In [1]:
```
from sklearn import datasets
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

iris = datasets.load_iris()
```

In [2]:
```
# 1
iris_df = pd.DataFrame(data=iris.data, columns=iris.feature_names)
iris_df['Species'] = iris.target

print("Rows and columns in iris:", iris_df.shape)
```

```
Rows and columns in iris: (150, 5)
```

In [3]:
```
# 2
sub1 = pd.concat([iris_df.iloc[:9], iris_df.iloc[[-1]]], ignore_index=True)
print("\nsub1 DataFrame:\n", sub1)
```

```
sub1 DataFrame:
    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   
5                 5.4               3.9                1.7               0.4   
6                 4.6               3.4                1.4               0.3   
7                 5.0               3.4                1.5               0.2   
8                 4.4               2.9                1.4               0.2   
9                 5.9               3.0                5.1               1.8   

   Species  
0        0  
1        0  
2        0  
3        0  
4        0  
5        0  
6        0  
7        0  
8        0  
9        2  
```

In [4]:
```
# 3
sub2 = iris_df[iris_df['sepal width (cm)'] < 2.4][['sepal length (cm)', 'sepal width (cm)', 'Species']]
print("\nsub2 DataFrame:\n", sub2)
```

```
sub2 DataFrame:
      sepal length (cm)  sepal width (cm)  Species
41                 4.5               2.3        0
53                 5.5               2.3        1
60                 5.0               2.0        1
62                 6.0               2.2        1
68                 6.2               2.2        1
87                 6.3               2.3        1
93                 5.0               2.3        1
119                6.0               2.2        2
```

In [5]:
```
# 4
Versicolor_Is_The_Best = np.where(iris_df['Species'] == 1, 100, 0)
print("\nVersicolor_Is_The_Best:\n", Versicolor_Is_The_Best)
```

```
Versicolor_Is_The_Best:
 [  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0 100 100 100 100
 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100
 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100
 100 100 100 100 100 100 100 100 100 100   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0]
```

In [6]:
```
# 5
sw = iris_df['sepal width (cm)']

print("\nMean of sw:", sw.mean())
print("Median of sw:", sw.median())
print("Max of sw:", sw.max())
print("Min of sw:", sw.min())
```

```
Mean of sw: 3.0573333333333337
Median of sw: 3.0
Max of sw: 4.4
Min of sw: 2.0
```

In [7]:

```python
# 6
sum_sw = 0
count = 0

for value in sw:
    sum_sw += value
    count += 1
    if sum_sw > 100:
        break

print(f"\nSum exceeded 100 at: {sum_sw} after {count} loops.")
```

```
Sum exceeded 100 at: 100.30000000000001 after 29 loops.
```

In [8]:

```python
# 7
def cmtoin(cm):
    return cm / 2.54

sw_in = sw.apply(cmtoin)
print("\nFirst 7 values of sw_in:\n", sw_in.head(7))
```

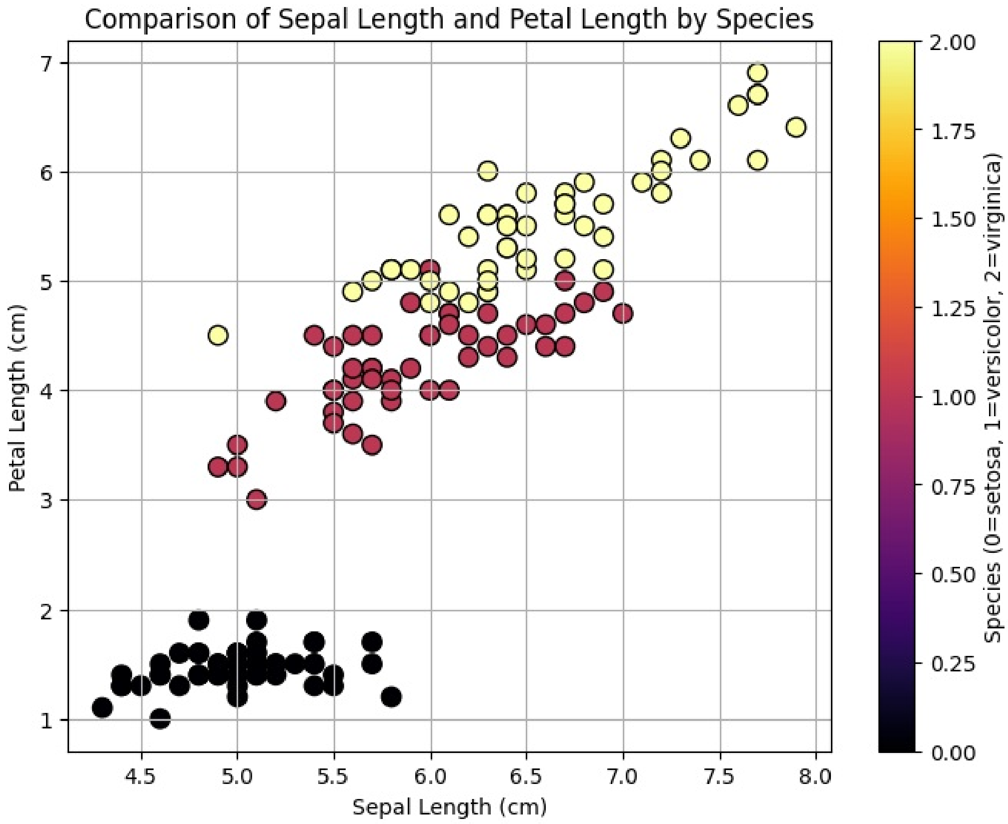
```
First 7 values of sw_in:
 0    1.377953
1    1.181102
2    1.259843
3    1.220472
4    1.417323
5    1.535433
6    1.338583
Name: sepal width (cm), dtype: float64
```

In [9]:

```python
# 8
iris_df['petal length (cm)'] = iris.data[:, 2]

plt.figure(figsize=(8, 6))
plt.scatter(iris_df['sepal length (cm)'], iris_df['petal length (cm)'],
            c=iris_df['Species'], cmap='inferno', edgecolor='k', s=80)

plt.title('Comparison of Sepal Length and Petal Length by Species')
plt.xlabel('Sepal Length (cm)')
plt.ylabel('Petal Length (cm)')
plt.colorbar(label='Species (0=setosa, 1=versicolor, 2=virginica)')
plt.grid(True)
plt.show()
```



In [ ]:

```
In [ ]:
```