2001 Paper 8 Question 15

Topics in Concurrency

(a) Describe an algorithm for deciding whether or not a finite-state CCS process satisfies an assertion in the modal μ-calculus. [6 marks]

(b) Draw the reachable transition system of the CCS process P, where

$$P \stackrel{\text{def}}{=} a.P + b.(b.nil + a.nil).$$ [2 marks]

(c) Illustrate the use of the algorithm of part (a) by giving a derivation which decides whether or not the CCS process P above satisfies the modal μ-calculus assertion A, where

$$A \equiv \nu X.([b]F \vee (\langle a\rangle T \wedge [\cdot]X)).$$

(You should assume the usual properties of boolean operations.) [8 marks]

(d) Give, without proof, a short description of those finite-state processes which satisfy the assertion A. [4 marks]