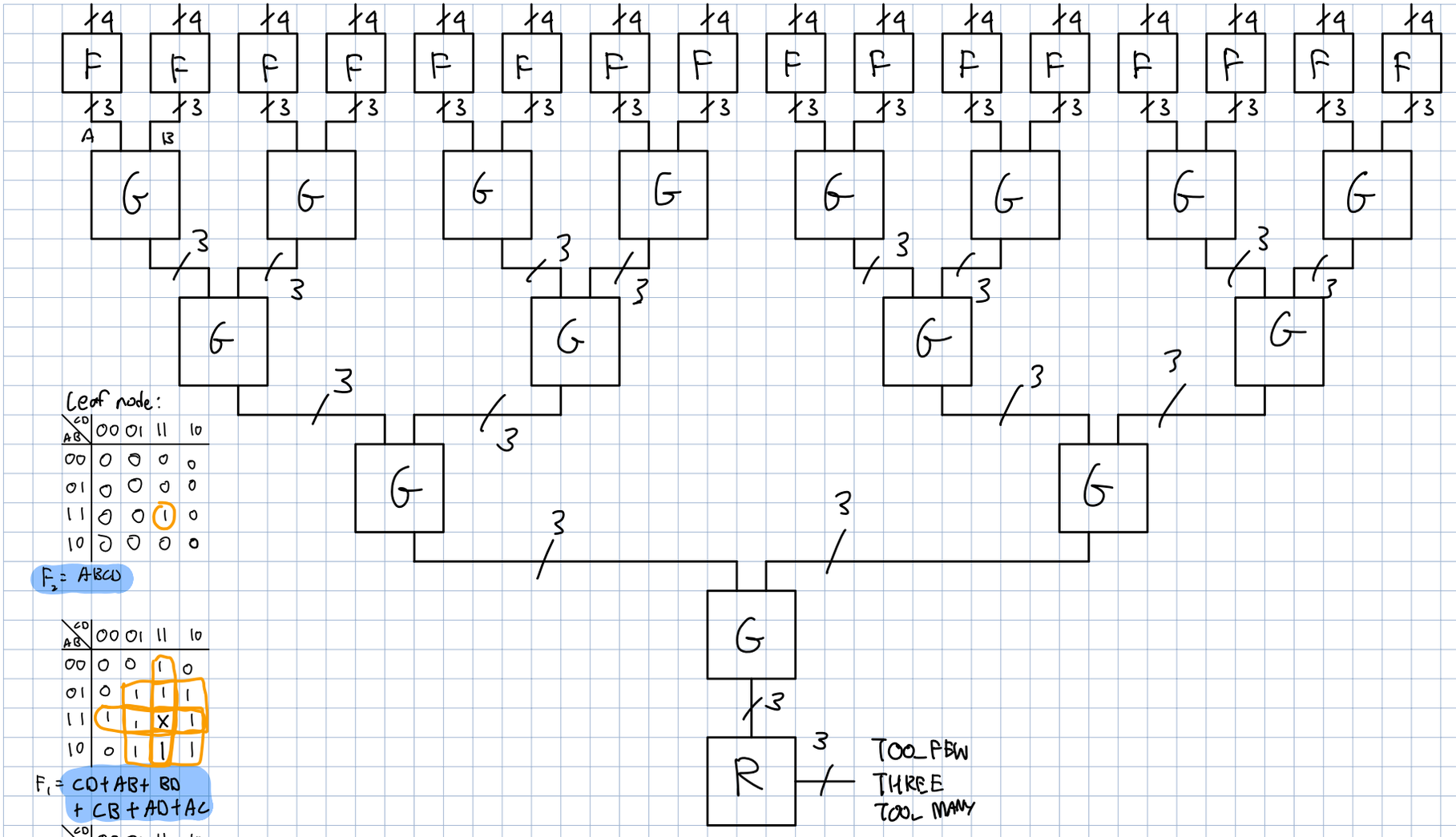

Leaf node:

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	0	1	0
10	0	0	0	0

$F_2 = ABCD$

AB \ CD	00	01	11	10
00	0	0	1	0
01	0	1	1	1
11	1	1	X	1
10	0	1	1	1

$F_1 = C\bar{D} + A\bar{B} + B\bar{D} + C\bar{B} + A\bar{D} + A\bar{C}$

AB \ CD	00	01	11	10
00	0	1	0	1
01	1	0	1	0
11	0	1	X	1
10	1	0	1	0

$F_0 = A \oplus B \oplus C \oplus D$

Internal Nodes : "saturating" adder

Truth table too large, 6 input k-map not feasible to do by hand.

