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# Testing iOS Apps with HadoopUnit

*Rapid Distributed GUI Testing*

Scott Tilley  
Krissada Dechokul

*SYNTHESIS LECTURES ON SOFTWARE ENGINEERING*

# Testing Ios Apps With Hadoopunit Rapid Distributed Gui Testing

**Corina S. Păsăreanu**



## **Testing Ios Apps With Hadoopunit Rapid Distributed Gui Testing:**

*Testing iOS Apps with HadoopUnit* Scott Tilley, Krissada Dechokul, 2022-05-31 Smartphone users have come to expect high quality apps. This has increased the importance of software testing in mobile software development. Unfortunately testing apps, particularly the GUI, can be very time consuming. Exercising every user interface element and verifying transitions between different views of the app under test quickly becomes problematic. For example, execution of iOS GUI test suites using Apple's UI Automation framework can take an hour or more if the app's interface is complicated. The longer it takes to run a test, the less frequently the test can be run, which in turn reduces software quality. This book describes how to accelerate the testing process for iOS apps using HadoopUnit, a distributed test execution environment that leverages the parallelism inherent in the Hadoop platform. HadoopUnit was previously used to run unit and system tests in the cloud. It has been modified to perform GUI testing of iOS apps on a small scale cluster, a modest computing infrastructure available to almost every developer. Experimental results have shown that distributed test execution with HadoopUnit can significantly outperform the test execution on a single machine, even if the size of the cluster used for the execution is as small as two nodes. This means that the approach described in this book could be adopted without a huge investment in IT resources. HadoopUnit is a cost effective solution for reducing lengthy test execution times of system level GUI testing of iOS apps.

*Testing iOS Apps with HadoopUnit* Scott Tilley, Krissada Dechokul, 2014-11-01 Smartphone users have come to expect high quality apps. This has increased the importance of software testing in mobile software development. Unfortunately testing apps, particularly the GUI, can be very time consuming. Exercising every user interface element and verifying transitions between different views of the app under test quickly becomes problematic. For example, execution of iOS GUI test suites using Apple's UI Automation framework can take an hour or more if the app's interface is complicated. The longer it takes to run a test, the less frequently the test can be run, which in turn reduces software quality. This book describes how to accelerate the testing process for iOS apps using HadoopUnit, a distributed test execution environment that leverages the parallelism inherent in the Hadoop platform. HadoopUnit was previously used to run unit and system tests in the cloud. It has been modified to perform GUI testing of iOS apps on a small scale cluster, a modest computing infrastructure available to almost every developer. Experimental results have shown that distributed test execution with HadoopUnit can significantly outperform the test execution on a single machine, even if the size of the cluster used for the execution is as small as two nodes. This means that the approach described in this book could be adopted without a huge investment in IT resources. HadoopUnit is a cost effective solution for reducing lengthy test execution times of system level GUI testing of iOS apps.

Symbolic Execution and Quantitative Reasoning Corina S. Păsăreanu, 2022-05-31 This book reviews recent advances in symbolic execution and its probabilistic variant and discusses how they can be used to ensure the safety and security of software systems. Symbolic execution is a systematic program analysis technique which explores multiple program behaviors.

all at once by collecting and solving symbolic constraints collected from the branching conditions in the program. The obtained solutions can be used as test inputs that execute feasible program paths. Symbolic execution has found many applications in various domains such as security, smartphone applications, operating systems, databases, and more recently deep neural networks uncovering subtle errors and unknown vulnerabilities. We review here the technique, which has also been extended to reason about algorithmic complexity and resource consumption. Furthermore, symbolic execution has been recently extended with probabilistic reasoning, allowing one to reason about quantitative properties of software systems. The approach computes the conditions to reach target program events of interest and uses model counting to quantify the fraction of the input domain satisfying these conditions, thus computing the probability of event occurrence. This probabilistic information can be used, for example, to compute the reliability of an aircraft controller under different wind conditions, modeled probabilistically, or to quantify the leakage of sensitive data in a software system using information theory metrics such as Shannon entropy. This book is intended for students and software engineers who are interested in advanced techniques for testing and verifying software systems.

