

SOEN331: Introduction to Formal Methods
for Software Engineering

Assignment 2 on Object-Z specification

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1 Map

[Description, Coordinate]

Point == Coordinate \times Coordinate

Message ::= ok | location_already_known | no_location_found

Map

locations : Description \rightarrow Point

INIT

locations = {}

AddLocationOK

$\Delta(\textit{locations})$

newDescription? : Description

newPoint? : Point

newDescription? $\notin \text{dom } \textit{locations}$

locations' = *locations* \cup {*newDescription?* \rightarrow *newPoint?*}

DeleteLocationOK

$\Delta(\textit{locations})$

location? : *locations*

location? $\in \textit{locations}$

locations' = *locations* \setminus {*location?*}

ModifyLocationOK

$\Delta(\textit{locations})$

desc? : Description

newPoint? : Point

desc? $\in \text{dom } \textit{locations}$

locations' = *locations* \oplus {*desc?* \rightarrow *newPoint?*}

FindLocationOK

$\Xi(\textit{locations})$

desc? : Description

point! : Point

desc? $\in \text{dom } \textit{locations}$

point! = *locations*(*desc?*)

Success

$\Xi(locations)$

result! : *Message*

result! = *ok*

NoLocationFound

$\Xi(locations)$

description? : *Description*

result! : *Message*

description? $\notin \text{dom } locations$

result! = *no_location_found*

$AddLocation \stackrel{\wedge}{=} (AddLocationOk \wedge Success) \vee LocationAlreadyKnown$

$DeleteLocation \stackrel{\wedge}{=} (DeleteLocationOK \wedge Success) \vee NoLocationFound$

$ModifyLocation \stackrel{\wedge}{=} (ModifyLocationOK \wedge Success) \vee NoLocationFound$

$FindLocation \stackrel{\wedge}{=} (FindLocationOK \wedge Success) \vee NoLocationFound$

Map2 _____

Map

count : \mathbb{N}

count ≥ 0

INIT _____

count = 0

AddLocationOK _____

$\Delta(\textit{count})$

count' = *count* + 1

DeleteLocationOK _____

$\Delta(\textit{count})$

count' = *count* - 1

ModifyLocationOK _____

count' = *count*

FindLocationOK _____

count' = *count*

Success _____

count' = *count*

LocationAlreadyKnown _____

count' = *count*

NoLocationFound _____

count' = *count*