EXPLORING FIBONACCI NUMBERS WITH A CALCULATOR

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It has often been noted that the study of numbers is both experimental and theoretical in character. Even in the days before the calculator, to say nothing of the computer, the truly great mathematicians often arrived at beautiful results on the basis of observation and numerical work before they proceeded to proof and theoretical justification. If we find ourselves enjoying calculation and seeing tangible results, we are in very good company and need not worry about the attitude of the theorist who is afraid to soil his hands with numbers.

In this vein, the following exploration is proposed. It may be observed by looking at a list of Fibonacci numbers that in certain cases F_n has the n corresponding to the terminal digits of the number. Thus F_5 is 5; F_{29} is 514229; F_{61} is 2504730781961. As long as we have a table of Fibonacci numbers on hand we can proceed to make such verifications. But suppose we set out to find all these coincidences for Fibonacci numbers up to a certain level such as $F_{10,000}$. In the absence of these numbers we now have an interesting mathematical problem involving computation.

One very simple way to proceed would be to take the successive Fibonacci numbers modulo 10,000. In other words we would consider only the last five digits and forget about all those that go before. This is a straightforward procedure but it would be long and tedious and subject to error. In fact, once a mistake in introduced, all results thereafter would be vitiated. There must be a better way. Perhaps there are several ways. We shall look forward to both the numerical results and the method employed in arriving at them.

Address all communications regarding this problem to: Brother U. Alfred, St. Mary's College, California. The solution will appear in the issue of December, 1964.