In [1]:

```python
from sklearn.datasets import load_iris
import pandas as pd
iris = load_iris()
df = pd.DataFrame(data=iris.data, columns=iris.feature_names)
df['species'] = iris.target
```

In [3]:

```python
print(f'Dataset Dimensions: {df.shape}')
```

```
Dataset Dimensions: (150, 5)
```

In [5]:

```python
print(df.head())
```

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

   species
0        0
1        0
2        0
3        0
4        0
```

In [7]:

```python
print(df.describe())
```

```
       sepal length (cm)  sepal width (cm)  petal length (cm)  \
count         150.000000        150.000000         150.000000
mean            5.843333          3.057333           3.758000
std             0.828066          0.435866           1.765298
min             4.300000          2.000000           1.000000
25%             5.100000          2.800000           1.600000
50%             5.800000          3.000000           4.350000
75%             6.400000          3.300000           5.100000
max             7.900000          4.400000           6.900000

       petal width (cm)     species
count        150.000000  150.000000
mean           1.199333    1.000000
std            0.762238    0.819232
min            0.100000    0.000000
25%            0.300000    0.000000
50%            1.300000    1.000000
75%            1.800000    2.000000
max            2.500000    2.000000
```

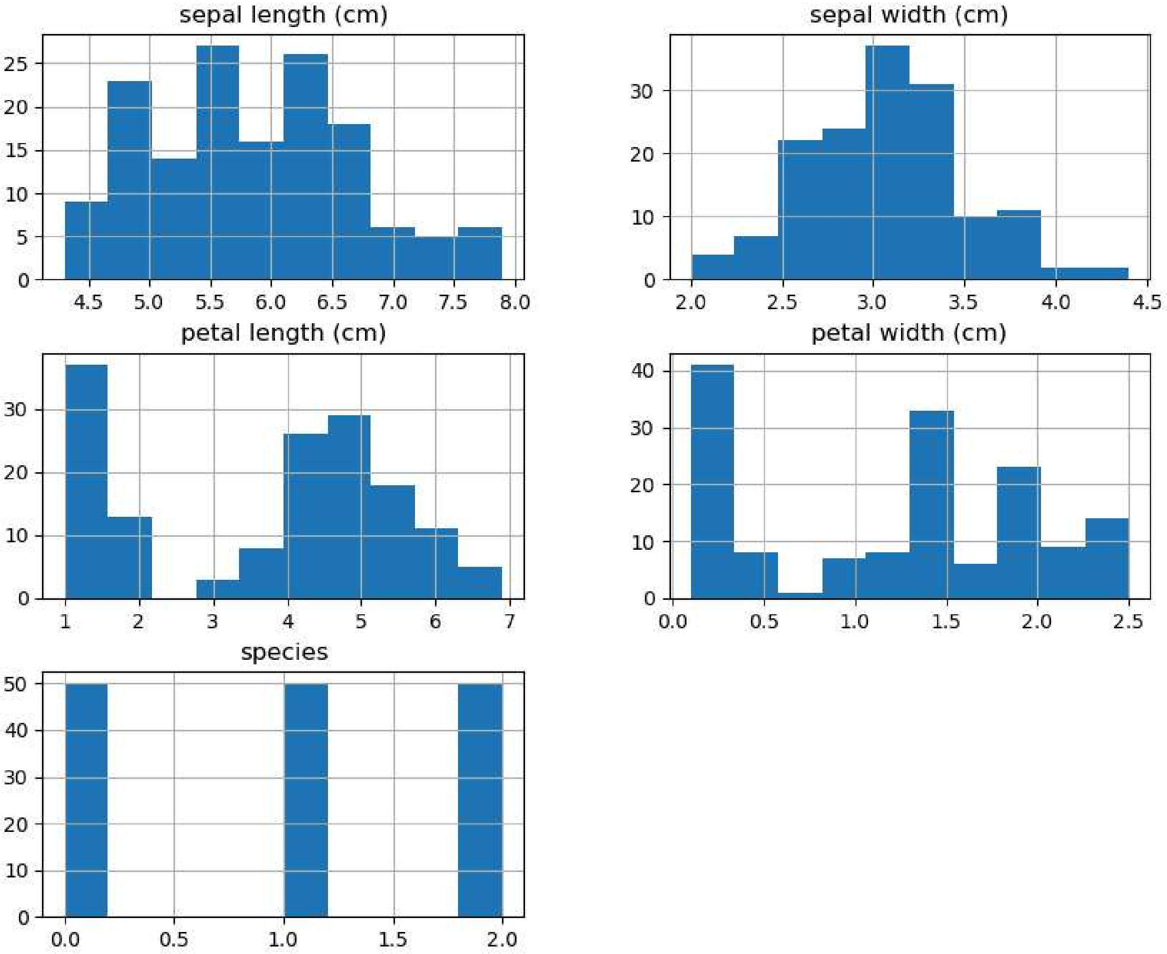
In [9]:

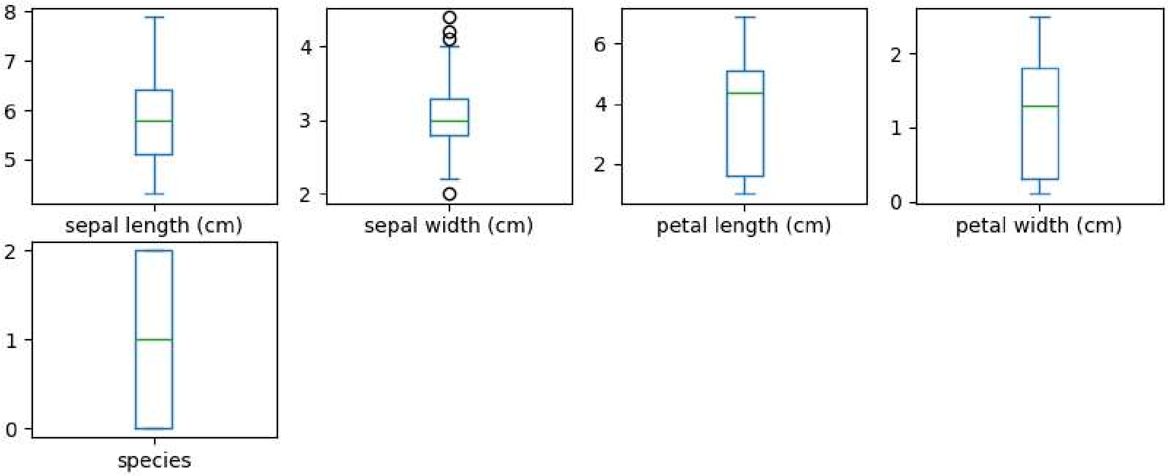
```
print(df['species'].value_counts())
```

