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Sommario/riassunto	Program debugging has always been a difficult and time-consuming task in the context of software development, where spectrum-based fault localization (SBFL) is one of the most widely studied families of techniques. While it's not particularly difficult to learn about the process and empirical performance of a particular SBFL technique from the available literature, researchers and practitioners aren't always familiar with the underlying theories. This book provides the first comprehensive guide to fundamental theories in SBFL, while also addressing some emerging challenges in this area. The theoretical framework introduced here reveals the intrinsic relations between various risk evaluation formulas, making it possible to construct a formula performance hierarchy. Further extensions of the framework

provide a sufficient and necessary condition for a general maximal formula, as well as performance comparisons for hybrid SBFL methods. With regard to emerging challenges in SBFL, the book mainly covers the frequently encountered oracle problem in SBFL and introduces a metamorphic slice-based solution. In addition, it discusses the challenge of multiple-fault localization and presents cutting-edge approaches to overcoming it. SBFL is a widely studied research area with a massive amount of publications. Thus, it is essential that the software engineering community, especially those involved in program debugging, software maintenance and software quality assurance (including both newcomers and researchers who want to gain deeper insights) understand the most fundamental theories – which could also be very helpful to ensuring the healthy development of the field.

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