CMU 15-671 | Models of Software Systems | Fall 1997

Larch Interface Specs; Concurrency

Garlan | Homework 9 | Due: 27 October 1997

Problem 1.

Write a Larch C Interface specification for a set type. The specification should include the following operations: newSet, addElement, isEmpty, elementOf (to create a set, add an element to a set, check if a set is empty, and check if an element is a member of a set). Your specification may refer to the terms defined in your shared language specification of Homework 8.

Problem 2.

Suppose P and Q are sequential processes that share the integer variable x, initialized to 0. P's code looks like:

$x := 1;$
$x := x + 5$

and Q's code looks like:

$x := 2;$
$x := 2x$

Suppose P and Q are run in parallel. Consider each assignment statement to be atomic.

a. Give all the possible interleavings of P's and Q's statements. What are all the possible final values of x?

b. Suppose each of P's and Q's code is atomic:

P's code:

$<< x := 1;$
$x := x + 5 >>$

and Q's code:

$<< x := 2;$
$x := 2x >>$

Now what are the possible final values of x?