This book introduces the Zynq-7000 System-on-Chip, an embedded device from Xilinx. The Zynq-7000 combines a powerful processing platform that includes ARM Cortex-A9 applications and an ARM Cortex-R5 real-time processor, with Xilinx reprogrammable logic. As well as guiding the reader through the architecture of the device, design tools and methods are also covered in detail, both the conventional hardware and firmware development and the new, more flexible, microblaze and software development. Practical projects include Zynq-based design realised in Xilinx Vivado development tools, including development tools and platform management and an example library. There are also special sections on PYNQ, the Python-based framework for Zynq devices, and Xilinx ML runtimes.

This book is designed for engineers, students, and educators who are interested in real-time embedded design and digital hardware and software development for real-time systems. The book is also suitable for those interested in embedded systems and related topics in control and automation systems. The book addresses several Zynq features and their implementation and architectures, including its ARM and reprogrammable block components. This book also includes many practical design examples and their implementations.

The book demonstrates how to design Zynq-based systems, how to use ARM and reprogrammable components, and how to develop an application for Zynq. In addition, the book provides an overview of the Xilinx Vivado development tool, which is used to develop, implement, and verify a design for Zynq. The book also provides a tutorial for Zynq ML runtimes and their implementation and architectures, including ARM and reprogrammable components.

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