Assignment-4

Assignment Date	17 October 2022
Student Name	D.Santhiya
Student Roll Number	962719106029
Maximum Marks	2Marks

Question 1:

Download the dataset

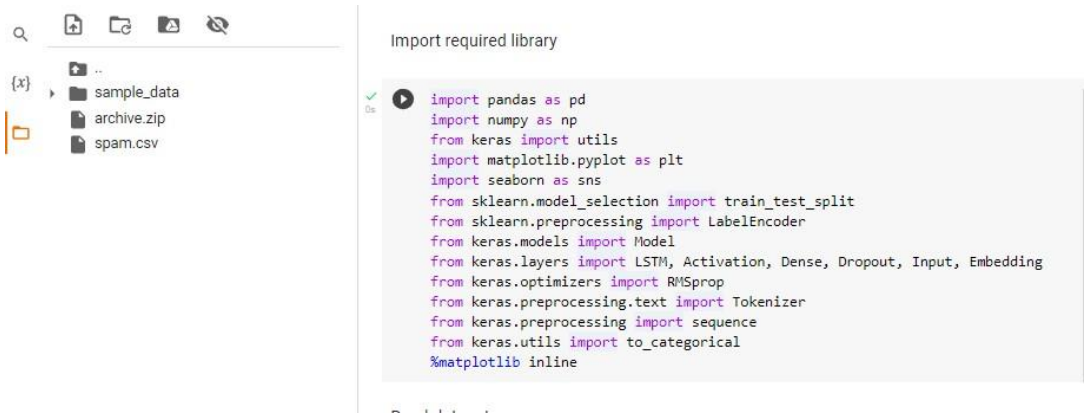
Link:
https://drive.google.com/file/d/1Sjqx5H5R86tRp2YZKzzd4_iEfjChZ3ob/view?usp=sharing

Question 2:

Import required library

Solution:

```
import pandas as pd
import numpy as np
from keras import utils
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from keras.models import Model
from keras.layers import LSTM, Activation, Dense, Dropout, Input, Embedding
from keras.optimizers import RMSprop
from keras.preprocessing.text import Tokenizer
from keras.preprocessing import sequence
from keras.utils import to_categorical
```



Question 3:

Read dataset and do pre-processing

Solution:

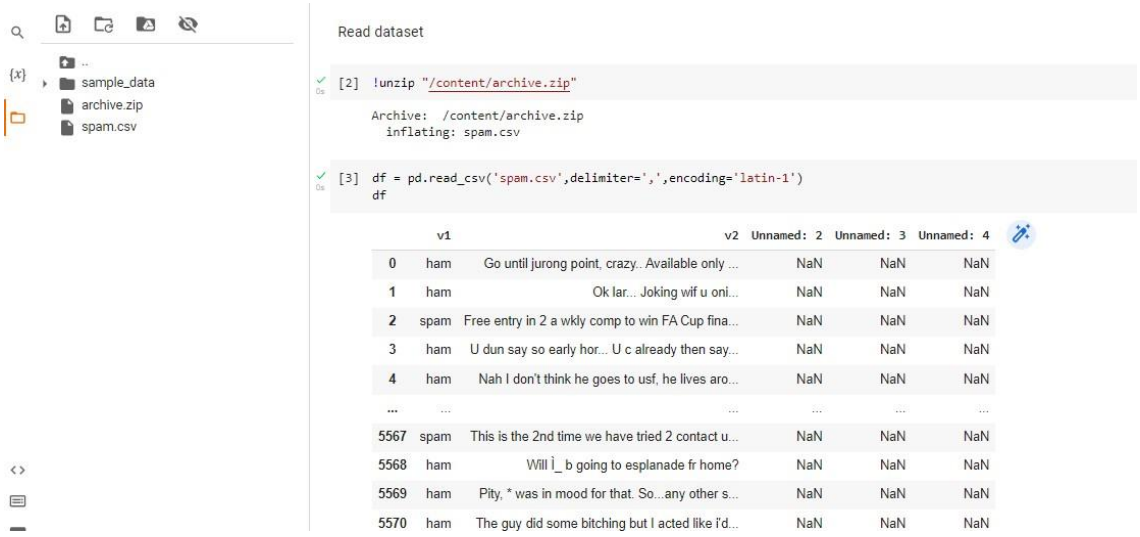
Read dataset

```
!unzip "/content/archive.zip"

df = pd.read_csv('spam.csv',delimiter=',',encoding='latin-1')
df
```

Pre processing

```
df.drop(['Unnamed: 2', 'Unnamed: 3', 'Unnamed: 4'],axis=1,inplace=True)
df

sns.countplot(df.v1,palette='Set3')
plt.xlabel('Label')
plt.title('Number of ham and spam messages')

X = df.v2
Y = df.v1
le = LabelEncoder()
Y = le.fit_transform(Y)
Y = Y.reshape(-1,1)

X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=0.15)

max_words = 1000
max_len = 150
tok = Tokenizer(num_words=max_words)
tok.fit_on_texts(X_train)
sequences = tok.texts_to_sequences(X_train)
sequences_matrix = utils.pad_sequences(sequences,maxlen=max_len)
```

```
sequences_matrix.shape

sequences_matrix.ndim

sequences_matrix = np.reshape(sequences_matrix,(4736,150,1))
sequences_matrix.ndim
```



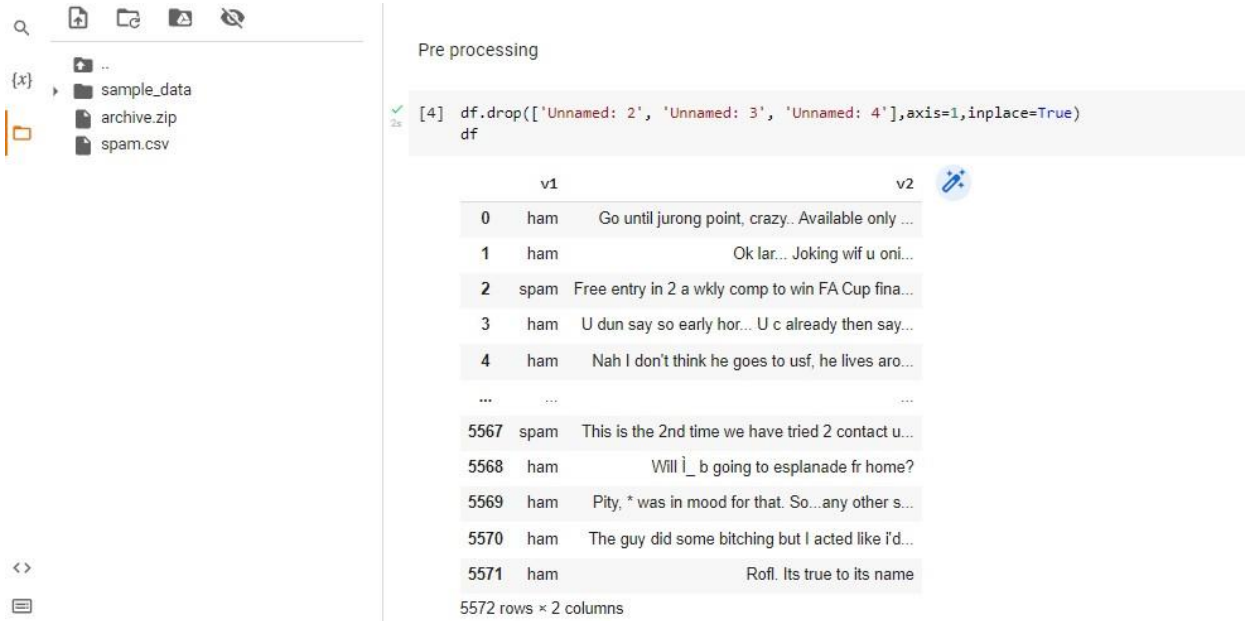
Read dataset

```
[2] !unzip "/content/archive.zip"
```

```
Archive:  /content/archive.zip
  inflating: spam.csv
```

```
[3] df = pd.read_csv('spam.csv',delimiter=',',encoding='latin-1')
    df
```

