IRIS CLASSIFICATION

In [20]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
df=pd.read_csv("C:/Users/Namitha CV/Downloads/Iris.csv")
df
```

Out[2]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

In [3]:
```
#understanding data
df.head()
```

Out[3]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

In [4]:
```
df.tail()
```

Out[4]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

In [7]:
```
df.describe()
```

Out[7]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000	150.000000
mean	75.500000	5.843333	3.054000	3.758667	1.198667
std	43.445368	0.828066	0.433594	1.764420	0.763161
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	38.250000	5.100000	2.800000	1.600000	0.300000
50%	75.500000	5.800000	3.000000	4.350000	1.300000
75%	112.750000	6.400000	3.300000	5.100000	1.800000
max	150.000000	7.900000	4.400000	6.900000	2.500000

In [6]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             150 non-null    int64  
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

In [8]:
```
df["Species"].value_counts()
```

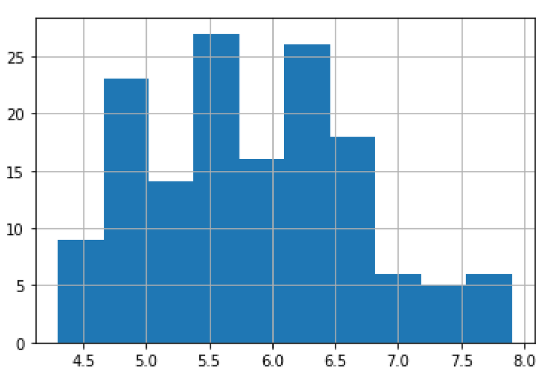
Out[8]:
```
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: Species, dtype: int64
```

In [9]:
```
df.isnull().sum()
```

Out[9]:
```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

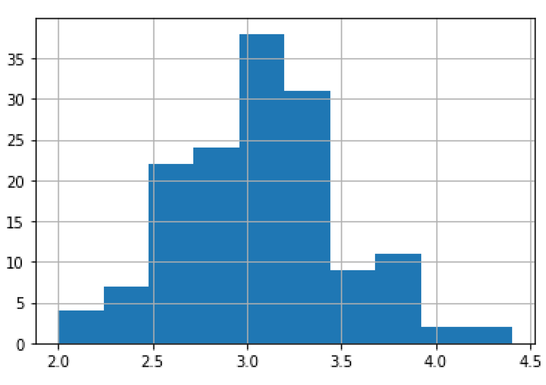
In [10]:
```
#exploratory data analysis
df['SepalLengthCm'].hist()
```

Out[10]: `<AxesSubplot:>`



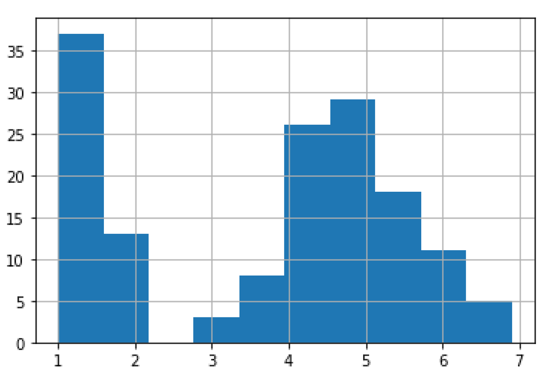
In [11]:
```
df['SepalWidthCm'].hist()
```

Out[11]: `<AxesSubplot:>`



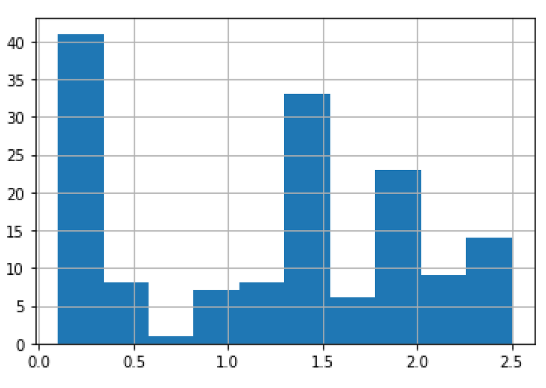
In [12]:
```
df['PetalLengthCm'].hist()
```

