How did a branch of mathematics established in the Victorian era become the basis for some incredible technological achievements a century later? Boolean algebra, also called Boolean logic, is at the heart of the electronic circuitry in everything we use from our computers and cars, to our kitchen gadgets and home appliances. The best-selling popular author Paul Nahin combines in this book engaging problems and a colourful historical narrative to tell the remarkable story of how two mathematicians in different eras became founding fathers of the electronic communications age. They are George Boole (1815-1864) and electrical engineer and information theorist Claude Shannon (1916-2001). Presenting their biographies, Nahin examines the history of Boole’s innovative ideas, and points out how they led to Shannon’s groundbreaking work on electrical circuits and information theory. In the course of the exposition, problems in logic are given for the readers to solve. Also the author writes about the contributions of such key players as Georg Cantor, Tibor Radó, Marvin Minsky and Alan Turing, in the development of mathematical logic and data transmission. The author succeeds in developing the story from fundamental concepts to a deeper and more sophisticated understanding of how modern digital machines, such as the computer, are constructed. Some ideas in quantum mechanics and thermodynamics are introduced to explore the possible limitations of computing in the present century.

The chapter headings are provided for the interest of potential readers: What You Need to Know to Read this Book; Introduction to George Boole and Claude Shannon: Two Mini-Biographies; Boolean Algebra; Logical Switching Circuits; Boole, Shannon, and Probability; Some Combinatorial Logic Examples; Sequential State Digital Circuits; Turing Machines; Beyond Boole and Shannon; Epilogue; and Appendix (Fundamental Electric Circuit Concepts). Each chapter concludes with Notes and References.

Reading this book would help one understand how gigahertz chips work in electronic gadgets. The book is well written.