

```
In [ ]: import tensorflow as tf  
import numpy as np  
import matplotlib.pyplot as plt
```

```
In [ ]: x = np.array([  
                    np.array([0,0,0]),  
                    np.array([0,0,1]),  
                    np.array([0,1,0]),  
                    np.array([0,1,1]),  
                    np.array([1,0,0]),  
                    np.array([1,0,1]),  
                    np.array([1,1,0]),  
                    np.array([1,1,1]),  
                  ])  
y = np.array([[0],[1],[1],[0],[1],[0],[0],[1]])
```

```
In [ ]: inp_layer = tf.keras.Input(shape=(3,))  
hid_layer = tf.keras.layers.Dense(2,activation="sigmoid")  
out_layer = tf.keras.layers.Dense(1,activation="sigmoid")  
model = tf.keras.Sequential([inp_layer,hid_layer,out_layer])  
model.compile(optimizer=tf.keras.optimizers.Adam(learning_rate=0.05)  
              ,loss=tf.keras.losses.BinaryCrossentropy()  
              ,metrics="accuracy")  
model.summary()
```

Model: "sequential_15"

Layer (type)	Output Shape	Param #
=====		
dense_31 (Dense)	(None, 2)	8
dense_32 (Dense)	(None, 1)	3

=====

Total params: 11

Trainable params: 11

Non-trainable params: 0

In []: model.fit(x,y,epochs=350)

Epoch 1/350
1/1 [=====] - 0s 415ms/step - loss: 0.6977 - accuracy: 0.5000
Epoch 2/350
1/1 [=====] - 0s 7ms/step - loss: 0.6938 - accuracy: 0.5000
Epoch 3/350
1/1 [=====] - 0s 10ms/step - loss: 0.6936 - accuracy: 0.5000
Epoch 4/350
1/1 [=====] - 0s 9ms/step - loss: 0.6947 - accuracy: 0.5000
Epoch 5/350
1/1 [=====] - 0s 8ms/step - loss: 0.6949 - accuracy: 0.5000
Epoch 6/350
1/1 [=====] - 0s 7ms/step - loss: 0.6943 - accuracy: 0.5000
Epoch 7/350
1/1 [=====] - 0s 10ms/step - loss: 0.6935 - accuracy: 0.6250
Epoch 8/350
1/1 [=====] - 0s 11ms/step - loss: 0.6931 - accuracy: 0.3750
Epoch 9/350
1/1 [=====] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.3750
Epoch 10/350
1/1 [=====] - 0s 6ms/step - loss: 0.6934 - accuracy: 0.5000
Epoch 11/350
1/1 [=====] - 0s 7ms/step - loss: 0.6936 - accuracy: 0.5000
Epoch 12/350
1/1 [=====] - 0s 5ms/step - loss: 0.6936 - accuracy: 0.5000
Epoch 13/350
1/1 [=====] - 0s 9ms/step - loss: 0.6934 - accuracy: 0.5000
Epoch 14/350
1/1 [=====] - 0s 5ms/step - loss: 0.6931 - accuracy: 0.5000
Epoch 15/350
1/1 [=====] - 0s 5ms/step - loss: 0.6929 - accuracy: 0.5000
Epoch 16/350
1/1 [=====] - 0s 8ms/step - loss: 0.6929 - accuracy: 0.5000
Epoch 17/350
1/1 [=====] - 0s 5ms/step - loss: 0.6930 - accuracy: 0.6250
Epoch 18/350
1/1 [=====] - 0s 5ms/step - loss: 0.6931 - accuracy: 0.5000
Epoch 19/350
1/1 [=====] - 0s 19ms/step - loss: 0.6931 - accuracy: 0.5000
Epoch 20/350
1/1 [=====] - 0s 8ms/step - loss: 0.6930 - accuracy: 0.5000
Epoch 21/350
1/1 [=====] - 0s 7ms/step - loss: 0.6929 - accuracy: 0.5000
Epoch 22/350

1/1 [=====] - 0s 11ms/step - loss: 0.6928 - accuracy: 0.6250
Epoch 23/350
1/1 [=====] - 0s 7ms/step - loss: 0.6927 - accuracy: 0.6250
Epoch 24/350
1/1 [=====] - 0s 5ms/step - loss: 0.6928 - accuracy: 0.6250
Epoch 25/350
1/1 [=====] - 0s 5ms/step - loss: 0.6928 - accuracy: 0.3750
Epoch 26/350
1/1 [=====] - 0s 6ms/step - loss: 0.6928 - accuracy: 0.3750
Epoch 27/350
1/1 [=====] - 0s 6ms/step - loss: 0.6928 - accuracy: 0.3750
Epoch 28/350
1/1 [=====] - 0s 6ms/step - loss: 0.6927 - accuracy: 0.5000
Epoch 29/350
1/1 [=====] - 0s 7ms/step - loss: 0.6926 - accuracy: 0.6250
Epoch 30/350
1/1 [=====] - 0s 12ms/step - loss: 0.6926 - accuracy: 0.6250
Epoch 31/350
1/1 [=====] - 0s 5ms/step - loss: 0.6925 - accuracy: 0.6250
Epoch 32/350
1/1 [=====] - 0s 5ms/step - loss: 0.6925 - accuracy: 0.6250
Epoch 33/350
1/1 [=====] - 0s 5ms/step - loss: 0.6925 - accuracy: 0.6250
Epoch 34/350
1/1 [=====] - 0s 5ms/step - loss: 0.6924 - accuracy: 0.6250
Epoch 35/350
1/1 [=====] - 0s 12ms/step - loss: 0.6924 - accuracy: 0.6250
Epoch 36/350
1/1 [=====] - 0s 6ms/step - loss: 0.6923 - accuracy: 0.6250
Epoch 37/350
1/1 [=====] - 0s 5ms/step - loss: 0.6922 - accuracy: 0.7500
Epoch 38/350
1/1 [=====] - 0s 5ms/step - loss: 0.6921 - accuracy: 0.6250
Epoch 39/350
1/1 [=====] - 0s 5ms/step - loss: 0.6921 - accuracy: 0.6250
Epoch 40/350
1/1 [=====] - 0s 5ms/step - loss: 0.6920 - accuracy: 0.6250
Epoch 41/350
1/1 [=====] - 0s 7ms/step - loss: 0.6919 - accuracy: 0.6250
Epoch 42/350
1/1 [=====] - 0s 5ms/step - loss: 0.6917 - accuracy: 0.6250
Epoch 43/350
1/1 [=====] - 0s 5ms/step - loss: 0.6916 - accuracy: 0.7500