*Model-Driven Software Engineering in Practice* Marco Brambilla, Jordi Cabot, Manuel Wimmer, 2017-03-30. This book discusses how model-based approaches can improve the daily practice of software professionals. This is known as Model-Driven Software Engineering (MDSE) or simply Model-Driven Engineering (MDE). MDSE practices have proved to increase efficiency and effectiveness in software development, as demonstrated by various quantitative and qualitative studies. MDSE adoption in the software industry is foreseen to grow exponentially in the near future, e.g., due to the convergence of software development and business analysis. The aim of this book is to provide you with an agile and flexible tool to introduce you to the MDSE world, thus allowing you to quickly understand its basic principles and techniques and to choose the right set of MDSE instruments for your needs, so that you can start to benefit from MDSE right away. The book is organized into two main parts. The first part discusses the foundations of MDSE in terms of basic concepts, i.e., models and transformations, driving principles, application scenarios, and current standards like the well-known MDA initiative proposed by OMG (Object Management Group), as well as the practices on how to integrate MDSE in existing development processes. The second part deals with the technical aspects of MDSE, spanning from the basics on when and how to build a domain-specific modeling language to the description of Model-to-Text and Model-to-Model transformations and the tools that support the management of MDSE projects. The second edition of the book features a set of completely new topics, including a full example of the creation of a new modeling language (IFML), discussion of modeling issues and approaches in specific domains like business process modeling, user interaction modeling, and enterprise architecture, complete revision of examples, figures, and text for improving readability, understandability, and coherence, better formulation of definitions, dependencies between concepts, and ideas, addition of a complete index of book content. In addition to the contents of the book, more resources are provided on the book's website (<http://www.mdse-book.com>) including the

examples presented in the book **Java Software Development with Event B** Néstor Cataño Collazos, 2022-05-31 The cost of fixing software design flaws after the completion of a software product is so high that it is vital to come up with ways to detect software design flaws in the early stages of software development for instance during the software requirements the analysis activity or during software design before coding starts It is not uncommon that software requirements are ambiguous or contradict each other Ambiguity is exacerbated by the fact that software requirements are typically written in a natural language which is not tied to any formal semantics A palliative to the ambiguity of software requirements is to restrict their syntax to boilerplates textual templates with placeholders However as informal requirements do not enjoy any particular semantics no essential properties about them or about the system they attempt to describe can be proven easily Formal methods are an alternative to address this problem They offer a range of mathematical techniques and mathematical tools to validate software requirements in the early stages of software development This book is a living proof of the use of formal methods to develop software The particular formalisms that we use are EVENT B and refinement calculus In short i software requirements as written as User Stories ii they are ported to formal specifications iii they are refined as desired iv they are implemented in the form of a prototype and finally v they are tested for inconsistencies If some unit test fails then informal as well as formal specifications of the software system are revisited and evolved This book presents a case study of software development of a chat system with EVENT B and a case study of formal proof of properties of a social network

**Model-Driven Software Engineering in Practice, Second Edition** Marco Brambilla, Jordi Cabot, Manuel Wimmer, 2022-05-31 This book discusses how model based approaches can improve the daily practice of software professionals This is known as Model Driven Software Engineering MDSE or simply Model Driven Engineering MDE MDSE practices have proved to increase efficiency and effectiveness in software development as demonstrated by various quantitative and qualitative studies MDSE adoption in the software industry is foreseen to grow exponentially in the near future e g due to the convergence of software development and business analysis The aim of this book is to provide you with an agile and flexible tool to introduce you to the MDSE world thus allowing you to quickly understand its basic principles and techniques and to choose the right set of MDSE instruments for your needs so that you can start to benefit from MDSE right away The book is organized into two main parts The first part discusses the foundations of MDSE in terms of basic concepts i e models and transformations driving principles application scenarios and current standards like the well known MDA initiative proposed by OMG Object Management Group as well as the practices on how to integrate MDSE in existing development processes The second part deals with the technical aspects of MDSE spanning from the basics on when and how to build a domain specific modeling language to the description of Model to Text and Model to Model transformations and the tools that support the management of MDSE projects The second edition of the book features a set of completely new topics including full example of the creation of a new modeling language IFML discussion of modeling issues and approaches in

specific domains like business process modeling user interaction modeling and enterprise architecture complete revision of examples figures and text for improving readability understandability and coherence better formulation of definitions dependencies between concepts and ideas addition of a complete index of book content In addition to the contents of the book more resources are provided on the book s website <http://www.mdse-book.com> including the examples presented in the book

