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**EXP 16: Write the python program to implement Feed forward neural Network**

**AIM:**

To Write the python program to implement Feed forward neural Network.

**PROGRAM:**

import numpy as np

# Sigmoid activation

def sigmoid(x):

return 1/(1+np.exp(-x))

# Derivative of sigmoid

def sigmoid\_derivative(x):

return x\*(1-x)

# Input dataset

X = np.array([[0,0],[0,1],[1,0],[1,1]])

y = np.array([[0],[1],[1],[0]]) # XOR problem

# Initialize weights randomly

np.random.seed(1)

input\_neurons, hidden\_neurons, output\_neurons = 2, 4, 1

W1 = np.random.rand(input\_neurons, hidden\_neurons)

W2 = np.random.rand(hidden\_neurons, output\_neurons)

# Training (feedforward + backprop)

for epoch in range(10000):

hidden\_input = np.dot(X, W1)

hidden\_output = sigmoid(hidden\_input)

final\_input = np.dot(hidden\_output, W2)

output = sigmoid(final\_input)

error = y - output

d\_output = error \* sigmoid\_derivative(output)

d\_hidden = d\_output.dot(W2.T) \* sigmoid\_derivative(hidden\_output)

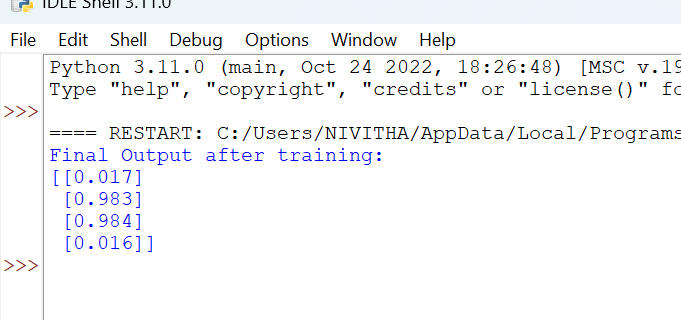
W2 += hidden\_output.T.dot(d\_output)

W1 += X.T.dot(d\_hidden)

print("Final Output after training:")

print(output.round(3))

OUTPUT:



**RESULT:**

Thus, the output is verified Feed forward neural Network.