Exp No: 2
BUILD A SIMPLE NEURAL NETWORKS

AIM:

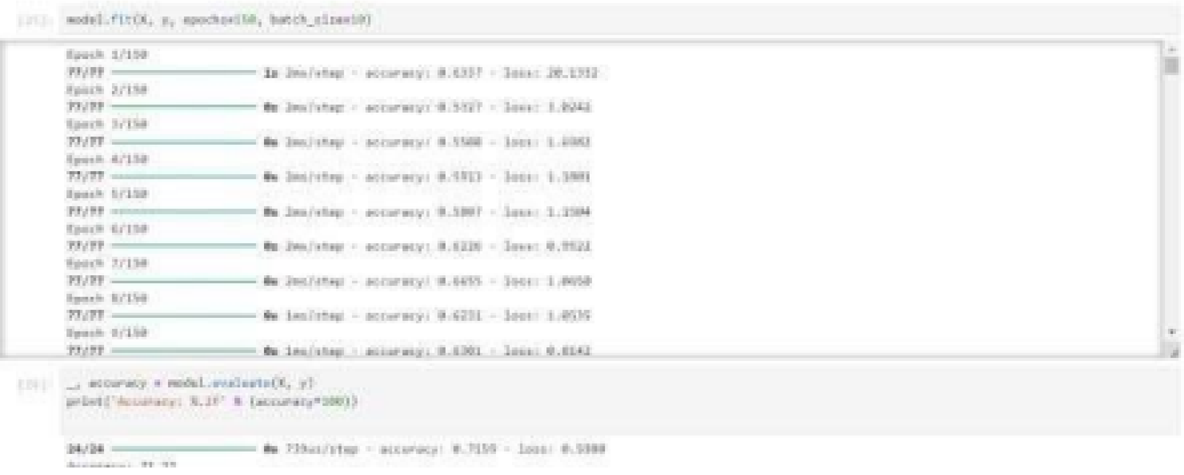
To build a simple neural network using Keras/TensorFlow.

PROCEDURE:

1. Download and load the dataset.
2. Perform analysis and preprocessing of the dataset.
3. Build a simple neural network model using Keras/TensorFlow.
4. Compile and fit the model.
5. Perform prediction with the test dataset.
6. Calculate performance metrics.

PROGRAM:

```
import pandas as pd
from numpy import loadtxt
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

dataset = loadtxt('pima-indians-diabetes-data.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=150, batch_size=10)

_, accuracy = model.evaluate(X, y)
print('Accuracy: %.2f' % (accuracy*100))
```



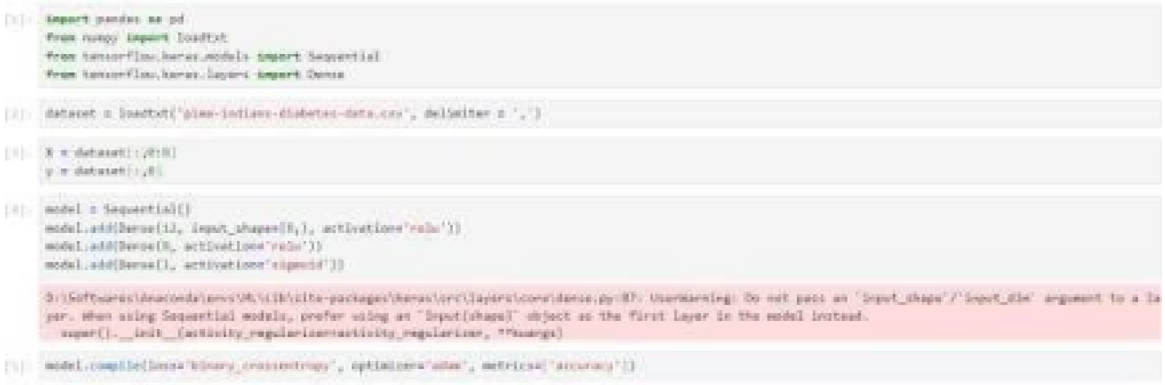
```
[21]: model.fit(X, y, epochs=150, batch_size=10)
```

```
Epoch 1/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 1s 2ms/step - accuracy: 0.6337 - loss: 20.1332
Epoch 2/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5327 - loss: 1.8242
Epoch 3/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5500 - loss: 1.6302
Epoch 4/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5513 - loss: 1.3001
Epoch 5/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5807 - loss: 1.2304
Epoch 6/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6220 - loss: 0.9522
Epoch 7/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6455 - loss: 1.0050
Epoch 8/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6231 - loss: 1.0535
Epoch 9/150
77/77 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6301 - loss: 0.8142
```

```
[22]: _, accuracy = model.evaluate(X, y)
print('Accuracy: %.2f' % (accuracy*100))
```

```
24/24 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.7159 - loss: 0.5980
Accuracy: 71.77
```

OUTPUT



```
[1]: import pandas as pd
     from numpy import loadtxt
     from tensorflow.keras.models import Sequential
     from tensorflow.keras.layers import Dense

[2]: dataset = loadtxt('pima-indians-diabetes-data.csv', delimiter = ',')

[3]: X = dataset[:,0:8]
     y = dataset[:,8]

[4]: model = Sequential()
     model.add(Dense(12, input_shape=(8,), activation='relu'))
     model.add(Dense(8, activation='relu'))
     model.add(Dense(1, activation='sigmoid'))

     D:\Softwares\Anaconda\envs\ML\Lib\site-packages\keras\src\layers\core\dense.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a la
     yer. When using Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
       super().__init__(activity_regularizer=activity_regularizer, **kwargs)

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