Why

We want to associate elements of **Z** with bitstrings for use on digital computers.[1]

Definition

A *digital integer* is a bit-string. The set of *d-bit integers* is the set of length-d bit strings $\{0,1\}^d$. For example, the set of 8-bit digital integers is the set $\{0,1\}^8$.

Correspondence with Z

The bit string $x \in \{0,1\}^d$ corresponds to the integer $\sum_{i=1}^{d} x_i 2^i$.

Notation

We denote the set of 8-bit (16-bit, 32-bit, 64-bit) integers by `int64` (`int8`, `int16`, `int32`).

It is easy to embed $x \in$ `int8` by considering $x' \in$ `int16` defined by

$$x' = (x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, 0, 0, 0, 0, 0, 0, 0, 0)$$

In other words, we associate an 8-bit integer with a 16-bit integer.

Naturally, we associate the integers with bit strings.

Signed integers

[2]

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[1]Future editions will discuss digital computers.

[2]Future editions will include an account of signed integers, or will place this in another sheet.

Digital Integers

Digital Naturals

Bit Strings

Codes

Natural Powers

Dot-Dash Code

Natural Products

Flash Code

Natural Sums

Alphabets

Recursion Theorem

Lists

Direct Products

Set Numbers

Finite Sets

Equivalent Sets

Family Unions and Intersections

Function Inverses

Natural Order

Families

Function Images

Function Composites

Peano Axioms

Integer Numbers

Functions

Equivalence Relations

Natural Induction

Relations

Generalized Set Dualities

Set Products

Natural Numbers

Set Powers

Intersection of Empty Set

Partitions

Successor Sets

Set Unions and Intersections

Set Dualities

Unordered Triples

Set Intersections

Pair Intersections

Set Complements

Pair Unions

Set Unions

Ordered Pairs

Set Differences

Empty Set

Unordered Pairs

Set Specification

Set Equality

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects