Empty Set

Why

Can a set have no elements?

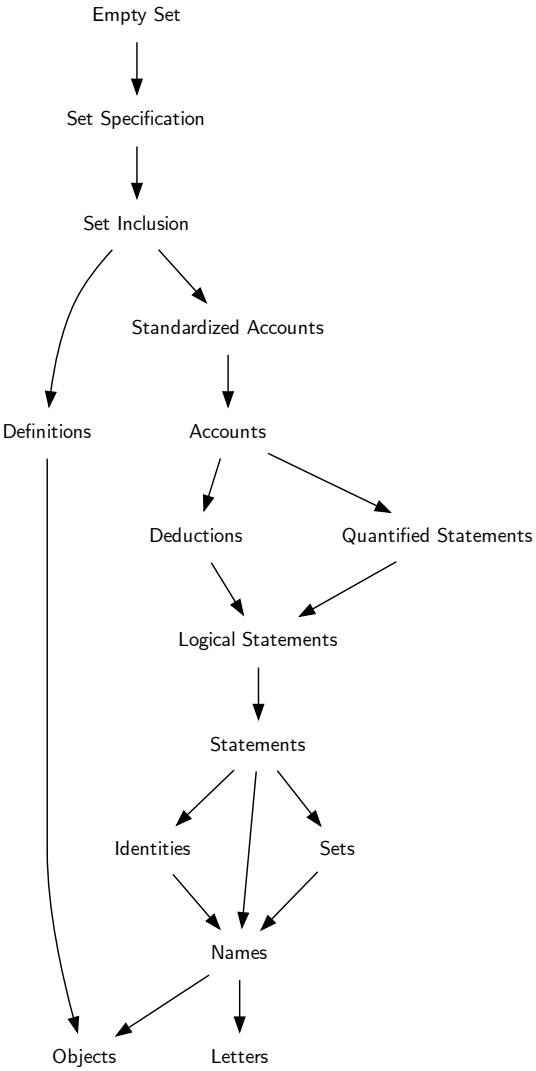
Definition

Sure. Take a set. At least one exists by the principle of existence (see *Sets*). Now, take the universally false statement $x \neq x$ and apply the principle of specification (see *Set Specification*) to that set. The set we get has no elements, since no object satisfies $x \neq x$. The principle of extension says that the set obtained is unique (contradiction).[1] We call this set with no elements *the empty set.*

Notation

We denote the empty set by $\varnothing$. In other words, in all future accounts (see *Accounts*), there are two implicit lines. First, "`name` $\varnothing$" and second "`have` $(\forall x)(x \notin \varnothing)$".

[1] This account will be expanded in the next edition.


Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Definitions
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Objects
Letters