

October 15

- Chapter 4 – Multiplication/Division

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Multiplication Facts

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

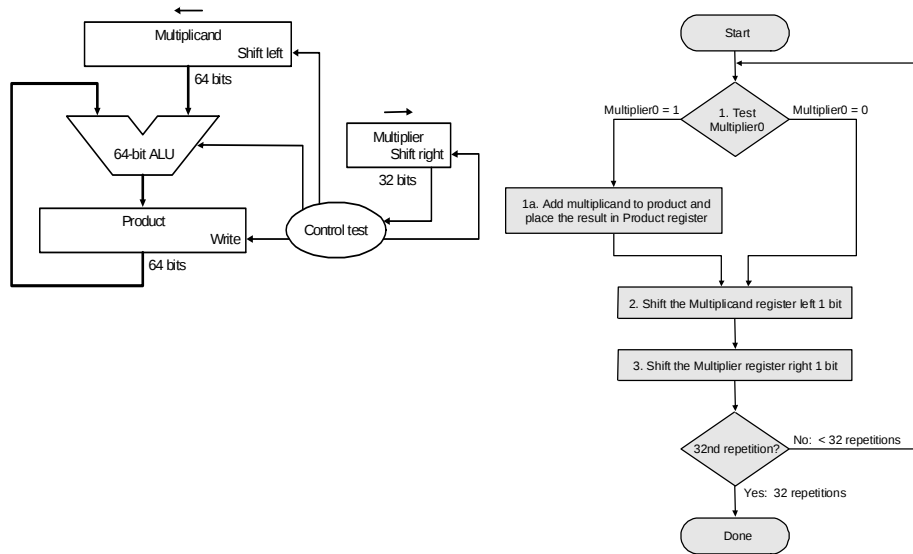
$$\begin{array}{r} 123 \\ \times 45 \\ \hline 615 \\ 492 \\ \hline 5535 \end{array}$$
$$\begin{array}{r} 101 \\ \times 11 \\ \hline 101 \\ 101 \\ \hline 1111 \end{array}$$

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Multiplication: Implementation

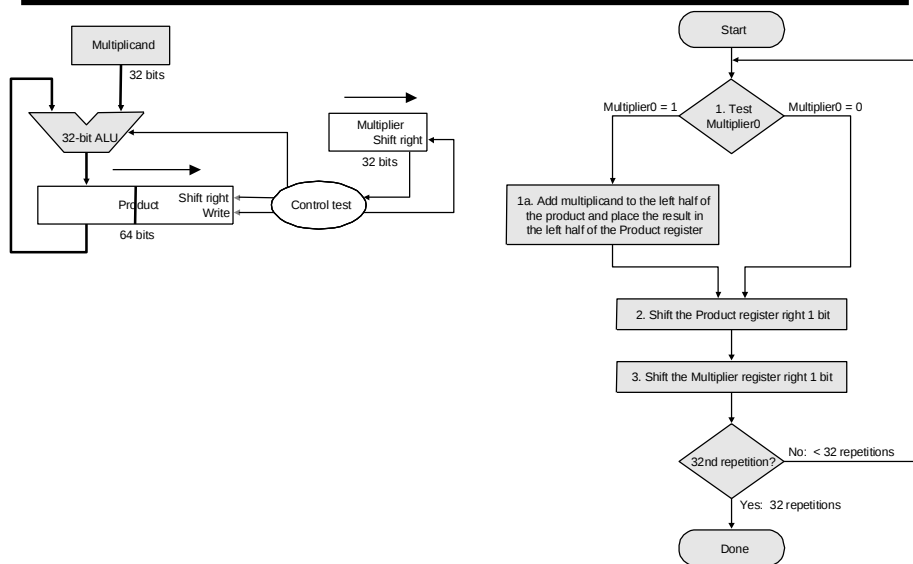


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Second Version



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Example for second version

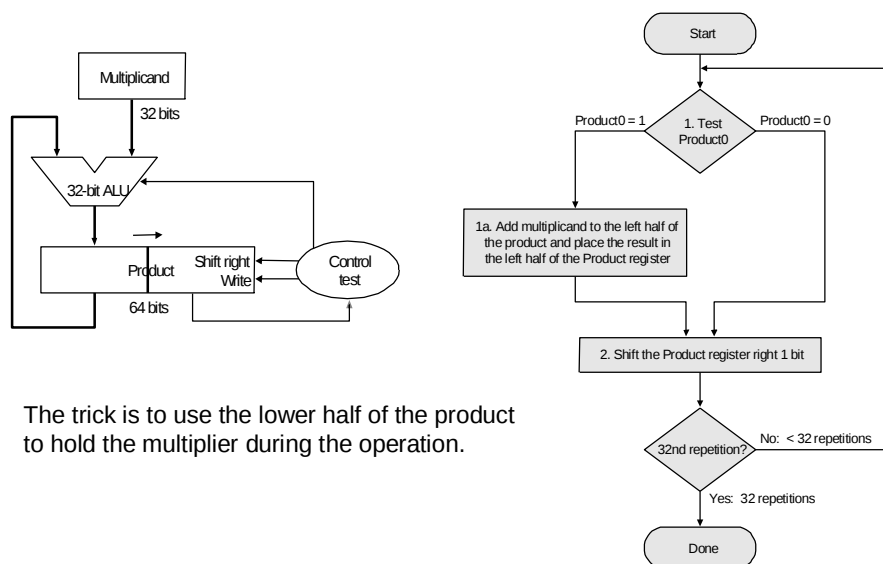
Iteration	Step	Multiplier	Multiplicand	Product
0	Initial	1011	0010	0000 0000
1	Test true shift right	1011 0101	0010	0010 0000 0001 0000
2	Test true shift right	0101 0010	0010	0011 0000 0001 1000
3	Test false shift right	0010 0001	0010	0001 1000 0000 1100
4	Test false shift right	0001 0000	0010	0010 1100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

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Final Version



The trick is to use the lower half of the product to hold the multiplier during the operation.

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What about the sign?

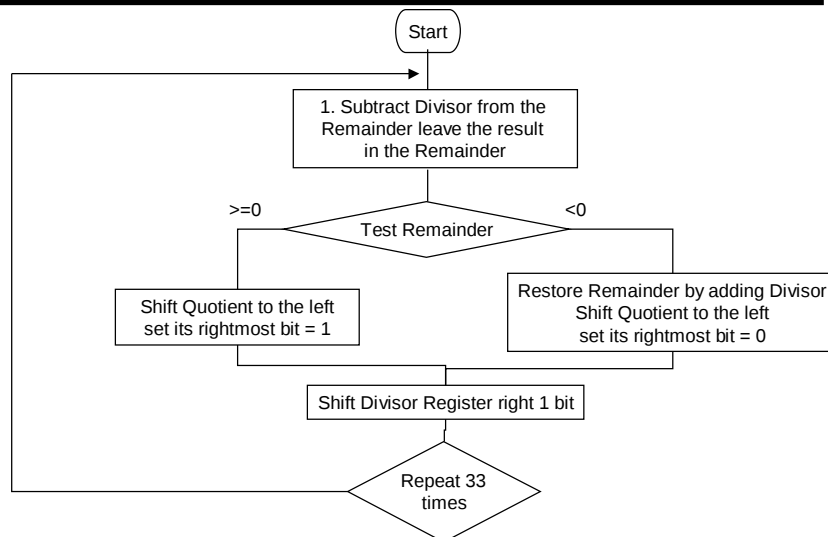
- Positive numbers are easy.
- How about negative numbers?

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Division



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