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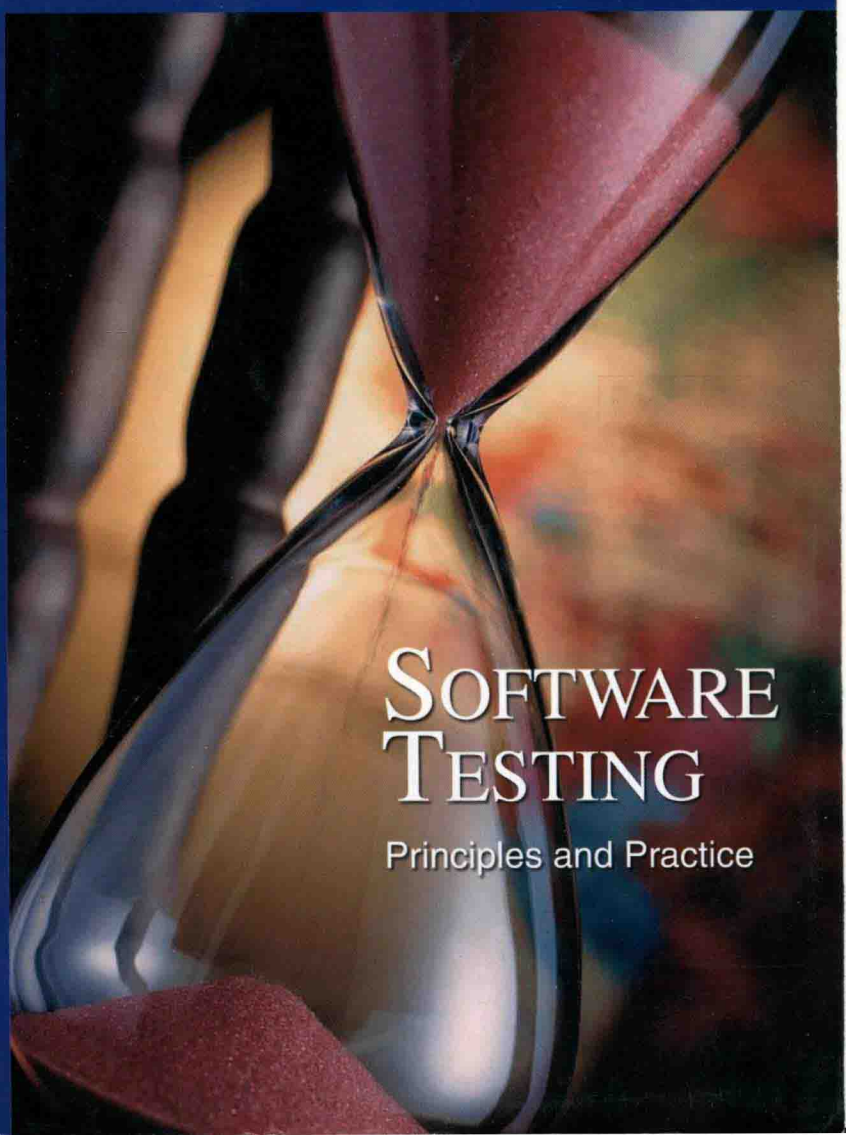
软件测试

原理与实践

（美国）Stephen Brown Joe Timoney Tom Lysaght
（中 国）Deshi Ye（叶德仕） 著

Software Testing
Principles and Practice
（英文版）



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这本软件测试教材基于爱尔兰国立大学梅努斯和中国浙江大学的一系列课程讲稿编写而成。全书一开始简单回顾了软件产业的发展历程，进而引出接下来要讲述的本书主要内容——软件测试的基础知识、原理以及相关技术。然后，在详细阐述静态和动态软件测试原理之前给出了一些关键定义。接着，针对过程式编程和面向对象编程（使用Java语言）提供了两个完整的单元测试实例。随后，本书讨论了系统测试和软件测试自动化的方法学。在这之后，本书采用常用的软件过程来解释软件测试在软件开发生命周期中的作用。最后，作者讨论了多个测试方面的高级主题，这些开放性问题需要深入的思考和研究，更进一步的资料在研究生课程中提供。

本书主要是面向软件测试的本科课程来设计相关内容，但书中讲述的理论和技术辅以许多实际的例子来说明，这些实用的内容对于软件专业人员也很有吸引力，因为软件测试是现代软件工程项目管理的一个非常关键的要素，其重要性日渐显现，正在引起软件产业乃至IT产业的充分重视……

本书特色

- 凝练作者多年的行业经验和教学经验，以丰富的实例，系统阐释软件测试的基本理论和技术。
- 附录中给出大量与实际应用相关的练习，便于读者理解和巩固所学知识。
- 涵盖一些高级主题，如测试技术选择、用浮点数测试、用复杂数据结构测试、GUI组件的单元测试、嵌入式软件测试等，需要读者在接下来的学习和工作实践中不断深入研究和思考。

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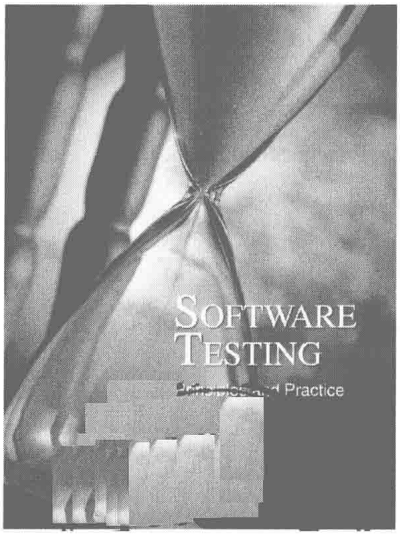