	v1	v2	Unnamed: 2	Unnamed: 3	Unnamed: 4
0	ham	Go until jurong point, crazy.. Available only ...	NaN	NaN	NaN
1	ham	Ok lar... Joking wif u oni...	NaN	NaN	NaN
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...	NaN	NaN	NaN
3	ham	U dun say so early hor... U c already then say...	NaN	NaN	NaN
4	ham	Nah I don't think he goes to usf, he lives aro...	NaN	NaN	NaN
...	...	...	...	...	...
5567	spam	This is the 2nd time we have tried 2 contact u...	NaN	NaN	NaN
5568	ham	Will Ì_ b going to esplanade fr home?	NaN	NaN	NaN
5569	ham	Pity, * was in mood for that. So...any other s...	NaN	NaN	NaN
5570	ham	The guy did some bitching but I acted like i'd...	NaN	NaN	NaN

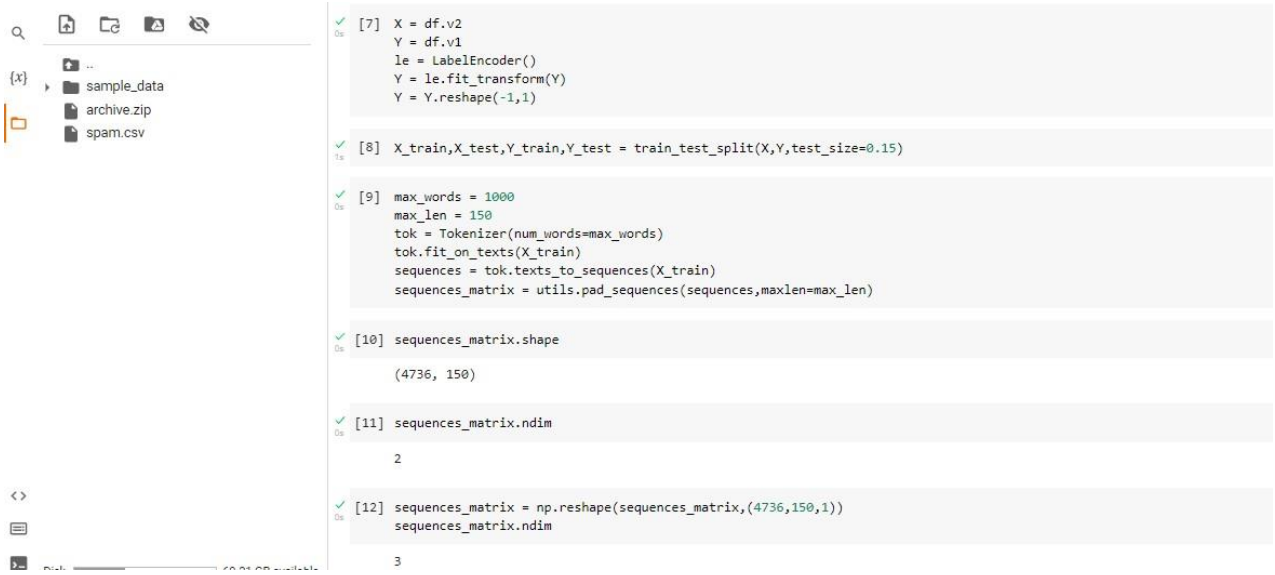


Pre processing

```
[4] df.drop(['Unnamed: 2', 'Unnamed: 3', 'Unnamed: 4'],axis=1,inplace=True)
    df
```

	v1	v2
0	ham	Go until jurong point, crazy.. Available only ...
1	ham	Ok lar... Joking wif u oni...
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...
3	ham	U dun say so early hor... U c already then say...
4	ham	Nah I don't think he goes to usf, he lives aro...
...	...	...
5567	spam	This is the 2nd time we have tried 2 contact u...
5568	ham	Will Ì_ b going to esplanade fr home?
5569	ham	Pity, * was in mood for that. So...any other s...
5570	ham	The guy did some bitching but I acted like i'd...
5571	ham	Rofl. Its true to its name

