

2006 Paper 9 Question 14

Denotational Semantics

- (a) State carefully, without proof, the soundness and adequacy results for PCF. (You need not describe the syntax, operational and denotational semantics of PCF in any detail.) [3 marks]
- (b) Define the logical relation you would use in proving adequacy for PCF. State carefully without proof the “fundamental theorem” for the logical relation. [5 marks]
- (c) Define contextual equivalence for PCF. [2 marks]
- (d) Explain carefully the difficulties in obtaining a fully abstract denotational semantics for PCF. [7 marks]
- (e) Describe how PCF syntax and operational semantics can be extended to obtain full abstraction. [3 marks]