

2007 Paper 7 Question 9

Types

- (a) What is meant by the term *type soundness* in connection with type systems for programming languages? [1 mark]
- (b) Explain by example how ML-style polymorphism for let-expressions combined with reference types leads to an unsound type system. (As part of your answer you should define the type system, but you need not give a formal definition of how expressions in the language evaluate.) [14 marks]
- (c) How does Standard ML restrict the typing rule for let-expressions in order to restore type soundness? Why does the restriction render untypeable the example you used in part (b)? [5 marks]