Epoch 44/350
1/1 [=====] - 0s 5ms/step - loss: 0.6915 - accuracy: 0.7500
Epoch 45/350
1/1 [=====] - 0s 5ms/step - loss: 0.6913 - accuracy: 0.7500
Epoch 46/350
1/1 [=====] - 0s 5ms/step - loss: 0.6912 - accuracy: 0.7500
Epoch 47/350
1/1 [=====] - 0s 5ms/step - loss: 0.6910 - accuracy: 0.7500
Epoch 48/350
1/1 [=====] - 0s 5ms/step - loss: 0.6907 - accuracy: 0.7500
Epoch 49/350
1/1 [=====] - 0s 8ms/step - loss: 0.6905 - accuracy: 0.7500
Epoch 50/350
1/1 [=====] - 0s 6ms/step - loss: 0.6902 - accuracy: 0.7500
Epoch 51/350
1/1 [=====] - 0s 6ms/step - loss: 0.6899 - accuracy: 0.7500
Epoch 52/350
1/1 [=====] - 0s 5ms/step - loss: 0.6895 - accuracy: 0.7500
Epoch 53/350
1/1 [=====] - 0s 5ms/step - loss: 0.6891 - accuracy: 0.7500
Epoch 54/350
1/1 [=====] - 0s 12ms/step - loss: 0.6886 - accuracy: 0.7500
Epoch 55/350
1/1 [=====] - 0s 5ms/step - loss: 0.6881 - accuracy: 0.7500
Epoch 56/350
1/1 [=====] - 0s 5ms/step - loss: 0.6875 - accuracy: 0.7500
Epoch 57/350
1/1 [=====] - 0s 5ms/step - loss: 0.6868 - accuracy: 0.7500
Epoch 58/350
1/1 [=====] - 0s 5ms/step - loss: 0.6861 - accuracy: 0.7500
Epoch 59/350
1/1 [=====] - 0s 5ms/step - loss: 0.6852 - accuracy: 0.7500
Epoch 60/350
1/1 [=====] - 0s 7ms/step - loss: 0.6843 - accuracy: 0.7500
Epoch 61/350
1/1 [=====] - 0s 6ms/step - loss: 0.6832 - accuracy: 0.7500
Epoch 62/350
1/1 [=====] - 0s 6ms/step - loss: 0.6820 - accuracy: 0.7500
Epoch 63/350
1/1 [=====] - 0s 5ms/step - loss: 0.6807 - accuracy: 0.7500
Epoch 64/350
1/1 [=====] - 0s 6ms/step - loss: 0.6792 - accuracy: 0.7500
Epoch 65/350

1/1 [=====] - 0s 8ms/step - loss: 0.6776 - accuracy: 0.7500
Epoch 66/350
1/1 [=====] - 0s 6ms/step - loss: 0.6758 - accuracy: 0.7500
Epoch 67/350
1/1 [=====] - 0s 6ms/step - loss: 0.6738 - accuracy: 0.7500
Epoch 68/350
1/1 [=====] - 0s 10ms/step - loss: 0.6716 - accuracy: 0.7500
Epoch 69/350
1/1 [=====] - 0s 8ms/step - loss: 0.6692 - accuracy: 0.7500
Epoch 70/350
1/1 [=====] - 0s 8ms/step - loss: 0.6666 - accuracy: 0.7500
Epoch 71/350
1/1 [=====] - 0s 16ms/step - loss: 0.6638 - accuracy: 0.7500
Epoch 72/350
1/1 [=====] - 0s 17ms/step - loss: 0.6607 - accuracy: 0.7500
Epoch 73/350
1/1 [=====] - 0s 14ms/step - loss: 0.6573 - accuracy: 0.7500
Epoch 74/350
1/1 [=====] - 0s 13ms/step - loss: 0.6537 - accuracy: 0.7500
Epoch 75/350
1/1 [=====] - 0s 14ms/step - loss: 0.6498 - accuracy: 0.7500
Epoch 76/350
1/1 [=====] - 0s 17ms/step - loss: 0.6456 - accuracy: 0.7500
Epoch 77/350
1/1 [=====] - 0s 9ms/step - loss: 0.6410 - accuracy: 0.7500
Epoch 78/350
1/1 [=====] - 0s 8ms/step - loss: 0.6360 - accuracy: 0.7500
Epoch 79/350
1/1 [=====] - 0s 11ms/step - loss: 0.6307 - accuracy: 0.7500
Epoch 80/350
1/1 [=====] - 0s 10ms/step - loss: 0.6249 - accuracy: 0.7500
Epoch 81/350
1/1 [=====] - 0s 10ms/step - loss: 0.6186 - accuracy: 0.7500
Epoch 82/350
1/1 [=====] - 0s 10ms/step - loss: 0.6119 - accuracy: 0.7500
Epoch 83/350
1/1 [=====] - 0s 9ms/step - loss: 0.6047 - accuracy: 0.7500
Epoch 84/350
1/1 [=====] - 0s 6ms/step - loss: 0.5971 - accuracy: 0.7500
Epoch 85/350
1/1 [=====] - 0s 7ms/step - loss: 0.5891 - accuracy: 0.7500
Epoch 86/350
1/1 [=====] - 0s 8ms/step - loss: 0.5809 - accuracy: 0.7500

