Primality Testing for Beginners (Student Mathematical Library)

By Lasse Rempe-gillen, Rebecca Waldecker

Primality Testing for Beginners (Student Mathematical Library) By Lasse Rempe-gillen, Rebecca Waldecker

How can you tell whether a number is prime? What if the number has hundreds or thousands of digits? This question may seem abstract or irrelevant, but in fact, primality tests are performed every time we make a secure online transaction. In 2002, Agrawal, Kayal, and Saxena answered a long-standing open question in this context by presenting a deterministic test (the AKS algorithm) with polynomial running time that checks whether a number is prime or not. What is more, their methods are essentially elementary, providing us with a unique opportunity to give a complete explanation of a current mathematical breakthrough to a wide audience. Rempe-Gillen and Waldecker introduce the aspects of number theory, algorithm theory, and cryptography that are relevant for the AKS algorithm and explain in detail why and how this test works. This book is specifically designed to make the reader familiar with the background that is necessary to appreciate the AKS algorithm and begins at a level that is suitable for secondary school students, teachers, and interested amateurs. Throughout the book, the reader becomes involved in the topic by means of numerous exercises.

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About the Author
Lasse Rempe-Gillen, University of Liverpool, UK Rebecca Waldecker, Martin-Luther-Universitat Halle-Wittenberg, Germany

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