Assignment -4

SMS SPAM Classification

Assignment Date	22 October 2022
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Student Roll Number	211419104155
Maximum Marks	2 Marks

Question-1:

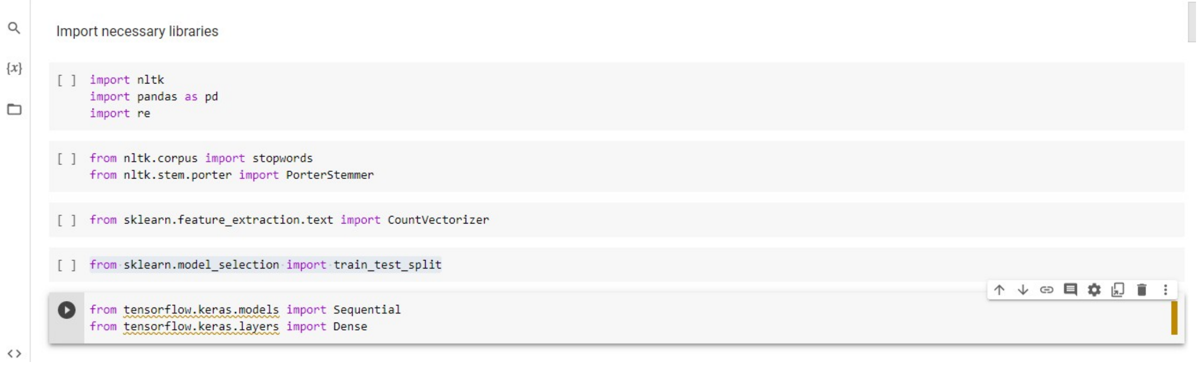
Download the dataset

Question-2:

Import required library

Solution

```
import nltk
import pandas as pd
import re
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.model_selection import train_test_split
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
```



Import necessary libraries

```
import nltk
import pandas as pd
import re
```

```
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
```

```
from sklearn.feature_extraction.text import CountVectorizer
```

```
from sklearn.model_selection import train_test_split
```

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
```

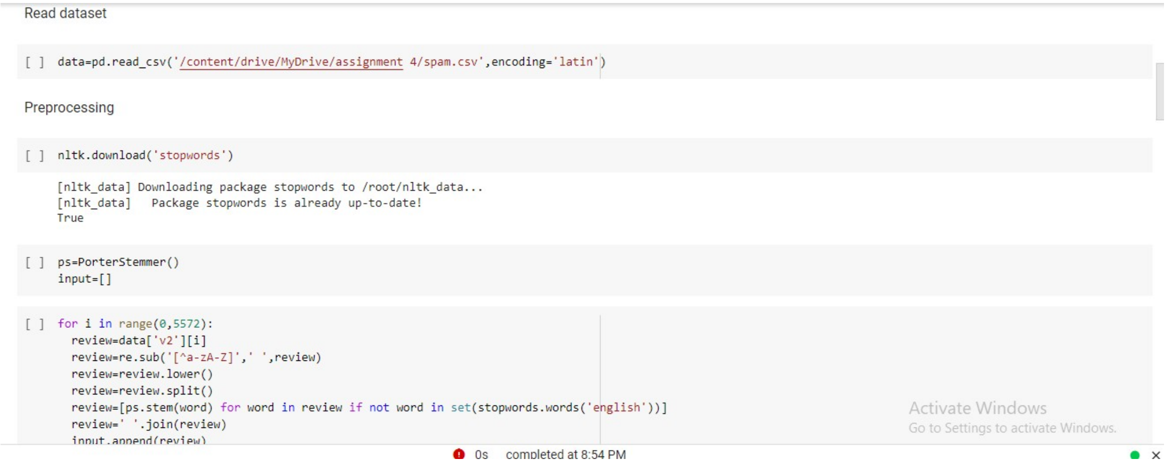
Question-3:

Read dataset and do pre-processing

Solution

```
data=pd.read_csv('/content/drive/MyDrive/assignment 4/spam.csv',encoding='latin')
```

```
nltk.download('stopwords')
ps=PorterStemmer()
input=[]
for i in range(0,5572):
  review=data['v2'][i]
  review=re.sub('[^a-zA-Z]',' ',review)
  review=review.lower()
  review=review.split()
  review=[ps.stem(word) for word in review if not word in set(stopwords.words('english'))]
  review=' '.join(review)
  input.append(review)
cv=CountVectorizer(max_features=7000)
x=cv.fit_transform(input).toarray()
y=data['v1'].values
x_train,x_test,y_train,y_test= train_test_split(x,y,test_size=0.2)
```



Read dataset

```
[ ] data=pd.read_csv('/content/drive/MyDrive/assignment 4/spam.csv',encoding='latin')
```

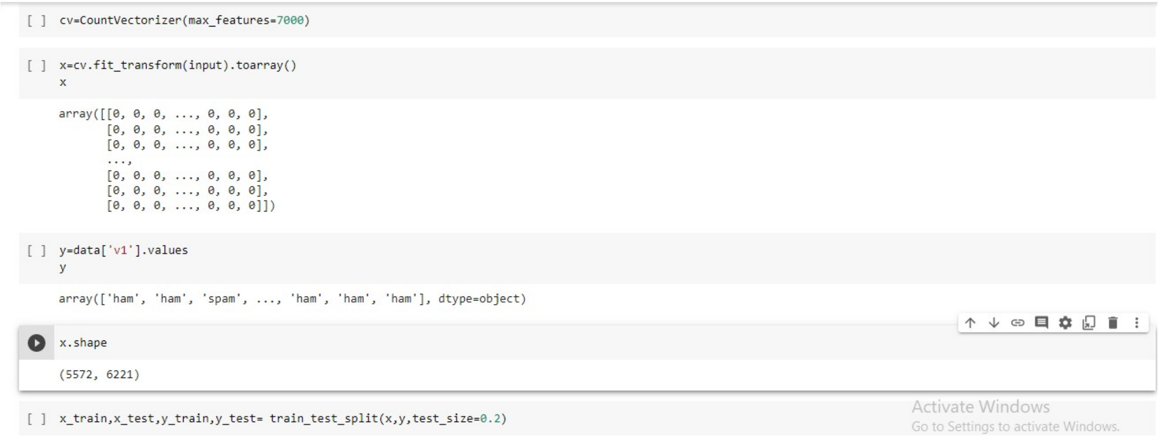
Preprocessing

