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Nota di contenuto	Programming Multi-Agent Systems in AgentSpeak using Jason; Contents; Preface; Acknowledgements; 1 Introduction; 1.1 Autonomous Agents; 1.2 Characteristics of Agents; 1.3 Multi-Agent Systems; 1.4 Hello World!; 2 The BDI Agent Model; 2.1 Agent-Oriented Programming; 2.2 Practical Reasoning; 2.3 A Computational Model of BDI Practical Reasoning; 2.4 The Procedural Reasoning System; 2.5 Agent Communication; 3 The Jason Agent Programming Language; 3.1 Beliefs; 3.2 Goals; 3.3 Plans; 3.4 Example: A Complete Agent Program; 3.5 Exercises; 4 Jason Interpreter; 4.1 The Reasoning Cycle; 4.2 Plan Failure 4.3 Interpreter Configuration and Execution Modes4.4 Pre-Defined Plan Annotations; 4.5 Exercises; 5 Environments; 5.1 Support for Defining Simulated Environments; 5.2 Example: Running a System of Multiple Situated Agents; 5.3 Exercises; 6 Communication and Interaction; 6.1 Available Performatives; 6.2 Informal Semantics of Receiving Messages; 6.3 Example: Contract Net Protocol; 6.4 Exercises; 7 User-Defined Components; 7.1 Defining New Internal Actions; 7.2 Customising the Agent Class; 7.3 Customising the Overall Architecture; 7.4 Customising

the Belief Base; 7.5 Pre-Processing Directives  
7.6 Exercises  
8 Advanced Goal-Based Programming; 8.1 BDI Programming; 8.2 Declarative (Achievement) Goal Patterns; 8.3 Commitment Strategy Patterns; 8.4 Other Useful Patterns; 8.5 Pre-Processing Directives for Plan Patterns; 9 Case Studies; 9.1 Case Study I: Gold Miners; 9.2 Case Study II: Electronic Bookstore; 10 Formal Semantics; 10.1 Semantic Rules; 10.2 Semantics of Message Exchange in a Multi-Agent System; 10.3 Semantic Rules for Receiving Messages; 10.4 Semantics of the BDI Modalities for AgentSpeak; 11 Conclusions; 11.1 Jason and Agent-Oriented Programming  
11.2 Ongoing Work and Related Research  
11.3 General Advice on Programming Style and Practice; Appendix: Reference Guide; A.1 EBNF for the Agent Language; A.2 EBNF for the Multi-Agent Systems Language; A.3 Standard Internal Actions; A.4 Pre-Defined Annotations; A.5 Pre-Processing Directives; A.6 Interpreter Configuration; References; Index

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## Sommario/riassunto

Jason is an Open Source interpreter for an extended version of AgentSpeak - a logic-based agent-oriented programming language - written in Java™. It enables users to build complex multi-agent systems that are capable of operating in environments previously considered too unpredictable for computers to handle. Jason is easily customisable and is suitable for the implementation of reactive planning systems according to the Belief-Desire-Intention (BDI) architecture. Programming Multi-Agent Systems in AgentSpeak using Jason provides a brief introduction to multi-agent sy

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