter the size of the integer, there seems to be a clear upper bound on the size, by count of primes, of its prime factorization.
Note: this seems to be what’s proved in the Hardy-Ramanujam theorem [1].

TODO: check the *composition* of the factors i.e. the regularity of which primes are in them.

References

1. Hardy-Ramanujam theorem, Wikipedia. https://en.wikipedia.org/wiki/Hardy%E2%80%93Ramanujan_theorem