In [1]:
```
import pandas as pd
df = pd.read_csv('./Iris.csv')
df = df.drop('Id',axis=1)
```

In [2]:
```
print(df.Species.dtype)
```

```
object
```

In [3]:
```
from sklearn import preprocessing

if df.Species.dtype == 'object':
    lbl = preprocessing.LabelEncoder()
    lbl.fit(list(df.Species.values))
    df.Species = lbl.transform(list(df.Species.values))

print(df.Species.dtype)
```

```
int64
```

In [4]:
```
from sklearn.model_selection import train_test_split

Y = df.Species.values
X = df.drop(['Species'],axis=1).values

x_train, x_test, y_train, y_test = train_test_split(X,Y, test_size= 0.20, random_s
```

In [5]:
```
from sklearn.naive_bayes import GaussianNB
from sklearn.metrics import accuracy_score
gnb = GaussianNB()
NaiveBayesModel = gnb.fit(x_train, y_train)
y_pred = NaiveBayesModel.predict(x_test)
accuracy_score(y_test, y_pred)
```

Out[5]:
```
0.9
```

In [6]:
```
from sklearn.metrics import confusion_matrix
con_mat = confusion_matrix(y_test,y_pred)
print(con_mat)
```

```
[[ 7  0  0]
 [ 0 10  1]
 [ 0  2 10]]
```

In [7]:
```
import seaborn as sn

sn.set(font_scale=1.4)
sn.heatmap(pd.DataFrame(con_mat), annot=True,annot_kws={"size": 16})
```

Out[7]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2cd65373e48>
```

In [8]:
```
from sklearn import svm

from sklearn.metrics import average_precision_score

x_train, x_test, y_train, y_test = train_test_split(X[Y<2],Y[Y<2], test_size= 0.95

classifier = svm.LinearSVC(random_state=27)
classifier.fit(x_train, y_train)
y_score = classifier.decision_function(x_test)

average_precision = average_precision_score(y_test, y_score)
print('Average precision-recall score: {0:0.2f}'.format(average_precision))
```

```
Average precision-recall score: 1.00
```

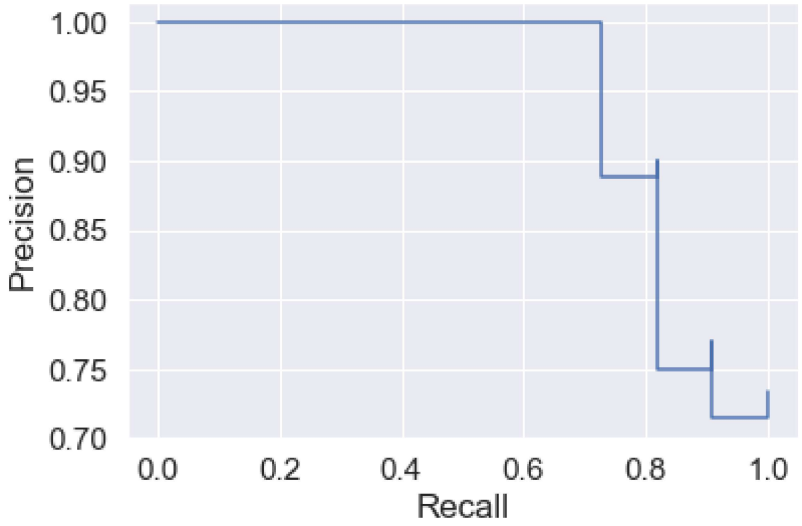
Since the precision-recall score is 100%, we will try adding noise data and build the SVM model.

In [9]:
```
import numpy as np
# Add noisy features
random_state = np.random.RandomState(0)
n_samples, n_features = X.shape
X = np.c_[X, random_state.randn(n_samples, 200 * n_features)]

x_train, x_test, y_train, y_test = train_test_split(X[Y<2],Y[Y<2], test_size= 0.20
```

In [10]:
```
from sklearn.metrics import precision_recall_curve
import matplotlib.pyplot as plt

classifier = svm.SVC(kernel='linear', random_state=27)
classifier.fit(x_train, y_train)
y_score = classifier.decision_function(x_test)

print('Average precision-recall score:',average_precision_score(y_test, y_score))
precision, recall, _ = precision_recall_curve(y_test, y_score)

plt.step(recall, precision, color='b')
plt.xlabel('Recall')
plt.ylabel('Precision')
```

