In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
diabetes = pd.read_csv('diabetes.csv')
print(diabetes.columns)
```

```
Index(['Pregnancies', 'Glucose', 'BloodPressure', 'SkinThickness', 'Insulin',
       'BMI', 'DiabetesPedigreeFunction', 'Age', 'Outcome'],
      dtype='object')
```

In [2]:

```
print("dimension of diabetes data: {}".format(diabetes.shape))
```

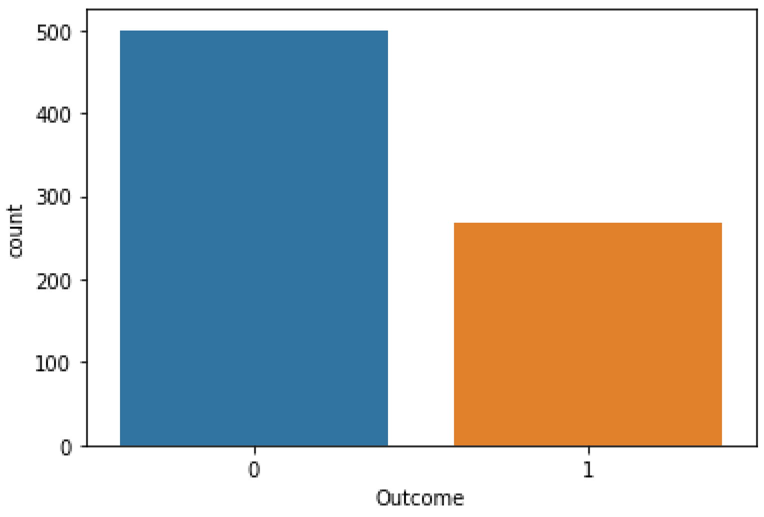
```
dimension of diabetes data: (768, 9)
```

In [3]:

```
import seaborn as sns
sns.countplot(diabetes['Outcome'],label="Count")
```

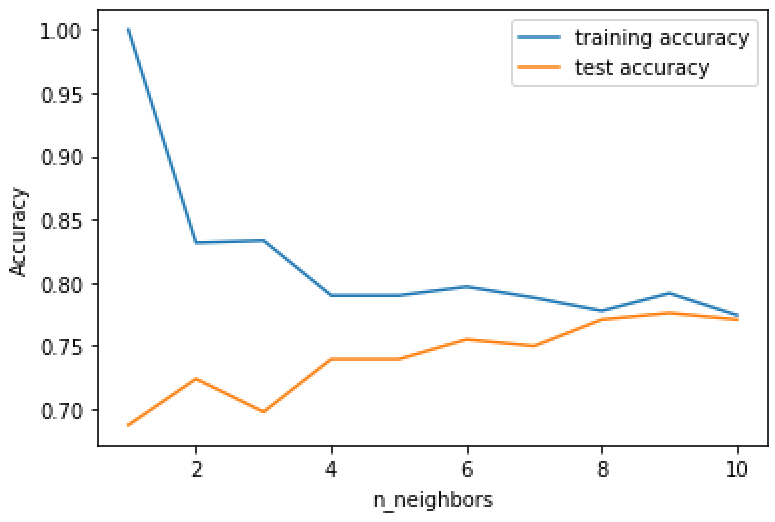
Out[3]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x175b60fa948>
```



In [4]:

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(diabetes.loc[:, diabetes.columns != 'Out
come'], diabetes['Outcome'], stratify=diabetes['Outcome'], random_state=66)
from sklearn.neighbors import KNeighborsClassifier
training_accuracy = []
test_accuracy = []
# try n_neighbors from 1 to 10
neighbors_settings = range(1, 11)
for n_neighbors in neighbors_settings:
    # build the model
    knn = KNeighborsClassifier(n_neighbors=n_neighbors)
    knn.fit(X_train, y_train)
    # record training set accuracy
    training_accuracy.append(knn.score(X_train, y_train))
    # record test set accuracy
    test_accuracy.append(knn.score(X_test, y_test))
plt.plot(neighbors_settings, training_accuracy, label="training accuracy")
plt.plot(neighbors_settings, test_accuracy, label="test accuracy")
plt.ylabel("Accuracy")
plt.xlabel("n_neighbors")
plt.legend()
plt.savefig('knn_compare_model')
```



In [5]:

```
knn = KNeighborsClassifier(n_neighbors=9)
knn.fit(X_train, y_train)
print('Accuracy of K-NN classifier on training set: {:.2f}'.format(knn.score(X_train, y_trai
n)))
print('Accuracy of K-NN classifier on test set: {:.2f}'.format(knn.score(X_test, y_test)))
```

```
Accuracy of K-NN classifier on training set: 0.79
Accuracy of K-NN classifier on test set: 0.78
```

In [6]:

```
from sklearn.linear_model import LogisticRegression
logreg = LogisticRegression().fit(X_train, y_train)
print("Training set score: {:.3f}".format(logreg.score(X_train, y_train)))
print("Test set score: {:.3f}".format(logreg.score(X_test, y_test)))
```

```
Training set score: 0.781
Test set score: 0.771
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\linear_model\logistic.py:432: FutureWarnin
g: Default solver will be changed to 'lbfgs' in 0.22. Specify a solver to silence this warnin
g.
  FutureWarning)
```

In [9]:

```
tree = DecisionTreeClassifier(max_depth=3, random_state=0)
tree.fit(X_train, y_train)
print("Accuracy on training set: {:.3f}".format(tree.score(X_train, y_train)))
print("Accuracy on test set: {:.3f}".format(tree.score(X_test, y_test)))
```

```
Accuracy on training set: 0.773
Accuracy on test set: 0.740
```

In [10]:

```
from sklearn.ensemble import RandomForestClassifier
rf = RandomForestClassifier(n_estimators=100, random_state=0)
rf.fit(X_train, y_train)
print("Accuracy on training set: {:.3f}".format(rf.score(X_train, y_train)))
print("Accuracy on test set: {:.3f}".format(rf.score(X_test, y_test)))
```

```
Accuracy on training set: 1.000
Accuracy on test set: 0.786
```

In [11]:

```
rf1 = RandomForestClassifier(max_depth=3, n_estimators=100, random_state=0)
rf1.fit(X_train, y_train)
print("Accuracy on training set: {:.3f}".format(rf1.score(X_train, y_train)))
print("Accuracy on test set: {:.3f}".format(rf1.score(X_test, y_test)))
```

```
Accuracy on training set: 0.800
Accuracy on test set: 0.755
```