Carry-Save Addition of Summands

Carry Save Adder The carry save adder seems to be the most useful adder for our application. It is simply a parallel ensemble of k full-adders without any horizontal connection. Its main function is to add three k-bit integers A, B, and C to produce two integers C 0 and S such that
C 0 + S = A + B + C

As an example, let A = 40, B = 25, and C = 20, we compute S and C 0 as shown below:

	1	0	1	1	11
	1	1	0	1	13
+	0	1	0	1	5
The first row			1	1	3
The second row		0	1		2
The third row	1	0			8
The fourth row 1	0				16

It does not really solve our problem of adding two integers and producing a single output. Instead, it adds three integers and produces two such that sum of these two is equal to the sum of three inputs. This method may not be suitable for application which only needs the regular addition.

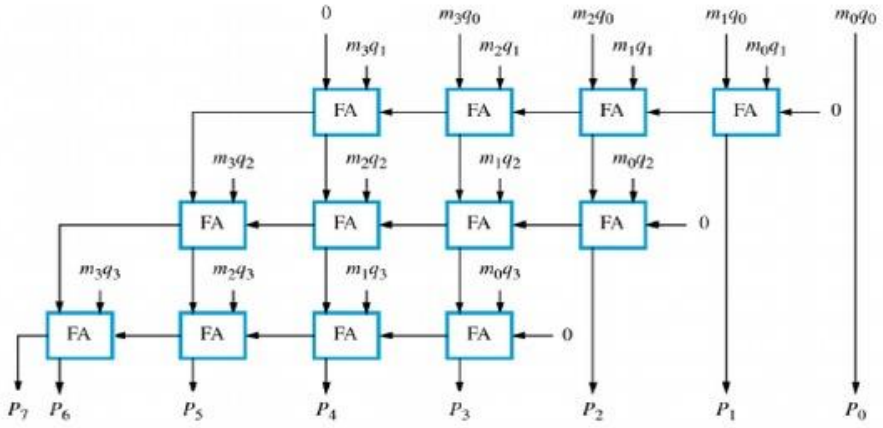
The sign detection is hard: When a number is represented as a carry-save pair (C, S) such that its actual value is C + S, we may not know the exact sign of total sum C + S. Unless the addition is performed in full length, the correct sign may never be determined.

Carry Delayed Adder:
The carry delayed adder is a two-level carry save adder. As we will see in Section 7.3, a certain property of the carry delayed adder can be used to reduce the multiplication complexity. The carry delayed adder produced a pair of integers (D, T), called a carry

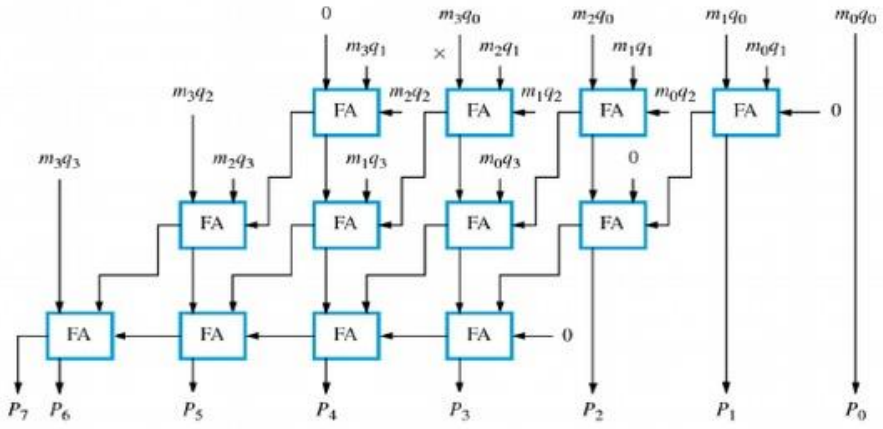
Computer Organization and Architecture
Module 2:: Fast Multiplication

CARRY-SAVE ADDITION OS SUMMANDS

1. Multiplication requires the addition of several summands. A technique called carry-save addition (CSA) can be used to speed up the process.



(a) Ripple-carry array



(b) Carry-save array

Figure 9.16 Ripple-carry and carry-save arrays for a 4 × 4 multiplier.

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