Binary Addition of four 4 – Bit Numbers using FULL ADDER

This addition is based on the concept of cumulative sum.

Let the four 4 – bit numbers be as follows,

A -> A3 A2 A1 A0

B -> B3 B2 B1 B0

C -> C3 C2 C1 C0

D -> D3 D2 D1 D0

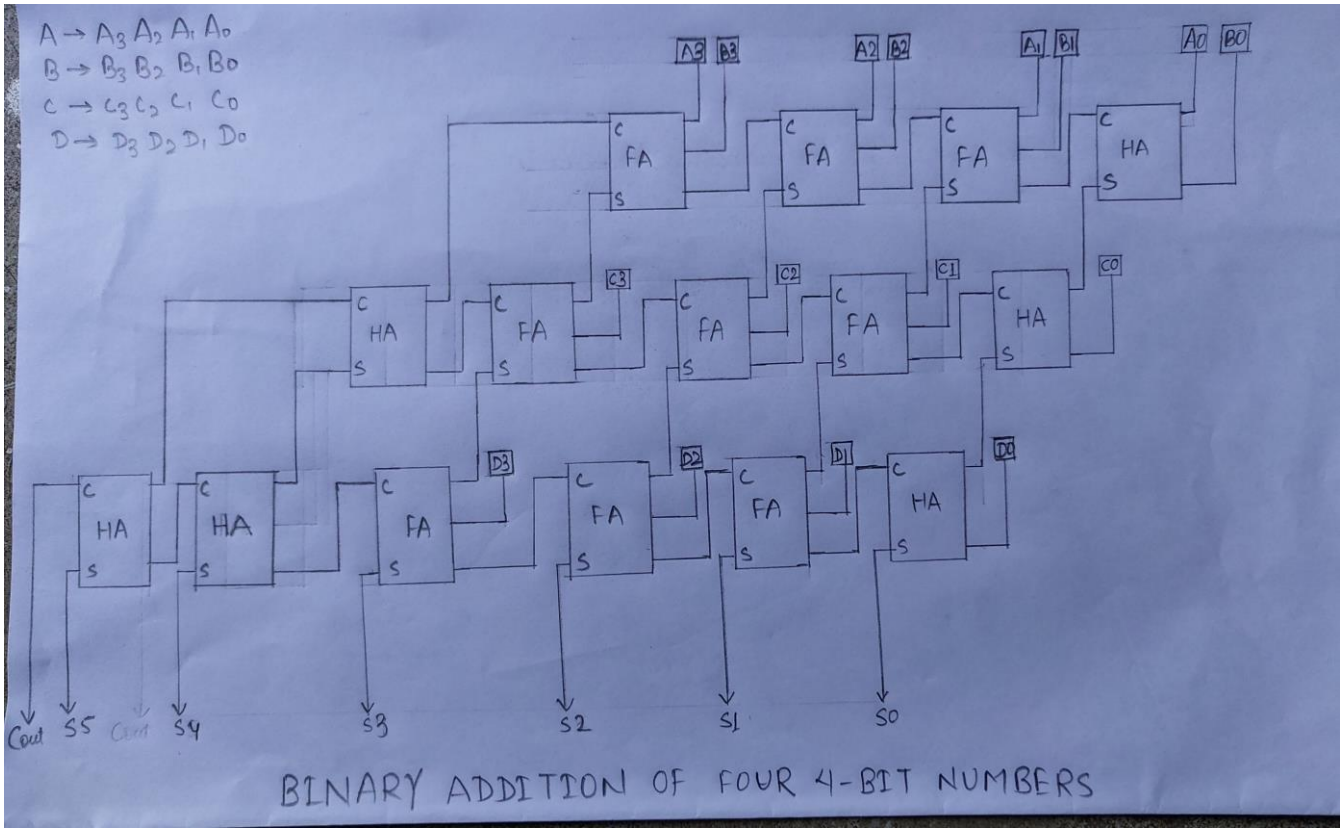
Now we add the two numbers A and B with the technique of Full Adders. And the cumulative sum so obtained is called the **Partition Sum.**

Then the partition sum obtained is again added to the next number C with the same technique.

And we do the same till we add the last number, (in this case it is D).

