Let’s say the sampled input signal is equal to 11.2 V ()

The reference voltage of the DAC is equal to 16 V (Vref = 16 V)

Whenever the new conversion starts then the successive approximation register sets the MSB to 1 and all other bits to 0.

That means we can say that the input to the DAC is equal to 1000.

And for a 16 V of the reference voltage, if you see the corresponding output voltage then it will be equal to 8 V, which is just half of the reference voltage.

For **1**000,

8V

Now this voltage will get compared with the input voltage and based on the comparator output, the output of the successive approximation register will get changed.

That means if VA is greater than the DAC output () then the MSB will be kept as it is, and the next bit will be set to 1 for new comparison. 1100

If VA is less than , then the MSB will be set to 0, and the next bit will be set to 1 for the new comparison. 0100

Since () >

**1**100

So now the output of the DAC corresponding to 1100 is equal to .

This voltage will get compared with .

Since () <

So the second bit will be set to 0 and the next bit will be set to 1 for new comparison.

**10**10

So now the input to the DAC is equal to 1010.

And if you see the corresponding output voltage than it is will be equal to 10 V.

So once again this voltage will get compared with the input voltage.

Since () >

So the third bit will be kept as it is, and the next bit will be set to 1 for new comparison.

**101**1

So now the input to the DAC is equal to 1011.

And if you see the corresponding output voltage than it is will be equal to 11 V.

So once again this voltage will get compared with the input voltage.

Since () >

So the fourth bit will be kept as it is.

**1011**

**And finally 1011 will be the output code corresponding to the input voltage.**