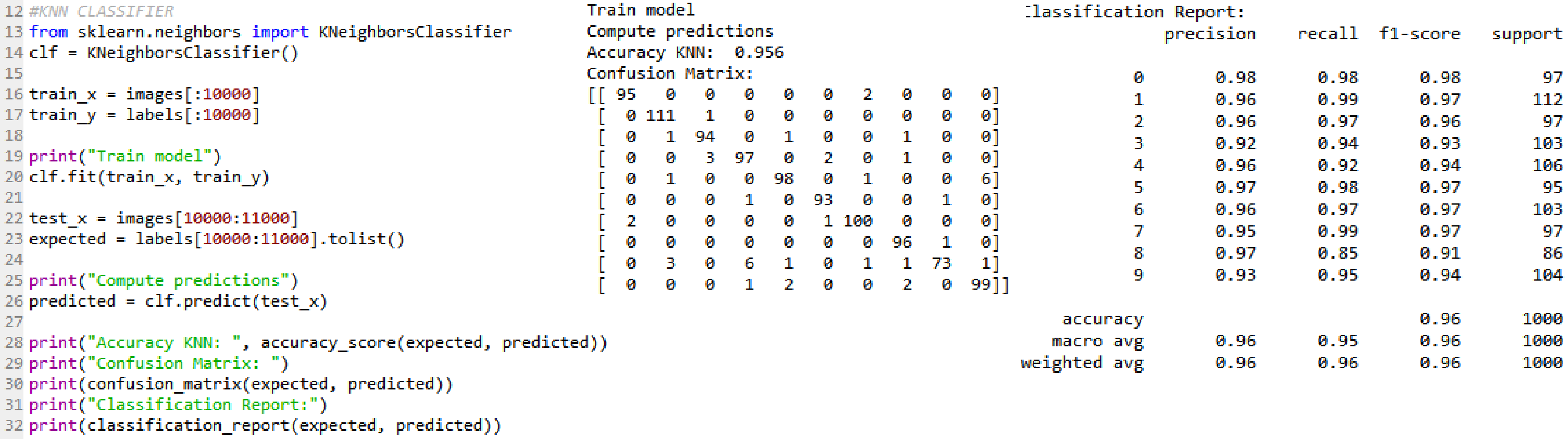
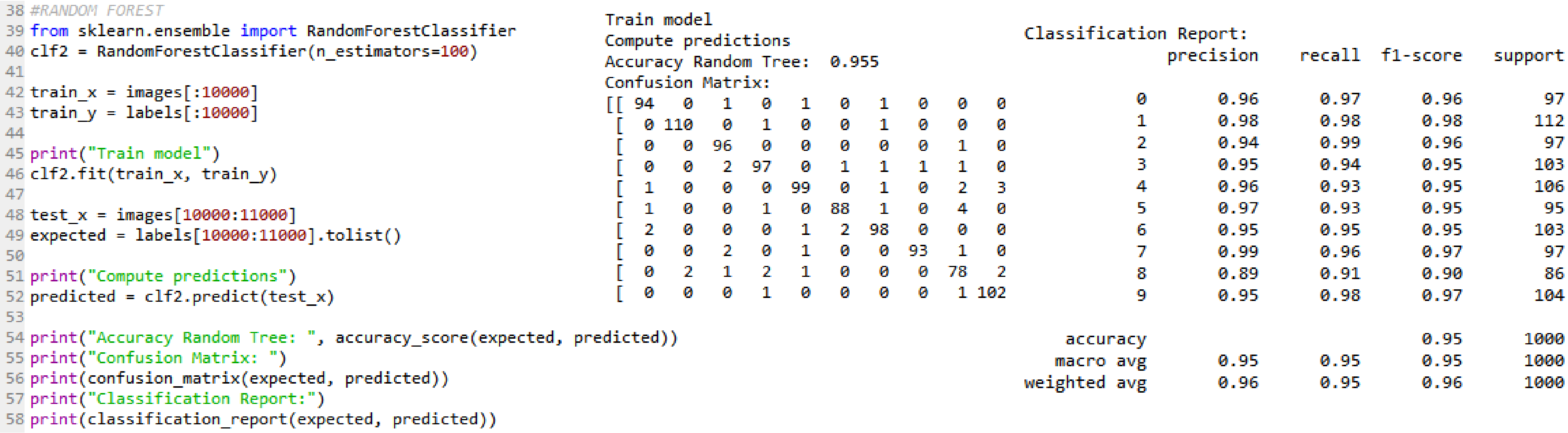


```python
#KNN CLASSIFIER
from sklearn.neighbors import KNeighborsClassifier
clf = KNeighborsClassifier()

train_x = images[:10000]
train_y = labels[:10000]

print("Train model")
clf.fit(train_x, train_y)

test_x = images[10000:11000]
expected = labels[10000:11000].tolist()

print("Compute predictions")
predicted = clf.predict(test_x)

print("Accuracy KNN: ", accuracy_score(expected, predicted))
print("Confusion Matrix: ")
print(confusion_matrix(expected, predicted))
print("Classification Report:")
print(classification_report(expected, predicted))
```

```
Train model
Compute predictions
Accuracy KNN:  0.956
Confusion Matrix:
[[ 95   0   0   0   0   0   2   0   0   0]
 [  0 111   1   0   0   0   0   0   0   0]
 [  0   1  94   0   1   0   0   1   0   0]
 [  0   0   3  97   0   2   0   1   0   0]
 [  0   1   0   0  98   0   1   0   0   6]
 [  0   0   0   1   0  93   0   0   1   0]
 [  2   0   0   0   0   1 100   0   0   0]
 [  0   0   0   0   0   0   0  96   1   0]
 [  0   3   0   6   1   0   1   1  73   1]
 [  0   0   0   1   2   0   0   2   0  99]]
```

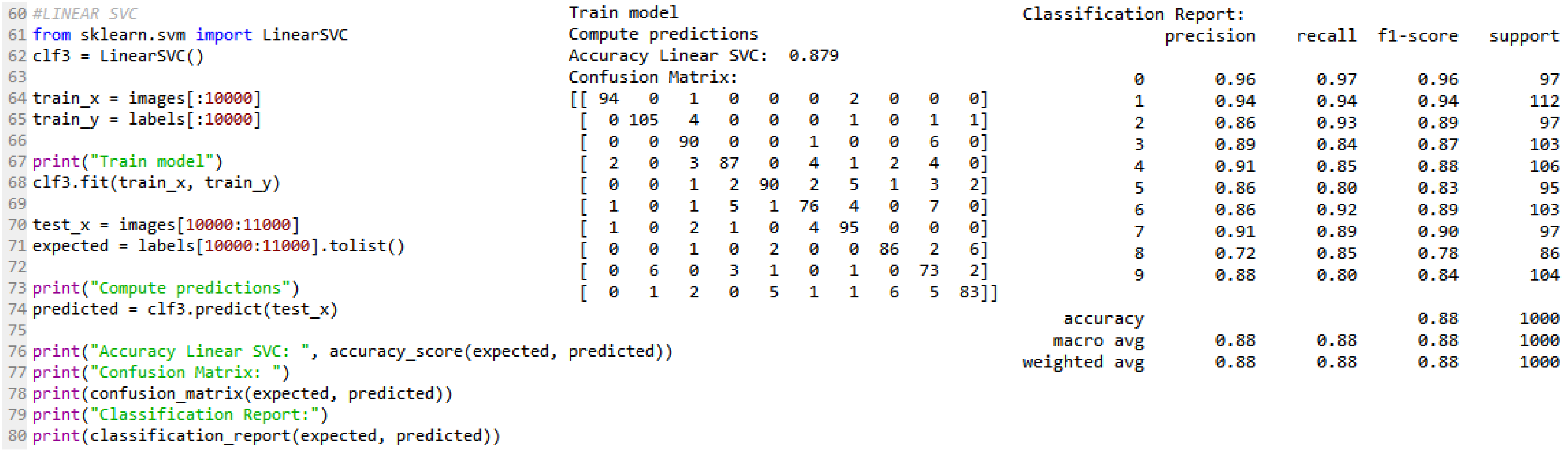
```
Classification Report:
              precision    recall  f1-score   support

           0       0.98      0.98      0.98        97
           1       0.96      0.99      0.97       112
           2       0.96      0.97      0.96        97
           3       0.92      0.94      0.93       103
           4       0.96      0.92      0.94       106
           5       0.97      0.98      0.97        95
           6       0.96      0.97      0.97       103
           7       0.95      0.99      0.97        97
           8       0.97      0.85      0.91        86
           9       0.93      0.95      0.94       104

    accuracy                           0.96      1000
   macro avg       0.96      0.95      0.96      1000
