Name: Rushikesh Jyoti

Division: A

Roll no: 27

SRN: 201901139

The dataset used is *iris dataset* for flowers

In [62]:

```
import pandas as pd
import seaborn as sb
from matplotlib import pyplot as plot
from sklearn.datasets import load_iris
```

In [63]:

```
iris_df = load_iris()
original_df = pd.DataFrame(iris_df['data'], columns=iris_df.feature_names)
original_df['species'] = iris_df.target
original_df.head()

df = original_df
df.head()
```

Out[63]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	species
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0

In [64]:

```
def fig(width, height):
    plot.figure(1, (width, height))

sb.set(font_scale = 1.8)
```

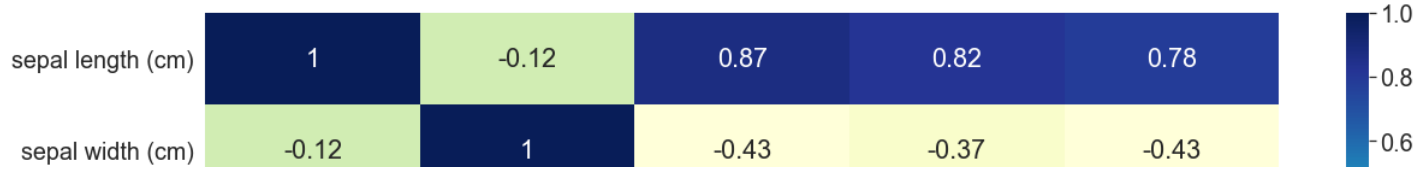
Correlation Heatmap

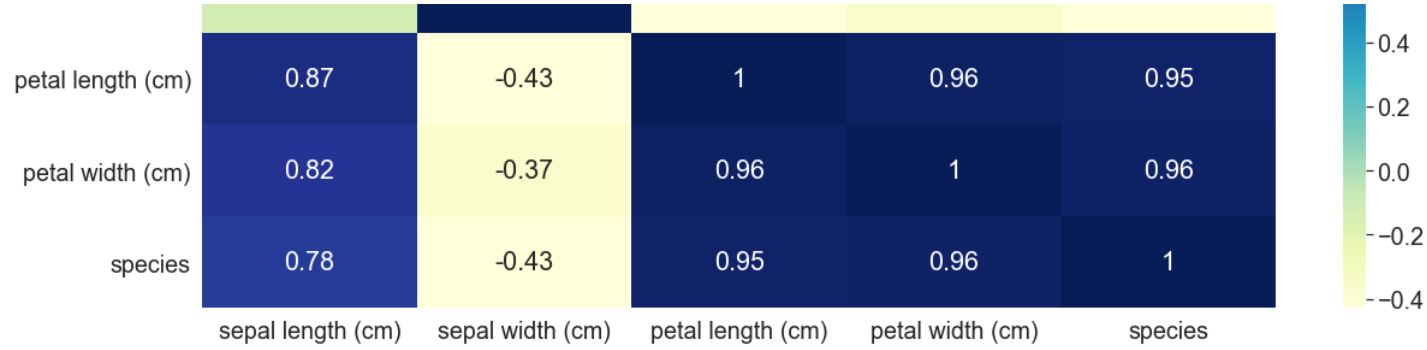
In [65]:

```
fig(20, 7)
sb.heatmap(df.corr(), cmap='YlGnBu', annot=True)
```

Out[65]:

```
<AxesSubplot:>
```





In [66]:

```
from sklearn.model_selection import train_test_split
from sklearn import metrics

from sklearn.tree import DecisionTreeClassifier
from sklearn.linear_model import LogisticRegression
```

In [67]:

```
df.dtypes
```

Out[67]:

```
sepal length (cm)    float64
sepal width (cm)     float64
petal length (cm)    float64
petal width (cm)     float64
species                int32
dtype: object
```

Splitting the dataset

80% Train

20% Test

In [68]:

```
xtrain, xtest, ytrain, ytest = train_test_split(df.drop(['species'], axis=1), df['species'], train_size=0.8)

print(xtrain.shape, xtest.shape, ytrain.shape, ytest.shape)
# ytrain
```

```
(120, 4) (30, 4) (120,) (30,)
```

Logistic Regression Model

In [69]:

```
lg_model = LogisticRegression().fit(xtrain, ytrain)
lg_predictions = lg_model.predict(xtest)
```

Deicision Tree Model

In [70]:

```
dt_model = DecisionTreeClassifier().fit(xtrain, ytrain)
dt_predictions = dt_model.predict(xtest)
```

In [71]:

```
def errors(real, predicted, title):
```

```
    print(title.center(40, '='))
    print("Root Mean Squared Error:", metrics.mean_squared_error(real, predicted))
    print("Mean Squared Error:", metrics.mean_squared_error(real, predicted, squared=Fals
e))
    print("Mean Absolute Error:", metrics.mean_absolute_error(real, predicted))
    print("R2:", metrics.r2_score(real, predicted))
```

Metrics

Logistic Regression

In [72]:

```
print(metrics.classification_report(ytest, lg_predictions))
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00         9
           1       0.90      1.00      0.95         9
           2       1.00      0.92      0.96        12

    accuracy                           0.97        30
   macro avg       0.97      0.97      0.97        30
weighted avg       0.97      0.97      0.97        30
```

Decision Tree

In [73]:

```
print(metrics.classification_report(ytest, dt_predictions))
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00         9
           1       1.00      1.00      1.00         9
           2       1.00      1.00      1.00        12

    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30
```

Errors

In [74]:

```
errors(ytest, lg_predictions, " Logistic Regression ")
errors(ytest, dt_predictions, " Decision Tree ")
```

```
========= Logistic Regression ==========
Root Mean Squared Error: 0.03333333333333333
Mean Squared Error: 0.18257418583505536
Mean Absolute Error: 0.03333333333333333
R2: 0.9516908212560387
============ Decision Tree =============
Root Mean Squared Error: 0.0
Mean Squared Error: 0.0
Mean Absolute Error: 0.0
R2: 1.0
```