

computer simulation. The basic concept of computer simulation is fairly simple. Think of a system as being composed of a collection of elements together with a set of rules governing the performance and behavior of these elements. These rules will describe not only the behavior of individual elements under various conditions, but also the basic interrelationships among them. Elements of a system can be any object or condition that effect the system's operation. They may be such things as people, machines, equipment, places and environmental conditions. They may even be whole sub-systems whose operations have already been analyzed by another means. The rules of behavior will specify basic element performance. They will prescribe simple cause and effect relationships and they will give frequency distributions for any random variables in the system. And, they will set physical and doctrinal limitations on the behavior of elements.

The rules will also specify decisions as to courses of action to be taken at different stages in the operation of the system. In other words, the first step in constructing a computer simulation model is to examine carefully all the bits and pieces which make up the system and understand their basic relationship to one another. So far, the procedure is really no different than that used to construct any other model; it just takes longer.

The big difference begins with the next step. This is to take each of the elements and rules and represent it somehow in the form of words and instructions for the digital computer. Such representations are then tied together by means of a computer program. This program states in computer language how and in what order the given rules are applied to system elements to produce behavior and interactions similar to those that would occur in an actual system. Such a program is normally written from a logical flow diagram which shows in detail the operating characteristics of the simulated system arranged in their proper order in space and time.