Ex No: 1 **BUILD A NEURAL NETWORK WITHOUT KERAS**
Date: 02/08/2024

Aim:

To build a simple neural network without using Keras/TensorFlow.

Procedure:

1. Download and load the dataset.
2. Perform analysis and preprocessing of the dataset.
3. Build a simple neural network model without using Keras/TensorFlow.
4. Compile and fit the model.
5. Perform prediction with the test dataset.
6. Calculate performance metrics.

Program:

```
import tensorflow

from numpy import loadtxt

from tensorflow.keras.models import Sequential

from tensorflow.keras.layers import Dense



dataset=loadtxt("sample_data/pima-indians-diabetes.csv",delimiter=',')

X=dataset[:,0:8]

y=dataset[:,8]



model = Sequential()

model.add(Dense(12, input_shape=(8,), activation='relu'))

model.add(Dense(8, activation='relu'))

model.add(Dense(1, activation='sigmoid'))
```

```
model.compile(loss='binary_crossentropy', optimizer='adam', metrics=['accuracy'])

model.fit(X, y, epochs=10, batch_size=10)

_, accuracy = model.evaluate(X, y)

print('Accuracy: %.2f' % (accuracy*100))

predictions = model.predict(X)

rounded = [round(x[0]) for x in predictions]

predictions = (model.predict(X) > 0.5).astype(int)
```

Output:

```
/usr/local/lib/python3.10/dist-packages/keras/src/layers/core/dense.py:87:
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
Epoch 1/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 2s 2ms/step - accuracy: 0.4261 - loss: 23.0919
Epoch 2/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6469 - loss: 2.9452
Epoch 3/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6279 - loss: 1.7695
Epoch 4/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6241 - loss: 1.3593
Epoch 5/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6372 - loss: 1.1231
Epoch 6/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6396 - loss: 0.9946
Epoch 7/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6312 - loss: 0.8817
Epoch 8/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6223 - loss: 0.8457
Epoch 9/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6519 - loss: 0.7719
Epoch 10/10
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6341 - loss: 0.7653
24/24 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6566 - loss: 0.7124
Accuracy: 67.84
24/24 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step
24/24 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step
```

Result:

Thus the program to build a simple neural network without using Keras/TensorFlow is implemented successfully.