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EECS 150 R. H. Katz, Instructor
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Quiz #8: Booth Step Sequential Multiplier
Thursday, 26 April 2007
Open Neighbor! Closed Book!

Consider the design of a 4-bit twos complement multiplier that takes two 4-bit operands and produces an 8-bit product. Suppose that you want to multiply 5 by 7.

(a) Using a conventional sequential multiplier, assuming 5 (0101) is the multiplicand and 7 (0111) is the multiplier, how many shift and how many add operations will be executed?

Number of shifts: _____4_____ Number of adds: _____3_____

(b) Using a sequential multiplier that implements the Booth multiplier step, with the same multiplicand and multiplier, how many shift and how many add operations will be executed?

Number of shifts: _____4_____ Number of adds/subs: _____2_____

(c) Show the step-by-step, add/subtract, skip, and shift operations that take place to multiply 5 by 7 using a Booth multiplier. Fill in the Product/Multiplier/Extra Digit boxes with the RESULTS of applying the operation you select for the Op column:

Step	Op (Add/Sub, Skip, or Shift)	Multiplicand	Product	Multiplier	Extra Digit
Initial	----------	0101	0000	0111	0
1a.	Sub 0101		1011	0111	0
1b.	Shift		1101	1011	1
2a.	Skip		1101	1011	1
2b.	Shift		1110	1101	1
3a.	Skip		1110	1101	1
3b.	Shift		1111	0110	1
4a.	Add 0101		0100	0110	1
4b.	Shift		0010	0011	0