The collatz conjecture

Firstly to start I would like to make mention of why I chose the collatz conjecture .It is because I don't enjoy number theory and that is why I am writing this essay to show how obscure number theory is,even if it is simple that does not mean it's easy to prove.

The Collatz conjecture is one of the most famous unsolved problems in mathematics. The conjecture poses the question of whether repeating two simple arithmetic operations will eventually transform every positive integer into 1.The two arithmetic operations are as follows.If the integer ,represented by n, is an even number like 4 then divide by two .(N/2).If the integer is odd like 7 then multiply the integer by 3 and add 1.(3n+1).Let's take the integer 7 for example ,since the integer is odd we multiply by 3 and add 1…3(7)+1=22
22 is even, therefore we divide by 2…
(22/2)=11
11 is odd so we use the 3n+1…
3(11)+1=34
34 is even so we divide by 2….
34/2=17
17 is odd so we use 3n+1…
3(17)+1=52
52 is even so we divide by 2….
52/2=26
26 is even so we divide by 2….
26/2=13
13 is odd so use 3n+1….
3(13)+1=40
40 is even so we divide by 2…
40/2=20
20 is even so we divide by 2…
20/2=10
10 is even so we divide by 2…
10/2=5
5 is odd so we use 3n+1…
3(5)+1=16
16 is even so we divide by 2…
16/2=8
8 is even so we divide by 2…
8/2=4
4 is even so we divide by 2…
4/2=2
2 is even so we divide by 2…
2/2=1

This string of the two continuous arithmetic operations led to our integer (7) being led to the value of 1.The collatz conjecture emphasizes that all positive integers from 1-infinity are all subject to this rule.However the the collatz conjecture is not yet proved.The operation is simple to show and understand ,using these two arithmetic operations we can get to 1 yet it is strenuous as the 3n+1 operation for odd numbers leads to increasingly greater values of numbers,and obscurity ,leading to numbers being arranged in unpredictable ways.Sequences can grow very high and rapidly drop unpredictably.thereby resisting formal proof to prove this conjecture,however mathematicians have verified this with the use of computers for numbers up to 2^68 which is incredibly large.

The Collatz Conjecture,was proposed by German mathematician Lothar Collatz in 1937 during the Nazi rein.It is known by many names, including hailstone numbers, the 3n+1 problem(as the 3n+1 part is the trickiest part), the Syracuse problem, Ulam's conjecture, and Kakutani's problem.The
problem spread throughout the 1950s but remained relatively obscure until popularized by Martin Gardner in America in 1972.It is frequently discussed in the modern era despite being so hard to prove and is widely spoken of because of that fact.People want to solve it and prove that mathematics is a set of trial and error that leads to a perfect unity.

Total stopping time is the number of steps to reach 1, while stopping time is the number of steps to reach a number smaller than the starting value.for example lets take the integer 12 the Sequence would be: 12, 6, 3, 10, 5, 16, 8, 4, 2, 1. Total stopping time is 9 steps.and the stopping time is just 1 step to get a number smaller than 12 now let's take the integer 27:the integer 27 takes 111 steps to reach 1 and reaches an extremely high number of 9,232. Representing this graphically the collatz conjecture shows how these numbers rise unpredictably and decrease unpredictably,which means obscure behaviour.They reach a high peak on a graph and then fall,after this fall it may rise again and fall repeating a continuous rise and fall until 1 is reached.

Why is the collatz conjecture so hard to prove.There is no known function that decreases on every step of every sequence, which is why a straightforward proof has not been found.There is no known monotone quantity.The Collatz Conjecture is also connected to binary and is much easier to understand and visualize using binary numbers -base-2, using only 0s and 1s than with normal decimal numbers. In binary, we use 1 and 0 which in collatz conjecture means that the numbers become 1 and 0 like 7 in binary is 111. In collatz conjecture its sequence is 111,10010,1011…..
In 2019, mathematician Terence Tao provided a possible solution with regard to the Collatz conjecture, showing that almost all Collatz orbits attain almost bounded values. His work suggests that 99% or more of starting values eventually reach a value very close to 1, providing strong evidence .Tao proved that for any function that goes to infinity (no matter how slowly), almost all orbits of the Collatz map eventually reach a value less than f(n).
A collatz orbit is a sequence of integers created by a specific function from an integer.

Some mathematicians claim that the collatz conjecture is a trap to waste time as it took up so much of some mathematicians time just to still have it not solved up until the modern day.A man named Erdos said mathematics is not advanced enough to actually solve this conjecture and that we may need to invent whole new branches of mathematics just to solve it,as our modern techniques just aren't allowing us to reach the level that we need in order to solve the collatz conjecture.

If the collatz conjecture is solved it can prove that for every positive integer, the sequence eventually reaches 1 no matter how great the number is, A solution might reveal new ways to solve simple yet complex theories,that mathematicians have struggled on for centuries even posing answers to better understand our universe .It can likely result in new algorithms for analyzing complex sequences in computers.It can lead to the advancement of technology,thereby changing our understanding of mathematics.