



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> Nikhil Lonberg	<b>Project Number</b> <b>J1607</b>
<b>Project Title</b> The Random Fibonacci Sequence	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of this project is to see if the $n$ th root of the absolute value of the $n$ th term in a random Fibonacci sequence approaches $\varphi$ (1.1319...). The project also resolves a discrepancy between two different published descriptions of the random Fibonacci sequence. The hypothesis of this project is that the $n$ th root does approach $\varphi$ and the original description of the behavior of the random Fibonacci sequence, by Divakar Viswanath, is more correct. <b>Methods/Materials</b> The hypothesis is tested by generating a random Fibonacci sequence and determining the $n$ th root of it to see if it converges on $\varphi$ . This experiment will also test to see if Mario Livio is right about the random Fibonacci sequence converging at around the hundredth number in the sequence. To simulate this, the experiment uses a Visual Basic computer program with a pseudo random number generator to choose the operators. An order to perform this experiment the computer needs Microsoft Visual Basic installed into Excel. <b>Results</b> The results show that the $n$ th root of the $n$ th term does eventually approach $\varphi$ , but very far into the sequence. Although the results vary because of the randomness of the sequence, the $n$ th root typically becomes very close to $\varphi$ when $n$ is approximately equal to 50,000. <b>Conclusions/Discussion</b> The $n$ th root of the $n$ th term approaches $\varphi$ well past the hundredth number in the sequence. This supports Viswanath's conclusions on random Fibonacci sequences.	
<b>Summary Statement</b> This project explores and tests the behaviors of a random Fibonacci sequence, a variant of the Fibonacci sequence.	
<b>Help Received</b> Father made useful suggestions about programming.	