2003 Paper 7 Question 1

Comparative Architectures

(a) Compare and contrast each of the following techniques for achieving instruction-level parallelism:

   (i)   statically-scheduled super scalar;

   (ii) out-of-order speculative execution;

   (iii) Very Long Instruction Word (VLIW);

   (iv) EPIC (as used by IA-64).

[12 marks]

(b) Discuss hardware multi-threading, and hence the different implementation approaches that have been tried to enable a single CPU core to execute from multiple instruction streams. How can multi-threading be used to improve system performance? What are the pitfalls? [8 marks]