

## Booth's Algorithm for Binary Multiplication Example

Multiply 14 times -5 using 5-bit numbers (10-bit result).

14 in binary: 01110

-14 in binary: 10010 (so we can add when we need to subtract the multiplicand)

-5 in binary: 11011

Expected result: -70 in binary: 11101 11010

Step	Multiplicand	Action	Multiplier upper 5-bits 0, lower 5-bits multiplier, 1 "Booth bit" initially 0
0	01110	Initialization	00000 11011 0
1	01110	10: Subtract Multiplicand	00000+10010=10010 10010 11011 0
		Shift Right Arithmetic	11001 01101 1
2	01110	11: No-op	11001 01101 1
		Shift Right Arithmetic	11100 10110 1
3	01110	01: Add Multiplicand	11100+01110=01010 (Carry ignored because adding a positive and negative number cannot overflow.) 01010 10110 1
		Shift Right Arithmetic	00101 01011 0
4	01110	10: Subtract Multiplicand	00101+10010=10111 10111 01011 0
		Shift Right Arithmetic	11011 10101 1
5	01110	11: No-op	11011 10101 1
		Shift Right Arithmetic	11101 11010 1