

1998 Paper 2 Question 2

Digital Electronics

You are to design a 2-bit multiplier which takes inputs b_1b_0 a_1a_0 representing two unsigned 2-bit numbers and produces a 4-bit result in the outputs $z_3z_2z_1z_0$.

- (a) Give a truth table for the outputs. [5 marks]
- (b) Give simplified forms for $z_3z_2z_1z_0$. [5 marks]
- (c) Discuss alternatives for producing an 8-bit multiplier with special consideration for gate count and speed. Give a full design for one of the alternatives for a 4-bit adder. [10 marks]