In [2]:

```
#Name: Reeti Jha
#Reg no: RA1911030010121
#Assignment 5
```

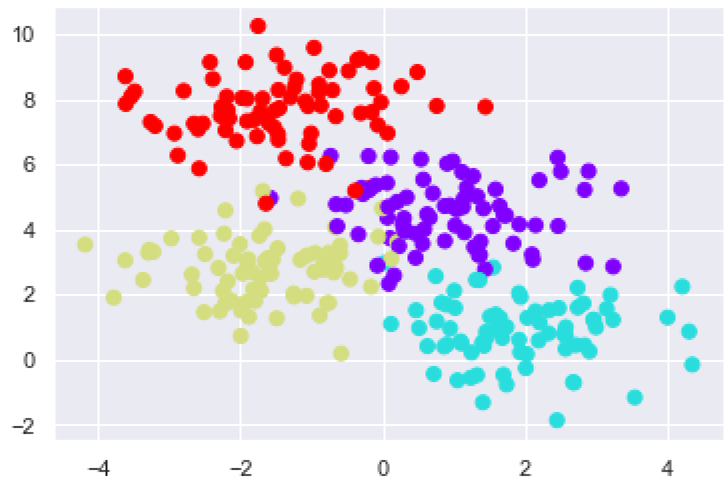
In [1]:

```
%matplotlib inline
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns; sns.set()
```

Creation and estimation of a decision Tree

In [2]:

```
from sklearn.datasets import make_blobs

X, y = make_blobs(n_samples=300, centers=4,
                  random_state=0, cluster_std=1.0)
plt.scatter(X[:, 0], X[:, 1], c=y, s=50, cmap='rainbow');
```



In [3]:

```
from sklearn.tree import DecisionTreeClassifier
tree = DecisionTreeClassifier().fit(X, y)
```

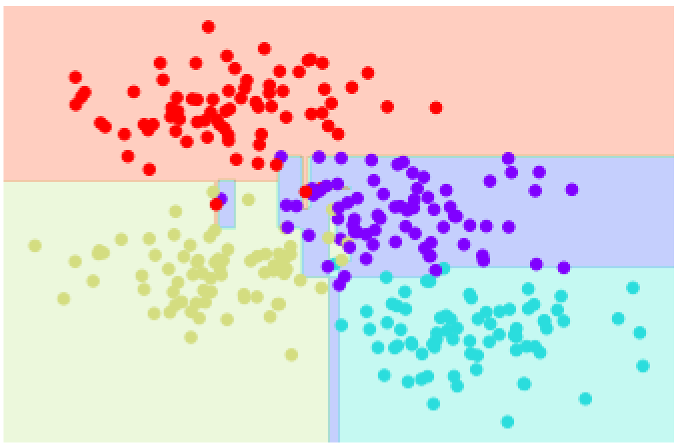
In [4]:

```
def visualize_classifier(model, X, y, ax=None, cmap='rainbow'):
    ax = ax or plt.gca()

    # Plot the training points
    ax.scatter(X[:, 0], X[:, 1], c=y, s=30, cmap=cmap,
               clim=(y.min(), y.max()), zorder=3)
    ax.axis('tight')
    ax.axis('off')
    xlim = ax.get_xlim()
    ylim = ax.get_ylim()

    # fit the estimator
    model.fit(X, y)
    xx, yy = np.meshgrid(np.linspace(*xlim, num=200),
                         np.linspace(*ylim, num=200))
    Z = model.predict(np.c_[xx.ravel(), yy.ravel()]).reshape(xx.shape)

    # Create a color plot with the results
    n_classes = len(np.unique(y))
    contours = ax.contourf(xx, yy, Z, alpha=0.3,
                           levels=np.arange(n_classes + 1) - 0.5,
                           cmap=cmap, clim=(y.min(), y.max()),
                           zorder=1)

    ax.set(xlim=xlim, ylim=ylim)
```

In [5]:

```
visualize_classifier(DecisionTreeClassifier(), X, y)
```

```
C:\Users\jhare\anaconda3\lib\site-packages\ipykernel_launcher.py:23: Use
rWarning: The following kwargs were not used by contour: 'clim'
```

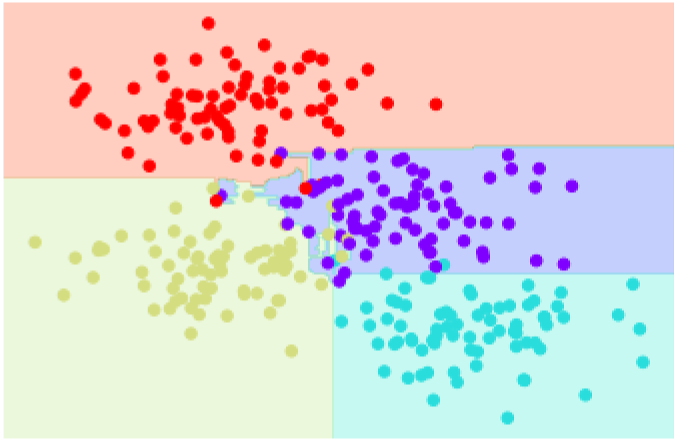


Random Forests

In [7]:

```
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import BaggingClassifier

tree = DecisionTreeClassifier()
bag = BaggingClassifier(tree, n_estimators=100, max_samples=0.8,
                        random_state=1)

bag.fit(X, y)
visualize_classifier(bag, X, y)
```

