Foreword

In recent decades a large community of scholars has intensively investigated the theoretical bases of concurrency, driven both by scientific curiosity and by the fact that concurrent features appear in many different fields, such as biology, economics, medicine, and the social sciences. Many mathematical models have been developed for formalizing the behavior of concurrent systems, i.e., systems composed of agents that not only compute in isolation, but also by exchanging information with each other. Particularly relevant is therefore the representation of the interactions, or process, that may occur in these concurrent systems, which are hosted in an open environment.

Roberto Gorrieri and Cristian Versari have been leading scientists in the field, and have great experience in teaching the topics covered. The reader of this book is gently lead through the fascinating area of concurrency from very basic results to increasingly complex issues, always with great clarity and analytical rigor. A large number of examples and exercises help in uncovering and understanding the many subtleties of the presentation.

This monograph is therefore an excellent textbook for introducing undergraduate and graduate students, as well as people developing or using concurrent systems, to the theories of concurrency. Some aspects of concurrent systems are not considered here, those typical to more advanced models, like mobility of agents. After a course based on this book, however, a student will have all the knowledge and the techniques to face this intriguing and challenging topic, and many others.

The starting point of the intellectual journey proposed by the authors is the semantic structure, namely labelled transition systems, which provides us with the means and the tools to express processes, to compose them, to prove properties they enjoy, typically equality of syntactically different systems that behave the same. The rest of the book relies on the *Calculus of Communicating Systems* proposed by Milner. Tailored versions of this calculus are used to study various notions of equality between systems, and to investigate in detail the expressive power of the models considered.

Warm thanks are due to the authors of this book, for their successful work in bringing together the fundamentals of concurrency theory in an accurate, uniform and enjoyable volume.

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