

Phone Book Spec

Z symbols

range ran

domain dom

relation or many to many \longleftrightarrow

total function \longrightarrow

partial function \rightarrowtail

pair (line 2 related fields from database record) \mapsto (e.g. $\text{john} \mapsto \text{12-Jan-1980}$)

override \oplus

relational image $\langle \rangle$, e.g. all the telephone number of john is: $\text{tel} \langle \text{john} \rangle$

PhoneBook

$\text{tel} : \text{Person} \longleftrightarrow \text{Phone}$

$\text{dept} : \mathbb{F}\text{Person}$

$\text{dom } \text{tel} \subseteq \text{dept}$

addNum

$\Delta \text{PhoneBook}$

$p? : \text{Person}$

$n? : \text{Phone}$

$p? \in \text{dept}$

$p? \mapsto n? \notin \text{tel}$

$\text{tel}' = \text{tel} \cup \{ p? \mapsto n? \}$

$\text{dept}' = \text{dept}$

lookup

$\Xi \text{PhoneBook}$

$\text{name}? : \text{Person}$

$\text{nos}! : \mathbb{F}\text{Phone}$

$\text{name}? \in \text{dept}$

$\text{nos}! = \{ \text{num} : \text{Phone} \mid p? \mapsto \text{num} \in \text{tel} \}$

or

lookup

$\Xi`PhoneBook$

$p? : Person$

$nos! : \mathbb{F}Phone$

$p? \in dept$

$nos! = tel \ (\mid p? \)$

remMember

$\Delta PhoneBook$

$p? : Person$

$p? \in dept$

$tel' = tel \setminus \{ p? \mapsto n \mid p? \mapsto n \in tel \}$

$dept' = dept \setminus \{p?\}$