related to information retrieval. Recall that an object is not a system just because it contains a collection of properties inherent in making it a system. An object can be considered a system when the investigation of its properties and characteristics is performed from the systems point of view. However, we have not seen articles using the systems approach, say, during the analysis or creation of a printed subject index.

In some situations it is assumed that an object is made into a system by having the word "system" added to its name, or because someone has already analyzed the given object from the systems point of view. For example, this explanation of the concept of an IR system is sometimes used: "an information retrieval system is an information system, which is a system . . ." (Salton & McGill 1983). This type of statement does not correspond to the concept "system" that is accepted in the systems approach (see Chapter 1).

Thus, in the present book *when we use the term "IR system" we mean an object, and only that object, that is in a position to carry out a retrieval of information without the participation of a human being* and only with the help of a computer. This is exactly the object—in this new form—that will help society to overcome the information crisis described in the previous chapter. This form is not a continuation and development of the previous forms used for carrying out information retrieval. An ocean liner is not a more developed camel. For this reason, the developers of IR systems were (and are) faced with many new problems within the framework of informational activity (older forms) that were not considered earlier.

In the following exposition *we will consider an IR system as a system*, that is, in the analysis of IR systems we will use principles of the systems approach. Because the development of any system begins with an exact definition of the purpose of its creation, we begin our consideration with the definition of this purpose for an IR system. After this, starting with the formulated goal, we determine the function of the system, a function that provides, as a minimum, the acceptable fulfillment of the indicated goal. Then we will consider the structure of an IR system capable of realizing the function that we formulated. The enumerated steps not only precede construction of each structural element of the system (several following chapters will be dedicated to this) but also help us to understand the object, which we call an IR system.

4.3
The Purpose of Creating an IR System

In analyzing the vital activity of a human being, we noted that one's actions are a reaction to arising (in the process of this activity) needs and are directed toward their satisfaction. Moreover, *any conscious behavior can be considered goal-oriented* (Ackoff & Emery, 1972), where, again, it is directed to satisfying

existing needs. Occasionally this is not obvious, since a specific action may represent only a link in a chain of actions directed toward satisfaction of some need. However, it is important to understand that both the origination and the direction of any activity are inseparably connected with some need. Such a direction toward a need (both of actions and behavior) itself suggests some general purpose of an activity—a purpose connected with the satisfaction of an existing need. Therefore *any goal can be defined as an ideal, mental anticipation of the results of an activity*, which is, in the final analysis, directed toward satisfaction of a need.

It is obvious that we are interested not in just any need but in the need for information. Thus, an IR system is created with the goal of satisfying an IN. However, such a definition of goal seems too general and clearly does not express the specifics of an IR system. In fact, satisfaction of an IN is the goal of informational activity in general, and in a specific sense, of any other existing form within the framework of this activity. Of all forms existing in informational activity, we are considering only those that are connected with information retrieval and, more precisely, only those that are in a position to carry out retrieval without the participation of a person (automatically); therefore we will reformulate the given definition in the following manner: *IR systems are created with the goal of automatic information retrieval for satisfaction of an IN*. It is not difficult to note that the given definition agrees with the representation of an object (IR system), which was considered earlier. This is a workable definition, however, we will narrow it further and define more accurately exactly what kind of IN we will satisfy.

Thus, IR systems are aimed at the satisfaction of IN and if we want to create *something for satisfaction of some need*, then this something must take into account the properties and characteristics inherent to this satisfiable need. In Chapter 2, in consideration of the IN, we showed that the IN is not homogeneous and that it consists of various types that differ by exactly those inherent properties. Therefore, in creating an IR system, we must clearly describe for which type of IN it is intended. Moreover, we must know also the properties characterizing this type, that is, we must be able to describe for which properties of which type of IN it is intended. Thus, *for satisfaction of different types of IR systems is necessary*, and the types of these systems are determined by the types of IN for which they are intended (Frants & Brush). We will consider this proposition in more detail.

Two examples of the different types of IN were introduced previously. POIN (problem-oriented information need) and CIN (concrete information need). Now we will consider which IR systems can be used to satisfy these types of IN (i.e., we will determine the requirements for the systems satisfying the mentioned types of IN). We first describe basic properties of the indicated types of IN, because the IR systems must take into account precisely these properties. The more completely the properties of a concrete type of IN are taken into account, the higher quality its satisfaction will be.