（爱尔兰）Stephen Brown Jo[illegible]mon Lysaght
（中　国）Deshi Ye 叶德仕
著

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出版者的话

文艺复兴以降，源远流长的科学精神和逐步形成的学术规范，使西方国家在自然科学的各个领域取得了垄断性的优势；也正是这样的传统，使美国在信息技术发展的六十多年间名家辈出、独领风骚。在商业化的进程中，美国的产业界与教育界越来越紧密地结合，计算机学科中的许多泰山北斗同时身处科研和教学的最前线，由此而产生的经典科学著作，不仅擘划了研究的范畴，还揭示了学术的源变，既遵循学术规范，又自有学者个性，其价值并不会因年月的流逝而减退。

近年，在全球信息化大潮的推动下，我国的计算机产业发展迅猛，对专业人才的需求日益迫切。这对计算机教育界和出版界都既是机遇，也是挑战；而专业教材的建设在教育战略上显得举足轻重。在我国信息技术发展时间较短的现状下，美国等发达国家在其计算机科学发展的几十年间积淀和发展的经典教材仍有许多值得借鉴之处。因此，引进一批国外优秀计算机教材将对我国计算机教育事业的发展起到积极的推动作用，也是与世界接轨、建设真正的世界一流大学的必由之路。

机械工业出版社华章公司较早意识到“出版要为教育服务”。自 1998 年开始，我们就将工作重点放在了遴选、移译国外优秀教材上。经过多年的不懈努力，我们与 Pearson，McGraw-Hill，Elsevier，MIT，John Wiley & Sons，Cengage 等世界著名出版公司建立了良好的合作关系，从他们现有的数百种教材中甄选出 Andrew S. Tanenbaum，Bjarne Stroustrup，Brain W. Kernighan，Dennis Ritchie，Jim Gray，Afred V. Aho，John E. Hopcroft，Jeffrey D. Ullman，Abraham Silberschatz，William Stallings，Donald E. Knuth，John L. Hennessy，Larry L. Peterson 等大师名家的一批经典作品，以“计算机科学丛书”为总称出版，供读者学习、研究及珍藏。大理石纹理的封面，也正体现了这套丛书的品位和格调。

“计算机科学丛书”的出版工作得到了国内外学者的鼎力襄助，国内的专家不仅提供了中肯的选题指导，还不辞劳苦地担任了翻译和审校的工作；而原书的作者也相当关注其作品在中国的传播，有的还专程为其书的中译本作序。迄今，“计算机科学丛书”已经出版了近两百个品种，这些书籍在读者中树立了良好的口碑，并被许多高校采用为正式教材和参考书籍。其影印版“经典原版书库”作为姊妹篇也被越来越多实施双语教学的学校所采用。

权威的作者、经典的教材、一流的译者、严格的审校、精细的编辑，这些因素使我们的图书有了质量的保证。随着计算机科学与技术专业学科建设的不断完善和教材改革的逐渐深化，教育界对国外计算机教材的需求和应用都将步入一个新的阶段，我们的目标是尽善尽美，而反馈的意见正是我们达到这一终极目标的重要帮助。华章公司欢迎老师和读者对我们的工作提出建议或给予指正，我们的联系方法如下：

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华章教育

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Preface

This book is based on a series of lectures given at the National University of Ireland, Maynooth and Zhejiang University. It provides a textbook for a number of courses, describing the fundamentals of software testing. The material has been developed over the past ten years, and reflects both the experiences from 20 years in industry from one of the authors, and the authors' joint experiences in lecturing.

There is no one standard textbook on software testing, and this book is the result of many years of extracting and interpreting test techniques from a wide and varied number of sources. These include testing classics such as The Art of Software Testing by Myers, Software Testing by Roper, and Testing Object-Oriented Systems by Binder; standard textbooks such as Software Engineering by Pressman and Ince, and Software Engineering by Sommerville; software process books such as Software Testing in the Real World by Kit and extreme Programming explained by Beck; and ISO and IEEE standards related to software quality and testing.

Software testing is a challenging task – it is as important for businesses and government as it is for research institutions. It is still as much an art as a science: there are no accepted standards or norms for applying the various techniques, and interpretation is required. There is no well established research on the effectiveness of different approaches. The techniques are easy to understand, but generally difficult to apply to real-world software. By providing extensive worked examples, this book aims to provide a solid basis for both understanding, and applying, various test techniques

前　言

本书的内容基于爱尔兰国立大学梅努斯和浙江大学的一系列课程讲稿。该书覆盖了软件测试的基本原理，可以作为许多课程的参考教材。本书的内容历经十年发展，融合了其中一位作者近二十年的工业界经验及全部作者的教学经验。

在软件测试领域，目前还没有统一的标准教科书，而本书是通过对各种不同的软件测试技术进行多年的提炼、阐释而形成的。这些测试技术的来源包括：一些经典的测试书籍，如 Myers 的《软件测试的艺术》、Roper 的《软件测试》、Binder 的《面向对象系统测试》；标准的软件工程教材，如 Pressman 和 Ince 的《软件工程》、Sommerville 的《软件工程》；软件过程类书籍，如 Kit 的《现实世界中的软件测试》、Beck 的《极限编程》；软件质量及测试相关的 ISO 和 IEEE 标准。

软件测试是一项具有挑战性的任务，它对科研机构、企业及政府具有同等的重要性。软件测试既是一门科学也是一门艺术。针对如何应用不同的软件测试技术，目前还没有广泛认同的标准，因此对各种软件测试技术的阐释是必需的。针对各种不同技术的有效性，目前还没有成熟的研究成果。总的来说，各种测试技术容易理解，但如何将其应用到软件产品中是困难的。本书旨在通过广泛丰富的实例，为读者理解和应用各种不同的软件测试技术提供一个坚实的基础。

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