SOFTWARE TESTING

Dr. R. Sabitha

Associate Professor, CSE Dept SNS College of Technology, Coimbatore, TN, INDIA.

Ms. D. Shanti Priya

Assistant Professor, CSE Dept

SNS College of Technology, Coimbatore, TN, INDIA.

Ms. G. Brindha

Assistant Professor, CSE Dept

SNS College of Technology, Coimbatore, TN, INDIA.

Ms. V. Savitha

 $Assistant\ Professor,\ CSE\ Dept$

SNS College of Technology, Coimbatore, TN, INDIA.

Mrs. Dhivya P.

Assistant Professor, CSE Dept

SNS College of Technology, Coimbatore, TN, INDIA.

SOFTWARE TESTING

Copyright © : Dhivya P.

Publishing Rights (P) : VSRD Academic Publishing

A Division of Visual Soft India Pvt. Ltd.

ISBN-13: 978-93-87610-32-3 FIRST EDITION, FEBRUARY 2019, INDIA

Printed & Published by:

VSRD Academic Publishing
(A Division of Visual Soft India Pvt. Ltd.)

Disclaimer: The author(s) are solely responsible for the contents compiled in this book. The publishers or its staff do not take any responsibility for the same in any manner. Errors, if any, are purely unintentional and readers are requested to communicate such errors to the Authors or Publishers to avoid discrepancies in future.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publishers & Author.

Printed & Bound in India

VSRD ACADEMIC PUBLISHING

A Division of Visual Soft India Pvt. Ltd.

REGISTERED OFFICE

154, Tezabmill Campus, Anwarganj, KANPUR – 208003 (UP) (IN) Mb: 9899936803, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

MARKETING OFFICE

340, FF, Adarsh Nagar, Oshiwara, Andheri(W), MUMBAI–400053 (MH)(IN) Mb: 9956127040, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

PREFACE

It is with great pleasure that we are bringing out the first edition of this book. We hope that the present edition lives up to the challenge, and provides a power-packed which has been developed from scratch. We are confident that the reader would find immense value in this book for keeping pace with the changing paradigm of Internet technologies, and that sufficient concepts as well as depth are provided to give the reader a feel of complete understanding of the whole thing.

Here is a summary of the content and structure of the book. Readers new to the field of software test and analysis can obtain an overview by reading Chapters

- 1. Introduction to Software Testing
- 2. Testing Fundamentals
- 3. Defect Classes and Defect Repository
- 4. Test Case Design
- 5. Black Box Test Case Design Techniques
- 6. White Box Test Case Design Techniques
- 7. Levels of Testing Unit Testing
- 8. Levels of Testing Integration Testing
- 9. Levels of Testing System Testing
- 10. Testing Goals and Test Planing
- 11. Test Reports
- 12. The Test Organization
- 13. Controlling and Monitoring
- 14. Software Reviews

ACKNOWLEDGEMENT

First of all we extend our hearth felt gratitude to the management of SNS college of Technology, Dr.V.S.Velusamy, Founder Trustee, Dr. S.Rajalakshmi, Correspondent and Dr. S.N.Subramanian, chairman and Dr. V.P. Arunachalam, Director for providing us with all sorts of supports in completion of this book.

We record our indebtedness to our principal Dr. S.Chenthur Pandian for his guidance and sustained encouragement for the successful completion of this book.

We are highly grateful to Dr. S.Karthik, Professor& Dean, Department of Computer Science and Engineering, for his valuable suggestions and guidance throughout the course of this book.

We profoundly grateful to Dr.T.Kalaikumaran, Professor & Head, Department of Computer Science and Engineering, for his consistent encouragement and directions to prove our book and completing the book work in time.

We thanks, VSRD Academic Publishing (A Division of Visual Soft India Private Limited), for giving us chance to publish our valuable work in their publishing house.

 \angle Author(s)