Using an online equation simplifier:
A is left input, B is right input.

$G_2 = B_2 + A_2 + A_1 B_1 + A_0 B_1 B_0 + A_1 A_0 B_0$

$G_1 = B_1 + A_1 + A_0 B_0$

$G_0 = A_0 \oplus B_0$

Root node:

A_2	A_1	A_0	TP	T	TM
0	0	0	1	0	0
0	0	1	1	0	0
0	1	0	1	0	0
0	1	1	0	1	0
1	0	0	0	0	1
1	0	1	0	0	1
1	1	0	0	0	1
1	1	1	0	0	1

THREE = $A_1 A_0$
TOO_FEW = $A_2' A_1' + A_1' A_0'$
TOO_MANY = A_2

5

	±	64	32	16	8	4	2	1
M: 87	87:	0	1	0	1	0	1	1	1
Q: -78	78:	0	1	0	0	1	1	1	0
	-78:	1	0	1	1	0	0	1	0
+M:		0	1	0	1	0	1	1	1
-M:		1	0	1	0	1	0	0	1

Booth:

P	Q	F	
0 0 0 0 0 0 0 0	1 0 1 1 0 0 1 0	0	Init
0 0 0 0 0 0 0 0	1 0 1 1 0 0 1 0	0	+0
0 0 0 0 0 0 0 0	0 1 0 1 1 0 0 1	0	SHFR
1 0 1 0 1 0 0 1	0 1 0 1 1 0 0 1	0	−M
1 1 0 1 0 1 0 0	1 0 1 0 1 1 0 0	1	SHFR
0 0 1 0 1 0 1 1	1 0 1 0 1 1 0 0	1	+M
0 0 0 1 0 1 0 1	1 1 0 1 0 1 1 0	0	SHFR
0 0 0 1 0 1 0 1	1 1 0 1 0 1 1 0	0	+0
0 0 0 0 1 0 1 0	1 1 1 0 1 0 1 1	0	SHFR
0 0 0 0 1 0 1 0	1 1 1 0 1 0 1 1	0	−M
1 1 1 1 0 0 1 0	1 1 1 1 0 1 0 1	1	SHFR
1 1 0 1 1 0 0 1	1 1 1 1 0 1 0 1	1	+0
1 1 0 1 1 0 0 1	1 1 1 1 0 1 0 1	1	SHFR
1 1 1 0 1 1 0 0	1 1 1 1 0 1 0 1	1	+M
0 1 0 0 0 0 1 1	1 1 1 1 0 1 0 1	1	SHFR
0 0 1 0 0 0 0 1	1 1 1 1 1 0 1 0	0	−M
1 1 0 0 1 0 1 0	1 1 1 1 1 0 1 0	0	SHFR
1 1 1 0 0 1 0 1	0 1 1 1 1 1 0 1	1	SHFR

± 2^{14} 2^{13} 2^{12} 2^{11} 2^{10} 2^{9} 2^{8} 2^{7} 2^{6} 2^{5} 2^{4} 2^{3} 2^{2} 2^{1} 2^{0}

0 0 0 1 1 0 1 0 1 0 0 0 0 0 1 0

−6786

+M:	0	0	1	0	1	0	1	1	1
−M:	1	1	0	1	0	1	0	0	1
+2M:	0	1	0	1	0	1	1	1	0
−2M:	1	0	1	0	1	0	0	1	0

Radix 4:

P	Q	F	
0 0 0 0 0 0 0 0 0	1 0 1 1 0 0 1 0	0	Init
1 0 1 0 1 0 0 1 0	1 0 1 1 0 0 1 0	0	−2M
1 1 1 0 1 0 1 0 0	1 0 1 1 0 0 1 0	1	SHFR 2
0 0 0 1 0 1 0 1 1	1 0 1 0 1 1 0 0	1	+M
0 0 0 0 0 1 0 1 0	1 1 1 0 1 0 1 1	0	SHFR 2
1 1 0 1 1 0 0 1 1	1 1 1 0 1 0 1 1	0	−M
1 1 1 1 0 1 1 0 0	1 1 1 1 1 0 1 0	1	SHFR 2
1 1 0 0 1 0 1 0 1	1 1 1 1 1 0 1 0	1	−M
1 1 1 1 0 0 1 0 1	0 1 1 1 1 1 0 1	1	SHFR 2

Same as Booth binary