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In [1]:

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [3]:

```
df = pd.read_csv('emails.csv')
df.head()
```

Out[3]:

	Email No.	the	to	ect	and	for	of	a	you	hou	...	connevey	jay	valued	lay	infrastr
0	Email 1	0	0	1	0	0	0	2	0	0	...	0	0	0	0	0
1	Email 2	8	13	24	6	6	2	102	1	27	...	0	0	0	0	0
2	Email 3	0	0	1	0	0	0	8	0	0	...	0	0	0	0	0
3	Email 4	0	5	22	0	5	1	51	2	10	...	0	0	0	0	0
4	Email 5	7	6	17	1	5	2	57	0	9	...	0	0	0	0	0

5 rows × 3002 columns

In [5]:

```
df.isnull().sum()
```

Out[5]:

```
Email No.     0
the           0
to            0
```

```
df.dropna(how='any',inplace=True)
```

```
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ect           0
and           0
.. military
0 allowing      0
ff            0
dry           0
Prediction    0
Length: 3002, dtype: int64
```

In [6]:

In [7]:

```
x = df.iloc[:,1:-1].values
y = df.iloc[:,-1].values
```

In [8]:

```
from sklearn.model_selection import train_test_split x_train,x_test,y_train,y_test =
train_test_split(x,y,test_size=0.25,random_state=10)
```

In [68]:

```
from sklearn.metrics import ConfusionMatrixDisplay,confusion_matrix,accuracy_score,preci
def report(classifier):
    y_pred = classifier.predict(x_test)
cm = confusion_matrix(y_test,y_pred)
    display = ConfusionMatrixDisplay(cm,display_labels=classifier.classes_)
display.plot()
    print(f"Accuracy:  {accuracy_score(y_test,y_pred)}")
print(f"Precision Score:  {precision_score(y_test,y_pred)}")
print(f"Recall Score:  {recall_score(y_test,y_pred)}")
plot_precision_recall_curve(classifier,x_test,y_test)
plot_roc_curve(classifier,x_test,y_test)
```

K-Nearest Neighbours Classifier

In [69]:

```
from sklearn.neighbors import KNeighborsClassifier
```

In [70]:

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```
kNN = KNeighborsClassifier(n_neighbors=10)
kNN.fit(x_train,y_train)
```

Out[70]:

```
KNeighborsClassifier(n_neighbors=10)
```

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In [71]:

```
report(kNN)
```

```
Accuracy:  0.8747099767981439
Precision Score:  0.7613065326633166
Recall Score:  0.8189189189189189