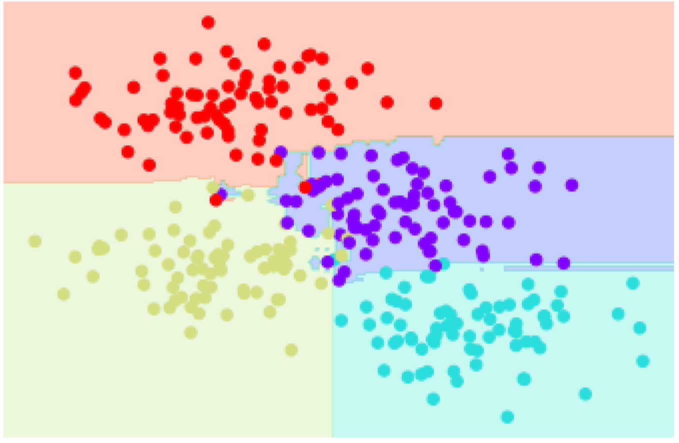
```
C:\Users\jhare\anaconda3\lib\site-packages\ipykernel_launcher.py:23: Use
rWarning: The following kwargs were not used by contour: 'clim'
```



In [8]:

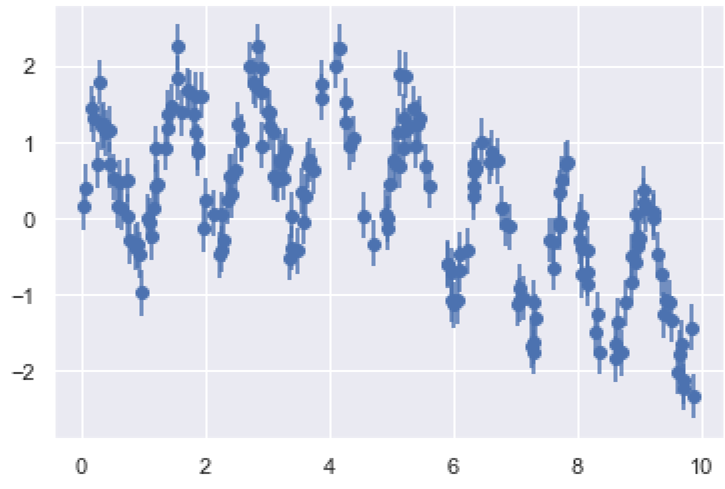
```
from sklearn.ensemble import RandomForestClassifier

model = RandomForestClassifier(n_estimators=100, random_state=0)
visualize_classifier(model, X, y);
```

```
C:\Users\jhare\anaconda3\lib\site-packages\ipykernel_launcher.py:23: Use
rWarning: The following kwargs were not used by contour: 'clim'
```



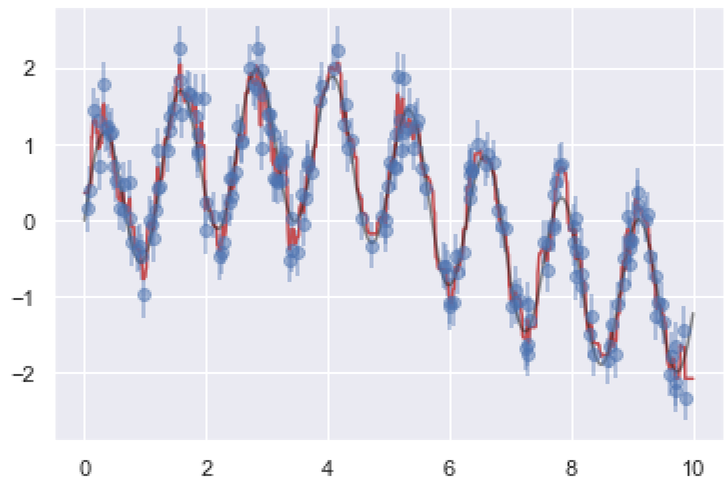
In [9]:

```
rng = np.random.RandomState(42)
x = 10 * rng.rand(200)

def model(x, sigma=0.3):
    fast_oscillation = np.sin(5 * x)
    slow_oscillation = np.sin(0.5 * x)
    noise = sigma * rng.randn(len(x))

    return slow_oscillation + fast_oscillation + noise

y = model(x)
plt.errorbar(x, y, 0.3, fmt='o');
```



In [10]:

```
from sklearn.ensemble import RandomForestRegressor
forest = RandomForestRegressor(200)
forest.fit(x[:, None], y)

xfit = np.linspace(0, 10, 1000)
yfit = forest.predict(xfit[:, None])
ytrue = model(xfit, sigma=0)

plt.errorbar(x, y, 0.3, fmt='o', alpha=0.5)
plt.plot(xfit, yfit, '-r');
plt.plot(xfit, ytrue, '-k', alpha=0.5);
```



In [11]:

In [ ]: