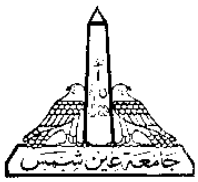

AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING
Computer Engineering and Systems

VALIDATION AND VERIFICATION OF UML MODELS

A Thesis submitted in partial fulfillment of the requirements of the degree of Master of Science in Electrical Engineering

(Computer Engineering and Systems)

by

Azza Shawki Othman

Bachelor of Science in Electrical Engineering
Computer Engineering and Systems department

Faculty of Engineering, Ain Shams University, year 2008

Supervised By

Prof. Hoda K. Mohamed

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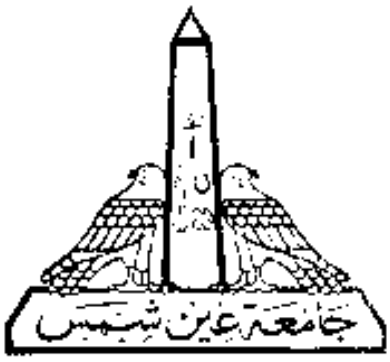
Cairo - (2018)



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Validation and Verification of UML models

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Statement

This thesis is submitted as a partial fulfilment of Master of Science in Electrical Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Thesis Summary

Recently, the Software designs process has clearly become much more sophisticated, thus the integrity of software system designs has gradually become difficult to be verified. For this purpose, the unified modelling language (UML) has been produced to be a standard language for designing software.

Verification and validation of UML models are necessary because some of UML models exhibited behaviours are neither wanted nor expected by the developer, this causes severe problems during runtime. This step is usually done by a model checker.

There are considerable numbers of model checking tools. However, this is usually accomplished by experts who have a good awareness of the model checker language and its construction. That's why it is necessary for a model validator to work along with the model designer. Thereby achieving the concern of separation accomplishes this step. In this thesis, a bridge has been constructed to tighten the gap between design and analysis processes through the USE2ALLOY tool. This tool can transform a model produced by the designer to a model suitable for conducting automated analysis by the validator.

This thesis presents a study of USE2ALLOY with OCL constraints. The translation allows analysis of UML models via Alloy to identify consistencies in those UML models and search for their instances with minimum effort from the designer. A comparison between this work and other related works has been done. Also, a conclusion has drawn and suggestions produced for future work.

Key words: UML; class diagram; OCL Model; Constraint; Alloy analyzer; Signature; USE tool; USE2ALLOY

Acknowledgment

First and above all, I praise and thank the God, for providing me this opportunity and granting me the capability to proceed successfully and complete this work.

This thesis appears in its final form due to the help and guidance of several people. I would therefore like to offer my sincere thanks to all of them.

Prof. Dr. Hoda K., my cordial thanks for accepting me as a M.A. student, thank for your warm encouragement, thoughtful guidance, critical comments, and correction of the thesis.

My sincere thanks and special appreciation also go to my advisor Dr. Islam El Maddah, for the trust, the insightful discussion, offering valuable advice, for your support during the whole period of the study, and especially for your patience and guidance during the writing process.

I would like to extend my sincerest thanks and appreciation to my friend Alaa Hamed, who helped me to accomplish this study, thank for your love, your supporting, encouragement and thank for giving me strength to reach.

Finally, I would like to sincerely thank my dear parents for their love, understanding, and support to finish my academic degree. I dedicate all my success to them.

September 2018

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