THESIS REPORT

A unified model for software functional testing

SUBMITTED TO:

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE (SOFTWARE ENGINEERING)

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بسم الله الرحمن الرحيم

FINAL APPROVAL

It is certified that the research work presented in this thesis entitled "A Unified Model for Software Functional Testing" was conducted by Jawad Abbas, under the supervision of Mr. Amjad Hussain Zahid at University of Management and Technology, Lahore, Pakistan. It has been completed in September 2017 to fulfill the requirements of the degree of MS Software Engineering.

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DECLARATION

I, Jawad Abbas ID# 15007114005 Session 2015-2017, hereby certify that this thesis is being submitted in partial fulfillment of the requirements for the MS degree in Software Engineering. This thesis is my original work and the data/material presented here in has not been used for the acquisition of any other degree from any institution.

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PREFACE

This thesis was prepared as a partial fulfillment of the requirements of acquiring the degree, Master of Science in Software Engineering MS (SE), in the School of Systems and Technology (SST) at the University of Management and Technology (UMT), Lahore, Pakistan.

This research document contains five chapters. In the first chapter, the introductory information and content has been written. Second chapter purely includes the Literature Review related to the topic. This is describing the previous work done in this area. Research Methodology has been discussed in third chapter which describes the method of research, overview of tools and techniques used in this research. After the Research Methodology, chapter 4 discusses the proposed framework. It has been described that how this unified model for software functional testing has been built and tested for validity. At the end, conclusion and future work chapter (5^{th} Chapter) finalizes and provides the outcome of this profound research.

ABSTRACT

The development of large software systems is a challenging and error prone process. To guarantee extraordinary quality, it is essential to examine software at different stages. Software testing is the dynamic parts of Software Development Life Cycle (SDLC). However, the software testing field has various issues like effective test cases generation, assembling of test cases, which require time and cost of testing. Software testing needs a guidance model for test selection and authentication. Model-based functional testing compares the SUT against defined test model. This process consists of generation of test suite against the test model, execution of the suite, and comparison with expected one. This thesis study has debated on the basics of testing briefly, recent advancements in various software testing strategies, techniques and automations models with respect to functional testing. In resultant, this research has introduced a unified testing model, which is based on the characteristics of object-oriented testing model and data driven testing methodology. In this study, it has been tried to find a solution to test web application by using model-based testing approach. Due to several benefits, Model-based testing approach has been chosen as a guideline. Selenium tool is used as a test Automation software. Framework has been written in pay Charm IDE supported by python language. Test application named 'Library Reservation' has also been developed in this thesis for the implementation of developed model.

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LIST OF ABBREVIATIONS

ADV	Aqua Dev. Desktop
CMM	Capability Maturity Model
CMMI	Capability Maturity Model Integration
CMS	Content Management System
CSS	Cascading Style Sheets
CSV	Comma Separated Values
FSM	Finite State Machine
HTML	Hyper Text Markup Language
IDE	Integrated Development Environment
IE	Internet Explorer
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Standard Organization
ISTQB	International Software Testing Qualifications Board
LAMP	Linux operating system, the Apache HTTP Server, the MySQL relational database management system (RDBMS), and the PHP programming language
MBT	Model Based Testing
OS	Operating System
PHP	Hypertext Preprocessor
POM	Page Object Model
RSS	Really Simple Syndication
SDLC	Software Development Life Cycle
SQA	Software Quality Assurance
SQL	Structured Query Language
SSH	Secure Shell
SUT	System Under Test
TQM	Total Quality Management
TSV	Tab-Separated Values
UI	User Interface
UML	Unified Modeling Language
XML	EXtensible Markup Language

Chapter 1

Introduction

CHAPTER 1

1. Introduction

Complex Information systems are now vital part of daily life. Every information system consists of two kinds of measures, namely software and hardware. Development of large and complex software is always a challenging and error prone procedure and errors may occur in any phase of software development. To make sure extraordinary quality of software, it is compulsory to verify the software at different stages. The complex software systems need more detailed verification before implementation. The software quality can be explained as collection of features and properties, which define advantages and disadvantages of software.