



## Why

We often use functions to keep track of several objects by the objects of some well-known set with which they correspond. In this case, we use specific language and notation.

## Definition

Let  $I$  and  $X$  denote sets. A *family* is a function from  $I$  to  $X$ . We call an element of  $I$  an *index* and we call  $I$  the *index set*. Of course, the letter  $I$  was picked here to be a mnemonic for “index”. We call the range of the family the *indexed set* and we call the value of the family at an index  $i$  a *term* of the family at  $i$  or the  *$i$ th term* of the family.

Experience shows that it is useful to discuss sets using indices, especially when discussing a set of sets. If the values of the family are sets, we speak of a *family of sets*. Indeed, we often speak of a *family of* whatever object the values of the function are. So for instance, a family of subsets of  $X$  is understood to be a function from some index set into  $\mathcal{P}(X)$ .

## Notation

Let  $x : I \rightarrow X$  be a family. We denote the  $i$ th term of  $x$  by  $x_i$ . We sometimes denote the family by  $\{x_i\}_{i \in I}$ .



