1 - IMPORTING NECESSARY LIBRARIES

In [1]:
```
import pandas as pd
import numpy as np
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.model_selection import train_test_split
from sklearn.linear_model import PassiveAggressiveClassifier
from sklearn.metrics import accuracy_score, confusion_matrix,
                                            classification_report
import itertools
import seaborn as sns
import matplotlib.pyplot as plt
```

2 - READ AND EXPLORE THE DATASET

In [15]:
```
news_data= pd.read_csv("news.csv")
news_data.head(5)
```

Out[15]:

	Unnamed: 0	title	text	label
0	8476	You Can Smell Hillary's Fear	Daniel Greenfield, a Shillman Journalism Fello...	FAKE
1	10294	Watch The Exact Moment Paul Ryan Committed Pol...	Google Pinterest Digg Linkedin Reddit Stumbleu...	FAKE
2	3608	Kerry to go to Paris in gesture of sympathy	U.S. Secretary of State John F. Kerry said Mon...	REAL
3	10142	Bernie supporters on Twitter erupt in anger ag...	— Kaydee King (@KaydeeKing) November 9, 2016 T...	FAKE
4	875	The Battle of New York: Why This Primary Matters	It's primary day in New York and front-runners...	REAL

In [16]:
```
news_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6335 entries, 0 to 6334
Data columns (total 4 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Unnamed: 0  6335 non-null   int64 
 1   title       6335 non-null   object
 2   text        6335 non-null   object
 3   label       6335 non-null   object
dtypes: int64(1), object(3)
memory usage: 198.1+ KB
```

In [17]:
```
news_data.shape
```

Out[17]:
```
(6335, 4)
```

In [18]:
```
news_data["label"].value_counts()
```

Out[18]:
```
label
REAL    3171
FAKE    3164
Name: count, dtype: int64
```

In [20]:
```
labels= news_data.label
labels.head(5)
```

Out[20]:
```
0    FAKE
1    FAKE
2    REAL
3    FAKE
4    REAL
Name: label, dtype: object
```

3 - BUILD THE MODEL

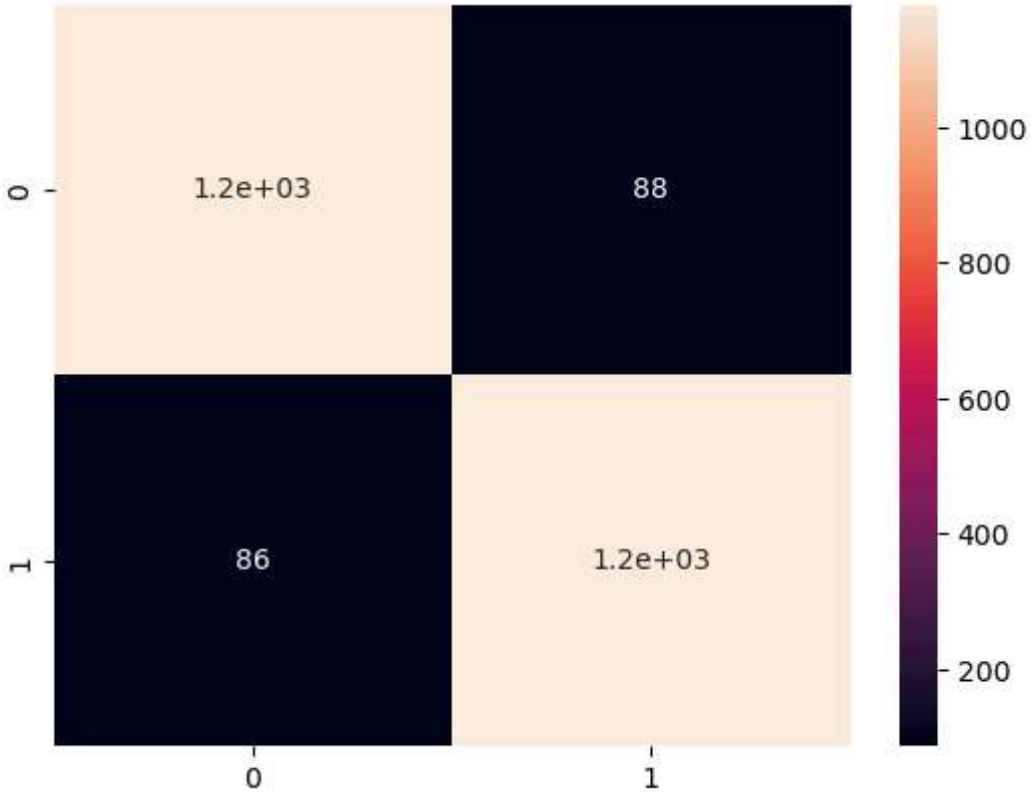
In [21]:
```
#First, we split the dataset into train & test samples:
x_train, x_test, y_train, y_test= train_test_split(news_data["text"],
                                   labels, test_size= 0.4, random_state= 7)

vectorizer=TfidfVectorizer(stop_words='english', max_df=0.7)
tfidf_train=vectorizer.fit_transform(x_train)
tfidf_test=vectorizer.transform(x_test)

#PassiveAggressiveClassifier
passive=PassiveAggressiveClassifier(max_iter=50)
passive.fit(tfidf_train,y_train)

y_pred=passive.predict(tfidf_test)
```

4 - EVALUATE THE MODEL'S ACCURACY

In [22]:
```
# confusion matrix
matrix= confusion_matrix(y_test,y_pred, labels=['FAKE','REAL'])
matrix
```

Out[22]:
```
array([[1182,   88],
       [  86, 1178]], dtype=int64)
```

In [23]:
```
sns.heatmap(matrix, annot=True)
plt.show()
```



In [24]:
```
# model's accuracy
Accuracy=accuracy_score(y_test,y_pred)
Accuracy*100
```

Out[24]:
```
93.1333859510655
```

In [25]:
```
Report= classification_report(y_test, y_pred)
print(Report)
```

```
              precision    recall  f1-score   support

        FAKE       0.93      0.93      0.93      1270
        REAL       0.93      0.93      0.93      1264

    accuracy                           0.93      2534
   macro avg       0.93      0.93      0.93      2534
weighted avg       0.93      0.93      0.93      2534
```