Concepts in Programming Languages

(a) Write a procedure and a call to it in block-structured pseudocode such that the execution of the procedure under pass-by-reference and under pass-by-value/result yields different outcomes. Justify your answer.

[7 marks]

(b) Explain the meaning of static (i.e. compile-time) and dynamic (i.e. run-time) type checking.

Compare the advantages and disadvantages of these two approaches to type checking from the point of view of the language designer, the language implementer, and the programmer.

[6 marks]

(c) Explain how objects can be simulated in SML, giving an example.

Does it follow that SML, together with its module system, is an object-oriented programming language? Why?

[7 marks]