```
%tensorflow_version 2.x

import tensorflow as tf
import pandas as pd

from tensorflow import keras

import numpy as np
import matplotlib.pyplot as plt
from google.colab import files
import io
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
```

```
uploaded = files.upload()

for fn in uploaded.keys():
  print('User uploaded file "{name}" with length {length} bytes'.format(
      name=fn, length=len(uploaded[fn])))
```

```
df = pd.read_csv(io.BytesIO(uploaded['heart.csv']))
```

Choose Files heart.csv

- **heart.csv**(application/vnd.ms-excel) - 11328 bytes, last modified: 7/9/2021 - 100% done

```
Saving heart.csv to heart (1).csv
User uploaded file "heart.csv" with length 11328 bytes
```

```
#train and test set preparation
X = df.drop(['target'], axis=1)
y=df['target']
X_train,X_test,y_train,y_test=train_test_split(
    X,y,test_size=0.2, random_state=0)
```

```
#model
model = keras.Sequential([
    keras.layers.Flatten(input_shape=(13,)),
    keras.layers.Dense(20, activation='relu'),
    keras.layers.Dense(25, activation='relu'),
    keras.layers.Dense(10, activation='relu'),
    keras.layers.Dense(1, activation='sigmoid'),
])
model.compile(optimizer='adam',
              loss = 'binary_crossentropy',
              metrics=['accuracy'])

model.fit(X_train, y_train, epochs=50, batch_size=1)
```

```
Epoch 22/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4993 - accuracy: 0.7537
Epoch 23/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4762 - accuracy: 0.7684
Epoch 24/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4698 - accuracy: 0.7904
Epoch 25/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4339 - accuracy: 0.7868
Epoch 26/50
272/272 [==============================] - 0s 2ms/step - loss: 0.5071 - accuracy: 0.7463
Epoch 27/50
272/272 [==============================] - 0s 1ms/step - loss: 0.5067 - accuracy: 0.7647
Epoch 28/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4965 - accuracy: 0.7684
Epoch 29/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4716 - accuracy: 0.7721
Epoch 30/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4980 - accuracy: 0.7684
Epoch 31/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4940 - accuracy: 0.7537
Epoch 32/50
272/272 [==============================] - 0s 1ms/step - loss: 0.5198 - accuracy: 0.7279
Epoch 33/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4703 - accuracy: 0.7794
Epoch 34/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4725 - accuracy: 0.7721
Epoch 35/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4743 - accuracy: 0.7794
```

```
Epoch 36/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4586 - accuracy: 0.7831
Epoch 37/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4956 - accuracy: 0.7757
Epoch 38/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4570 - accuracy: 0.7721
Epoch 39/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4558 - accuracy: 0.7904
Epoch 40/50
272/272 [==============================] - 0s 1ms/step - loss: 0.5024 - accuracy: 0.7574
Epoch 41/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4341 - accuracy: 0.7978
Epoch 42/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4749 - accuracy: 0.7537
Epoch 43/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4742 - accuracy: 0.7794
Epoch 44/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4716 - accuracy: 0.7684
Epoch 45/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4629 - accuracy: 0.7978
Epoch 46/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4598 - accuracy: 0.7831
Epoch 47/50
272/272 [==============================] - 0s 2ms/step - loss: 0.4417 - accuracy: 0.7941
Epoch 48/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4874 - accuracy: 0.7426
Epoch 49/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4605 - accuracy: 0.7831
Epoch 50/50
272/272 [==============================] - 0s 1ms/step - loss: 0.4634 - accuracy: 0.7757
<tensorflow.python.keras.callbacks.History at 0x7f7259db7210>
```

```
test_loss, test_acc = model.evaluate(X_test, y_test)
```

```
1/1 [==============================] - 0s 17ms/step - loss: 0.2217 - accuracy: 1.0000
```

✓ 0s completed at 3:03 AM