Preface

The present volume is the second of three volumes on the engineering principles and techniques of software engineering. We refer to the Preface of Vol. 1, as well as to Chap. 1 of that same volume, for a proper preface and overall introduction to all volumes in this series. We assume that the reader has studied Vol. 1.

Overview

The present volume focuses on principles and techniques for specifying languages and systems. It uses the abstraction and modelling principles, techniques and tools covered in Vol. 1, and it supplements those principles, techniques and tools with additional ones. In particular the present volume emphasises the following four aspects:

- advanced specification facets:
  - ⋆ hierarchies and composition — Chap. 2
  - ⋆ denotations and computations — Chap. 3
  - ⋆ configurations: contexts and states — Chap. 4
  - ⋆ time, space and space/time — Chap. 5
  - ⋆ modularisation and — Chap. 10
  - ⋆ automata and machines — Chap. 11
- linguistics:
  - ⋆ pragmatics — Chap. 6
  - ⋆ semantics — Chap. 7
  - ⋆ syntax and — Chap. 8
  - ⋆ semiotics — Chap. 9
- concurrency and temporality:
  - ⋆ Petri nets — Chap. 12
  - ⋆ message sequence charts and live sequence charts — Chap. 13
  - ⋆ statecharts and — Chap. 14

"UML"-ising Formal Techniques

Some notable features should be emphasised here. The concurrency aspect, Chaps. 12–14, also illustrates diagrammatic specifications, as does Sect. 10.3 (UML class diagrams). Together this material illustrates that popular features of the Unified Modeling Language (UML [59, 237, 382, 440]) can simply and elegantly be included, i.e., used, with RSL. Christian Krog Madsen is the main author of Chaps. 12–14.

The RAISE Specification Language: RSL

As in Vol. 1, we use RSL extensively in the present volume. Hence we insert, in Chap. 1, an RSL Primer — and otherwise refer to the RAISE URL: `http://www.iist.unu.edu/raise/`.

Acknowledgments

The preface of Vol. 1 contained an extensive acknowledgment section.

Combining RSL with Petri nets (Chap. 12), with message or live sequence charts (Chap. 13), and with statecharts (Chap. 14) is due primarily to Christian Krog Madsen [316, 317]. Very many and dear thanks are therefore extended to Christian. Combining RSL with UML-like class diagrams (Sect. 10.3) is due primarily to Steffen Holmslykke [9,10]. Similar thanks are therefore graciously extended to Steffen. Martin Pěnička is likewise dearly acknowledged for having provided Examples 12.8 (Sect. 12.3.4), 14.7 (Sect. 14.4.1) and 14.8 (Sect. 14.4.2).

Colleagues at the National University of Singapore, Andrei Stefan and Yang ShaoFa, studied and proofread Chaps. 12–15. It was with Yang ShaoFa, as the leading person, that I decided to work out the model of CTP (Communicating Transaction Processes) of Sect. 13.6. Their comments and work are much appreciated.

A main source of academic joy has been the 30 years I have been at the Technical University of Denmark, 1976 till now.

Last, but not least, I acknowledge the tremendous support received from the Springer editor, Ronan Nugent.