Asynchronous Programming in the Abstract Behavioural Specification Language

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Part III

Enhancing Parallelism

This part consists of the following chapters:

Chapter 4 Asynchronous Actor-based software programming has gained increasing attention as a model of concurrency and distribution. Many modern distributed software applications require a form of continuous interaction between their components which consists of streaming data from a server to its clients. In this chapter, we extend the basic model of asynchronous method invocation and return in order to support the streaming of data [13]. We introduce the notion of "future-based data streams" by augmenting the syntax, type system, and operational semantics of ABS. The application involving future-based data streams is illustrated by a case study on social network simulation.

Chapter 5 In this chapter we introduce a new programming model of multi-threaded actors which feature the parallel processing of their messages [15]. In this model an actor consists of a group of active objects which share a message queue. We provide a formal operational semantics, and a description of a Java-based implementation for the basic programming abstractions describing multi-threaded actors. Finally, we evaluate our proposal by means of an example application.