Z

$[NAME, DATE]$

??

$\bullet$.

$\bullet birthday :$
$known$
$birthday$
$known$
$birthday$
$known$
$known$
$known$
$birthday$

$known = \{John, Mike, Susan\}$

$birthday = \{John \mapsto 25{-}Mar, \qquad Mike \mapsto 20{-}Dec, \qquad Susan \mapsto 20{-}Dec\}.$

$birthday$
$known$
$birthday$
??
$\notin$
$known$
$\cup\{name? \mapsto$
$date?\}$
$Birthday$
$known$
$birthday$
$known'$
$birthday'$
$birthday$
$known' = known \cup \{name?\}.$

$AddBirthday$
$known' = birthday' \qquad = (birthday \cup \{name? \mapsto date?\}) \qquad = birthday \cup \{name? \mapsto date?\} \qquad = birthday \cup$

dom
$dom(f \cup g) = (dom f) \cup (dom g) \; dom\{a \mapsto b\} = \{a\}.$

??
$\Xi BirthdayBook$
$\in$
$known$
??
$\Xi BirthdayBook$
$known'$
$birthday'$
$kKnown$
$birthday$
$\Xi BirthdayBook$
$BirthdayBook$
$known' = known \; birthday' = birthday$

$date$
$FindBirthday$
$name?$
$date!$
$birthday$
$name?$
$today?$
$cards!$
$\{$
$\}$
??
$Remind$
$cards!$
n
$known$
$birthday$
$today?$
y
$\{x :$
$S|...x...\}$
y
S
$...y...$
y
x
$y \in \{x : S|...x...\} \Leftrightarrow y \in S \wedge (...y...).$

$m \in \{n : known | birthday(n) = today?\} \qquad \Leftrightarrow m \in known \wedge birthday(m) = today?.$

m
$cards!$
$today?$
??
$known$
$birthday$
$result!$
ok
$already known$
$not known$