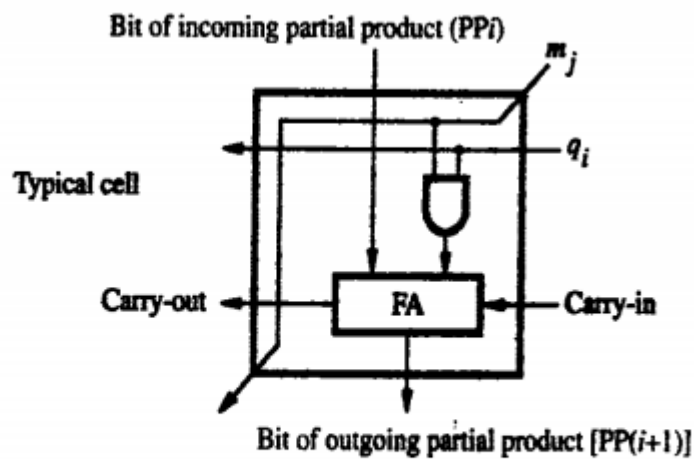
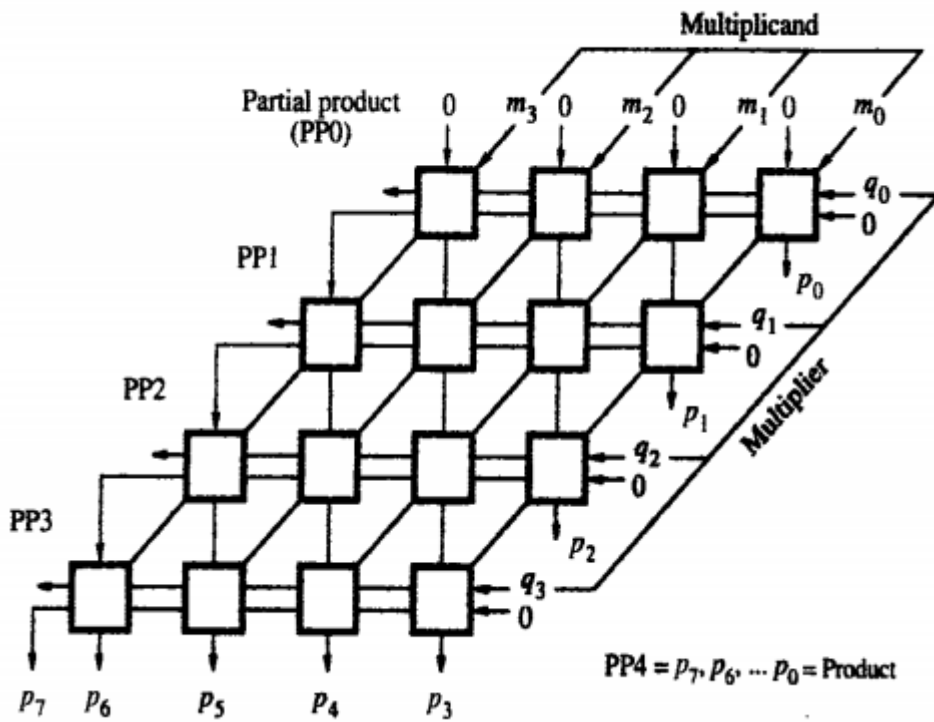


# Multiplication of Positive Numbers

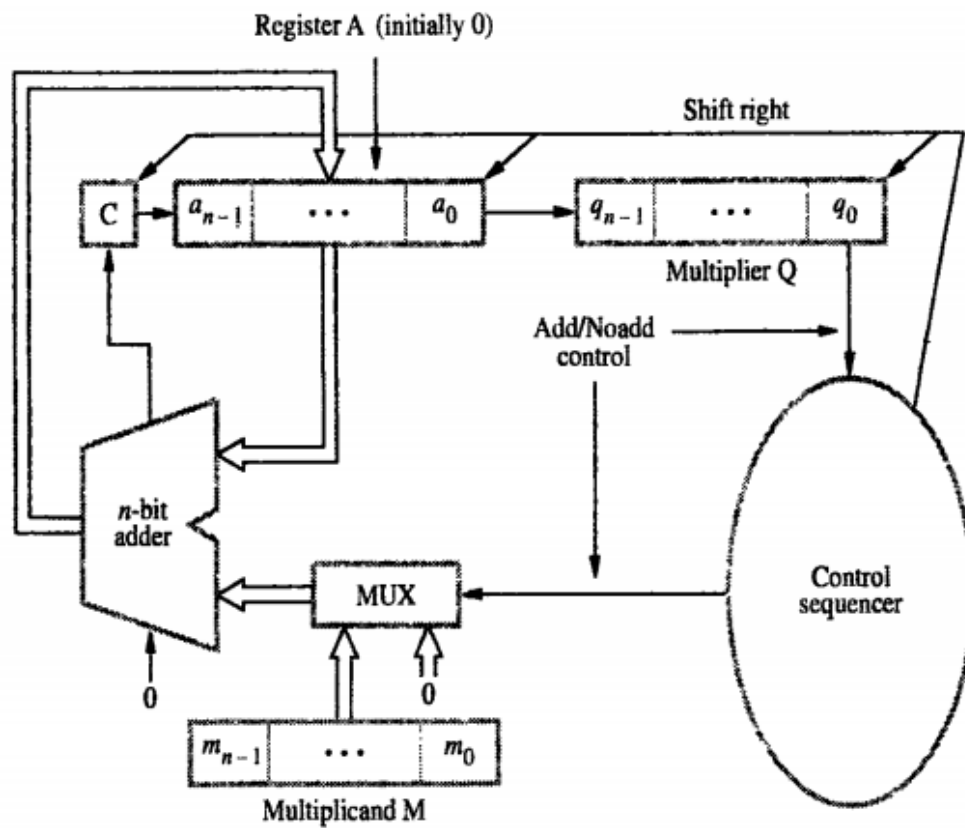
$$\begin{array}{r}
 1101 \quad (13) \text{ Multiplicand } M \\
 \times 1011 \quad (11) \text{ Multiplier } Q \\
 \hline
 1101 \\
 0000 \\
 1101 \\
 1101 \\
 \hline
 10001111 \quad (143) \text{ Product } P
 \end{array}$$

(a) Manual multiplication algorithm



(b) Array implementation

Figure 6.6 Array multiplication of positive binary operands.



(a) Register configuration

	M			
		1 1 0 1		Initial configuration
0	0 0 0 0		1 0 1 1	
C	A		Q	
0	1 1 0 1		1 0 1 1	Add Shift } First cycle
0	0 1 1 0		1 1 0 1	
1	0 0 1 1		1 1 0 1	Add Shift } Second cycle
0	1 0 0 1		1 1 1 0	
0	1 0 0 1		1 1 1 0	No add Shift } Third cycle
0	0 1 0 0		1 1 1 1	
1	0 0 0 1		1 1 1 1	Add Shift } Fourth cycle
0	1 0 0 0		1 1 1 1	
Product				

(b) Multiplication example

Figure 6.7 Sequential circuit binary multiplier.