



## Why

We want language and notation for recording elements of a set.

## Definition

A *dataset* of size  $n$  in (or from) a non-empty set  $A$  is a finite sequence in  $A$  (in other words, an element of the direct product  $A^n$ ). In other words, it is an  $n$ -tuple. In the case that we speak of a dataset, we call its coordinates the records. So, for example, we call the first coordinate the first record and the second coordinate the second record. The  $i$ th coordinate is the  $i$ th record, for  $i = 1, \dots, n$ .

Although the terminology dataset is standard, datasets are not sets. Datasets may contain an element multiple times. Thus we use the single word “dataset,” in contrast with the two words “data set,” which may together suggest that the object involved was a set.

In the case that the dataset is from a set  $A$  which is a product of two sets (say,  $\mathcal{U}$  and  $\mathcal{V}$ , so that  $A = \mathcal{U} \times \mathcal{V}$ ) we say that it is a dataset of *record pairs*. A record pair is sometimes called an *observation*.

## Notation

Let  $A$  be a non-empty set. Although we usually denote sequences by  $(a_1, \dots, a_n)$ , we will denote datasets by  $(a^1, \dots, a^n)$ ; notably, using a superscript. Often  $A$  is itself a set of se-

quences, and so we will want to refer to the  $i$ th component of  $a^1$  by  $a_i^1$ .