/home/pratik/.local/lib/python3.8/site-packages/sklearn/utils/deprecatio
n.py:87: FutureWarning: Function plot_precision_recall_curve is deprecate
d; Function `plot_precision_recall_curve` is deprecated in 1.0 and will b
e removed in 1.2. Use one of the class methods: PrecisionRecallDisplay.fr
om_predictions or PrecisionRecallDisplay.from_estimator.
  warnings.warn(msg, category=FutureWarning)
/home/pratik/.local/lib/python3.8/site-packages/sklearn/utils/deprecatio
n.py:87: FutureWarning: Function plot_roc_curve is deprecated; Function :
func:`plot_roc_curve` is deprecated in 1.0 and will be removed in 1.2. Us
e one of the class methods: :meth:`sklearn.metrics.RocCurveDisplay.from_p
redictions` or :meth:`sklearn.metrics.RocCurveDisplay.from_estimator`.
  warnings.warn(msg, category=FutureWarning)
```

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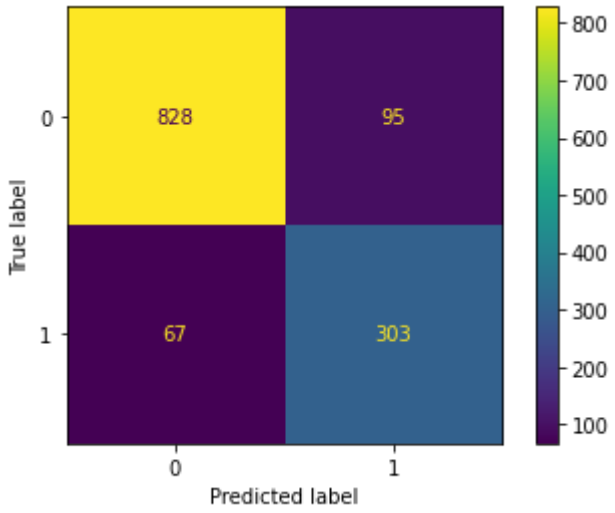

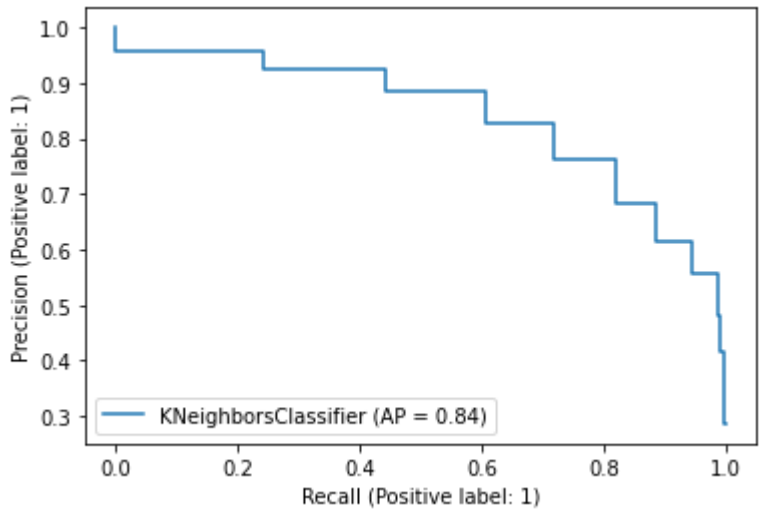

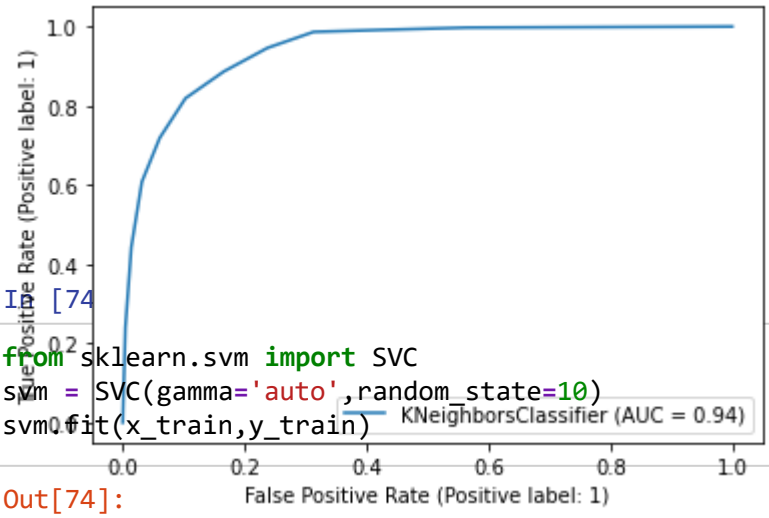

In [74]:
```
from sklearn.svm import SVC
svm = SVC(gamma='auto',random_state=10)
svm.fit(x_train,y_train)
```

Out[74]:

