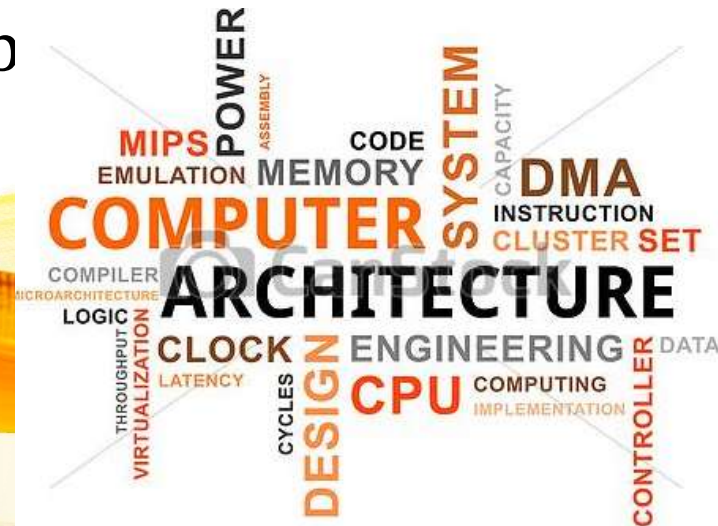


UNIT II

ARITHMETIC OPERATIONS

Addition and subtraction of signed numbers – Design of fast adders – **Multiplication of positive numbers** - Signed operand multiplication- fast multiplication – Integer division – Floating point num



Recap the previous Class

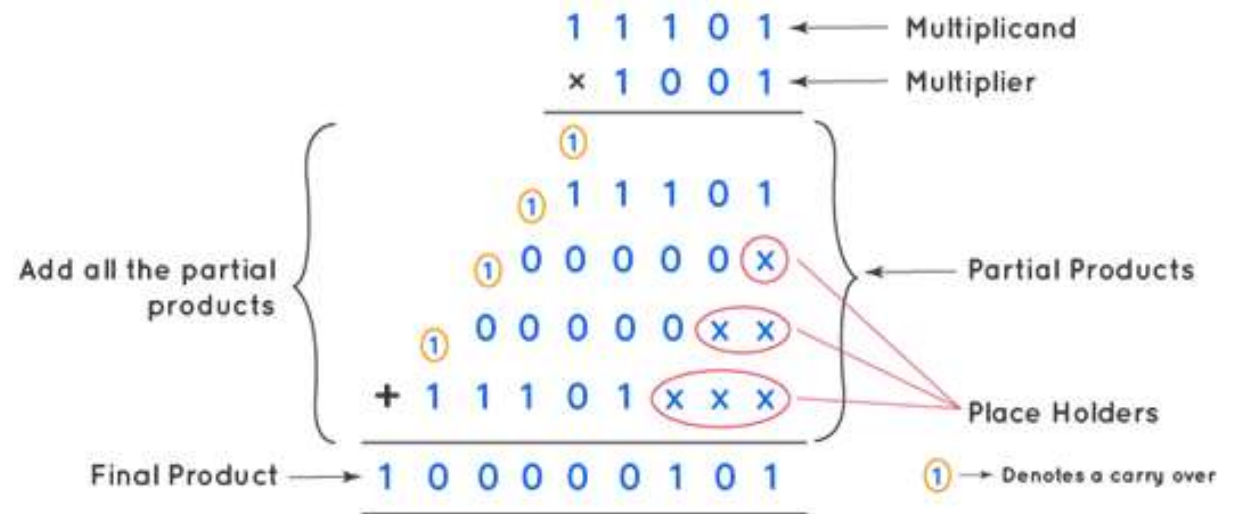


Manual Multiplication Algorithm

BINARY MULTIPLICATION

$$\begin{array}{r}
 1101 \quad (13) \\
 \times 1011 \quad (11) \\
 \hline
 1011 \\
 0000 \\
 1011 \\
 1011 \\
 \hline
 10001111 \quad (143)
 \end{array}$$

Binary multiplication is even easier than decimal, because we have either multiplication by 1 or by 0 in the intermediate sums.



