

2010 Paper 8 Question 14

Topics in Concurrency

- (a) Describe the syntax and transition semantics of CCS (without value-passing). [6 marks]
- (b) Define the relation of strong bisimilarity \sim between states of a transition system. [2 marks]
- (c) Show, for CCS processes p, p', q that if $p \sim p'$ then $p \parallel q \sim p' \parallel q$. [The expression $p \parallel q$ denotes the CCS parallel composition of p and q .] [5 marks]
- (d) Describe diagrammatically a Petri net semantics of the CCS operations of prefixing, sum and parallel composition. Your description should include an explanation of the “token game” you assume on Petri nets. State, without proof, the mathematical relationship you expect to hold between your Petri net semantics and the transition semantics of CCS. [7 marks]