```
SVC(gamma='auto', random_state=10)
```

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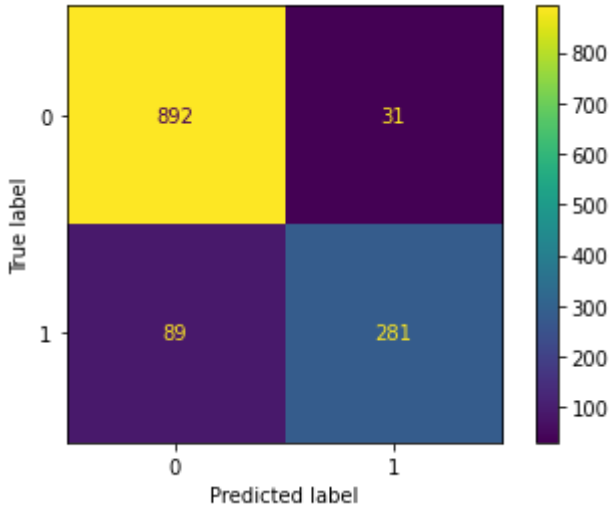
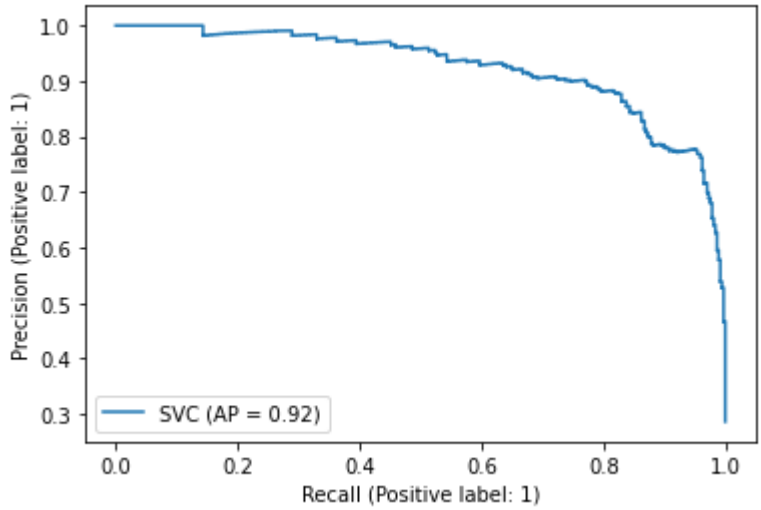
In [75]:

```
report(svm)
```

```
Accuracy:  0.9071925754060325
Precision Score:  0.9006410256410257
Recall Score:  0.7594594594594595

/home/pratik/.local/lib/python3.8/site-packages/sklearn/utils/deprecatio
n.py:87: FutureWarning: Function plot_precision_recall_curve is deprecate
d; Function `plot_precision_recall_curve` is deprecated in 1.0 and will b
e removed in 1.2. Use one of the class methods: PrecisionRecallDisplay.fr
om_predictions or PrecisionRecallDisplay.from_estimator.
warnings.warn(msg, category=FutureWarning)
/home/pratik/.local/lib/python3.8/site-packages/sklearn/utils/deprecatio
n.py:87: FutureWarning: Function plot_roc_curve is deprecated; Function :
func:`plot_roc_curve` is deprecated in 1.0 and will be removed in 1.2. Us
e one of the class methods: :meth:`sklearn.metrics.RocCurveDisplay.from_p
redictions` or :meth:`sklearn.metrics.RocCurveDisplay.from_estimator`.
warnings.warn(msg, category=FutureWarning)
```





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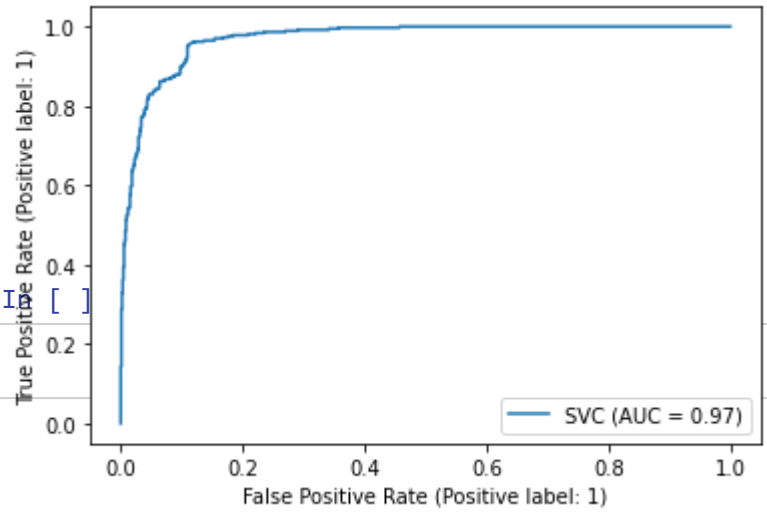

In [ ]