

$[NAME, DATE]$

$BirthdayBook$
$known : \mathbb{P} NAME$ $birthday : NAME \rightarrow DATE$
$known = \text{dom } birthday$

$InitBirthdayBook$
$BirthdayBook'$
$known' = \{\}$

$AddBirthday$
$\Delta BirthdayBook$ $name? : NAME$ $date? : DATE$
$name? \notin known$ $birthday' = birthday \cup \{name? \mapsto date?\}$

$FindBirthday$
$\Xi BirthdayBook$ $name? : NAME$ $date! : DATE$
$name? \in known$ $date! = birthday(name?)$

$REPORT ::= ok \mid already\_known \mid not\_known$

$Success$
$result! : REPORT$
$result! = ok$

$AlreadyKnown$
$\Xi BirthdayBook$ $name? : NAME$ $result! : REPORT$
$name? \in known$ $result! = already\_known$

<i>NotKnown</i>	
$\exists \text{BirthdayBook}$	
$\text{name?} : \text{NAME}$	
$\text{result!} : \text{REPORT}$	
$\text{name?} \notin \text{known}$	
$\text{result!} = \text{not\_known}$	

$R\text{AddBirthday} ==$   
 $(\text{AddBirthday} \wedge \text{Success})$   
 $\vee \text{AlreadyKnown}$   
 $R\text{FindBirthday} ==$   
 $(\text{FindBirthday} \wedge \text{Success}) \vee \text{NotKnown}$