CHA	APTER	CONTENTS	PAGE NO
UNI	T I INT	RODUCTION	1
1	INT	RODUCTION TO SOFTWARE TESTING	1
	1.1	TESTING AS AN ENGINEERING ACTIVITY	1
	1.2	ROLE OF PROCESS IN SOFTWARE QUALITY	3
	1.3	TESTING AS A PROCESS	3
	1.4	BASIC DEFINITIONS	5
2		TING FUNDAMENTALS	10
	2.1	SOFTWARE TESTING PRINCIPLES	10
	2.2	TESTERS ROLE IN A SOFTWARE DEVELOPMENT	14
		ORGANISATION	
3		ECT CLASSES AND DEFECT REPOSITORY	16
	3.1	DEFECTS	16
	3.2	DEFECT CLASSES, THE DEFECT REPOSITORY, AND	17
	2.2	TEST DESIGN	
	3.3	DEVELOPER/TESTER SUPPORT FOR DEVELOPING A	21
		DEFECT REPOSITORY	
TINIT	TI TE	CT CACE DECICN	23
4		ST CASE DESIGN CASE DESIGN	23
4	4.1	INTRODUCTION	23
	4.1	THE SMART TESTER	23
	4.3	TEST CASE DESIGN STRATEGIES AND TECHNIQUES	24
	4.4	USING THE BLACK BOX APPROACH TO TEST CASE	
	7.7	DESIGN	26
5	BLAC	CK BOX TEST CASE DESIGN TECHNIQUES	27
	5.1	RANDOM TESTING	28
	5.2	EQUIVALENCE CLASS PARTITIONING	29
	5.3	BOUNDARY VALUE ANALYSIS	33
	5.4	CAUSE - AND – EFFECT GRAPHING	35
	5.5	BLACK BOX TESTING AND COMMERCIAL OFF-THE-	40
		SHELF (COTS) COMPONENTS	
6		TE BOX TEST CASE DESIGN TECHNIQUES	42
	6.1	DIFFERENT METHODS USED IN THE WHITE BOX	42
		TESTING STRATEGIES	
	6.2	TEST ADEQUACY CRITERIA	42
	6.3	DECISION (OR) BRANCH COVERAGE	43
	6.4	DATA FLOW TESTING	44
	6.5	CONTROL FLOW TESTING/COVERAGE	45
	6.6	MCCABE'S CYCLOMATIC COMPLEXITY	47
	6.7	MUTATION TESTING	48
	6.8	EVALUATE TEST SELECTION/ ADEQUACY/ COVERAGE/ STOP CRITERIA	49
		STOT CRITERIA	
UNI	T III LE	VELS OF TESTING	52
7	LEVE	LS OF TESTING - UNIT TESTING	52
	7.1	INTRODUCTION	52
	7.2	UNIT TESTING	53
	7.3	UNIT TEST PLANNING	55
	7.4	DESIGNING THE UNIT TESTS	56
	7.5	UNIT TEST ON CLASS / OBJECTS	58

	7.6	THE TEST HARNESS	59
	7.7	RUNNING THE UNIT TESTS AND RECORDING RESULTS	60
8	LEVE	LS OF TESTING – INTEGRATION TESTING	63
	8.1	INTEGRATION TESTING	63
	8.2	DESIGN AN INTEGRATION TEST	63
	8.3	INTEGRATION TEST PLANING	67
9	LEVE	LS OF TESTING - SYSTEM TESTING	68
	9.1	SEVERAL TYPES OF SYSTEM TESTS	68
	9.2	FUNCTIONAL TESTING	68
	9.3	PERFORMANCE TESTING	69
	9.4	CONFIGURATION TESTING	70
	9.5	SECURITY TESTING	71
	9.6	RECOVERY TESTING	72
	9.7	ACCEPTANCE TEST, ALPHA AND BETA TESTING	73
UNI	T IV TE	ST MANAGEMENT	75
10	TEST	ING GOALS AND TEST PLANING	75
	10.1	INTRODUCTION	75
	10.2	TESTING AND DEBUGGING GOALS AND POLICIES	76
	10.3	DOCUMENT TYPES	81
	10.4	TEST PLANING	82
	10.5	TEST PLAN COMPONENTS/CONTENTS	85
	10.6	TEST COST ESTIMATION METHODS	89
	10.7	TEST PLAN ATTACHEMENTS	93
	10.8	LOCATING TEST ITEMS: TEST ITEM TRANSMITTAL REPORT	94
11	TEST	REPORTS	96
11	11.1	REPORTING TEST RESULTS	96
	11.2	THE ROLE OF THE THREE CRITICAL GROUPS IN	
		TESTING PLANNING AND TEST POLICY DEVELOPMENT	100
	11.3	PROCESS AND THE ENGINEERING DISCIPLINES	103
12	THE	TEST ORGANIZATION	104
	12.1	INTRODUCING THE TEST SPECIALIST	104
	12.2	SKILLS NEEDED BY A TEST SPECIALIST	105
	12.3	BUILDING A TESTING GROUP	107
	12.4	THE STRUCTURE OF THE TEST GROUP	108
UNI	T V CO	NTROLLING AND MONITORING	112
13	CONT	ROLLING AND MONITORING	112
	13.1	INTRODUCTION	112
	13.2	MEASUREMENTS AND MILESTONES FOR MONITORING AND CONTROLLING	114
	13.3	MEASUREMENTS FOR MONITORING TESTING STATUS	118
	13.4	MEASUREMENTS FOR MONITORING TESTING STATUS MEASUREMENTS TO MONITOR TESTER PRODUCTIVITY	121
	13.4	MEASUREMENTS FOR MONITORING TESTING COSTS	121
	13.5	MEASUREMENTS FOR MONITORING TESTING COSTS MEASUREMENTS FOR MONITORING ERROR, FAULTS,	
	13.0	AND FAILURES	123
	13.7	MONITORING TEST EFFECTIVENESS	124
	13.8	STATUS MEETINGS, REPORTS, AND CONTROL ISSUES	126
	13.9	CRITERIA FOR TEST COMPLETION	129
	13.10	SOFTWARE CONFIGURATION MANAGEMENT	131

14	SOFTWARE REVIEWS		
	14.1	INTRODUCTION	137
	14.2	TYPES OF REVIEWS	138
	14.3	TYPES OF REVIEWS ACCORDING TO FORMALITY	139
	14.4	REVIEWS AND TESTING	142
	14.5	TECHNICAL AND MANAGEMENT REVIEWS	143
	14.6	COMPONENTS OF A REVIEW PLAN	143
	14.7	CHECKLIST FOR REVIEWING	150
	14.8	REPORTING REVIEW RESULTS	157