

Contents

- 1 Introduction 1**
 - 1.1 The Software Crisis 1
 - 1.2 Why Test Software? 3
 - 1.3 Objectives and Research Questions 5
 - 1.4 Structure of the Book. 6
 - References 6
- 2 Software Testing 11**
 - 2.1 Testing Basics. 11
 - 2.1.1 Defects 11
 - 2.1.2 Aims of Testing 14
 - 2.1.3 Classification and Categorization 16
 - 2.1.4 Standards 19
 - 2.2 Testing Techniques 21
 - 2.2.1 Static Techniques 22
 - 2.2.2 Dynamic Techniques 25
 - 2.2.3 Testing of Web based Programs 34
 - 2.2.4 Additional Techniques. 35
 - 2.2.5 Techniques with Regard to Phases 38
 - 2.3 Organization of Testing 39
 - 2.3.1 Phases of Testing 39
 - 2.3.2 Test Driven Development 42
 - 2.3.3 Documentation 42
 - 2.3.4 Test Management 43
 - 2.3.5 Certification 45
 - 2.4 Tool Support and Automatization 46
 - 2.4.1 Test Tools 46
 - 2.4.2 True Automatization 48
 - References 50

3	Research Design	57
3.1	General Considerations	57
3.2	Research Method	59
3.2.1	Design Science	59
3.2.2	Particularities of Research on Technical Aspects	60
3.2.3	Particularities of Research on Organizational Aspects	63
3.2.4	Particularities of Research on E-Learning Aspects	65
3.3	Research Process	66
	References	66
4	Technical Aspects: Muggl	71
4.1	Background	71
4.2	Related Work	72
4.3	Muggl	74
4.3.1	Java Virtual Machine Basics	74
4.3.2	Basic Functions and Execution Principles	78
4.3.3	Architecture	80
4.3.4	Example Test Case	81
4.3.5	Notable Functions	82
4.3.6	Performance	87
4.3.7	Intermediate Conclusion	88
4.4	Overview of Published Work	88
	References	90
5	Organizational Aspects: The IHK Project	95
5.1	Background	95
5.2	Related Work	96
5.3	Findings of the IHK Project	97
5.3.1	Participants	98
5.3.2	Status Quo of Testing	98
5.3.3	Framework	99
5.3.4	Recommendations	101
5.3.5	Additional Findings	102
5.4	Overview of Published Work	102
	References	107
6	Testing and E-Assessment	111
6.1	Background	111
6.2	Related Work	112
6.3	The E-Assessment System EASy	113
6.3.1	Basics	113
6.3.2	The Module for Software Verification Proofs	114
6.3.3	The Module for Programming and Testing	117
6.4	Overview of Published Work	122
	References	124

7 Conclusion	127
7.1 Synopsis	127
7.2 Lessons Learned	129
7.3 Discussion and Limitations	132
References	134
8 Future Work	135
8.1 Open Questions	135
8.2 Ongoing Research	137
References	138
Glossary	141
Index	155

Improving Software Testing
Technical and Organizational Developments

Majchrzak, T.A.

2012, XVIII, 160 p. 17 illus., Softcover

ISBN: 978-3-642-27463-3