SOEN331: Introduction to Formal Methods for Software Engineering

for Software Engineering

Assignment 2 on Object-Z specification

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February 25, 2019

1 Map

Map

$[Description, Coordinate]$
$Point == Coordinate \times Coordinate$
$Message ::== ok \mid location\_already\_known \mid no\_location\_found$

$locations : Description \nrightarrow Point$

INIT

$locations = \{\}$

AddLocationOK

$\Delta(locations)$
$newDescription? : Description$
$newPoint? : Point$

$newDescription? \notin dom\ locations$
$locations' = locations \cup \{newDescription? \rightarrow newPoint?\}$

DeleteLocationOK

$\Delta(locations)$
$location? : locations$

$location? \in\ locations$
$locations' = locations \setminus \{location\}$

ModifyLocationOK

$\Delta(locations)$
$desc? : Description$
$newPoint? : Point$

$desc? \in dom\ locations$
$locations' = locations \oplus \{desc? \rightarrow newPoint?\}$

FindLocationOK

$desc? : Description$
$point! : Point$

$desc? \in\ dom locations$
$point! = locations(desc?)$

Success

$result! : Message$

$result! = ok$

LocationAlreadyKnown

$\Xi(locations)$
$description? : Description\ result! : Message$

$description? \in dom\ locations$
$result! = location_a lready_k nown$

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noLocationFound

$\Xi(locations)$
$description? : Description\ result! : Message$

$description? \notin dom\ locations$
$result! = no_l ocation_f ound$

$AddLocation = (AddLocationOk \wedge Sucess) \vee locationAlreadyKnown$
$deleteLocation = (DeleteLocationOK \wedge Sucess) \vee NoLocationFound$
$modifyLocation = (ModifyLocationOK \wedge Sucess) \vee NoLocationFound$
$findLocation = (FindLocationOK\ Sucess) \vee NoLocationFound$

Map2

Map

$count : \mathbb{N}$

$count >= 0$

INIT

$count = 0$

AddLocationOK

$\Delta(count)$

$count' = count + 1$

DeleteLocationOK

$\Delta(count)$

$count' = count - 1$

ModifyLocationOK

$count' = count$

FindLocationOK

$count' = count$