

Assignment 4 on Object-Z

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1 Initialization operation initState

The operation to initialize stock is:

$InitState$	
$State'$	
$stock' = \emptyset$	
$orders' = \emptyset$	
$newids' = OrderId$	

2 NewOrder Operation

The operation to handle new orders is:

$NewOrder$	
$\Delta State$	
$order? : Order$	
$id! : OrderId$	
$id! \in newids$	
$stock' = stock$	
$orders' = orders \cup \{id! \mapsto pending\}$	
$orderStatus' = orderStatus \cup \{id! \mapsto pending\}$	

3 InvoiceOrder Operation

The operation to invoice pending orders is:

$InvoiceOrder$
$\Delta State$ $id? : OrderId$
$orders(id?) \sqsubseteq stock$ $orderStatus(id?) = pending$ $stock' = stock \setminus \{orders(id?)\}$ $orders' = orders$ $orderStatus' = orderStatus \oplus \{id? \mapsto invoiced\}$

4 InvoiceError error case

The following is for the error case:

$InvoiceError$
$\exists State$ $id? : OrderId$ $rep! : Report$
$orderStatus(id?) \neq pending$ $rep! = order_not_pending$

5 total operation InvoiceOrderOp

$$InvoiceOrderOp == (InvoiceOrder \wedge Successful) \vee InvoiceError \vee StockError$$