$LC = 0.5$

1)

The net output of the hidden unit-1 and the actual output of hidden unit-1

Net output of Hidden unit 1 =

$$(0.2 \times 0) + (0.8 \times 1)$$

$$= 0.8$$

Actual output of Hidden unit 1 =

$$\frac{1}{1 + e^{-u}} = \frac{1}{1 + e^{-0.6}}$$

$$= 0.645656$$

$$= 0.6457$$

2)   Net output of hidden unit 2 =

$$(0.3 \times 0) + (0.9 \times 1)$$

$$0.9$$

Actual dp of Hidden unit 2 =

$$\frac{1}{1 + e^{-0.9}} = 0.7109419$$

$$= 0.7109$$

3.) Net of output unit 1 =

$$(0.5 \times 0.6457) + (0.8 \times 0.7109)$$

$$= 0.89157$$

$$= 0.8916$$

Actual o/p of output unit 1 =

$$\frac{1}{1+e^{-n}} = \frac{1}{1+e^{-0.8916}}$$

$$= 0.70922$$

$$= 0.7092$$

4.) Net o/p of o/p. 2 = $(0.7 \times 0.6457) +$

$$(0.1 \times 0.7109)$$

$$= 0.52308$$

$$= 0.5231$$

Actual o/p = $\frac{1}{1+e^{-(0.5231)}} = 0.627892$

$$= 0.6279$$

5.) Delta of o/p unit 1 = $(T-A)A(1-A)$

$$= (0 - 0.7092) \, 0.7092$$

$$(1 - 0.7092)$$

$$= -0.146262$$

$$= -0.1463$$

Delta of o/p unit 2

$$(T-A) A (1-A)$$

$$= (1 - 0.9279) 0.6279 (1 - 0.6279)$$

$$= 0.086938$$

$$= 0.0869$$

6.) updated weight of o.8

$$= 0.8 + (LLC * \delta op_1 \times Act \, n_2)$$

$$= 0.8 + (0.5 \times -0.1463 \times 0.7109):$$

$$= 0.747299$$

$$= 0.7480$$

7.) Updated weight of 0.7

$$= 0.7 + (LLC \times \delta op_2 \times Act \, n_1)$$

$$= 0.7 + (0.5 \times 0.0869 \times 0.6457)$$

$$= 0.7280555$$

$$= 0.7281$$

8.) Delta of hidden unit 1 =

$$(0.5 \times \delta op_1 \cdot 0.4 \times \delta o_2) * Act_1 (1 - Act_1)$$

$$= ((0.5 \times -0.1463) + (0.7 \times 0.0869)) * 0.6457$$

$$(1 - 0.6457)$$

$$= -2.81946 \times 10^{-3}$$

$$= -0.0028818 \approx -0.0028$$

9.) Updated weight of 0.2

$$= 0.2 + a \cdot c * \delta u_1 * input\ 1)$$

$$= 0.2 + (0.5 + -0.0028 * 0)$$

$$= 0.2.$$

10.) Updated weight of 0.92

$$0.9 + (L \cdot c * \delta u_2 * input\ 4)$$

$$\delta u_2 = (0.8 * \delta_{01} + 0.1 * \delta_{02}) * Act_2 (1 - Act_2)$$

$$= ((0.8 \times -0.1463) + (0.1 * 0.0869)) * 0.7109$$

$$(1 - 0.7109)$$

$$= -0.02226 \approx 0.0223$$

$$\rightarrow 0.9 = 0.9 + (0.5 * -0.0223 * 1)$$

$$= 0.88885 \approx 0.8889.$$

① Epoch-1   Epoch 2

input	output	initial weights	Actual output	updated weights	initial
(0,0)	0	(0.4,0.8)	0	0.4,0.8	1.0,1.4
0 1	1	0.4,0.8	6	0.4,1.1	1.0,1.4
1 0	1	0.4,1.1	6	0.7,1.1	1.0,1.7
1 1	0	0.7,1.1	0	1.0,1.4	1.3,1.7

Actual o/p	updated weights
0	1.0,1.4
0	1.0,1.7
6	1.3,1.7
1	1.3,1.7

Epoch 3

initial	Actual	final
1.3,1.7	0	1.3,1.7
1.3,1.7	0	1.3,2.0
1.3,2.0	0	1.6,2.0
1.6,2.0	1	1.6,2.0

Epoch-4

initial	Actual	final
1.6,2.0	0	1.6,2.0
1.6,2.6	0	1.9,2.0
1.9,2.0	0	1.9,2.3
1.9,2.3	1	1.9,2.3

Epoch-5

initial	Actual	Final
1.9,2.3	0	(1.9,2.3)
1.9,2.3	0	1.9,2.6
1.9,2.6	0	2.2,2.6
2.2,2.6	1	2.2,2.6

Epoch-6

initial	Actual	Final
2.2,2.6	0	2.2,2.6
2.2,2.6	1	2.2,2.6
2.2,2.6	0	2.5,2.6
2.5,2.6	1	2.5,2.6

Epoch-7

initial	Actual	Final
2.5,2.6	0	2.5,2.6
2.5,2.6	1	2.5,2.6
2.5,2.6	1	2.5,2.6
2.5,2.6	1	2.5,2.6