Preface

"Almost no plan is guaranteed, no utterance utterly unambiguous, no rule without exception — there's no such thing as a sure thing."   *David W. Etherington, 1986*

Reasoning with incomplete information constitutes a major challenge for any intelligent system. In fact, we expect from such systems that they are not paralyzed by missing information but rather arrive at plausible results by bridging the gaps in the available information. There are moreover situations in which it is necessary to act despite incomplete information. In a word, intelligent systems have to provide means for reasoning in the absence of total information. The automation of this form of reasoning is the subject of this book.

A versatile way of reasoning in the absence of information is to reason *by default*. In this manner, we overcome a lack of information by making default assumptions about a situation at hand. Default reasoning puts faith in standard situations that are free from strangeness and unexpectedness; it relies on general rules expressing anticipated states of affairs. A formalization of this form of reasoning is furnished by *default logic* — a logical system developed by Raymond Reiter in [Rei80].

This book aims at providing formal and practical means for automating reasoning with incomplete information by starting from the approach taken by default logic. For this endeavor, we span a bridge between formal semantics, over logical systems for default reasoning, to efficient implementations.

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The act of expressing gratitude constitutes a privilege and a pleasure for everybody finishing a long piece of work. It is then a great source of satisfaction to lean back and think about all the little victories and defeats one was able to share with other people. However, such an account becomes longer and longer over the years and it bears the danger of overlooking many people that merit an acknowledgment but are not explicitly honored. Thanks to all of you! Nonetheless, I would like to express particular gratitude to those that are on the top of my mind:

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In fact, this monograph describes the outcome of a research program that I have been able to pursue since 1990. As a matter of fact, a salient part of this book stems from material taken from my dissertation thesis [Sch92a] carried out at the Technical University of Darmstadt, Germany, and my habilitation thesis [Sch95a] accomplished at IRISA, Rennes, France. Therefore, I would like to take this opportunity to express my great appreciation to the members of the my dissertation committee: Peter Kammerer, Wolfgang Bibel, Alejandro Buchmann, James Delgrande, José Encarnação, and Rüdiger Reischuk, and to those of my habilitation committee: Jean-Pierre Banâtre, Wolfgang Bibel, Patrice Enjalbert, Christine Froidevaux, Philippe Besnard, Jean-Paul Delahaye, and Jean-Claude Raoult. I thank all of you

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The author moved to the University of Potsdam during the printing phase of this monograph.