**Part I:**

**Why Primes?**

**~** Beyond being a nerd, why should we care about primes?

* They are natural numbers with only two positive factors being one and itself.

~ I mean yeah, but what does that mean to me?

* They are not composite! 1 is neither composite nor prime. (or 2 positive divisors)

~ Oh ok, what else?

* 2 is the only even prime.

~ Uh huh… but again why should we care?

* Cybersecurity? Cryptography?

~ Oh, can you elaborate more on that?

* Prime numbers help us encrypt pretty much everything! The first ingredient required for the algorithm are two large prime numbers. The larger the numbers, the safer the encryption.

~ How so?

* Take two very large numbers that are relatively prime and multiply them together. That way it’s hard to find the number used to encrypted personal information because the only factors are the primes and 1.

~ Ok but aren’t there ways to detect primes?

* \*\* Proofs to detect prime numbers

~ That doesn’t mean they are safe! What about our credit cards, online accounts, and etc.?! That’s just narrowing down the options of infinite numbers so they can find the right ones!

* Well, I mean….

**Part II:**

**Mathematical Proof of Infinite numbers**

**Twin prime formula used in our next example (p, p+2)**

**Part III:**

**Show code**

**Conclusion:**

As far as the best mathematicians and computer scientists have been able to determine, it is totally impossible to come up with a truly efficient formula for factoring large numbers into primes. When trying to factor large numbers into primes, taking a simple algorithm to factor would take forever (even for a computer). Modern encryption algorithms exploit the fact that we can easily take two large primes and multiply them together to get a new, super-large number, but that no computer yet created can take that super-large number and quickly figure out which two primes went into making it. So, your personal information is still safe no matter what.