Out[12]: `<AxesSubplot:>`



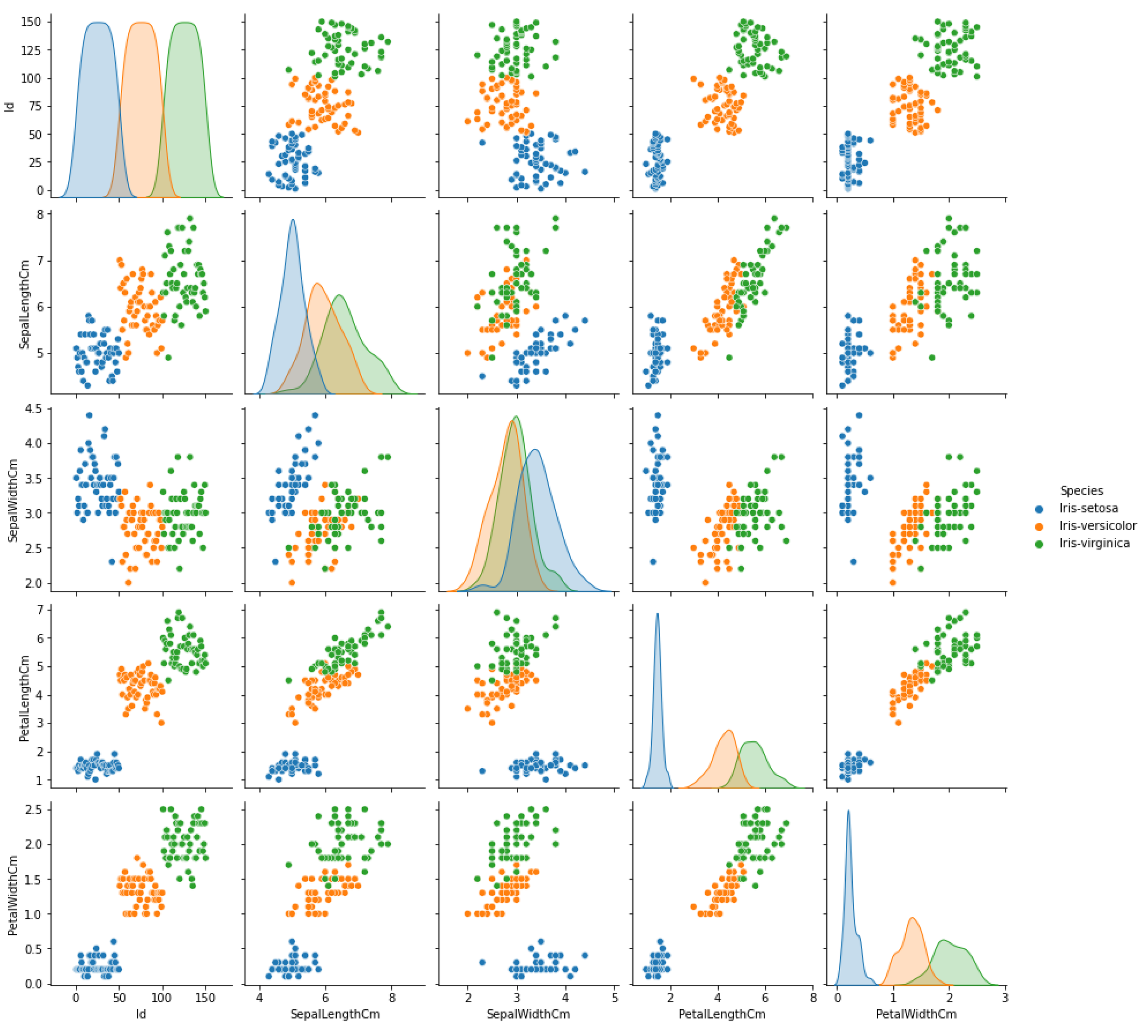
In [13]:
```
df['PetalWidthCm'].hist()
```

