Part I
Foundations

In Part I, we first provide the motivation for delving into the realm of parallel computation and especially of parallel programming. There are several reasons for doing so: first, our computers are already parallel; secondly, parallelism can be of great practical value when it comes to solving computationally demanding problems from various areas; and finally, there is inertia in the design of contemporary computers which keeps parallelism a key ingredient of future computers.

The second chapter provides an introduction to parallel computing. It describes different parallel computer systems and formal models for describing such systems. Then, various patterns for interconnecting processors and memories are described and the role of communication is emphasized. All these issues have impact on the execution time required to solve computational problems. Thus, we introduce the necessary topics of the parallel computational complexity. Finally, we present some laws and principles that govern parallel computation.