01.2 Processing

A CPU has an abstract model, called an instruction set architecture (ISA), that typically describes how the processor interacts with memory, input, output, and instructions. A popular architecture for personal computers is the x86 ISA. For mobile and embedded computers, however, the ARM ISA is ubiquitous.[3]

The ARM ISA is a reduced instruction set computing architecture (RISC architecture), which means its instructions are less complex than those of a complex instruction set computing architecture (CISC architecture), such as x86. RISC architectures are often used in embedded computers.

The Embedded Computing Lab's embedded computers (on NI myRIO 1900 boards—see Resource 1) use the ARM architecture. Specifically, the system on a chip (SoC) Xilinx Z-7010's Coretex-A9 (dual) CPUs use the ARMv7-A ISA (see Resource 2).

Although the focus of this chapter is this architecture, many of the concepts apply more broadly, to CPUs with different ISAs.

3. Another popular embedded architecture is the MIPS architecture.