Epoch 87/350
1/1 [=====] - 0s 7ms/step - loss: 0.5724 - accuracy: 0.7500
Epoch 88/350
1/1 [=====] - 0s 9ms/step - loss: 0.5637 - accuracy: 0.7500
Epoch 89/350
1/1 [=====] - 0s 7ms/step - loss: 0.5548 - accuracy: 0.7500
Epoch 90/350
1/1 [=====] - 0s 15ms/step - loss: 0.5457 - accuracy: 0.7500
Epoch 91/350
1/1 [=====] - 0s 7ms/step - loss: 0.5366 - accuracy: 0.7500
Epoch 92/350
1/1 [=====] - 0s 5ms/step - loss: 0.5274 - accuracy: 0.8750
Epoch 93/350
1/1 [=====] - 0s 10ms/step - loss: 0.5182 - accuracy: 0.8750
Epoch 94/350
1/1 [=====] - 0s 7ms/step - loss: 0.5090 - accuracy: 0.8750
Epoch 95/350
1/1 [=====] - 0s 8ms/step - loss: 0.4998 - accuracy: 0.8750
Epoch 96/350
1/1 [=====] - 0s 15ms/step - loss: 0.4908 - accuracy: 0.8750
Epoch 97/350
1/1 [=====] - 0s 10ms/step - loss: 0.4819 - accuracy: 0.8750
Epoch 98/350
1/1 [=====] - 0s 7ms/step - loss: 0.4733 - accuracy: 0.8750
Epoch 99/350
1/1 [=====] - 0s 9ms/step - loss: 0.4649 - accuracy: 0.8750
Epoch 100/350
1/1 [=====] - 0s 10ms/step - loss: 0.4567 - accuracy: 0.8750
Epoch 101/350
1/1 [=====] - 0s 11ms/step - loss: 0.4489 - accuracy: 0.8750
Epoch 102/350
1/1 [=====] - 0s 9ms/step - loss: 0.4414 - accuracy: 0.8750
Epoch 103/350
1/1 [=====] - 0s 17ms/step - loss: 0.4342 - accuracy: 0.8750
Epoch 104/350
1/1 [=====] - 0s 11ms/step - loss: 0.4273 - accuracy: 0.8750
Epoch 105/350
1/1 [=====] - 0s 10ms/step - loss: 0.4207 - accuracy: 0.8750
Epoch 106/350
1/1 [=====] - 0s 18ms/step - loss: 0.4144 - accuracy: 0.8750
Epoch 107/350
1/1 [=====] - 0s 11ms/step - loss: 0.4085 - accuracy: 0.8750
Epoch 108/350

