

An Event-B Specification of m1
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MACHINE m1

REFINES m0

SEES c1

VARIABLES

stockMilk
stockPlain
selectedProduct
coin
machineMoneyMilk
machineMoneyPlain

INVARIANTS

StockMilkType : $stockMilk \in \mathbb{N}$
StockPlainType : $stockPlain \in \mathbb{N}$
machineMoneyMilkType : $machineMoneyMilk \in \mathbb{N}$
machineMoneyPlainType : $machineMoneyPlain \in \mathbb{N}$
selectedProductType : $selectedProduct \in Products$
stockGluingInvariant : $stock = stockMilk + stockPlain$
machineMoneyGluingInvariant : $machineMoney = machineMoneyMilk + machineMoneyPlain$
machineMoneyInvariant : $(INIT_AMOUNT_MILK * ValueCoin(MILK_COIN)) + (INIT_AMOUNT_PLAIN * ValueCoin(PLAIN_COIN)) = (stockMilk * ValueCoin(MILK_COIN)) + (stockPlain * ValueCoin(PLAIN_COIN)) + machineMoneyMilk + machineMoneyPlain$

EVENTS

Initialisation

begin

machineMoneyMilkInit : $machineMoneyMilk := 0$
machineMoneyPlainInit : $machineMoneyPlain := 0$
coinCustomerInit : $coin := NO_COIN$
StockMilkInit : $stockMilk := INIT_AMOUNT_MILK$
StockPlainInit : $stockPlain := INIT_AMOUNT_PLAIN$
selectedProductInit : $selectedProduct := NONE$

end

Event buyMilk $\hat{=}$

refines Buy

when

correctCoin : $coin = MILK_COIN$
productIsMilk : $selectedProduct = MILK$
availableStock : $stockMilk > 0$
then
dispenseProduct : $stockMilk := stockMilk - 1$
increaseMoney : $machineMoneyMilk := machineMoneyMilk + ValueCoin(coin)$
clearProductSelection : $selectedProduct := NONE$
clearCustomerCoin : $coin := NO_COIN$

end

Event buyPlain $\hat{=}$

refines Buy

when

validCoin : $coin = PLAIN_COIN$
productIsPlain : $selectedProduct = PLAIN$
inStock : $stockPlain > 0$

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    then
      dispenseProduct : stockPlain := stockPlain - 1
      increaseMoney : machineMoneyPlain := machineMoneyPlain + ValueCoin(coin)
      clearProductSelection : selectedProduct := NONE
      clearCustomerCoin : coin := NO_COIN
    end
Event insertCustomerCoin  $\hat{=}$ 
refines insertCustomerCoin
  any
    coinCustomer
  where
    coinCustomerType : coinCustomer  $\in$  ValidCoin  $\setminus$  {NO_COIN}
    coinValue : coin = NO_COIN
  then
    insert : coin := coinCustomer
  end
Event selectProduct  $\hat{=}$ 
  any
    customerProduct
  where
    customerProductType : customerProduct  $\in$  Products  $\setminus$  {NONE}
    selectedProductValue : selectedProduct = NONE
  then
    setProduct : selectedProduct := customerProduct
  end
Event resetMilk  $\hat{=}$ 
refines reset
  when
    emptyStockMilk : stockMilk = 0
  then
    reStockMilk : stockMilk := INIT_AMOUNT_MILK
    emptyMachineMoneyMilk : machineMoneyMilk := 0
  end
Event resetPlain  $\hat{=}$ 
refines reset
  when
    emptyStockPlain : stockPlain = 0
  then
    reStockPlain : stockPlain := INIT_AMOUNT_PLAIN
    emptyMachineMoney : machineMoneyPlain := 0
  end
END

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