Abstract

According to Kronecker, a famous European mathematician, only natural numbers, i.e. positive integers like 1, 2, and 3... are given by God or belong to nature. All other numbers, like negative numbers, fractional numbers, irrational numbers, complex numbers, etc., are creations of the human mind. It is important to notice that all these other numbers are created using the natural numbers. Natural numbers have very interesting patterns and those patterns are elegantly simple and hence simply beautiful. The idea of this paper is to explore different patterns that are created with natural numbers, to demystify the connection of the natural numbers with nature, and then to use them to teach important concepts of software
engineering. We will take various examples, discuss the teaching methodology used to teach them, and uncover different software engineering concepts and best practices. The examples that we will use are the Fibonacci sequence and other natural number patterns, and we will connect them with software engineering concepts like loop patterns, recursion, refactoring and decomposition. For the last few years we have used this in our software engineering classes with much success, particularly in relation to student engagement and helping students to think creatively. We are confident that this type of teaching approach can be seamlessly integrated in tertiary as well as in high school software engineering curricula and has no geographical boundaries. This novel teaching approach is ready to be tested in different cultural settings. Finally, we conclude the paper with a desire for future research in cross-cultural, multi-institutional and multi-national settings.

References

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**Index Terms**

- Computer Science
- Information Technology

**Keywords**

- Software Engineering
- Introductory Programming
- Recursion
- Iteration
- Natural Numbers