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Formal Methods and Hybrid Real-Time Systems

Essays in Honour of Dines Bjørner and Zhou Chaochen
on the Occasion of Their 70th Birthdays

Springer

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Dines Bjørner

Zhou Chaochen

Foreword

Two outstanding computer scientists will soon reach their 70th birthdays: Dines Bjørner was born on October 4, 1937 in Denmark and Zhou Chaochen was born on November 1, in the same year in China. To celebrate their birthdays, we present three LNCS volumes in their honour.

- *Formal Methods and Hybrid Real-Time Systems. Essays in Honour of Dines Bjørner and Zhou Chaochen on the Occasion of Their 70th Birthdays.* Papers presented at a Symposium held in Macao, China, September 24–25, 2007. LNCS volume 4**70**0. Springer 2007.
- *Domain Modelling and the Duration Calculus.* International Training School, Shanghai, China, September 10–21, 2007. Advanced Lectures. LNCS volume 4710. Springer 2007.
- *Theoretical Aspects of Computing* - ICTAC 2007. 4th International Colloquium, Macao, China, September 26–28, 2007, Proceedings. LNCS volume 4711. Springer 2007.

Dines Bjørner is known for his many contributions to the theory and practice of formal methods for software engineering. He is particularly associated with two formal methods, although his influence is far wider. He worked with Cliff Jones and others on the *Vienna Development Method (VDM)*, initially at IBM in Vienna. Later, he was involved in producing the *Rigorous Approach to Industrial Software Engineering (RAISE)* formal method with tool support. His three-volume *magnum opus* on software engineering covers *Abstraction and Modelling*, *Specification of Systems and Languages*, and *Domains, Requirements, and Software Design.* He was a professor at the Technical University of Denmark (DTU) in Lyngby, near Copenhagen. He was the founding director of the United Nations University International Institute for Software Technology (UNU-IIST) in Macao during the 1990s. He was a co-founder of VDM-Europe, which transformed to become Formal Methods Europe, an organisation that promotes the use of formal methods. Its 18 monthly symposia have become the leading academic events in formal methods. Dines Bjørner is a Knight of the Order of the Dannebrog and was awarded the John von Neumann Medal in Budapest in 1994. He received a Doctorate (*honoris causa*) from the Masaryk University in Brno in 2004. He is a Fellow of both the IEEE and the ACM.

Zhou Chaochen is known for his seminal contributions to the theory and practice of timed and hybrid systems. His distinguished academic career started as an undergraduate in mathematics and mechanics at Peking University (1954–58) and as a postgraduate at the Institute for Computing Technology in the Chinese Academy of Sciences (1963–67). He continued his career at Peking University and the Chinese Academy, until he made an extended visit to Oxford University

Computing Laboratory (1989–92) at the invitation of Sir Tony Hoare FRS. Here he was the prime instigator of *Duration Calculus*, an interval logic for real-time systems, developed as part of a European ESPRIT project on Provably Correct Systems. He made further extended visits during the periods 1990–92 and 1995–96, as a visiting professor at the Technical University of Denmark, Lyngby, at the invitation of Dines Bjørner. He was a Principal Research Fellow at UNU-IIST during the period 1992–97, before becoming its director, an appointment he held from 1997 to 2002. He is a member of the Chinese Academy of Sciences and the Third World Academy of Sciences.

We thank both Dines Bjørner and Zhou Chaochen for their years of generous, wise advice, to us and to their many other colleagues, students, and friends. They have both been unfailingly inspiring, enthusiastic, and encouraging.

July 2007 J.C.P.W.

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Preface

This volume contains the papers presented at the *Festschrift Symposium* held September 24–25, 2007 in Macao on the occasion of the 70th birthdays of Dines Bjørner and Zhou Chaochen. It consists of 25 papers written by 59 authors. Online conference management was provided by EasyChair.

It is now difficult to remember exactly when it came to us that we should organise a celebration for the 70th birthdays of Dines Bjørner and Zhou Chaochen, which happily coincide this year. But I do know that the idea was a popular one. Zhiming Liu suggested that we should organise the symposium as part of the International Colloquium on Theoretical Aspects of Computing, which seemed perfect given that this series was founded by UNU/IIST. The event quickly took shape as He Jifeng offered to host a Training School in Shanghai with the assistance of Chris George, Geguang Pu, and Yong Zhou, and Cliff Jones agreed to help with the academic organisation of the symposium and the colloquium. Everything then just fell into place, thanks to the excellent help provided by the local organisers in Macao and Shanghai.

The subjects for the lectures for the school were obvious to us all: two topics pioneered by Dines Bjørner and Zhou Chaochen, both currently very active research areas. For the *Festschrift Symposium*, authors were invited to write on an original topic of their choosing. And for the colloquium, a general call-for-papers resulted in a satisfying collection of rigorously reviewed papers in theoretical computer science, including automata theory, case studies, concurrency, real-time systems, semantics and logics, and specification and verification.

So we have ended up with three volumes, one each for the school, symposium, and colloquium, which collectively amount to some 1,300 pages. And still there was not enough room for the many additional distinguished names we would have liked to invite.

To Dines and Chaochen from all of us:

We hope that you enjoy reading these books.

Happy birthday to both of you!

June 2007 J.C.P.W.

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