

Lecture 01.02 Processing

instruction set
architecture

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

x86 ISA
ARM ISA

reduced instruction
set computing
architecture
complex
instruction set
computing
architecture

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.

SoC
ARMv7-A ISA

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 R2.9](#)).

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

³Another popular embedded architecture is the MIPS architecture.