```
species
0    50
1    50
2    50
Name: count, dtype: int64
```

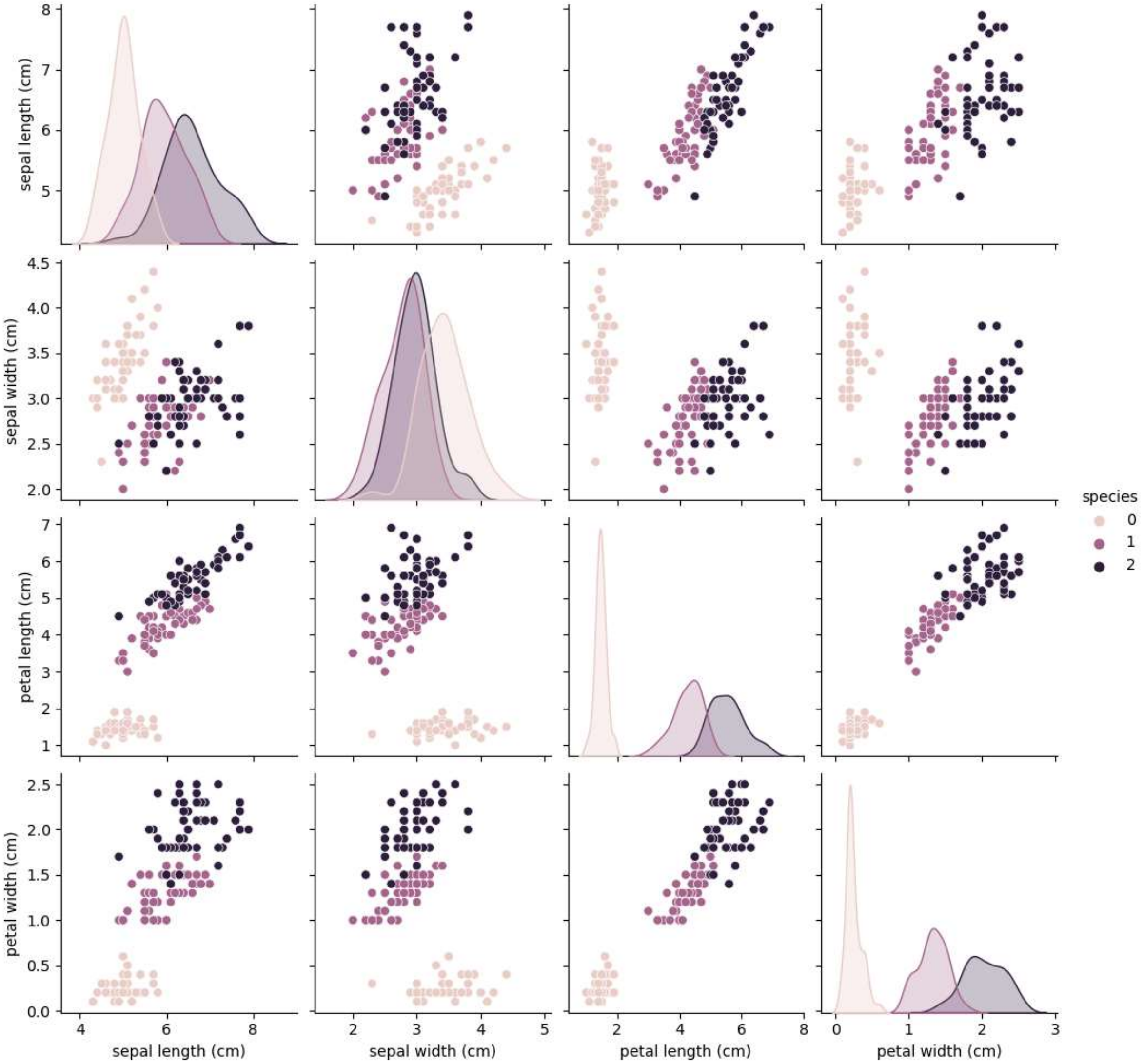
In [13]:

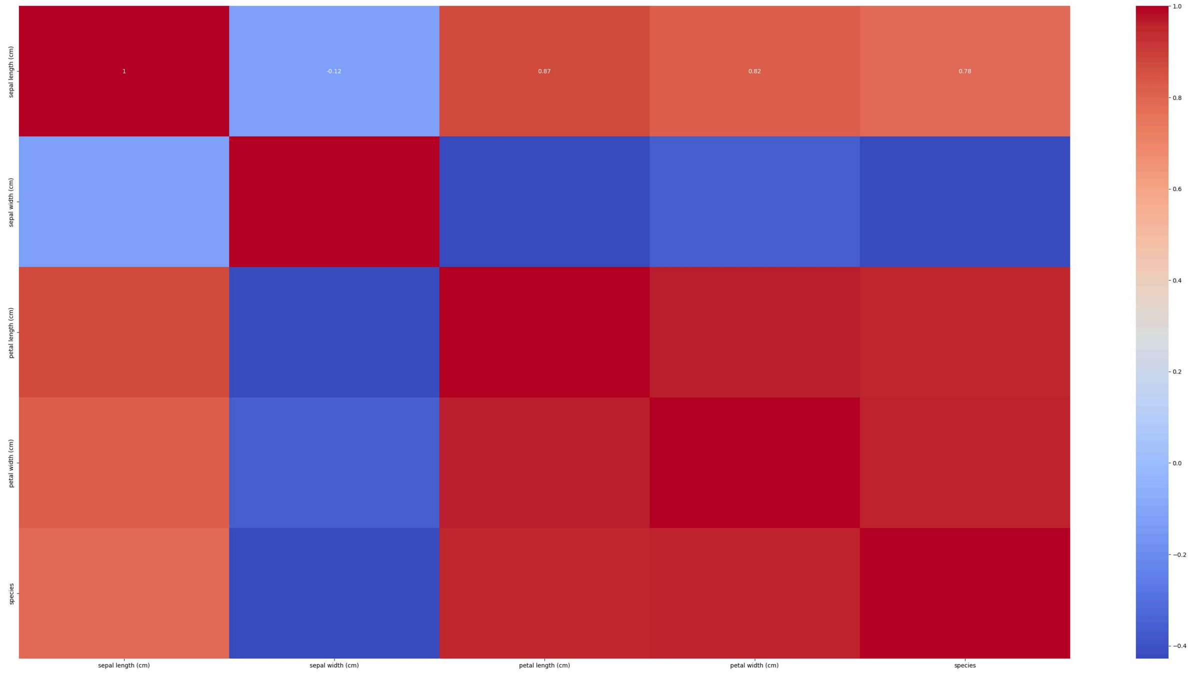
```
import matplotlib.pyplot as plt
import seaborn as sns
df.hist(figsize=(10, 8))
plt.show()
df.plot(kind='box', subplots=True, layout=(4,4), figsize=(10, 8))
plt.show()
```





In [33]:
```
import warnings
warnings.filterwarnings('ignore')
import seaborn as sns
import matplotlib.pyplot as plt
sns.pairplot(df, hue='species')
plt.show()
plt.figure(figsize=(40, 20))
sns.heatmap(df.corr(), annot=True, cmap='coolwarm')
plt.show()
from IPython.core.display import display, HTML
display(HTML("<style>.container { width:100% !important; }</style>"))
```





In [17]:
```
from sklearn.model_selection import train_test_split
X = df.iloc[:, :-1]
y = df['species']
X_train, X_val, y_train, y_val = train_test_split(X, y, test_size=0.2, random_
```

In [29]:
```
from sklearn.model_selection import cross_val_score
from sklearn.linear_model import LogisticRegression
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis
from sklearn.neighbors import KNeighborsClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.svm import SVC
models = []
models.append(('LR', LogisticRegression(max_iter=200)))