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1/1 [=====] - 0s 10ms/step - loss: 0.4028 - accuracy: 0.8750
Epoch 109/350
1/1 [=====] - 0s 6ms/step - loss: 0.3975 - accuracy: 0.8750
Epoch 110/350
1/1 [=====] - 0s 7ms/step - loss: 0.3925 - accuracy: 0.8750
Epoch 111/350
1/1 [=====] - 0s 6ms/step - loss: 0.3877 - accuracy: 0.8750
Epoch 112/350
1/1 [=====] - 0s 9ms/step - loss: 0.3832 - accuracy: 0.8750
Epoch 113/350
1/1 [=====] - 0s 7ms/step - loss: 0.3789 - accuracy: 0.8750
Epoch 114/350
1/1 [=====] - 0s 7ms/step - loss: 0.3749 - accuracy: 0.8750
Epoch 115/350
1/1 [=====] - 0s 7ms/step - loss: 0.3712 - accuracy: 0.8750
Epoch 116/350
1/1 [=====] - 0s 12ms/step - loss: 0.3676 - accuracy: 0.8750
Epoch 117/350
1/1 [=====] - 0s 6ms/step - loss: 0.3643 - accuracy: 0.8750
Epoch 118/350
1/1 [=====] - 0s 6ms/step - loss: 0.3611 - accuracy: 0.8750
Epoch 119/350
1/1 [=====] - 0s 7ms/step - loss: 0.3581 - accuracy: 0.8750
Epoch 120/350
1/1 [=====] - 0s 7ms/step - loss: 0.3553 - accuracy: 0.8750
Epoch 121/350
1/1 [=====] - 0s 6ms/step - loss: 0.3527 - accuracy: 0.8750
Epoch 122/350
1/1 [=====] - 0s 11ms/step - loss: 0.3502 - accuracy: 0.8750
Epoch 123/350
1/1 [=====] - 0s 6ms/step - loss: 0.3478 - accuracy: 0.8750
Epoch 124/350
1/1 [=====] - 0s 7ms/step - loss: 0.3456 - accuracy: 0.8750
Epoch 125/350
1/1 [=====] - 0s 14ms/step - loss: 0.3435 - accuracy: 0.8750
Epoch 126/350
1/1 [=====] - 0s 8ms/step - loss: 0.3415 - accuracy: 0.8750
Epoch 127/350
1/1 [=====] - 0s 12ms/step - loss: 0.3396 - accuracy: 0.8750
Epoch 128/350
1/1 [=====] - 0s 9ms/step - loss: 0.3379 - accuracy: 0.8750
Epoch 129/350
1/1 [=====] - 0s 8ms/step - loss: 0.3362 - accuracy: 0.8750
```

Epoch 130/350
1/1 [=====] - 0s 5ms/step - loss: 0.3346 - accuracy: 0.8750
Epoch 131/350
1/1 [=====] - 0s 6ms/step - loss: 0.3331 - accuracy: 0.8750
Epoch 132/350
1/1 [=====] - 0s 6ms/step - loss: 0.3316 - accuracy: 0.8750
Epoch 133/350
1/1 [=====] - 0s 6ms/step - loss: 0.3302 - accuracy: 0.8750
Epoch 134/350
1/1 [=====] - 0s 6ms/step - loss: 0.3289 - accuracy: 0.8750
Epoch 135/350
1/1 [=====] - 0s 6ms/step - loss: 0.3277 - accuracy: 0.8750
Epoch 136/350
1/1 [=====] - 0s 6ms/step - loss: 0.3265 - accuracy: 0.8750
Epoch 137/350
1/1 [=====] - 0s 5ms/step - loss: 0.3254 - accuracy: 0.8750
Epoch 138/350
1/1 [=====] - 0s 6ms/step - loss: 0.3243 - accuracy: 0.8750
Epoch 139/350
1/1 [=====] - 0s 9ms/step - loss: 0.3233 - accuracy: 0.8750
Epoch 140/350
1/1 [=====] - 0s 5ms/step - loss: 0.3223 - accuracy: 0.8750
Epoch 141/350
1/1 [=====] - 0s 6ms/step - loss: 0.3214 - accuracy: 0.8750
Epoch 142/350
1/1 [=====] - 0s 6ms/step - loss: 0.3205 - accuracy: 0.8750
Epoch 143/350
1/1 [=====] - 0s 8ms/step - loss: 0.3196 - accuracy: 0.8750
Epoch 144/350
1/1 [=====] - 0s 5ms/step - loss: 0.3188 - accuracy: 0.8750
Epoch 145/350
1/1 [=====] - 0s 5ms/step - loss: 0.3180 - accuracy: 0.8750
Epoch 146/350
1/1 [=====] - 0s 7ms/step - loss: 0.3173 - accuracy: 0.8750
Epoch 147/350
1/1 [=====] - 0s 10ms/step - loss: 0.3166 - accuracy: 0.8750
Epoch 148/350
1/1 [=====] - 0s 15ms/step - loss: 0.3159 - accuracy: 0.8750
Epoch 149/350
1/1 [=====] - 0s 8ms/step - loss: 0.3152 - accuracy: 0.8750
Epoch 150/350
1/1 [=====] - 0s 10ms/step - loss: 0.3145 - accuracy: 0.8750
Epoch 151/350

1/1 [=====] - 0s 9ms/step - loss: 0.3139 - accuracy: 0.8750
Epoch 152/350
1/1 [=====] - 0s 12ms/step - loss: 0.3133 - accuracy: 0.8750
Epoch 153/350
1/1 [=====] - 0s 9ms/step - loss: 0.3127 - accuracy: 0.8750
Epoch 154/350
1/1 [=====] - 0s 7ms/step - loss: 0.3122 - accuracy: 0.8750
Epoch 155/350
1/1 [=====] - 0s 12ms/step - loss: 0.3116 - accuracy: 0.8750
Epoch 156/350
1/1 [=====] - 0s 8ms/step - loss: 0.3111 - accuracy: 0.8750
Epoch 157/350
1/1 [=====] - 0s 8ms/step - loss: 0.3106 - accuracy: 0.8750
Epoch 158/350
1/1 [=====] - 0s 11ms/step - loss: 0.3101 - accuracy: 0.8750
Epoch 159/350
1/1 [=====] - 0s 14ms/step - loss: 0.3096 - accuracy: 0.8750
Epoch 160/350
1/1 [=====] - 0s 8ms/step - loss: 0.3092 - accuracy: 0.8750
Epoch 161/350
1/1 [=====] - 0s 9ms/step - loss: 0.3087 - accuracy: 0.8750
Epoch 162/350
1/1 [=====] - 0s 6ms/step - loss: 0.3083 - accuracy: 0.8750
Epoch 163/350
1/1 [=====] - 0s 9ms/step - loss: 0.3079 - accuracy: 0.8750
Epoch 164/350
1/1 [=====] - 0s 10ms/step - loss: 0.3075 - accuracy: 0.8750
Epoch 165/350
1/1 [=====] - 0s 9ms/step - loss: 0.3071 - accuracy: 0.8750
Epoch 166/350
1/1 [=====] - 0s 13ms/step - loss: 0.3067 - accuracy: 0.8750
Epoch 167/350
1/1 [=====] - 0s 9ms/step - loss: 0.3063 - accuracy: 0.8750
Epoch 168/350
1/1 [=====] - 0s 7ms/step - loss: 0.3060 - accuracy: 0.8750
Epoch 169/350
1/1 [=====] - 0s 8ms/step - loss: 0.3056 - accuracy: 0.8750
Epoch 170/350
1/1 [=====] - 0s 8ms/step - loss: 0.3053 - accuracy: 0.8750
Epoch 171/350
1/1 [=====] - 0s 10ms/step - loss: 0.3049 - accuracy: 0.8750
Epoch 172/350
