SOEN331: Introduction to Formal Methods for Software Engineering

Assignment 2 on Object-Z specification

Tarek Ait Hamouda (40044119), Abhijit Gupta (40066502),
Ethel Narra Pangan (40061530)

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1 Map

Map

$[Description, Coordinate]$

$Point == Coordinate \times Coordinate$

$Message ::== ok \mid location\_already\_known \mid no\_location\_found$

$locations : Description \pfun Point$

INIT

$locations = \{\}$

AddLocationOK

$\Delta(locations)$

$newDescription? : Description$

$newPoint? : Point$

$newDescription? \notin dom\ locations$

$locations' = locations \cup \{newDescription? \mapsto newPoint?\}$

DeleteLocationOK

$\Delta(locations)$

$location? : locations$

$location? \in locations$

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

ModifyLocationOK

$\Delta(locations)$

$desc? : Description$

$newPoint? : Point$

$desc? \in dom\ locations$

$locations' = locations \oplus \{desc? \mapsto newPoint?\}$

FindLocationOK

$\Xi(locations)$

$desc? : Description$

$point! : Point$

$desc? \in domlocations$

$point! = locations(desc?)$

Success

$\Xi(locations)$

$result! : Message$

$result! = ok$

LocationAlreadyKnown

$\Xi(locations)$
$description? : Descriptionresult! : Message$

$description? \in domlocations$
$result! = location_already_known$

noLocationFound

$\Xi(locations)$
$description? : Descriptionresult! : Message$

$description? \notin domlocations$
$result! = no_location_found$

$AddLocation \triangleq (\text{AddLocationOk} \land Sucess) \lor locationAlreadyKnown$
$deleteLocation \triangleq (\text{DeleteLocationOK} \land Sucess) \lor NoLocationFound$
$modifyLocation \triangleq (\text{ModifyLocationOK} \land Sucess) \lor NoLocationFound$
$findLocation \triangleq (\text{FindLocationOK} \land Sucess) \lor NoLocationFound$

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

$count' = count$