weighted avg       0.96      0.96      0.96      1000
```



```python
#RANDOM FOREST
from sklearn.ensemble import RandomForestClassifier
clf2 = RandomForestClassifier(n_estimators=100)

train_x = images[:10000]
train_y = labels[:10000]

print("Train model")
clf2.fit(train_x, train_y)

test_x = images[10000:11000]
expected = labels[10000:11000].tolist()

print("Compute predictions")
predicted = clf2.predict(test_x)

print("Accuracy Random Tree: ", accuracy_score(expected, predicted))
print("Confusion Matrix: ")
print(confusion_matrix(expected, predicted))
print("Classification Report:")
print(classification_report(expected, predicted))
```

```
Train model
Compute predictions
Accuracy Random Tree:  0.955
Confusion Matrix:
[[ 94   0   1   0   1   0   1   0   0   0
 [  0 110   0   1   0   0   1   0   0   0
 [  0   0  96   0   0   0   0   0   1   0
 [  0   0   2  97   0   1   1   1   1   0
 [  1   0   0   0  99   0   1   0   2   3
 [  1   0   0   1   0  88   1   0   4   0
 [  2   0   0   0   1   2  98   0   0   0
 [  0   0   2   0   1   0   0  93   1   0
 [  0   2   1   2   1   0   0   0  78   2
 [  0   0   0   1   0   0   0   0   1 102
```

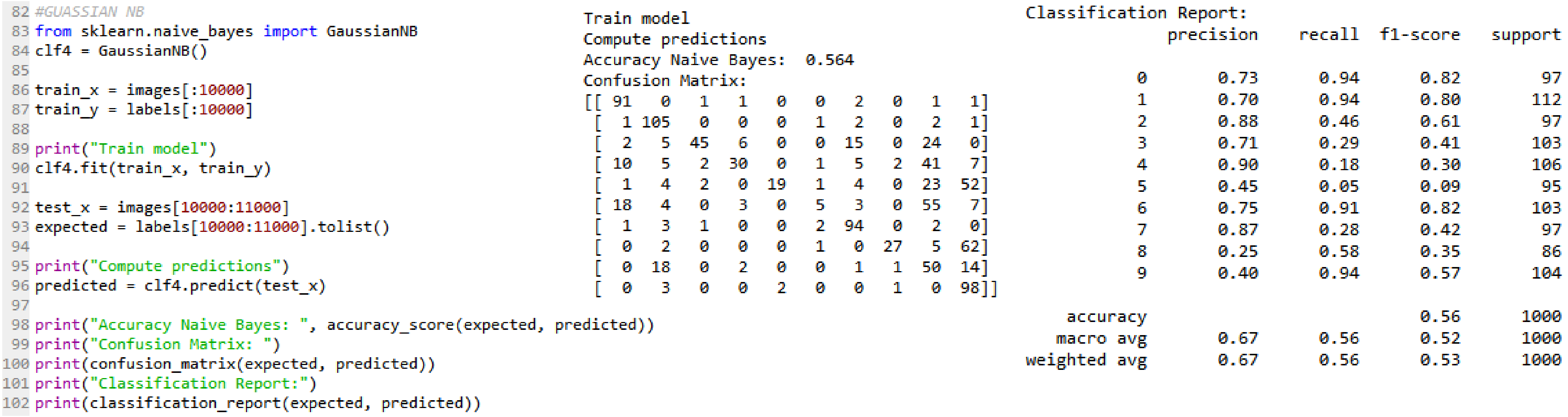
```
Classification Report:
              precision    recall  f1-score   support

           0       0.96      0.97      0.96        97
           1       0.98      0.98      0.98       112
           2       0.94      0.99      0.96        97
           3       0.95      0.94      0.95       103
           4       0.96      0.93      0.95       106
           5       0.97      0.93      0.95        95
           6       0.95      0.95      0.95       103
           7       0.99      0.96      0.97        97
           8       0.89      0.91      0.90        86
           9       0.95      0.98      0.97       104

    accuracy                           0.95      1000