1/1 [=====] - 0s 7ms/step - loss: 0.3046 - accuracy: 0.8750

Epoch 173/350
1/1 [=====] - 0s 8ms/step - loss: 0.3043 - accuracy: 0.8750
Epoch 174/350
1/1 [=====] - 0s 7ms/step - loss: 0.3040 - accuracy: 0.8750
Epoch 175/350
1/1 [=====] - 0s 10ms/step - loss: 0.3037 - accuracy: 0.8750
Epoch 176/350
1/1 [=====] - 0s 10ms/step - loss: 0.3034 - accuracy: 0.8750
Epoch 177/350
1/1 [=====] - 0s 9ms/step - loss: 0.3031 - accuracy: 0.8750
Epoch 178/350
1/1 [=====] - 0s 13ms/step - loss: 0.3028 - accuracy: 0.8750
Epoch 179/350
1/1 [=====] - 0s 12ms/step - loss: 0.3026 - accuracy: 0.8750
Epoch 180/350
1/1 [=====] - 0s 12ms/step - loss: 0.3023 - accuracy: 0.8750
Epoch 181/350
1/1 [=====] - 0s 11ms/step - loss: 0.3020 - accuracy: 0.8750
Epoch 182/350
1/1 [=====] - 0s 9ms/step - loss: 0.3018 - accuracy: 0.8750
Epoch 183/350
1/1 [=====] - 0s 11ms/step - loss: 0.3015 - accuracy: 0.8750
Epoch 184/350
1/1 [=====] - 0s 11ms/step - loss: 0.3013 - accuracy: 0.8750
Epoch 185/350
1/1 [=====] - 0s 10ms/step - loss: 0.3010 - accuracy: 0.8750
Epoch 186/350
1/1 [=====] - 0s 7ms/step - loss: 0.3008 - accuracy: 0.8750
Epoch 187/350
1/1 [=====] - 0s 10ms/step - loss: 0.3006 - accuracy: 0.8750
Epoch 188/350
1/1 [=====] - 0s 8ms/step - loss: 0.3004 - accuracy: 0.8750
Epoch 189/350
1/1 [=====] - 0s 8ms/step - loss: 0.3001 - accuracy: 0.8750
Epoch 190/350
1/1 [=====] - 0s 7ms/step - loss: 0.2999 - accuracy: 0.8750
Epoch 191/350
1/1 [=====] - 0s 8ms/step - loss: 0.2997 - accuracy: 0.8750
Epoch 192/350
1/1 [=====] - 0s 8ms/step - loss: 0.2995 - accuracy: 0.8750
Epoch 193/350
1/1 [=====] - 0s 6ms/step - loss: 0.2993 - accuracy: 0.8750
Epoch 194/350

1/1 [=====] - 0s 11ms/step - loss: 0.2991 - accuracy: 0.8750
Epoch 195/350
1/1 [=====] - 0s 6ms/step - loss: 0.2989 - accuracy: 0.8750
Epoch 196/350
1/1 [=====] - 0s 7ms/step - loss: 0.2987 - accuracy: 0.8750
Epoch 197/350
1/1 [=====] - 0s 9ms/step - loss: 0.2985 - accuracy: 0.8750
Epoch 198/350
1/1 [=====] - 0s 7ms/step - loss: 0.2984 - accuracy: 0.8750
Epoch 199/350
1/1 [=====] - 0s 7ms/step - loss: 0.2982 - accuracy: 0.8750
Epoch 200/350
1/1 [=====] - 0s 8ms/step - loss: 0.2980 - accuracy: 0.8750
Epoch 201/350
1/1 [=====] - 0s 7ms/step - loss: 0.2978 - accuracy: 0.8750
Epoch 202/350
1/1 [=====] - 0s 7ms/step - loss: 0.2977 - accuracy: 0.8750
Epoch 203/350
1/1 [=====] - 0s 8ms/step - loss: 0.2975 - accuracy: 0.8750
Epoch 204/350
1/1 [=====] - 0s 8ms/step - loss: 0.2973 - accuracy: 0.8750
Epoch 205/350
1/1 [=====] - 0s 8ms/step - loss: 0.2972 - accuracy: 0.8750
Epoch 206/350
1/1 [=====] - 0s 7ms/step - loss: 0.2970 - accuracy: 0.8750
Epoch 207/350
1/1 [=====] - 0s 8ms/step - loss: 0.2969 - accuracy: 0.8750
Epoch 208/350
1/1 [=====] - 0s 8ms/step - loss: 0.2967 - accuracy: 0.8750
Epoch 209/350
1/1 [=====] - 0s 7ms/step - loss: 0.2966 - accuracy: 0.8750
Epoch 210/350
1/1 [=====] - 0s 7ms/step - loss: 0.2964 - accuracy: 0.8750
Epoch 211/350
1/1 [=====] - 0s 7ms/step - loss: 0.2963 - accuracy: 0.8750
Epoch 212/350
1/1 [=====] - 0s 7ms/step - loss: 0.2961 - accuracy: 0.8750
Epoch 213/350
1/1 [=====] - 0s 8ms/step - loss: 0.2960 - accuracy: 0.8750
Epoch 214/350
1/1 [=====] - 0s 12ms/step - loss: 0.2958 - accuracy: 0.8750
Epoch 215/350
1/1 [=====] - 0s 15ms/step - loss: 0.2957 - accuracy: 0.8750

Epoch 216/350
1/1 [=====] - 0s 11ms/step - loss: 0.2956 - accuracy: 0.8750
Epoch 217/350
1/1 [=====] - 0s 17ms/step - loss: 0.2955 - accuracy: 0.8750
Epoch 218/350
1/1 [=====] - 0s 10ms/step - loss: 0.2953 - accuracy: 0.8750
Epoch 219/350
1/1 [=====] - 0s 7ms/step - loss: 0.2952 - accuracy: 0.8750
Epoch 220/350
1/1 [=====] - 0s 9ms/step - loss: 0.2951 - accuracy: 0.8750
Epoch 221/350
1/1 [=====] - 0s 9ms/step - loss: 0.2949 - accuracy: 0.8750
Epoch 222/350
1/1 [=====] - 0s 9ms/step - loss: 0.2948 - accuracy: 0.8750
Epoch 223/350
1/1 [=====] - 0s 11ms/step - loss: 0.2947 - accuracy: 0.8750
Epoch 224/350
1/1 [=====] - 0s 9ms/step - loss: 0.2946 - accuracy: 0.8750
Epoch 225/350
1/1 [=====] - 0s 7ms/step - loss: 0.2945 - accuracy: 0.8750
Epoch 226/350
1/1 [=====] - 0s 7ms/step - loss: 0.2944 - accuracy: 0.8750
Epoch 227/350
1/1 [=====] - 0s 6ms/step - loss: 0.2942 - accuracy: 0.8750
Epoch 228/350
1/1 [=====] - 0s 8ms/step - loss: 0.2941 - accuracy: 0.8750
Epoch 229/350
1/1 [=====] - 0s 9ms/step - loss: 0.2940 - accuracy: 0.8750
Epoch 230/350
1/1 [=====] - 0s 7ms/step - loss: 0.2939 - accuracy: 0.8750
Epoch 231/350
1/1 [=====] - 0s 7ms/step - loss: 0.2938 - accuracy: 0.8750
Epoch 232/350
1/1 [=====] - 0s 7ms/step - loss: 0.2937 - accuracy: 0.8750
Epoch 233/350
1/1 [=====] - 0s 9ms/step - loss: 0.2936 - accuracy: 0.8750
Epoch 234/350
1/1 [=====] - 0s 8ms/step - loss: 0.2935 - accuracy: 0.8750
Epoch 235/350
1/1 [=====] - 0s 11ms/step - loss: 0.2934 - accuracy: 0.8750
Epoch 236/350
1/1 [=====] - 0s 8ms/step - loss: 0.2933 - accuracy: 0.8750
Epoch 237/350

