2001 Paper 9 Question 7

Optimising Compilers

(*a*) Sketch an algorithm for *instruction scheduling*. Be careful to specify the nature of your initial and final data-structures; also give the worst-case running time of the algorithm and a program which causes this worst-case running time to be achieved. [10 marks]

(*b*) Explain the conflicts between register allocation, common sub-expression elimination and instruction scheduling on a machine where register usage should be minimised (for example to reduce procedure entry save/restore code). [5 marks]

(*c*) Describe Static Single Assignment (SSA) form and explain how it can help to produce better results in both compilation and decompilation. [5 marks]