TEST CASE GENERATOR FOR VISUAL PROGRAMMING LANGUAGE

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TEST CASE GENERATOR FOR VISUAL PROGRAMMING LANGUAGE

By

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DEDICATION

I want to dedicate this thesis to all.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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January 2007

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Designing test cases is a tedious and meticulous work. A tester needs to have a depth understanding of a program before a good test suite can be designed. Sometimes, even an expert tends to miss some test cases. The same scenario applies in designing test cases for Visual Programming Language (VPL). Most studies in designing test cases for VPL are using requirement specification, design specification, complex technique (i.e. Z) and third-party tools that requiring novice user to supply information that is not familiar to them. It is certain that the information supplied in creating test case was less accurate and thus affected the test suite produced. Therefore, this research explores the creation of automated test case generator for a VPL using Extensible Markup Language (XML) based language as data representation. The generation method is based on path coverage and boundary value analysis testing techniques. Validation and verification of the test cases created by the tools is done by comparing the generated test cases with the manually-designed test cases. Five test program are chosen and tested using the propose method. From

the result and analysis, a conclusion is drawn that the automated test case generator created are able to create test cases for VPL.

Abstrak tesis yang dikemukan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PENJANA KES PENGUJIAN UNTUK BAHASA PENGATURCARAAN VISUAL

Oleh

MOHD FARID JAAFAR

Januari 2007

Pengerusi: **Profesor Madya Hj Mohd Hasan Selamat**

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Mereka bentuk *test case* adalah satu tugas yang remeh dan leceh. Penguji perlu mempunyai pemahaman yang mendalam mengenai sesuatu atur cara sebelum satu *test suite* yang baik dapat dihasilkan. Kadangkala, pakar juga terlupa untuk menyertakan beberapa *test case*. Senario yang sama juga berlaku di dalam menghasilkan *test case* untuk Pengaturcaraan Berasaskan Visual (PBV). Kebanyakan penyelidikan dalam mereka bentuk *test suite* untuk PBV menggunakan spesifikasi keperluan, spesifikasi reka bentuk, teknik yang kompleks (contoh. Z) dan peralatan pihak ketiga yang memerlukan pengguna amatur memberikan maklumat yang mereka sendiri kurang fahami. Apa yang pasti, maklumat yang diberikan adalah kurang tepat dan memberi impak kepada *test suite* yang dihasilkan. Oleh itu, penyelidikan ini ialah untuk menghasilkan penjana automatik *test case* yang menggunakan bahasa berasaskan Extensible Markup Language (XML) sebagai perwakilan data. Kaedah penjanaan adalah berdasarkan kepada liputan laluan dan teknik pengujian analisa nilai sempadan. Penentusahan dan pengesahan *test case*

dilakukan dengan membandingkan *test case* yang dijana dengan *test case* yang dihasilkan secara manual. Lima atur cara telah dipilih dan diuji dengan kaedah yang dicadangkan. Dari hasil kajian dan analisis, satu kesimpulan yang dapat dibuat ialah pejana automatik *test case* dapat digunakan untuk menghasilkan *test case* kepada atur cara PBV.

I certify that an Examination Committee has met on 16th January 2007 to conduct the final examination of Mohd Farid Jaafar on his Master of Science thesis entitled "Test Case Generator for Visual Programming Language" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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This thesis submitted to Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows:

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Date: 10 MAY 2007

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any degree at UPM or other institutions.

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MOHD FARID JAAFAR

Date: 28 FEBRUARY 2007

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LIST OF ABBREVIATIONS

BNF	**Backus Normal Form**
BVA	**Boundary Value Analysis**
EBNF	**Extended BNF**
EP	**Equivalence Partitioning**
GraphML	**Graph Markup Language**
TCML	**Test Case Markup Language**
TSG	**Test Suite Generator**
URI	**Uniform Resource Identifier**
VP	**Visual Programming**
VPE	**Visual Programming Editor**
VPL	**Visual Programming Language**
XML	**Extensible Markup Language**