```
1/1 [=====] - 0s 8ms/step - loss: 0.2932 - accuracy: 0.8750
Epoch 238/350
1/1 [=====] - 0s 10ms/step - loss: 0.2931 - accuracy: 0.8750
Epoch 239/350
1/1 [=====] - 0s 11ms/step - loss: 0.2930 - accuracy: 0.8750
Epoch 240/350
1/1 [=====] - 0s 9ms/step - loss: 0.2929 - accuracy: 0.8750
Epoch 241/350
1/1 [=====] - 0s 7ms/step - loss: 0.2928 - accuracy: 0.8750
Epoch 242/350
1/1 [=====] - 0s 8ms/step - loss: 0.2927 - accuracy: 0.8750
Epoch 243/350
1/1 [=====] - 0s 6ms/step - loss: 0.2927 - accuracy: 0.8750
Epoch 244/350
1/1 [=====] - 0s 8ms/step - loss: 0.2926 - accuracy: 0.8750
Epoch 245/350
1/1 [=====] - 0s 6ms/step - loss: 0.2925 - accuracy: 0.8750
Epoch 246/350
1/1 [=====] - 0s 6ms/step - loss: 0.2924 - accuracy: 0.8750
Epoch 247/350
1/1 [=====] - 0s 5ms/step - loss: 0.2923 - accuracy: 0.8750
Epoch 248/350
1/1 [=====] - 0s 10ms/step - loss: 0.2922 - accuracy: 0.8750
Epoch 249/350
1/1 [=====] - 0s 6ms/step - loss: 0.2921 - accuracy: 0.8750
Epoch 250/350
1/1 [=====] - 0s 7ms/step - loss: 0.2921 - accuracy: 0.8750
Epoch 251/350
1/1 [=====] - 0s 6ms/step - loss: 0.2920 - accuracy: 0.8750
Epoch 252/350
1/1 [=====] - 0s 10ms/step - loss: 0.2919 - accuracy: 0.8750
Epoch 253/350
1/1 [=====] - 0s 9ms/step - loss: 0.2918 - accuracy: 0.8750
Epoch 254/350
1/1 [=====] - 0s 11ms/step - loss: 0.2917 - accuracy: 0.8750
Epoch 255/350
1/1 [=====] - 0s 7ms/step - loss: 0.2917 - accuracy: 0.8750
Epoch 256/350
1/1 [=====] - 0s 5ms/step - loss: 0.2916 - accuracy: 0.8750
Epoch 257/350
1/1 [=====] - 0s 7ms/step - loss: 0.2915 - accuracy: 0.8750
Epoch 258/350
1/1 [=====] - 0s 7ms/step - loss: 0.2914 - accuracy: 0.8750
```

Epoch 259/350
1/1 [=====] - 0s 8ms/step - loss: 0.2914 - accuracy: 0.8750
Epoch 260/350
1/1 [=====] - 0s 6ms/step - loss: 0.2913 - accuracy: 0.8750
Epoch 261/350
1/1 [=====] - 0s 6ms/step - loss: 0.2912 - accuracy: 0.8750
Epoch 262/350
1/1 [=====] - 0s 7ms/step - loss: 0.2912 - accuracy: 0.8750
Epoch 263/350
1/1 [=====] - 0s 8ms/step - loss: 0.2911 - accuracy: 0.8750
Epoch 264/350
1/1 [=====] - 0s 8ms/step - loss: 0.2910 - accuracy: 0.8750
Epoch 265/350
1/1 [=====] - 0s 6ms/step - loss: 0.2910 - accuracy: 0.8750
Epoch 266/350
1/1 [=====] - 0s 5ms/step - loss: 0.2909 - accuracy: 0.8750
Epoch 267/350
1/1 [=====] - 0s 7ms/step - loss: 0.2908 - accuracy: 0.8750
Epoch 268/350
1/1 [=====] - 0s 15ms/step - loss: 0.2908 - accuracy: 0.8750
Epoch 269/350
1/1 [=====] - 0s 16ms/step - loss: 0.2907 - accuracy: 0.8750
Epoch 270/350
1/1 [=====] - 0s 11ms/step - loss: 0.2906 - accuracy: 0.8750
Epoch 271/350
1/1 [=====] - 0s 8ms/step - loss: 0.2906 - accuracy: 0.8750
Epoch 272/350
1/1 [=====] - 0s 20ms/step - loss: 0.2905 - accuracy: 0.8750
Epoch 273/350
1/1 [=====] - 0s 10ms/step - loss: 0.2904 - accuracy: 0.8750
Epoch 274/350
1/1 [=====] - 0s 5ms/step - loss: 0.2904 - accuracy: 0.8750
Epoch 275/350
1/1 [=====] - 0s 8ms/step - loss: 0.2903 - accuracy: 0.8750
Epoch 276/350
1/1 [=====] - 0s 6ms/step - loss: 0.2903 - accuracy: 0.8750
Epoch 277/350
1/1 [=====] - 0s 7ms/step - loss: 0.2902 - accuracy: 0.8750
Epoch 278/350
1/1 [=====] - 0s 7ms/step - loss: 0.2901 - accuracy: 0.8750
Epoch 279/350
1/1 [=====] - 0s 8ms/step - loss: 0.2901 - accuracy: 0.8750
Epoch 280/350

1/1 [=====] - 0s 5ms/step - loss: 0.2900 - accuracy: 0.8750
Epoch 281/350
1/1 [=====] - 0s 5ms/step - loss: 0.2900 - accuracy: 0.8750
Epoch 282/350
1/1 [=====] - 0s 4ms/step - loss: 0.2899 - accuracy: 0.8750
Epoch 283/350
1/1 [=====] - 0s 5ms/step - loss: 0.2899 - accuracy: 0.8750
Epoch 284/350
1/1 [=====] - 0s 5ms/step - loss: 0.2898 - accuracy: 0.8750
Epoch 285/350
1/1 [=====] - 0s 5ms/step - loss: 0.2897 - accuracy: 0.8750
Epoch 286/350
1/1 [=====] - 0s 5ms/step - loss: 0.2897 - accuracy: 0.8750
Epoch 287/350
1/1 [=====] - 0s 5ms/step - loss: 0.2896 - accuracy: 0.8750
Epoch 288/350
1/1 [=====] - 0s 5ms/step - loss: 0.2896 - accuracy: 0.8750
Epoch 289/350
1/1 [=====] - 0s 6ms/step - loss: 0.2895 - accuracy: 0.8750
Epoch 290/350
1/1 [=====] - 0s 5ms/step - loss: 0.2895 - accuracy: 0.8750
