Booth's RADIX-2 Example

Multiply $28_{10} \times (-14_{10})$

Set $A = 28_{10} = 011100_2$
$B = -14_{10} = 110010_2$
$(-B) = 14_{10} = 001110_2$

00	Do nothing
01	ADD B
10	SUBtract B
11	Do nothing

Step 1. Create 12-Bit (each operand is 6 Bits) RESULT
2. Place A in the lower 6-Bits + 0 in the upper 6-Bits.
3. Pad a LSB with a zero.

	A	
000000	011100	0 ← PADDED BIT

Step 4; examine the 2 Right-most Bits & take action Based on the table
→ 00 So Do nothing

Step 5; Shift Right preserving the sign BIT (shift #1)

000000	001110	
000000	000111	00 Do nothing, shift #2
+ 001110	000111	10 subtract B (ADD -B) to upper Bits
001110	000111	shift #3
000111	000011	11 Do nothing · shift #4
000011	100001	11 " " #5
000001	110000	01 ADD B
+ 110010		
110011	110000	SHIFT #6 (Preserve sign Bit)
111001	111000	

FINAL RESULT = $111001\ 111000_2$
$= -392_{10}$

Booth RADIX-4 EXAMPLE | 28 x (-14)

$A = 28_{10} = 011100_2$
$B = -14_{10} = 110010_2$
$2B = -28_{10} = 100100_2$
$-B = 14_{10} = 001110_2$
$-2B = 28_{10} = 011100_2$

000	Do nothing
001	+B
010	+B
011	+2B
100	-2B
101	-B
110	-B
111	Do nothing

```
  000000  011100 0        000  Do nothing
  0000000 0001110         110  shift #1
                               Subtract B
+ 001110
  001110  000111
  000011  1000011              shift #2
                          011  ADD +2B
+ 100100
  100111  100001
                               shift #3
  111001  111000               (Preserve Sign-Bit)
```

Result = $111001111000_2 = -392_{10}$

Booth RADIX-4

B 3 = 0011
A −5 = 0101 = 1010+1 = 1011

−B = 1100+1 = 1101
−2B = 0110 = 1001+1 = 1010

4-bit

```
  0 0 0 0 1 0 1 1 0        -B
  1 1 0 1
  -----------------
  1 1 0 1 1 0 1 1 0
  1 1 1 1 0 1 1 0 1        shift
  1 1 0 1                  -B
  -----------------
  1 1 0 0 0 1 1 0 1
  1 1 1 1 0 0 0 1 1        shift
```

= 0000 1110 + 1 = −15

000	Nothing
001	+B
010	+B
011	+2B
100	−2B
101	−B
110	−B
111	Nothing

B = −20 = 00010100 = 11101011 +1 = 11101100
A = −31   00011111 = 11100000 +1 = 11100001

8 bit

```
  31
  20
  --
  60
 620
```

−B = 20 = 0001 0100
−2B = 40 = 0010 1000

```
    0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 1 0
 +  1 1 1 0 1 1 0 0                      +B
    ---------------------------------
    1 1 1 0 1 1 0 0 1 1 1 0 0 0 0 1
    1 1 1 1 1 0 1 1 0 0 1 1 1 0 0 0 0    shift
    1 1 1 1 1 1 1 0 1 1 0 0 1 1 1 0 0    shift
 +  0 0 1 0 1 0 0 0                      −2B
    ---------------------------------
    0 0 1 0 0 1 1 0 1 1 0 0 1 1 1 0 0
    0 0 0 0 1 0 0 1 1 0 1 1 0 0 1 1 1    shift
    0 0 0 0 0 0 1 0 0 1 1 0 1 1 0 0      shift
```

= 12+96+512 = 620