

MACHINE *SimpleBank*

SETS

ACCOUNT

VARIABLES

accounts , *balance*

INVARIANT

$accounts \subseteq ACCOUNT \wedge$

$balance \in accounts \rightarrow \mathbb{N}$

INITIALISATION

$accounts$, $balance := \{\}$, $\{\}$

OPERATIONS

$newacct \leftarrow \mathbf{NewAccount} \hat{=}$

PRE $accounts \neq ACCOUNT$

THEN

ANY ac **WHERE** $ac \in ACCOUNT - accounts$

THEN

$newacct := ac \parallel$

$accounts := accounts \cup \{ ac \} \parallel$

$balance := balance \Leftarrow \{ ac \mapsto 0 \}$

END

END ;

$\mathbf{Deposit} (amount , account) \hat{=}$

PRE $amount \in \mathbb{N} \wedge account \in accounts$

THEN

$balance := balance \Leftarrow \{ account \mapsto balance (account) + amount \}$

END ;

$\mathbf{Withdraw} (amount , account) \hat{=}$

PRE $amount \in \mathbb{N} \wedge account \in accounts \wedge amount \leq balance (account)$

THEN

$balance := balance \Leftarrow \{ account \mapsto balance (account) - amount \}$

END ;

$bal \leftarrow \mathbf{Balance} (account) \hat{=}$

PRE $account \in accounts$

THEN

$bal := balance (account)$

END ;

$total \leftarrow \mathbf{Holdings} \hat{=}$

PRE $accounts \subseteq ACCOUNT$

THEN
 $total := \sum ac . (ac \in accounts \mid balance (ac))$
END

END