This part of the book and the following one are on the enrichment of the distributed message-passing system in order to offer high-level operations to processes. This part, which is on resource allocation, is composed of two chapters. (The next part will be on high-level communication operations.)

Chapter 10 introduces the mutual exclusion (mutex) problem, which is the most basic problem encountered in resource allocation. An algorithm solving the mutex problem has to ensure that a given hardware or software object (resource) is accessed by at most one process at a time, and that any process that wants to access it will be able to do so. Two families of mutex algorithms are presented. The first is the family of algorithms based on individual permissions, while the second is the family of algorithms based on arbiter permissions. A third family of mutex algorithms is the family of token-based algorithms. Such a family was already presented in Chap. 5, devoted to mobile objects navigating a network (a token is a dataless mobile object).

Chapter 11 considers first the problem posed by a single resource with several instances, and then the problem posed by several resources, each with multiple instances. It assumes that a process is allowed to acquire several instances of several resources. The main issues are then to prevent deadlocks from occurring and to provide processes with efficient allocation algorithms (i.e., algorithms which reduce process waiting chains).