models.append(('LDA', LinearDiscriminantAnalysis()))
models.append(('KNN', KNeighborsClassifier()))
models.append(('CART', DecisionTreeClassifier()))
models.append(('NB', GaussianNB()))
models.append(('SVM', SVC()))
results = []
names = []
for name, model in models:
    cv_results = cross_val_score(model, X_train, y_train, cv=10, scoring='accu
    results.append(cv_results)
    names.append(name)
    print(f'{name}: {cv_results.mean()} ({cv_results.std()})')
```

```
LR: 0.9666666666666666 (0.04082482904638632)
LDA: 0.9749999999999999 (0.03818813079129868)
KNN: 0.9583333333333333 (0.041666666666666685)
CART: 0.9583333333333333 (0.041666666666666685)
NB: 0.9499999999999998 (0.05527707983925667)
SVM: 0.975 (0.03818813079129868)
```

In [31]:

```
model = KNeighborsClassifier()
model.fit(X_train, y_train)
predictions = model.predict(X_val)
from sklearn.metrics import accuracy_score, classification_report
print(f'Accuracy: {accuracy_score(y_val, predictions)}')
print(classification_report(y_val, predictions))
```

```
Accuracy: 1.0
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        11
           1       1.00      1.00      1.00        13
           2       1.00      1.00      1.00         6

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