2006 Paper 9 Question 16

Topics in Concurrency

(a) Define what it means for two states in a transition system to be bisimilar. [2 marks]

(b) Hennessy–Milner logic has assertions

$$A ::= \bigwedge_{i \in I} A_i \mid \neg A \mid \langle \alpha \rangle A \ ,$$

where I is a set, possibly empty, indexing a collection of assertions A_i, and α ranges over a set of actions Act. Define the semantics of the logic within a transition system with actions in Act. [4 marks]

(c) Show that if two states in the transition system are bisimilar, then they satisfy the same assertions of the logic. [6 marks]

(d) Show that if two states in the transition system satisfy exactly the same assertions of the logic, then they are bisimilar. [8 marks]