```
Average precision-recall score: 0.9456876456876457
```

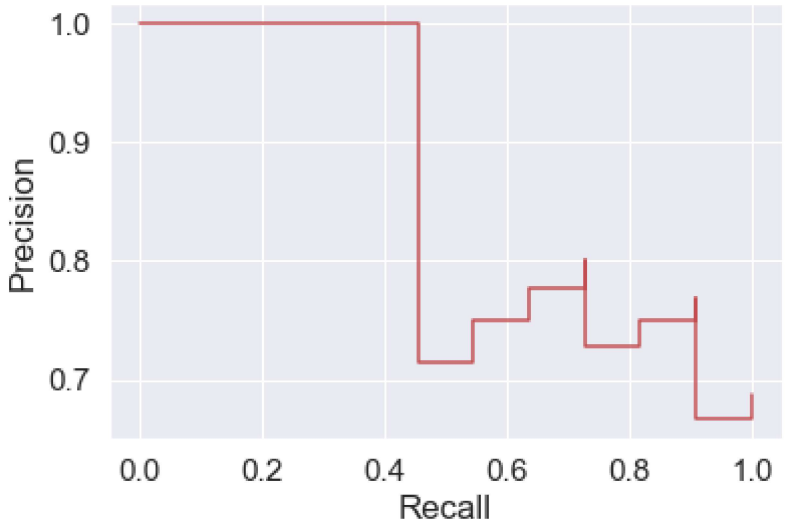
Out[10]:
```
Text(0,0.5,'Precision')
```



In [11]:
```
classifier = svm.SVC(kernel='poly', random_state=27)
classifier.fit(x_train, y_train)
y_score = classifier.decision_function(x_test)

print('Average precision-recall score:',average_precision_score(y_test, y_score))
precision, recall, _ = precision_recall_curve(y_test, y_score)

plt.step(recall, precision, color='r')
plt.xlabel('Recall')
plt.ylabel('Precision')
```

```
Average precision-recall score: 0.8667735042735043
```

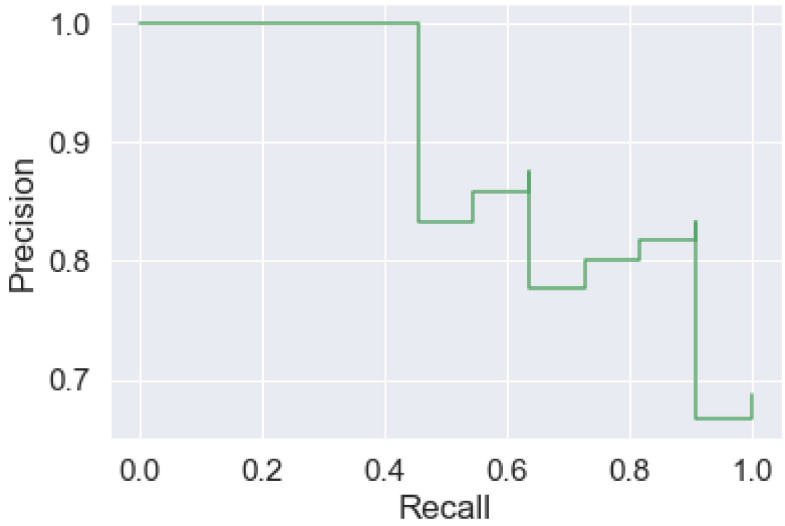
Out[11]: Text(0,0.5,'Precision')



In [12]:
```
classifier = svm.SVC(kernel='rbf', random_state=27)
classifier.fit(x_train, y_train)
y_score = classifier.decision_function(x_test)

print('Average precision-recall score:',average_precision_score(y_test, y_score))
precision, recall, _ = precision_recall_curve(y_test, y_score)

plt.step(recall, precision, color='g')
plt.xlabel('Recall')
plt.ylabel('Precision')
```

```
Average precision-recall score: 0.8973780007870917
```

Out[12]: Text(0,0.5,'Precision')



In [ ]:
```

```