

[*CUSTOMER*]
MEMBERSHIP ::= *Gold* | *Silver*

LoyaltyScheme

$members : \mathbb{F} \text{ } CUSTOMER$
 $membershipType : CUSTOMER \rightarrow MEMBERSHIP$
 $points : CUSTOMER \rightarrow \mathbb{N}$

$points \in members \rightarrow \mathbb{N}$
 $membershipType \in members \rightarrow MEMBERSHIP$

LoyaltySchemeInit

$\Delta LoyaltyScheme$

$members' = \emptyset$
 $points' = \emptyset$
 $membershipType' = \emptyset$

Join

$\Delta LoyaltyScheme$
 $newMember? : CUSTOMER$

$members' = members \cup \{newMember?\}$
 $points'(newMember?) = 100$
 $membershipType'(newMember?) = Silver$

Upgrade

$\Delta LoyaltyScheme$
 $member? : CUSTOMER$

$member? \in members$
 $membershipType'(member?) = Gold$
 $members' = members$
 $points' = points$

Till_receipt

$\Delta LoyaltyScheme$
 $receiptValue? : \mathbb{A}$
 $member? : CUSTOMER$

$member? \in members$
 $membershipType(member?) = Silver \Rightarrow points'(member?) = points(member?) + receiptValue?$
 $membershipType(member?) = Gold \Rightarrow points'(member?) = points(member?) + 2 * receiptValue?$
 $members' = members$
 $membershipType' = membershipType$

Issue

$\Delta LoyaltyScheme$
 $member? : CUSTOMER$
 $out! : \mathbb{N}$

$member? \in members$
 $out! = points(member?) \text{ div } 100$
 $points'(member?) = points(member?) \text{ mod } 100$
 $members' = members$
 $membershipType' = membershipType$