1995 Paper 8 Question 12

Specification and Verification II

Describe the technique of exhaustive enumeration and discuss its rôle in formal proofs of correctness.   [5 marks]

The non-equality of two boolean streams, a and b, is defined as follows:

    (NotEqual 0 (a,b) = F) ∧
    (NotEqual(t+1) (a,b) = (¬(a t = b t) → T | NotEqual t (a,b)))

Using basic gates and a register with the following behaviour

    REG(in,out) = (∀t. out t = ((t = 0) → F | in(t - 1)))

devise and verify a circuit with inputs a and b and an output, out, which satisfies the following behaviour: ∀t. out t = NotEqual t (a,b)   [15 marks]