Why

We want to associate elements of $\mathbf{Z}$ 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.

[1] Future editions will discuss digital computers.

Signed integers

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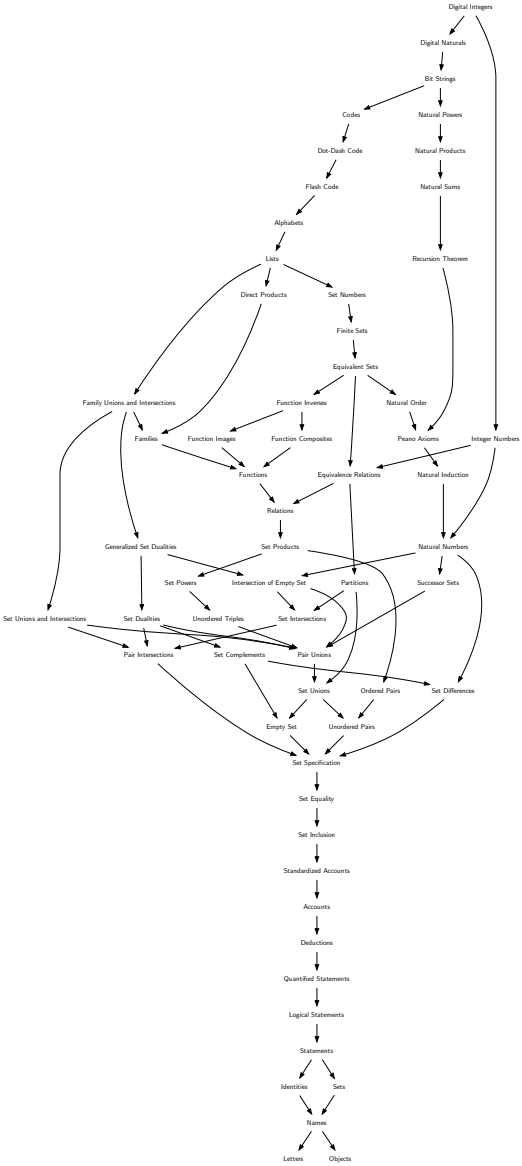
[2] Future editions will include an account of signed integers, or will place this in another sheet.


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