The outputs of the Full Adders which added the last number with its previous partition sum will be the final output of the circuit.

The following figure shows the circuit diagram for the above.



Let

$$\boldsymbol{A} = (\mathbf{1101})_{\mathbf{2}} = (\mathbf{13})_{\mathbf{10}}$$

$$\boldsymbol{B} = (\mathbf{1111})_{\mathbf{2}} = (\mathbf{15})_{\mathbf{10}}$$

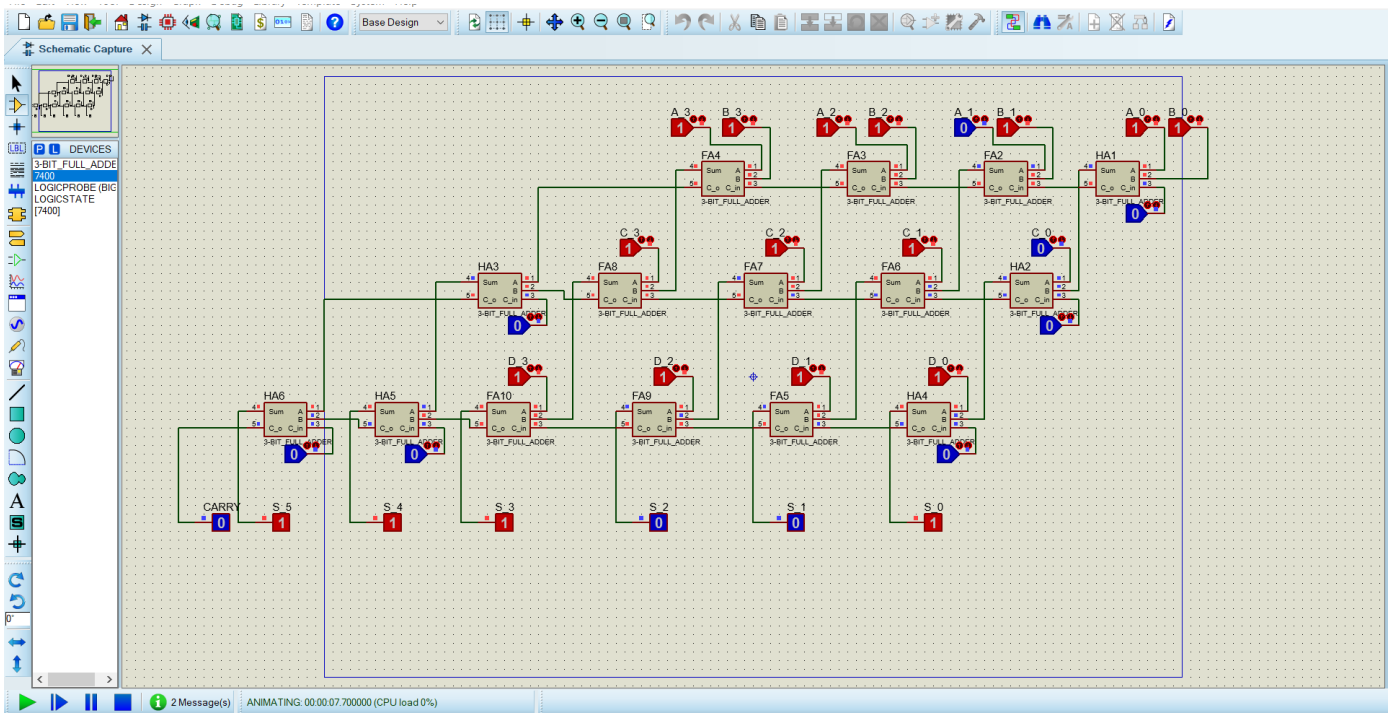
$$\boldsymbol{C} = (\mathbf{1110})_{\mathbf{2}} = (\mathbf{14})_{\mathbf{10}}$$

$$\boldsymbol{D} = (\mathbf{1111})_{\mathbf{2}} = (\mathbf{15})_{\mathbf{10}}$$

So the output should be,

$$\boldsymbol{O/p} = (\mathbf{0111001})_{\mathbf{2}} = (\mathbf{57})_{\mathbf{10}}$$

The following figure shows the implementation of the circuit on PROTEUS software.



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