```
import numpy as np
import matplotlib. pyplot as plt
```

```
x=np.array([[0,0,1,1],[0,1,0,1]])
y=np. array([[0,1,1,0]])
n_x=2
n_y=1
n_h=2
m = x.shape [1]
lr=0.1
np.random.seed(2)
w1 = np.random.rand (n_h, n_x)
w2 = np.random.rand (n_y, n_h)
losses = []
```

```
def sigmoid(z):
  z= 1/(1+np.exp(-z))
  return z
```

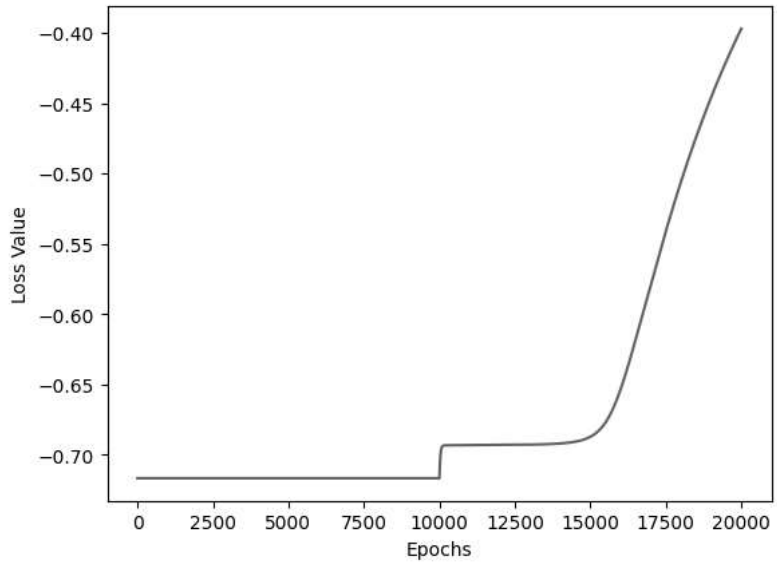
```
def forward_prop (w1,w2,x):
  z1 = np.dot (w1,x)
  a1 = sigmoid (z1)
  z2 = np.dot (w2, a1)
  a2 = sigmoid(z2)
  return z1,a1, z2,a2
```

```
def back_prop (m, w1,w2, z1,a1, z2, a2, y):
  dz2 = a2-y
  dw2 = np.dot (dz2, a1.T)/m
  dz1 = np.dot (w2.T, dz2) * a1*(1-a1)
  dw1 = np.dot (dz1, x . T)/m
  dw1 = np.reshape (dw1,w1.shape)
  dw2 = np.reshape (dw2,w2.shape)
  return dz2, dw2, dz1, dw1
```

```
iterations = 10000
for i in range (iterations):
  z1,a1, z2,a2 = forward_prop (w1,w2,x)
  loss = (1/m) *np. sum(y*np.log(a2)+(1-y)*np.log(1-a2))
  losses.append(loss)
  da2, dw2, dz1, dw1 = back_prop (m, w1,w2, z1, a1, z2,a2,y)
  w2 = w2-lr*dw2
  w1 = w1-lr*dw1
```

```
plt.plot(losses)
plt.xlabel("Epochs")
plt.ylabel("Loss Value")
```

```
Text(0, 0.5, 'Loss Value')
```



+ Code + Text

```
def predict (w1,w2, input):
  z1,a1,z2,a2 = forward_prop(w1,w2,test)
  a2 = np.squeeze(a2)
  if a2>=0.5:
```