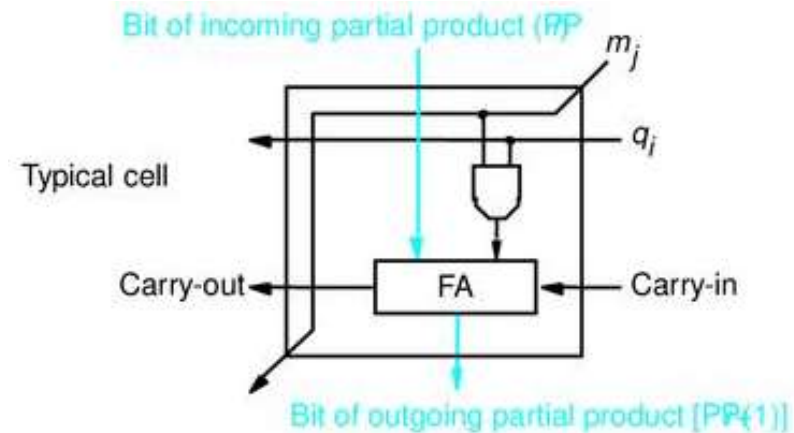
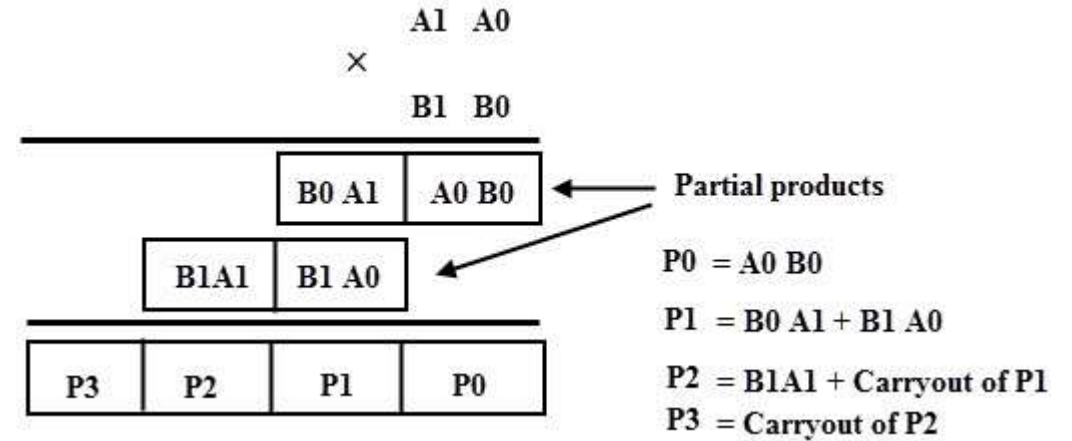
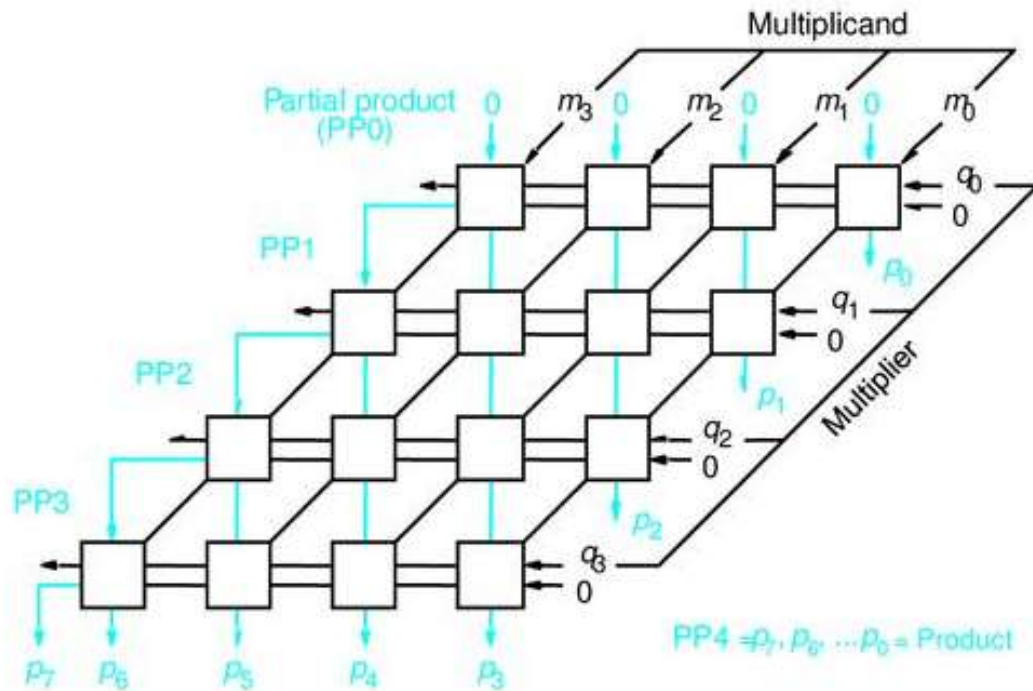
Rules of Binary Multiplication

