

# Text And Tests 2 Higher Level Pdf Download

## Automated test case generation from domain specific models of high-level requirements

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### ABSTRACT

Model based software development has been shown to improve productivity and quality of software through automation. This involves using abstractions or models at several stages of development. This work reports on preliminary attempts to automate the generation of test cases from software requirement models using an industrial case study. The requirements are represented using a modelling notation and test cases are automatically generated using model to test transformation techniques.

### CCS Concepts

Software verification and validation; Software testing and debugging.

### Keywords

Model Based Testing, Domain Specific Languages

### 1. INTRODUCTION

Software testing is one of the most crucial phases of development that could account for more than 50% of the overall cost of development [1]. The automation of this process could reduce this cost in terms of time and effort. Validation approaches such as requirements-based testing can be used to uncover faults and defects in artefacts during early stage development. To aid automated testing from requirements, software requirement specifications need to be precise. In this work, we propose an approach to automate test case generation from requirement models. This paper reports on an industrial case study. Requirement specifications at GE Aviation Systems is primarily done using natural "shall" statements in natural language. Natural language is often used for requirement specifications due to its ease of understanding and the need for no additional training. Design models are then created based on these requirements for modelling and simulation. These models are then refined and used

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for automated code generation. The test cases developed against the requirements and design are developed manually. The natural language requirements are often ambiguous and manual testing can be time consuming and prone to human error. This work presents a requirement-based approach to automate the test case generation process to increase productivity. The requirements are represented as models and model-based approaches are applied to automatically generate testcases.

Model Based Software Development (MBSW) is an approach to software development with models as primary artefacts. Models or abstractions of the system at different levels are used at several phases of development. Model Based Testing (MBT) involves the use of models in different formats as a basis for testing. In this work, our MBT approach uses requirements represented using a Domain Specific Language (DSL). DSLs are languages tailored to a particular domain or built for a specific purpose. They can be described as modelling languages whose constructs are based on domain related concepts. The use of DSLs have been shown to increase expressiveness of specifications by experts in a particular domain [2]. A DSL is used in this work to bridge the gap between ambiguous natural language specifications and rigorous formal specifications.

Automation of development activities in MBSW is usually done through a series of model transformations. Model transformation involves taking models conforming to a metamodel as input and generating development artefacts from them. With model transformations, models used at any stage of software development can be manipulated to generate a model or test used in another phase. There are two types of model transformations: Model to Model transformation (generation of models from other models) and Model to Text transformation (generation of textual artefacts from models). In this work, we apply Model to Text (MTT) transformation to generate model-based test cases from requirement models specified using the DSL. We present an approach to automate generation of test cases from textual requirement models expressed in a DSL. In this work, a MTT transformation language is applied for test case generation from requirement specifications expressed in a DSL. This paper is structured as follows: Section 2 presents some related work. The application of model transformations to test case generation is described in Section 3 while Section 4 concludes the paper and discusses future work.

### 2. RELATED WORK

There are several existing tools for automatic test case generation. However, the model-based approaches have been based on vari-

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