5572 rows × 2 columns

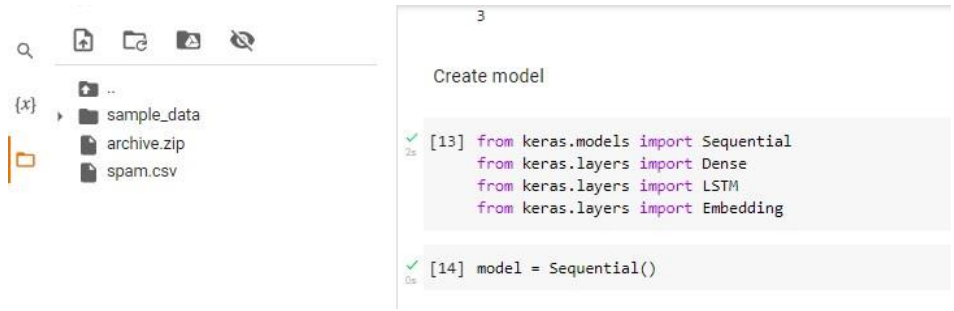


Question 4:

Create model

Solution:

```
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM
from keras.layers import Embedding

model = Sequential()
```

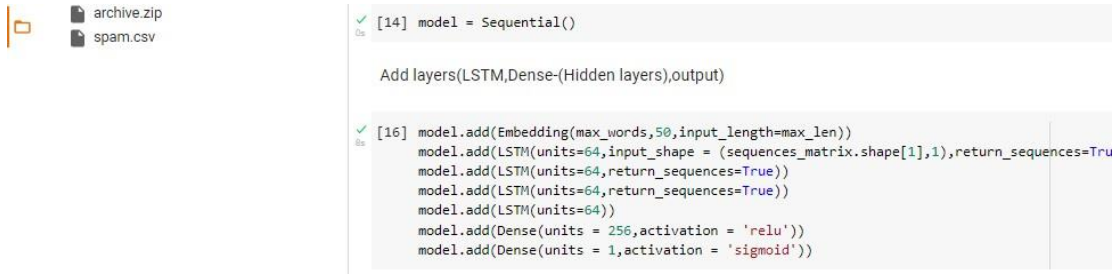


Question 5:

Add layers(LSTM,Dense-(Hidden layers),output)

Solution:

```
model.add(Embedding(max_words,50,input_length=max_len))
model.add(LSTM(units=64,input_shape = (sequences_matrix.shape[1],1),return_sequences=True))
model.add(LSTM(units=64,return_sequences=True))
model.add(LSTM(units=64,return_sequences=True))
model.add(LSTM(units=64))
model.add(Dense(units = 256,activation = 'relu'))
model.add(Dense(units = 1,activation = 'sigmoid'))
```