$0 \times 0 = 0, 0 \times 1 = 0, 1 \times 0 = 0, 1 \times 1 = 1$

Rules of Binary Addition

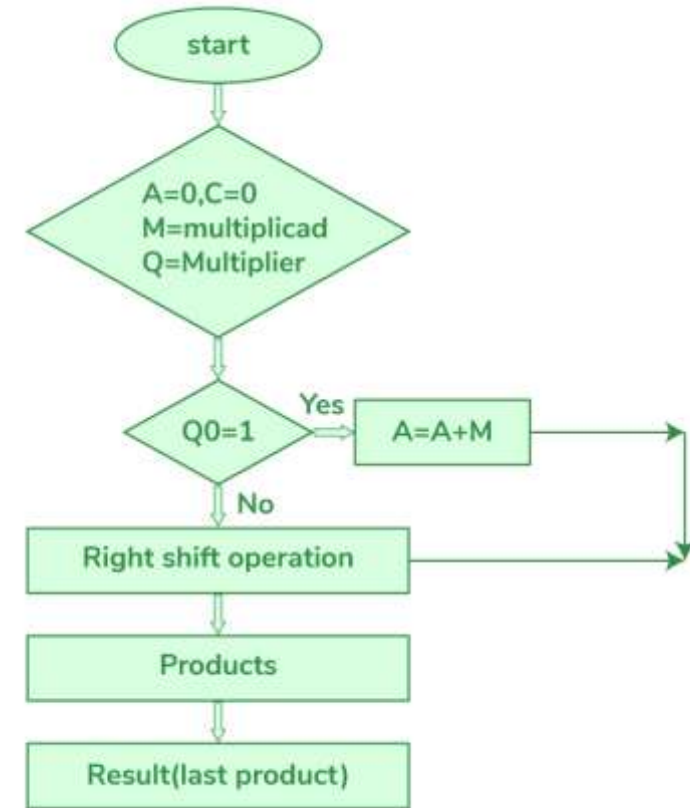
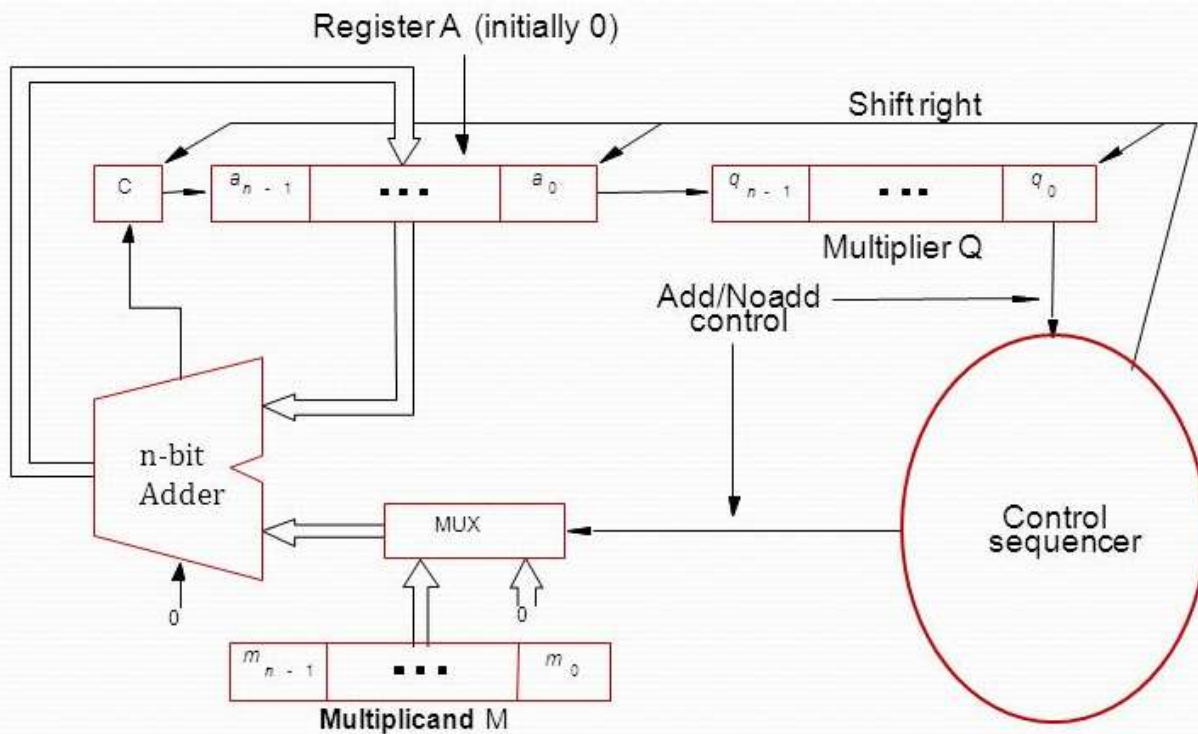
$0 + 0 = 0, 0 + 1 = 1, 1 + 1 = 10, 1 + 1 + 1 = 11$

