Name:KALYANAM VENKATA SREE SAI

ID:2000030439

SEC:01

CourseCode:20cs3026RA

In [2]:
```
import numpy as np

class NeuralNetwork():

    def __init__(self):
        np.random.seed(1)

        self.synaptic_weights = 2 * np.random.random((3, 1)) - 1

    def sigmoid(self, x):
        return 1 / (1 + np.exp(-x))

    def sigmoid_derivative(self, x):
        return x * (1 - x)

    def train(self, training_inputs, training_outputs, training_iterations):

        for iteration in range(training_iterations):
            output = self.think(training_inputs)

            error = training_outputs - output

            adjustments = np.dot(training_inputs.T, error * self.sigmoid_derivative(outp

            self.synaptic_weights += adjustments

    def think(self, inputs):
        inputs = inputs.astype(float)
        output = self.sigmoid(np.dot(inputs, self.synaptic_weights))
        return output


if __name__ == "__main__":
    neural_network = NeuralNetwork()

    print("Beginning Randomly Generated Weights: ")
    print(neural_network.synaptic_weights)

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

    training_outputs = np.array([[0,1,1,0]]).T

    neural_network.train(training_inputs, training_outputs, 15000)
```

```
    print("Ending Weights After Training: ")
    print(neural_network.synaptic_weights)

    user_input_one = str(input("User Input One: "))
    user_input_two = str(input("User Input Two: "))
    user_input_three = str(input("User Input Three: "))

    print("Considering New Situation: ", user_input_one, user_input_two, user_input_thre
    print("New Output data: ")
    print(neural_network.think(np.array([user_input_one, user_input_two, user_input_thre
```

```
Beginning Randomly Generated Weights:
[[-0.16595599]
 [ 0.44064899]
 [-0.99977125]]
Ending Weights After Training:
[[10.08740896]
 [-0.20695366]
 [-4.83757835]]
User Input One: 1
User Input Two: 2
User Input Three: 3
Considering New Situation:  1 2 3
New Output data:
[0.00785099]
```

In [ ]: