

2002 Paper 12 Question 6

Compiler Construction

- (a) Assuming a Java type is given to each variable, state a method by which an overloaded operator (such as `+`, `-` etc.) in a Java program can be determined to be an `int`, `real` or other operator. [3 marks]
- (b) Explain, using pseudo-code as appropriate, how to convert a syntax-tree into stack code such as that used in the JVM. For the purposes of this question, you only need consider trees representing bodies of `void`-returning functions, and these bodies only as consisting of a list of statements of the form `int x = e;` or `x = e;` where x ranges over variables and e over expressions; expressions contain variables, integer constants, the binary operator `+` and static method invocations. [10 marks]
- (c) Show how a sequence of simple stack code instructions, such as those used in your answer to part (b) above, can be translated into a sequence of instructions for a register-oriented architecture of your choice, for example ARM or Pentium. [7 marks]