

# Assignment 6 : IEC2017047

ANN-2

## QUESTION DESCRIPTION:

Using two input one output X-NOR data , train a Neural Network using Back Propagation Algorithm. Don't use any built in function for Back Propagation. Also explain how you will test the network.

## RESULTS:

Initialisation of hidden layer weights ,hidden layer bias,output layer weights and output layer bias.

```
Initial hidden weights:  
[[0.12985128 0.65470559]  
 [0.66364674 0.76732396]]
```

```
Initial hidden biases:  
[[0.01406569 0.67413631]]
```

```
Initial output weights:  
[0.60727386] [0.19866401]
```

```
Initial output biases:  
[[0.00390657]]
```

Final Values of hidden layer weights ,hidden layer bias,output layer weights , output layer bias and output after training.

```
Final hidden weights:  
[[3.69854568 5.76583652]  
 [3.71500912 5.8462897  ]]
```

```
Final hidden bias:  
[[-5.68100695 -2.43548059]]
```

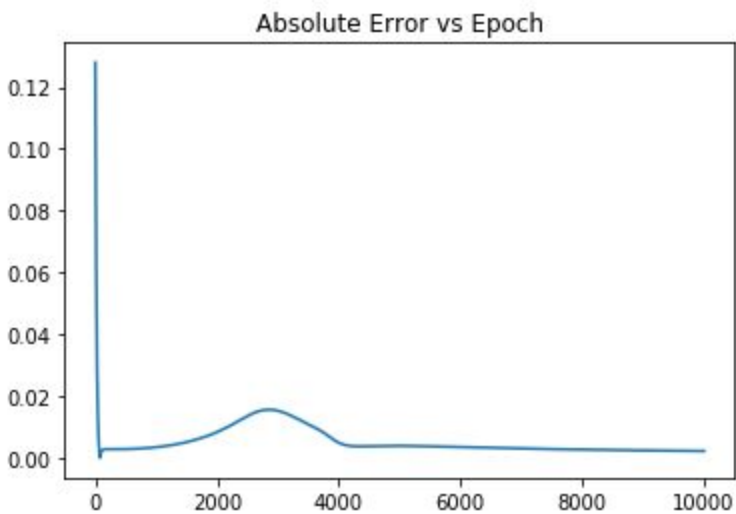
```
Final output weights:  
[[ 8.20335253]  
 [-7.53201389]]
```

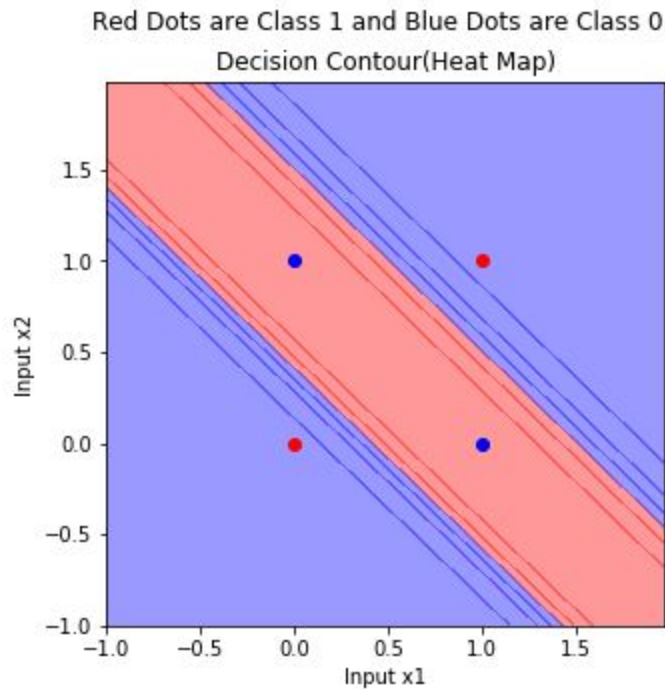
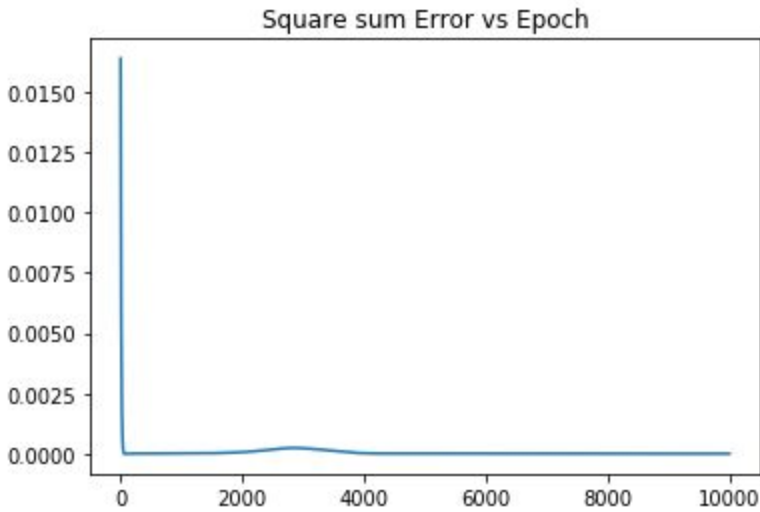
```
Final output bias:  
[[3.38233182]]
```

```
Expected Outputs:  
[[1]  
 [0]  
 [0]  
 [1]]
```

```
Output from neural network after 10,000 epochs:  
[[0.94287734]  
 [0.05208799]  
 [0.05233594]  
 [0.94383649]]
```

## Plots generated





## CONCLUSION:

As we can clearly see that the Output from neural network after 10,000 epochs is  $\begin{bmatrix} 0.94287734 \\ 0.05208799 \\ 0.05233594 \\ 0.94383649 \end{bmatrix}$  which is very close to  $\begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$ . So, we can say that the network is tested and verified. Moreover upon drawing the decision boundary, with

expected output from the weights calculated, we can clearly see that the two classes are properly classified.