Out[13]: `<AxesSubplot:>`



In [14]:
```
sns.pairplot(df,hue='Species')
```

Out[14]: `<seaborn.axisgrid.PairGrid at 0x29982875280>`



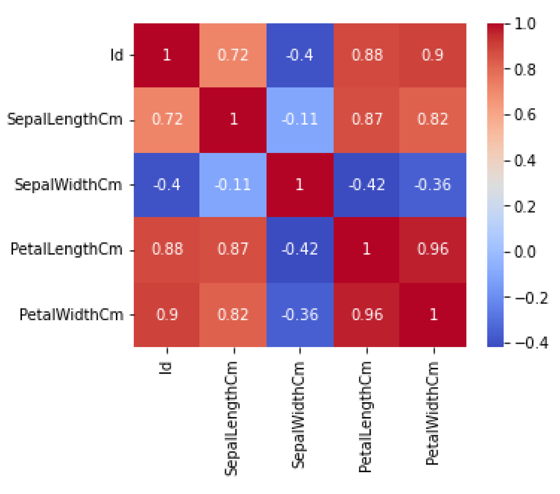
In [15]:
```
#correlation matrix
df.corr()
```

Out[15]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
Id	1.000000	0.716676	-0.397729	0.882747	0.899759
SepalLengthCm	0.716676	1.000000	-0.109369	0.871754	0.817954
SepalWidthCm	-0.397729	-0.109369	1.000000	-0.420516	-0.356544
PetalLengthCm	0.882747	0.871754	-0.420516	1.000000	0.962757
PetalWidthCm	0.899759	0.817954	-0.356544	0.962757	1.000000

In [16]:
```
corr = df.corr()
fig, ax = plt.subplots(figsize=(5, 4))
sns.heatmap(corr, annot=True, ax=ax, cmap='coolwarm')
```

Out[16]: `<AxesSubplot:>`



In [17]:
```
#model training
# Split the dataset into training and testing sets
from sklearn.model_selection import train_test_split
X = df.drop(columns=['Species'])
Y = df['Species']
x_train, x_test, y_train, y_test = train_test_split(X, Y, test_size=0.20)
```

In [21]:
```
# Logistic Regression Model
from sklearn.linear_model import LogisticRegression
m1 = LogisticRegression()
m1.fit(x_train, y_train)
accuracy_logreg = m1.score(x_test, y_test) * 100
print("Accuracy (Logistic Regression): ", accuracy_logreg)
```

```
Accuracy (Logistic Regression):  100.0
```

In [22]:
```
from sklearn.neighbors import KNeighborsClassifier
m2 = KNeighborsClassifier()
m2.fit(x_train, y_train)
accuracy_knn = m2.score(x_test, y_test) * 100
print("Accuracy (KNN): ", accuracy_knn)
```

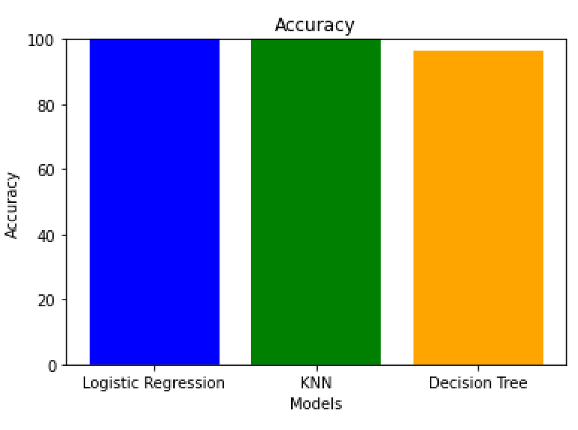
```
Accuracy (KNN):  100.0
```

In [24]:
```
from sklearn.tree import DecisionTreeClassifier
m3 = DecisionTreeClassifier()
m3.fit(x_train, y_train)
accuracy_decision_tree = m3.score(x_test, y_test) * 100
print("Accuracy (Decision Tree): ", accuracy_decision_tree)
```

```
Accuracy (Decision Tree):  96.66666666666667
```

In [25]:
```
models = ['Logistic Regression', 'KNN', 'Decision Tree']
accuracies = [accuracy_logreg, accuracy_knn, accuracy_decision_tree]

plt.bar(models, accuracies, color=['blue', 'green', 'orange'])
plt.xlabel("Models")
plt.ylabel("Accuracy")
plt.title("Accuracy")
plt.ylim([0, 100])
plt.show()
```



In [ ]: