

October 5

- Register to vote!
- Go to the State Fair! (15-24 October)
- Help with a user study! (Peter Parente parente@cs.unc.edu)
- How many struggling with Assignment 5,6,7?
- Questions?
- Chapter 4 – Multiplication/Division

10/5/2004

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Multiplication Facts

- N digit number TIMES a M digit number produces: ?
an (N+M) digit number
- 32 bit number TIMES a 32 bit number produces: ?
a 64 bit number

$$\begin{array}{r} 123 \\ \times 45 \\ \hline 615 \\ 492 \\ \hline 5535 \end{array}$$

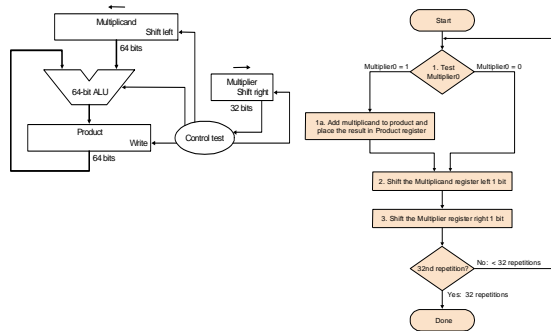
$$\begin{array}{r} 101 \\ \times 11 \\ \hline 101 \\ 101 \\ \hline 1111 \end{array}$$

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Multiplication: Implementation

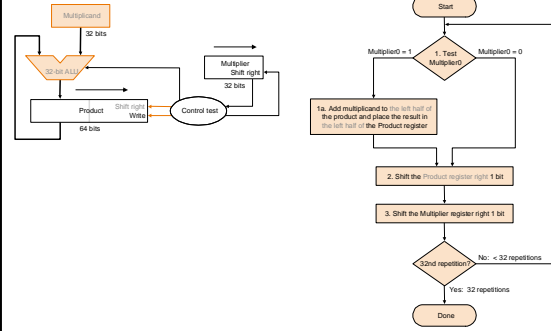


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Second Version



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Example for second version

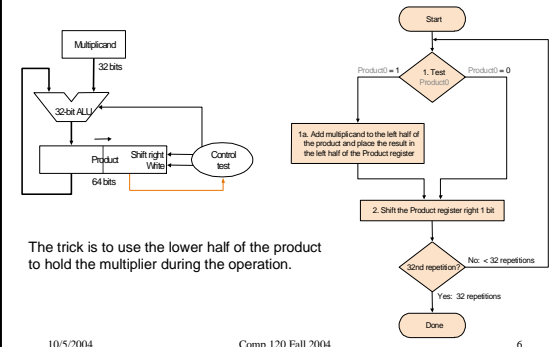
Iteration	Step	Multiplier	Multiplicand	Product
0	Initial	1011	0010	0000 0000
1	Test true shift right	1011 0101	0010	0010 0000 0001 0000
2	Test true shift right	0101 0010	0010	0011 0000 0001 1000
3	Test false shift right	0010 0001	0010	0001 1000 0000 1100
4	Test true shift right	0001 0000	0010	0010 1100 0001 0110

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Final Version



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What about the sign?

- Positive numbers are easy.
- How about negative numbers?

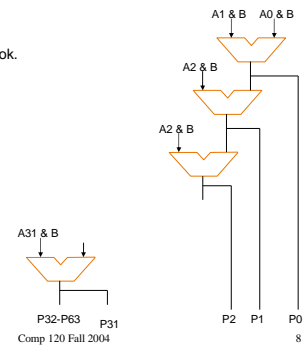
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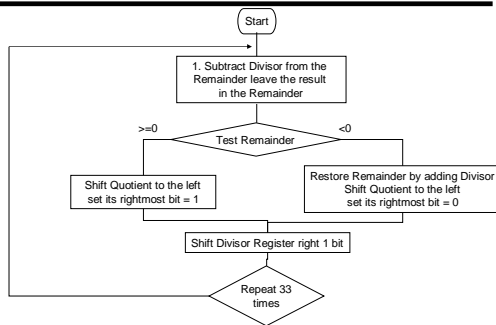
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Faster Multiply

See Booth coding in the book.



Division



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