Mysteries of the Euclidean Algorithm Revealed with Applications

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The Euclidean Algorithm is a method in finding the greatest common divisor of two integers efficiently, I have decided to observe the running time of the algorithm and create a Euclidean Algorithm Step chart which will help visualize my data. Patterns were found on the step chart and theorems were formed based on my observations. With the help of these theorems, the time required to calculate the greatest common divisor (gcd) among positive integers has been reduced. During my second year of research, a new security code was constructed and at the same time, the chart has found patterns in generating traditional musical rhythms throughout the world. Musical rhythms can be modeled as having rests and beats, with my new theorem, people are now able to predict the next musical model easier and more accurately. So instead of people having to sit down and divide numbers and notes, they can use this theorem. I have introduced mathematics with a new theorem and a new pattern. I hope that in the future, security places, in the military will use my new code. I hope that musicians will use my new theorem and be able to write their music and generate their patterns quicker. I have introduced a new efficient way in finding these things. I hope that people will find use in my new theorems, I want to show a new application to the world. I have also proven that the running time of the Euclidean Algorithm is linked with applications and that in math, you can find that everything is connected and related.

Awards Won: