SOEN331: Introduction to Formal Methods for Software Engineering
Assignment 4 on algebraic specifications

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April 7, 2019

Location

Spec: Location;

Sort: Loc;

Imports: String, Point;

Operations:

newLocation : String $\times$ Point $\rightarrow$ Loc;

setDescription : Loc $\times$ String $\rightarrow$ Loc ;

getDescription : Loc $\rightarrow$ String;

setPoint : Loc $\times$ Point $\rightarrow$ Loc ;

getPoint :Loc $\rightarrow$ Point;

Variables:

d: String; p1,p2: Point; st:String

Axioms:

[A1] getDescription(newLocation(d,p1)) = d;

[A2] getPoint(newLocation(d,p1)) = p1;

[A3] setDescription(newLocation(d,p1),st) = newLocation(st,p1) ;

[A4] setPoint(newLocation(d,p1),p2) = neweLocation(d,p2);

Map

Spec: Map(Element);

Sort: Map;

Imports: String,Point,Boolean,Natural,Location;

Operations:

newMap $\rightarrow Map$;

addLocation : Loc $\times$ Map $\rightarrow$ Map ;

deleteLocation : String $\times$ Map $\rightarrow$ Map;

containDescription : String $\times$ Map $\rightarrow$ Boolean ;

containPoint :Point $\times$ Map $\rightarrow$ Boolean;

findLocation :String $\times$ Map $\rightarrow$ Map;

isEmpty :Map $\rightarrow$ Boolean;

clear :Map $\rightarrow$ Map;

Variables:

m: Map; loc: Loc; d:String; p:Point el:Element

Axioms:

[A1] isEmpty(newMap)=true;

[A2] clear(m)=newMap;

[A6] isEmpty (deleteLocation (getDescription(loc), (addLocation (loc,newMap))) = true;

[A8] findLocation(newMap)=undefined;

[A9] deleteLocation(newMap)=undefined;