



## Why

We name sequences in  $\{0, 1\}$  to easily discuss codes in this set.<sup>1</sup>

## Definition

A *bit string* (*binary string*) is a finite sequence in the set  $\{0, 1\}$ .

If a bit string has length one, we refer to it as a *bit*. Using this terminology, it is natural to call the sequence terms *bits*. Other terminology for bit strings includes *binary string*, *bit sequence* and *digital datum*.

If the bit string has length eight, we refer to it as a *byte*. Using this terminology, a *kilobyte* is a length  $8 \cdot 2^{10}$  bit string. In other words, a kilobyte is  $2^{10} = 1024$  bytes, or roughly one thousand bytes. Likewise a *megabyte* is a length  $8 \cdot 2^{20}$  bit string. A megabyte is  $2^{20} = 1048576$  bytes, or roughly one million bytes. Similarly a *gigabyte* is  $2^{30}$  bytes and a *terabyte* is  $2^{40}$  bytes.<sup>2</sup>

## Notation

We often denote the set  $\{0, 1\}$  by **B**. Using this notation, we denote the length  $n$  bit strings by **B** <sup>$n$</sup> .

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<sup>1</sup>Why we want to name these requires more explanation, to be included in future editions.

<sup>2</sup>Warning: some authors use these monikers with powers of ten. For example, a kilobyte is exactly one thousand bytes. etc.

We occasionally use **false** to denote the length-1 bit string  $(0,)$  and **true** to denote the length-1 bit string  $(1,)$ . In this context, **bool** is another name for the set  $\{\mathbf{true}, \mathbf{false}\}$ <sup>3</sup>.

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<sup>3</sup>Future editions might break this out into its own sheet.



