```python
#spam SMS detection
import pandas as pd
import numpy as np
from sklearn.naive_bayes import MultinomialNB
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.metrics import classification_report, confusion_matrix, accuracy_score

df = pd.read_csv('spam.csv')
X=np.array(df['Message'])
y=np.array(df['Category'])
#print(X)
#print(y)
for i in range(len(y)):
    if y[i]=='ham':
        y[i]='not spam'
#print(y)

#splittting data and using coutVectorizer to get word count per training message
X_train, X_test, y_train, y_test = train_test_split(X, y,test_size=0.2)
#print(X_train)
cv=CountVectorizer()
X_train_WordCount=cv.fit_transform(X_train)
#print(X_train_WordCount.toarray()) #doesn't show full matrix due to its size...
print(f'shape of vector{X_train_WordCount.shape}')

#creating model with MultinomialNB since it works better with discrete values
model=MultinomialNB()
model.fit(X_train_WordCount,y_train)

#testing model with our own messages
pSpam1=['click here for your money reward']
pSpam1C=cv.transform(pSpam1)
print(f'{pSpam1}\t{model.predict(pSpam1C)}')
pSpam2=['Get your free prize as soon as possible']
pSpam2C=cv.transform(pSpam2)
print(f'{pSpam2}\t{model.predict(pSpam2C)}')
pNotSpam1=['Hi how are you doing?']
pNotSpam1C=cv.transform(pNotSpam1)
```

```python
40    print(f'{pNotSpam1}\t{model.predict(pNotSpam1C)}')
41    pNotSpam2=['Meet me at 8']
42    pNotSpam2C=cv.transform(pNotSpam2)
43    print(f'{pNotSpam2}\t{model.predict(pNotSpam2C)}')
44    userMessage=input("Enter a message to check: ")
45    userMessage=[userMessage]
46    userMessage=cv.transform(userMessage)
47    print(model.predict(userMessage))
48
49    #testing rest of dataset and getting accuracy score and confusion matrix
50    X_test_WordCount=cv.transform(X_test)
51    y_pred=model.predict(X_test_WordCount)
52    print(f'Accuracy score {accuracy_score(y_test,y_pred)}')
53    confusionMatrix = confusion_matrix(y_test, y_pred)
54    print(confusionMatrix)
55    print(classification_report(y_test, y_pred))
56
57    for i in range(len(y_pred)):
58        if y_pred[i] != y_test[i]:
59            print(f'{X_test[i]}\tPredicted: {y_pred[i]}\tActual: {y_test[i]}')
```

```
/usr/local/bin/python3 "/Users/raulrodriguez/Library/Mobile Documents/com~apple~CloudDocs/Documents/WorkSpaceVSPython/ProjectML.py"
● raulrodriguez@Rauls-Air WorkSpaceVSPython % /usr/local/bin/python3 "/Users/raulrodriguez/Library/Mobile Documents/com~apple~CloudDocs/Documents/WorkSpaceVSPython/ProjectML.py"
shape of vector(4457, 7708)
['click here for your money reward']    ['spam']
['Get your free prize as soon as possible']    ['spam']
['Hi how are you doing?']    ['not spam']
['Meet me at 8']    ['not spam']
Enter a message to check: click the link for free money
['spam']
Accuracy score 0.9847533632286996
[[966   2]
 [ 15 132]]
              precision    recall  f1-score   support

    not spam       0.98      1.00      0.99       968
        spam       0.99      0.90      0.94       147

    accuracy                           0.98      1115
   macro avg       0.98      0.95      0.97      1115
weighted avg       0.98      0.98      0.98      1115

How come it takes so little time for a child who is afraid of the dark to become a teenager who wants to stay out all night?    Predicted: not spam    Actual: spam
FreeMsg Hey there darling it's been 3 week's now and no word back! I'd like some fun you up for it still? Tb ok! XxX std chgs to send, £1.50 to rcv    Predicted: not spam    Actual: spam
26th OF JULY    Predicted: spam Actual: not spam
ROMCAPspam Everyone around should be responding well to your presence since you are so warm and outgoing. You are bringing in a real breath of sunshine.    Predicted: not spam    Actual: s
pam
Missed call alert. These numbers called but left no message. 07008009200    Predicted: not spam    Actual: spam
Am new 2 club & dont fink we met yet Will B gr8 2 C U Please leave msg 2day wiv ur area 09099726553 reply promised CARLIE x Calls£1/minMobsmore LKPOBOX177HP51FL    Predicted: not spam    A
ctual: spam
Yavnt tried yet and never played original either    Predicted: spam Actual: not spam
Hi I'm sue. I am 20 years old and work as a lapdancer. I love sex. Text me live - I'm i my bedroom now. text SUE to 89555. By TextOperator G2 1DA 150ppmsg 18+    Predicted: not spam    Actual: s
pam
CLAIRE here am havin borin time & am now alone U wanna cum over 2nite? Chat now 09099725823 hope 2 C U Luv CLAIRE xx Calls£1/minmoremobsEMSPOBox45PO139WA    Predicted: not spam    Actual: s
pam
Guess who am I?This is the first time I created a web page WWW.ASJESUS.COM read all I wrote. I'm waiting for your opinions. I want to be your friend 1/1    Predicted: not spam    Actual: s
pam
Your next amazing xxx PICSFREE1 video will be sent to you enjoy! If one vid is not enough for 2day text back the keyword PICSFREE1 to get the next video.    Predicted: not spam    Actual: s
pam
Would you like to see my XXX pics they are so hot they were nearly banned in the uk!    Predicted: not spam    Actual: spam
Sorry I missed your call let's talk when you have the time. I'm on 07090201529    Predicted: not spam    Actual: spam
I want some cock! My hubby's away, I need a real man 2 satisfy me. Txt WIFE to 89938 for no strings action. (Txt STOP 2 end, txt rec £1.50ea. OTBox 731 LA1 7WS. )    Predicted: not spam    A
ctual: spam
Not heard from U4 a while. Call me now am here all night with just my knickers on. Make me beg for it like U did last time 01223585236 XX Luv Nikiyu4.net    Predicted: not spam    Actual: s
pam
Back 2 work 2morro half term over! Can U C me 2nite 4 some sexy passion B4 I have 2 go back? Chat NOW 09099726481 Luv DENA Calls £1/minMobsmoreLKPOBOX177HP51FL Predicted: not spam    Actual: s
pam
LookAtMe!: Thanks for your purchase of a video clip from LookAtMe!, you've been charged 35p. Think you can do better? Why not send a video in a MMSto 32323.    Predicted: not spam    Actual: s
pam
○ raulrodriguez@Rauls-Air WorkSpaceVSPython %
```