   macro avg       0.95      0.95      0.95      1000
weighted avg       0.96      0.95      0.96      1000
```



```python
#LINEAR SVC
from sklearn.svm import LinearSVC
clf3 = LinearSVC()

train_x = images[:10000]
train_y = labels[:10000]

print("Train model")
clf3.fit(train_x, train_y)

test_x = images[10000:11000]
expected = labels[10000:11000].tolist()

print("Compute predictions")
predicted = clf3.predict(test_x)

print("Accuracy Linear SVC: ", accuracy_score(expected, predicted))
print("Confusion Matrix: ")
print(confusion_matrix(expected, predicted))
print("Classification Report:")
print(classification_report(expected, predicted))
```

```
Train model
Compute predictions
Accuracy Linear SVC:  0.879
Confusion Matrix:
[[ 94   0   1   0   0   0   2   0   0   0]
 [  0 105   4   0   0   0   1   0   1   1]
 [  0   0  90   0   0   1   0   0   6   0]
 [  2   0   3  87   0   4   1   2   4   0]
 [  0   0   1   2  90   2   5   1   3   2]
 [  1   0   1   5   1  76   4   0   7   0]
 [  1   0   2   1   0   4  95   0   0   0]
 [  0   0   1   0   2   0   0  86   2   6]
 [  0   6   0   3   1   0   1   0  73   2]
 [  0   1   2   0   5   1   1   6   5  83]]
```

```
Classification Report:
              precision    recall  f1-score   support

           0       0.96      0.97      0.96        97
           1       0.94      0.94      0.94       112
           2       0.86      0.93      0.89        97
           3       0.89      0.84      0.87       103
           4       0.91      0.85      0.88       106
           5       0.86      0.80      0.83        95
           6       0.86      0.92      0.89       103
           7       0.91      0.89      0.90        97
           8       0.72      0.85      0.78        86
           9       0.88      0.80      0.84       104

    accuracy                           0.88      1000
   macro avg       0.88      0.88      0.88      1000
