

CHAPTER 1

MODELS

The modeling approach in this book is based on the use of a general-purpose programming language for model implementation at the computational level. The alternative approach is to use a special-purpose simulation language; for a survey of several such languages, see Appendix A.

Sections

1.1. Introduction	2
1.2. A Single-Server Queue (program <code>ssq1</code>)	12
1.3. A Simple Inventory System (program <code>sis1</code>)	26

This chapter presents an introduction to discrete-event simulation, with an emphasis on model building. The focus in Section 1.1 is on the multiple steps required to construct a discrete-event simulation model. By design, the discussion in this section is at a high level of generality, with few details. In contrast, two specific discrete-event system models are presented in Sections 1.2 and 1.3, with a significant amount of detail. A single-server queue model is presented in Section 1.2 and a simple inventory system model is presented in Section 1.3. Both of these models are of fundamental importance because they serve as a basis for a significant amount of material in later chapters.

Although the material in this chapter also can be found in other modeling and simulation texts, there is a relatively novel emphasis on model building at the conceptual, specification and computational levels. Moreover, in Sections 1.2 and 1.3 there is a significant amount of notation, terminology, and computational philosophy which extends to subsequent chapters. For these reasons, this chapter is important to any reader of the book, even those already familiar with the rudiments of discrete-event simulation.