

CSI 5109 Assignment 4

marker: Neil Hart (nhart@csi.uottawa.ca)

1. By constructing the refusal trees of the two behaviour expressions below, show that conformance is not a symmetric relation.

A = a; b; stop [] c; stop
B = i; a; stop [] b; c; stop

2. Given the behaviour expressions:

A = (a; (b; stop [] i; c; stop)) |[a,c]| (a; (i; b; stop [] c; stop))
B = (a; (b; stop [] c; stop)) |[a, c]| (a; (i; b; stop [] i; c; stop))

- a) Are A and B weak bisimulation equivalent?
- b) Does one of them conform to the other?
- c) Are they trace equivalent?
- d) Are they testing equivalent?

3. Construct the canonical tester of the following behaviour expression and derive the set of test cases:

(a; (b; stop [] c; stop)) |[a,c,]| (a; (i; b; stop [] c; stop))

4. By reference to the notes by Burstall, prove the following:

- a) For all m, n, $m + \text{succ}(n) = \text{succ}(m+n)$ [Proposition 5.2 on page 7]
- b) For all l, $\text{join}(l, \text{nil}) = l$ [first Lemma 6.1 on page 9]
- c) Given the definition:
length : list(alpha) -> nat
length(nil) <= 0
length(n::l) <= length(l) + 1

Prove that:

length(join(k,l)) = length(k) + length(l)