COMP 3610 Tutorial 10

19 October, 2023

Exercise 1

Consider the cube of trace equivalences and weak trace equivalences from the lecture on Section 22. Come up with counterexamples for each pairing of equivalences where none is finer than the other that demonstrate that fact.

Exercise 2

Show that equivalence relations indeed partition the sets on which they are defined (a partition of a set S is a collection of non-empty subsets if S such that each element of S is a member of exactly one of the subsets).

Exercise 3

Give a modified version of the rules for the dynamic semantics of CCS (from Section 20, not the pure version) where messages are broadcast instead of only having exactly one sender and receiver.

Exercise 4

Consider Exercise 4 from Tutorial 9:

> Consider a number-guessing game: Player A secretly chooses a random number n between 1 and 100. Player B guesses a number m, tells player A, then player A tells player B whether $m = n$, $m < n$, or $m > n$. Player B repeats guessing until $m = n$; their score is how many guesses it took. Model this game using at least two parallel processes communicating via channels, at least one process for player A, and at least one process for player B. Implement an optimal guessing strategy for player B. You can do this in GCL, or CCS, or both. To pick a random number, use nondeterministic choice, but for simulation purposes, you can imagine picking between a smaller number of choices, say 13, 50, 72, and 84, instead of all numbers between 1 and 100.

For the CCS version of this problem, give the Labelled Transition System for your solution.