Array Multiplication of Positive Binary Operands



Sequential Circuit Binary Multiplier

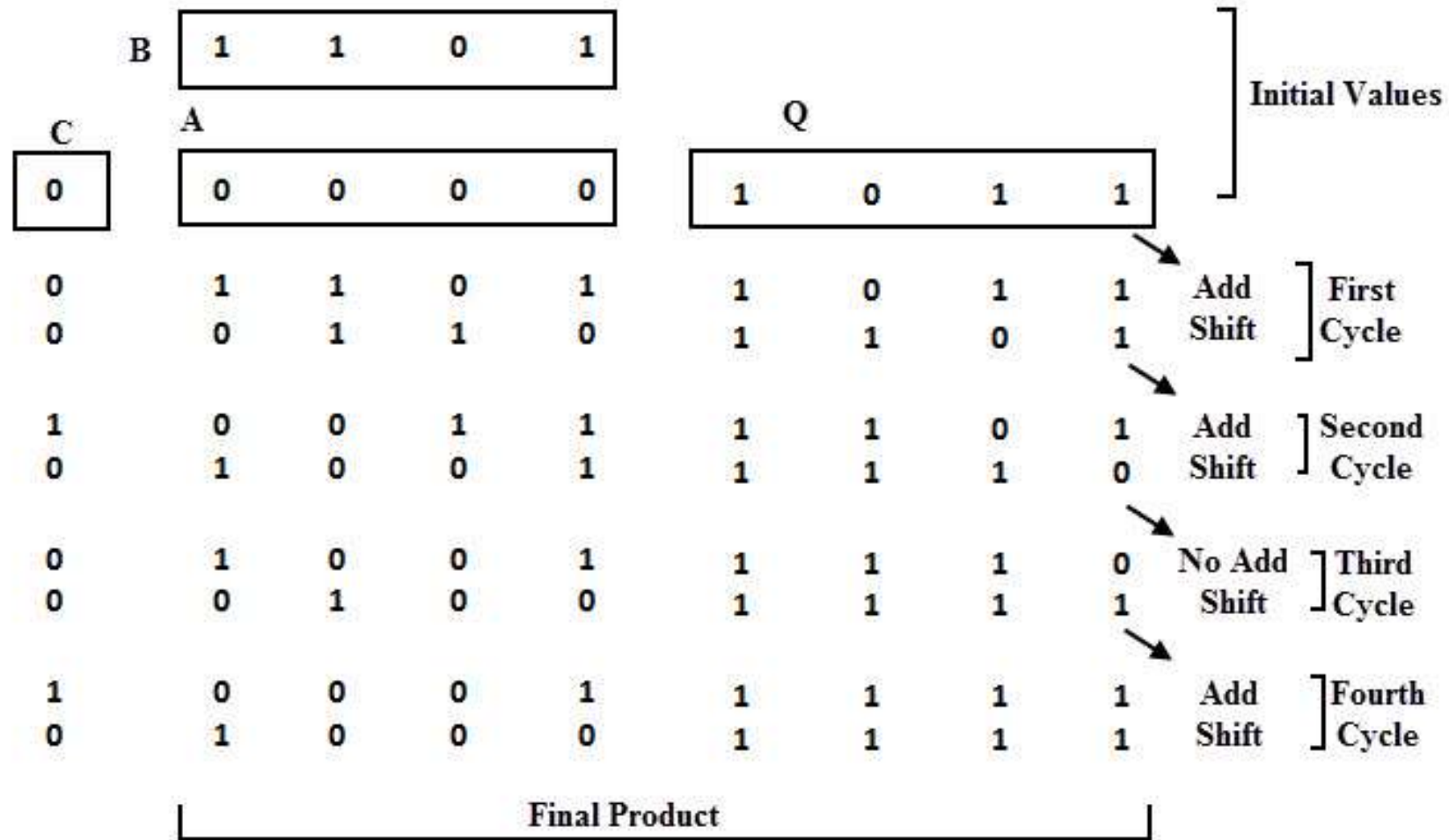
Register Configuration



Sequential Circuit Binary Multiplier

13 X 11
7 X 3

Multiplication Example





sns
INSTITUTIONS



Thank You