Epoch 291/350
1/1 [=====] - 0s 5ms/step - loss: 0.2894 - accuracy: 0.8750
Epoch 292/350
1/1 [=====] - 0s 5ms/step - loss: 0.2894 - accuracy: 0.8750
Epoch 293/350
1/1 [=====] - 0s 6ms/step - loss: 0.2893 - accuracy: 0.8750
Epoch 294/350
1/1 [=====] - 0s 5ms/step - loss: 0.2893 - accuracy: 0.8750
Epoch 295/350
1/1 [=====] - 0s 5ms/step - loss: 0.2892 - accuracy: 0.8750
Epoch 296/350
1/1 [=====] - 0s 5ms/step - loss: 0.2892 - accuracy: 0.8750
Epoch 297/350
1/1 [=====] - 0s 5ms/step - loss: 0.2891 - accuracy: 0.8750
Epoch 298/350
1/1 [=====] - 0s 5ms/step - loss: 0.2891 - accuracy: 0.8750
Epoch 299/350
1/1 [=====] - 0s 5ms/step - loss: 0.2890 - accuracy: 0.8750
Epoch 300/350
1/1 [=====] - 0s 5ms/step - loss: 0.2890 - accuracy: 0.8750
Epoch 301/350
1/1 [=====] - 0s 5ms/step - loss: 0.2889 - accuracy: 0.8750

Epoch 302/350
1/1 [=====] - 0s 5ms/step - loss: 0.2889 - accuracy: 0.8750
Epoch 303/350
1/1 [=====] - 0s 5ms/step - loss: 0.2889 - accuracy: 0.8750
Epoch 304/350
1/1 [=====] - 0s 5ms/step - loss: 0.2888 - accuracy: 0.8750
Epoch 305/350
1/1 [=====] - 0s 5ms/step - loss: 0.2888 - accuracy: 0.8750
Epoch 306/350
1/1 [=====] - 0s 5ms/step - loss: 0.2887 - accuracy: 0.8750
Epoch 307/350
1/1 [=====] - 0s 5ms/step - loss: 0.2887 - accuracy: 0.8750
Epoch 308/350
1/1 [=====] - 0s 5ms/step - loss: 0.2886 - accuracy: 0.8750
Epoch 309/350
1/1 [=====] - 0s 5ms/step - loss: 0.2886 - accuracy: 0.8750
Epoch 310/350
1/1 [=====] - 0s 5ms/step - loss: 0.2886 - accuracy: 0.8750
Epoch 311/350
1/1 [=====] - 0s 5ms/step - loss: 0.2885 - accuracy: 0.8750
Epoch 312/350
1/1 [=====] - 0s 5ms/step - loss: 0.2885 - accuracy: 0.8750
Epoch 313/350
1/1 [=====] - 0s 5ms/step - loss: 0.2884 - accuracy: 0.8750
Epoch 314/350
1/1 [=====] - 0s 5ms/step - loss: 0.2884 - accuracy: 0.8750
Epoch 315/350
1/1 [=====] - 0s 5ms/step - loss: 0.2883 - accuracy: 0.8750
Epoch 316/350
1/1 [=====] - 0s 5ms/step - loss: 0.2883 - accuracy: 0.8750
Epoch 317/350
1/1 [=====] - 0s 5ms/step - loss: 0.2883 - accuracy: 0.8750
Epoch 318/350
1/1 [=====] - 0s 6ms/step - loss: 0.2882 - accuracy: 0.8750
Epoch 319/350
1/1 [=====] - 0s 5ms/step - loss: 0.2882 - accuracy: 0.8750
Epoch 320/350
1/1 [=====] - 0s 5ms/step - loss: 0.2882 - accuracy: 0.8750
Epoch 321/350
1/1 [=====] - 0s 5ms/step - loss: 0.2881 - accuracy: 0.8750
Epoch 322/350
1/1 [=====] - 0s 4ms/step - loss: 0.2881 - accuracy: 0.8750
Epoch 323/350

1/1 [=====] - 0s 5ms/step - loss: 0.2880 - accuracy: 0.8750
Epoch 324/350
1/1 [=====] - 0s 5ms/step - loss: 0.2880 - accuracy: 0.8750
Epoch 325/350
1/1 [=====] - 0s 8ms/step - loss: 0.2880 - accuracy: 0.8750
Epoch 326/350
1/1 [=====] - 0s 10ms/step - loss: 0.2879 - accuracy: 0.8750
Epoch 327/350
1/1 [=====] - 0s 8ms/step - loss: 0.2879 - accuracy: 0.8750
Epoch 328/350
1/1 [=====] - 0s 7ms/step - loss: 0.2879 - accuracy: 0.8750
Epoch 329/350
1/1 [=====] - 0s 6ms/step - loss: 0.2878 - accuracy: 0.8750
Epoch 330/350
1/1 [=====] - 0s 9ms/step - loss: 0.2878 - accuracy: 0.8750
Epoch 331/350
1/1 [=====] - 0s 7ms/step - loss: 0.2878 - accuracy: 0.8750
Epoch 332/350
1/1 [=====] - 0s 8ms/step - loss: 0.2877 - accuracy: 0.8750
Epoch 333/350
1/1 [=====] - 0s 11ms/step - loss: 0.2877 - accuracy: 0.8750
Epoch 334/350
1/1 [=====] - 0s 8ms/step - loss: 0.2876 - accuracy: 0.8750
Epoch 335/350
1/1 [=====] - 0s 8ms/step - loss: 0.2876 - accuracy: 0.8750
Epoch 336/350
1/1 [=====] - 0s 9ms/step - loss: 0.2876 - accuracy: 0.8750
Epoch 337/350
1/1 [=====] - 0s 7ms/step - loss: 0.2875 - accuracy: 0.8750
Epoch 338/350
1/1 [=====] - 0s 9ms/step - loss: 0.2875 - accuracy: 0.8750
Epoch 339/350
1/1 [=====] - 0s 8ms/step - loss: 0.2875 - accuracy: 0.8750
Epoch 340/350
1/1 [=====] - 0s 11ms/step - loss: 0.2875 - accuracy: 0.8750
Epoch 341/350
1/1 [=====] - 0s 10ms/step - loss: 0.2874 - accuracy: 0.8750
Epoch 342/350
1/1 [=====] - 0s 7ms/step - loss: 0.2874 - accuracy: 0.8750
Epoch 343/350
1/1 [=====] - 0s 8ms/step - loss: 0.2874 - accuracy: 0.8750
Epoch 344/350
1/1 [=====] - 0s 9ms/step - loss: 0.2873 - accuracy: 0.8750

