CONCORDIA UNIVERSITY
Department of Computer Science
and Software Engineering

SOEN 331-W: Introduction to Formal Methods for Software Engineering
Winter 2019

Assignment 2 on the Object-Z specification language

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Contents

1 General information

Date posted: Monday 18 February, 2019.

Date due: Monday 4 March, 2019, by 23:59.

Weight: 5% of the overall grade.

2 Introduction

This assignment must be done by teams of 3 or 4. Each team should designate a leader who will submit the assignment electronically.

3 Type system

We introduce the basic types [*Description*, *Coordinate*], as well as the composite type

$$Point = Coordinate \times Coordinate$$

基本的type就是 描述，坐标

We also introduce an enumerated type

Message

枚举类message 会告诉你对应的error message

which will assume values that correspond to error messages.

4 Your assignment

Consider a map which can be annotated with locations. Upon instantiation, a map object contains no annotations. A location is a pair of description and its corresponding point. Even though descriptions are unique, locations may share a point on the map.

Define class *Map* to support the following operations:

- `AddLocationOK`: Adds a new location on the map.
- `DeleteLocationOK`: Deletes an existing location from the map.
- `ModifyLocationOK`: For a given description, it modifies its corresponding point on a map.
- `FindLocationOK`: For a given description, it provides its corresponding point on the map.

You will also need to provide appropriate error operations, thus combining the definitions above to produce *robust specifications* for the following interface:

- `AddLocation`
- `DeleteLocation`
- `ModifyLocation`
- `FindLocation`

Subclassify *Map* to introduce class *Map*2 that behaves exactly like *Map*, while keeping track of the total number locations.

5 What to submit

Please follow the instructions carefully:

1. Use LaTeX(a template is provided) to prepare the formal specification for classes `Map` and `Map2` in Object-Z in a single file, `map.tex`, and produce a single pdf file called `map.pdf`.
2. Place both files into a folder named after the University id of the person who will submit, and zip the folder.
3. Submit your `zip` file at the Electronic Assignment Submission portal (`https://fis.encs.concordia.ca/eas`) under **Assignment 2**.

6 Late submissions

No late submissions will be accepted after the due date and time.