*Distributed GUI Testing of IOS Applications with HadoopUnit* Krissada Dechokul,2014 Smartphones have become an important medium of communication for millions of people They have come to expect high quality mobile applications which have increased the importance of software testing in modern software development While software testing can ensure the quality of a system under test SUT it has suffered from lengthy execution time especially for system level GUI testing In general system level GUI testing can be time consuming because it requires walking through every user interface element and every possible variation that users could experience through the GUI of the application In addition this type of testing exercises the SUT from the outside of the applications meaning that it has to constantly wait for the drawing of UI components delays in transitions between different views and animations throughout the test execution Currently with UI Automation a popular testing framework from Apple for iOS applications test execution of iOS GUI test suites can take an hour or more to execute if the GUI of the application is complicated This amount of time is significant if the testing needs to be performed frequently throughout the software development life cycle More time means less frequent testing which in turn reduces software quality In this thesis the test process is accelerated by migrating the current test execution environment to a distributed execution environment called HadoopUnit HadoopUnit has been adopted to perform GUI testing of iOS applications on a small scale Hadoop cluster Experimental results have shown that distributed test execution with HadoopUnit can significantly outperform the test execution on a single machine even if the size of the cluster used for the execution is as small as two nodes This means that the work of this thesis could be adopted without a huge investment in IT resources making HadoopUnit a cost effective solution for reducing lengthy test execution time of system level GUI testing

**Test iOS Apps with UI Automation** Jonathan Penn,2013      [Test-Driven iOS Development](#) Graham Lee,2012-04-12 As iOS apps become increasingly complex and business critical iOS developers must ensure consistently superior code quality This means adopting best practices for creating and testing iOS apps Test Driven Development TDD is one of the most powerful of these best practices Test Driven iOS Development is the first book 100% focused on helping you successfully implement TDD and unit testing in an iOS environment Long time iOS Mac developer Graham Lee helps you rapidly integrate TDD into your existing processes using Apple s Xcode 4 and the OUnit unit testing framework He guides you through constructing an entire Objective C iOS app in a test driven manner from initial specification to functional product Lee also introduces powerful patterns for applying TDD in iOS development and previews powerful automated testing capabilities that will soon arrive on the iOS platform Coverage includes Understanding the purpose benefits and costs of unit testing in iOS

environments Mastering the principles of TDD and applying them in areas from app design to refactoring Writing usable readable and repeatable iOS unit tests Using OCUnit to set up your Xcode project for TDD Using domain analysis to identify the classes and interactions your app needs and designing it accordingly Considering third party tools for iOS unit testing Building networking code in a test driven manner Automating testing of view controller code that interacts with users Designing to interfaces not implementations Testing concurrent code that typically runs in the background Applying TDD to existing apps Preparing for Behavior Driven Development BDD The only iOS specific guide to TDD and unit testing Test Driven iOS Development covers both essential concepts and practical implementation [IOS Unit Testing by Example](#) Jon Reid, 2020 Fearlessly change the design of your iOS code with solid unit tests Use Xcode's built in test framework XCTest and Swift to get rapid feedback on all your code including legacy code Learn the tricks and techniques of testing all iOS code especially view controllers UIViewControllers which are critical to iOS apps Learn to isolate and replace dependencies in legacy code written without tests Practice safe refactoring that makes these tests possible and watch all your changes get verified quickly and automatically Make even the boldest code changes with complete confidence Manual code and UI testing get slower the deeper your navigation hierarchy goes It can take several taps just to reach a particular screen never mind the actual workflow tests Automatic unit testing offers such rapid feedback that it can change the rules of development Bring testing to iOS development even for legacy code Use XCTest to write unit tests in Swift for all your code iOS developers typically reserve unit tests for their model classes alone But that approach skips most of the code common to iOS apps especially with UIViewControllers Learn how to unit test these view controllers to expand your unit testing possibilities Since good unit tests form the bedrock for safe refactoring you're empowered to make bold changes Learn how to avoid the most common mistakes Swift programmers make with the XCTest framework Use code coverage to find holes in your test suites Learn how to identify hard dependencies Reshape the design of your code quickly with less risk and less fear [Pro iOS Testing](#) Avi Tsadok, 2020-10-20 Discover what tools there are for unit testing in iOS and how to work in a test driven environment This book reveals how testing is a crucial capability in any iOS developer's toolset and a minimum requirement in iOS interviews A few years ago tests on mobile platforms were not very popular It wasn't a technical constraint more a cultural one But these days it's a crucial skill set especially when projects become big and hard to maintain This book shows you how to set up a testing target in Xcode unit tests You'll learn how to write unit tests properly and incorporate concepts like spies and mocks and code coverage You'll also learn the philosophy behind the architecture of UI tests and how to mock network and DB layers in testing Write unbreakable UI tests performance tests as well And learn the difference between integration tests and snapshot testing This book will show you how to maintain code that's not only bug free but will also remain high quality over time and maintainable while you make changes and refactors during an app's life Testing in all its aspects is the best way of maintaining iOS projects to run fast and reliably long after you've released them Many iOS

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**Hands-on Mobile App Testing** Daniel Knott, 2015



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