2005 Paper 6 Question 7

Comparative Programming Languages

(*a*) Many computer scientists believe that languages with strong compile-time type checking are better than those that are typeless, dynamically typed, or are weakly type checked. Discuss the reasons for this view. [7 marks]

(*b*) If strictly-checked data types are seen as good, discuss whether augmenting a language with many more primitive data types is better. Consider, in particular, the possibility of incorporating into a language such as Java many new numerical types such as packed decimal of various precisions, scaled arithmetic, and new types to hold values representing distance, mass and time. How would these additions affect the readability and reliability of programs? [7 marks]

(*c*) Some languages allow different modes of calling of function arguments, such as call by value, call by reference and call by name. Discuss the advantages and disadvantages of incorporating the argument calling modes into the data types of functions. [6 marks]