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Nota di contenuto	Basic Components and Combinatorial Circuits -- Numbers, Basic Circuits, and the ALU -- Sequential Circuits -- An Elementary Processor -- Assembly Programming -- Compiling Higher-Level Languages -- Computer Organisation -- The Raspberry Pi and the ARM Processor -- App. A, An Extended Instruction Set for the Simple Processor -- App. B, The ARM Instruction Set -- App. C, Syntax of the Register Transfer Language -- App. D, Exercise Answers.
Sommario/riassunto	Computers are constructed with integrated circuits such as micro-processors. These processors can contain well over a billion transistors all connected with each other in an intricate pattern. In addition to this hardware, many layers of software are used, making computer systems very complex objects indeed. However, many of the essential ideas behind the construction of computers are actually quite straightforward. The purpose of this text book is to give a concise, but precise, description of the essence of a computer. It begins by describing the logic gates that are constructed from transistors, then explains how such gates can be used to implement logic functions through combinatorial circuits. Further coverage includes key aspects of processing, Assembly programming, compiling higher-level languages, and computer organisation. The book also includes a helpful chapter on Raspberry Pi as a suitable learning tool. Topics and features: * Presents a holistic view of relevant hardware and software technologies * Introduces students to basic electronic circuitry before

examining more advanced elements * Provides many exercises, also including their answers at the end of the book * Explains critical relationships to Assembly programming, higher-level languages, and computer organisation * Makes helpful use of the Raspberry Pi and ARM microprocessors for explanations Extensively class-tested, this unique, concise textbook for undergraduates describes the essential components and workings of a computer. Useful in computer science and electronics engineering courses or for self-study, the work assumes basic understandings of elementary mathematics and electronics, as well as some experience with a common programming language like Java or C++. Prof. Jan Friso Groote, Dr. Julien Schmaltz, and Dr. Adam Watkins are all at Eindhoven University of Technology, Mathematics and Computer Science, Eindhoven, The Netherlands. Mr. Rolf Morel is at the University of Oxford, Dept. of Computer Science, Oxford, United Kingdom.