weighted avg       0.88      0.88      0.88      1000
```



```python
#GUASSIAN NB
from sklearn.naive_bayes import GaussianNB
clf4 = GaussianNB()

train_x = images[:10000]
train_y = labels[:10000]

print("Train model")
clf4.fit(train_x, train_y)

test_x = images[10000:11000]
expected = labels[10000:11000].tolist()

print("Compute predictions")
predicted = clf4.predict(test_x)

print("Accuracy Naive Bayes: ", accuracy_score(expected, predicted))
print("Confusion Matrix: ")
print(confusion_matrix(expected, predicted))
print("Classification Report:")
print(classification_report(expected, predicted))
```

```
Train model
Compute predictions
Accuracy Naive Bayes:  0.564
Confusion Matrix:
[[ 91   0   1   1   0   0   2   0   1   1]
 [  1 105   0   0   0   1   2   0   2   1]
 [  2   5  45   6   0   0  15   0  24   0]
 [ 10   5   2  30   0   1   5   2  41   7]
 [  1   4   2   0  19   1   4   0  23  52]
 [ 18   4   0   3   0   5   3   0  55   7]
 [  1   3   1   0   0   2  94   0   2   0]
 [  0   2   0   0   0   1   0  27   5  62]
 [  0  18   0   2   0   0   1   1  50  14]
 [  0   3   0   0   2   0   0   1   0  98]]
```

```
Classification Report:
              precision    recall  f1-score   support

           0       0.73      0.94      0.82        97
           1       0.70      0.94      0.80       112
           2       0.88      0.46      0.61        97
           3       0.71      0.29      0.41       103
           4       0.90      0.18      0.30       106
           5       0.45      0.05      0.09        95
           6       0.75      0.91      0.82       103
           7       0.87      0.28      0.42        97
           8       0.25      0.58      0.35        86
           9       0.40      0.94      0.57       104

    accuracy                           0.56      1000
   macro avg       0.67      0.56      0.52      1000
weighted avg       0.67      0.56      0.53      1000
```