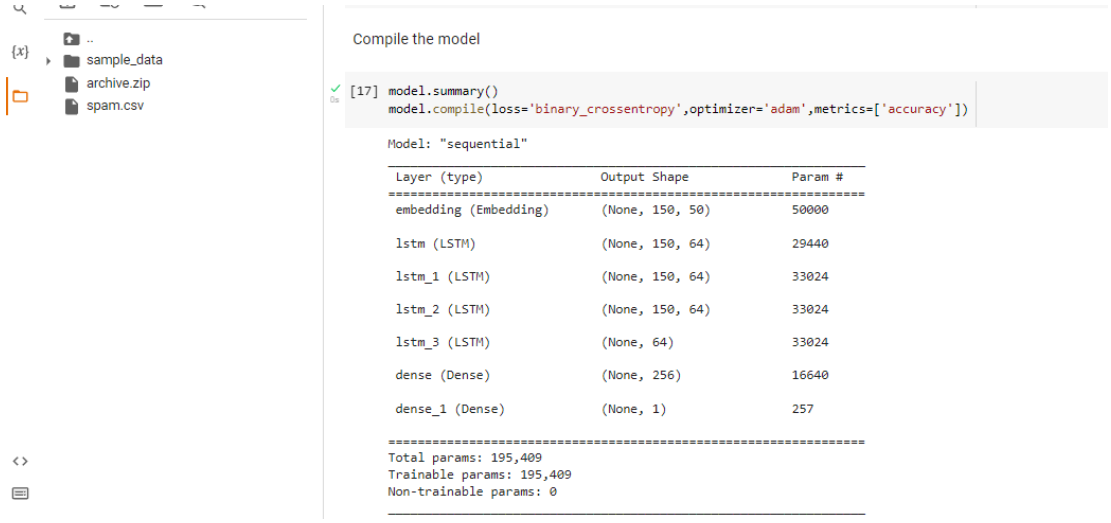


Question 6:

Compile the model

Solution:

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

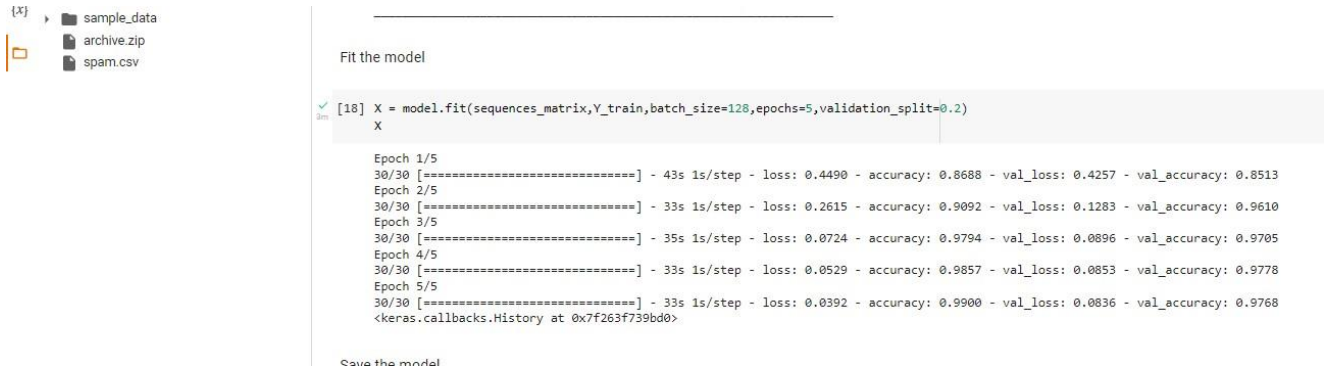


Question 7:

Fit the model

Solution:

X = model.fit(sequences_matrix,Y_train,batch_size=128,epochs=5,validation_split=0.2)
X

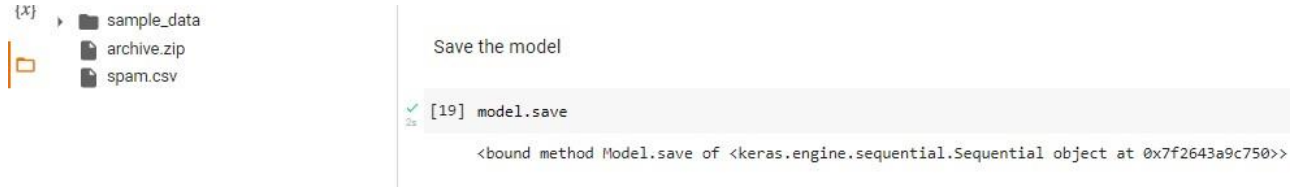


Question 8:

Save the model

Solution:

model.save



Question 9:

Test the model

Solution:

```
test_sequences = tok.texts_to_sequences(X_test)
test_sequences_matrix = utils.pad_sequences(test_sequences,maxlen=max_len)

accr = model.evaluate(test_sequences_matrix,Y_test)

l = accr[0]
a =accr[1]
print('Test set\n Loss: {:0.3f}\n Accuracy: {:0.3f}'.format(l,a))
```