```
[ ] nltk.download('stopwords')

    [nltk_data] Downloading package stopwords to /root/nltk_data...
    [nltk_data]   Package stopwords is already up-to-date!
    True
```

```
[ ] ps=PorterStemmer()
    input=[]
```

```
[ ] for i in range(0,5572):
      review=data['v2'][i]
      review=re.sub('[^a-zA-Z]',' ',review)
      review=review.lower()
      review=review.split()
      review=[ps.stem(word) for word in review if not word in set(stopwords.words('english'))]
      review=' '.join(review)
      input.append(review)
```



```
[ ] cv=CountVectorizer(max_features=7000)
```

```
[ ] x=cv.fit_transform(input).toarray()
    x

    array([[0, 0, 0, ..., 0, 0, 0],
           [0, 0, 0, ..., 0, 0, 0],
           [0, 0, 0, ..., 0, 0, 0],
           ...,
           [0, 0, 0, ..., 0, 0, 0],
           [0, 0, 0, ..., 0, 0, 0],
           [0, 0, 0, ..., 0, 0, 0]])
```

```
[ ] y=data['v1'].values
    y

    array(['ham', 'ham', 'spam', ..., 'ham', 'ham', 'ham'], dtype=object)
```

```
x.shape

(5572, 6221)
```

```
[ ] x_train,x_test,y_train,y_test= train_test_split(x,y,test_size=0.2)
```

Question-4:

Create Model

Solution

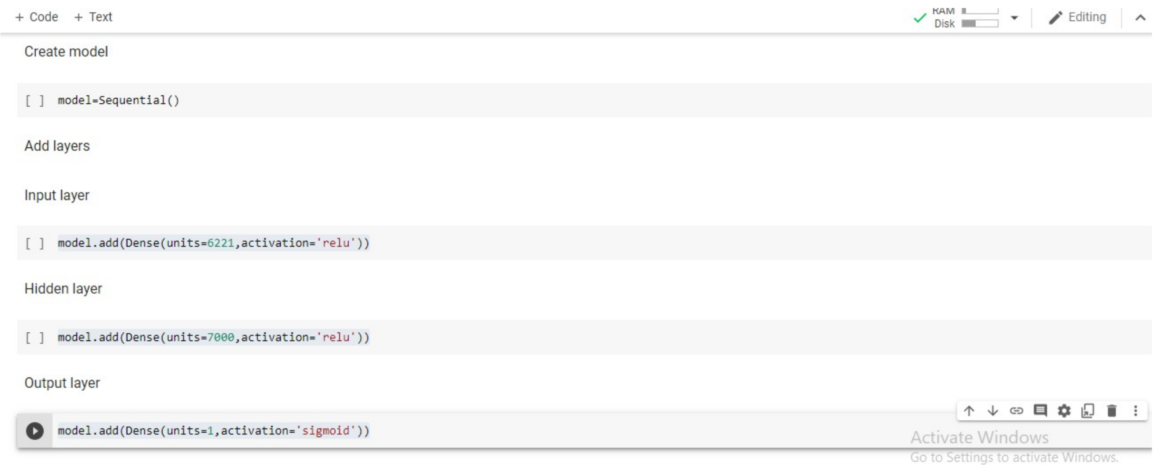
```
model=Sequential()
```

Question-5:

Add Layers (LSTM, Dense-(Hidden Layers), Output)

Solution

```
model.add(Dense(units=6221,activation='relu'))
model.add(Dense(units=7000,activation='relu'))
model.add(Dense(units=1,activation='sigmoid'))
```



Create model

```
[ ] model=Sequential()
```

Add layers

Input layer

```
[ ] model.add(Dense(units=6221,activation='relu'))
```

Hidden layer

```
[ ] model.add(Dense(units=7000,activation='relu'))
```

Output layer

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

Question-6:

Compile The Model

Solution

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

Compile the model

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

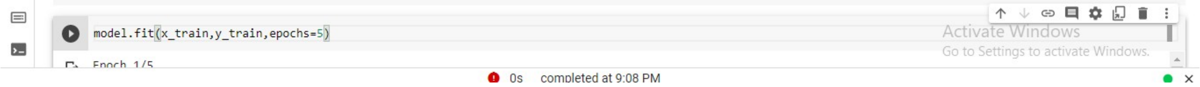
Fit the model

Question-7:

Fit The Model

Solution

```
model.fit(x_train,y_train,epochs=5)
```



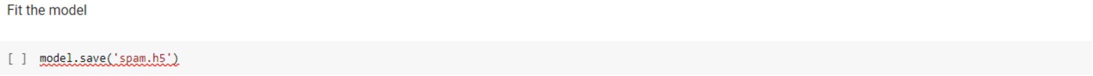
```
model.fit(x_train,y_train,epochs=5)
Epoch 1/5
```

Question-7:

Save The Model

Solution

model.save("Flowers.h5")



Fit the model

```
[ ] model.save('spam.h5')
```