Part I
Basic Concepts

The first part of this book introduces important concepts in hardware-software codesign. We compare and contrast two schools of thought in electronic design: the mindset used by the hardware designer, as opposed to the mindset used by the software designer. We will demonstrate that hardware/software codesign is not just gluing together hardware and software components; instead, it’s about finding the correct balance between flexibility and performance during design.

The trade-off between parallel and sequential implementations is another fundamental issue for the hardware/software co-designer; we will discuss a concurrent system model (data-flow), that can be converted into either a hardware (parallel) or else into a software (sequential) implementation.

Finally, we will show how a program in C can be analyzed and decomposed into control-flow and data-flow. This analysis is crucial to understand how a C program can be migrated into hardware. As we will discuss, a common approach to hardware/software codesign is to carry functionality from software into hardware, thereby improving the overall performance of the application.