1999 Paper 7 Question 15

Additional Topics

Justify each of the following statements, with the help of some formal details and examples.

"The dynamic behaviour of programs in a programming language can be defined in terms of a formal logical system, in which each sentence which can be inferred in the logic represents the evaluation of a piece of program."

"The type discipline of a programming language can be defined in terms of a formal logical system, in which each sentence which can be inferred in the logic represents the assertion that a piece of program obeys the discipline."

[15 marks]

Give and explain *two* examples of theorems about the behaviour of Standard ML programs which can be expressed and proved in terms of either or both of the two logical systems described above. [5 marks]