```
Epoch 345/350
1/1 [=====] - 0s 7ms/step - loss: 0.2873 - accuracy: 0.8750
Epoch 346/350
1/1 [=====] - 0s 7ms/step - loss: 0.2873 - accuracy: 0.8750
Epoch 347/350
1/1 [=====] - 0s 7ms/step - loss: 0.2872 - accuracy: 0.8750
Epoch 348/350
1/1 [=====] - 0s 8ms/step - loss: 0.2872 - accuracy: 0.8750
Epoch 349/350
1/1 [=====] - 0s 5ms/step - loss: 0.2872 - accuracy: 0.8750
Epoch 350/350
1/1 [=====] - 0s 5ms/step - loss: 0.2871 - accuracy: 0.8750
```

Out[]: <keras.callbacks.History at 0x7fa723469bd0>

In []: p = model.predict(x)
np.around(p)

Out[]: array([[0.],
[1.],
[1.],
[0.],
[1.],
[0.],
[0.],
[0.]], dtype=float32)

In []: print(model.layers[0].get_weights())

```
[array([[-7.6132674, -8.172722 ],  
[-7.177878 , -8.127281 ],  
[-7.5278707, -8.174358 ]], dtype=float32), array([ 3.4878926, 10.032507 ], dtype=float32)]
```

In []: print(model.layers[1].get_weights())

```
[array([[-10.533432],  
[ 7.154026]], dtype=float32), array([-1.0993525], dtype=float32)]
```

In []: model.save('xor_model')

```
INFO:tensorflow:Assets written to: xor_model/assets
```

In []: `!zip -r xor_model.zip xor_model`

```
adding: xor_model/ (stored 0%)
adding: xor_model/keras_metadata.pb (deflated 83%)
adding: xor_model/variables/ (stored 0%)
adding: xor_model/variables/variables.data-00000-of-00001 (deflated 73%)
adding: xor_model/variables/variables.index (deflated 60%)
adding: xor_model/saved_model.pb (deflated 87%)
adding: xor_model/assets/ (stored 0%)
```