SOEN331: Introduction to Formal Methods for Software Engineering Assignment 2

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Posted: Thursday 13 February, 2014.
Due: Friday 7 March, 2014, by 12 noon.

1 Introduction

Your assignment is to work in pairs to implement a *Priority Queue Abstract Data Type* of bounded capacity. Valid queue objects should have a capacity of at least 3. The Priority Queue must be developed with contractual specifications written in `adbc`. Use the Java `assert` statement in your code whenever you think it adds confidence and value to your implementation but have in mind that asserts will be disabled in final production (i.e. when we assess your code). The Priority Queue is implemented as a binary *max heap data structure* which is itself implemented using an array. The Priority Queue will store ($integer, string$) tuples, where the integer serves as a unique key defining the priority of the tuple, and the string serves as the element to be stored in the collection. The interface of the Priority Queue ADT is given as follows:

`size()`	Returns an integer, representing the number of elements held in the collection.
`isEmpty()`	Returns a Boolean value, indicating whether or not the collection is empty.
`insert(Key, Element)`	Inserts Element with Key into the collection.
`getMax()`	Returns but does not remove the element with the highest priority.
`remove()`	Returns and removes the element with the highest priority from the collection.

2 Running your program

Your main scenario should be a success scenario, demonstrating the complete behavior of the queue.

Additionally, in your code include commented out statements that would be expected to cause violations of the contractual specifications. Inside each comment, indicate the following:

1. If this statement were to be included in the final production, what type of contractual violation would it cause, as well as

2. The part of the contract that should catch it, and finally

3. The party responsible for the violation.

3 What to submit

You must electronically submit your Java code as one `zip` file under `project`. The zip file should be named after your Concordia id or your partner's.