

## Determining the Most Efficient Test Available in Software Testing

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**Abstract :** Software failures can present an enormous detriment to people's lives and cost millions of dollars to repair when they are unexpectedly encountered in the wild. Despite a significant portion of the software development lifecycle and resources are dedicated to testing, software failures are a relatively frequent occurrence. Nevertheless, the evaluation of testing effectiveness remains at the forefront of ensuring high-quality software and software metrics play a critical role in providing valuable insights into quantifiable objectives to assess the level of assurance and confidence in the system. As the selection of appropriate metrics can be an arduous process, the goal of this paper is to shed light on the significance of software metrics by examining a range of testing techniques and metrics as well as identifying key areas for improvement. Additionally, through this investigation, readers will gain a deeper understanding of how metrics can help to drive informed decision-making on delivering high-quality software and facilitate continuous improvement in testing practices.

**Keywords :** software testing, software metrics, testing effectiveness, black box testing, random testing, adaptive random testing, combinatorial testing, fuzz testing, equivalence partition, boundary value analysis, white box testing

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