

```
In [5]: import pandas as pd
import numpy as np

file_path = '/home/csl-4/Documents/7348/ASSIGNMENT3/Iris.csv'
df = pd.read_csv(file_path)

df.head()
```

```
Out[5]:
```

	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 [7]: # Group by Species and calculate summary statistics
summary_stats = df.groupby('Species')[['SepalLengthCm', 'SepalWidthCm', 'Peta
print("Summary Statistics by Species:\n", summary_stats)
```

Summary Statistics by Species:

	SepalLengthCm					SepalWidthCm		
\	mean	median	min	max	std	mean	median	
Species								
Iris-setosa	5.006	5.0	4.3	5.8	0.352490	3.418	3.4	
Iris-versicolor	5.936	5.9	4.9	7.0	0.516171	2.770	2.8	
Iris-virginica	6.588	6.5	4.9	7.9	0.635880	2.974	3.0	

	PetalLengthCm				
\	min	max	std	mean	median
Species					
Iris-setosa	2.3	4.4	0.381024	1.464	1.50
Iris-versicolor	2.0	3.4	0.313798	4.260	4.35
Iris-virginica	2.2	3.8	0.322497	5.552	5.55

	PetalWidthCm				
	mean	median	min	max	std
Species					
Iris-setosa	0.244	0.2	0.1	0.6	0.107210
Iris-versicolor	1.326	1.3	1.0	1.8	0.197753
Iris-virginica	2.026	2.0	1.4	2.5	0.274650

```
In [8]: numeric_lists = {sp: df[df['Species']==sp][['SepalLengthCm', 'SepalWidthCm', 'P
print("\nNumeric Lists by Species:\n", numeric_lists)
```

Numeric Lists by Species:

```
{'Iris-setosa': [[5.1, 3.5, 1.4, 0.2], [4.9, 3.0, 1.4, 0.2], [4.7, 3.2, 1.3,
0.2], [4.6, 3.1, 1.5, 0.2], [5.0, 3.6, 1.4, 0.2], [5.4, 3.9, 1.7, 0.4], [4.6,
3.4, 1.4, 0.3], [5.0, 3.4, 1.5, 0.2], [4.4, 2.9, 1.4, 0.2], [4.9, 3.1, 1.5,
0.1], [5.4, 3.7, 1.5, 0.2], [4.8, 3.4, 1.6, 0.2], [4.8, 3.0, 1.4, 0.1], [4.3,
3.0, 1.1, 0.1], [5.8, 4.0, 1.2, 0.2], [5.7, 4.4, 1.5, 0.4], [5.4, 3.9, 1.3,
0.4], [5.1, 3.5, 1.4, 0.3], [5.7, 3.8, 1.7, 0.3], [5.1, 3.8, 1.5, 0.3], [5.4,
3.4, 1.7, 0.2], [5.1, 3.7, 1.5, 0.4], [4.6, 3.6, 1.0, 0.2], [5.1, 3.3, 1.7,
0.5], [4.8, 3.4, 1.9, 0.2], [5.0, 3.0, 1.6, 0.2], [5.0, 3.4, 1.6, 0.4], [5.2,
3.5, 1.5, 0.2], [5.2, 3.4, 1.4, 0.2], [4.7, 3.2, 1.6, 0.2], [4.8, 3.1, 1.6,
```

```
0.2], [5.4, 3.4, 1.5, 0.4], [5.2, 4.1, 1.5, 0.1], [5.5, 4.2, 1.4, 0.2], [4.9,
3.1, 1.5, 0.1], [5.0, 3.2, 1.2, 0.2], [5.5, 3.5, 1.3, 0.2], [4.9, 3.1, 1.5,
0.1], [4.4, 3.0, 1.3, 0.2], [5.1, 3.4, 1.5, 0.2], [5.0, 3.5, 1.3, 0.3], [4.5,
2.3, 1.3, 0.3], [4.4, 3.2, 1.3, 0.2], [5.0, 3.5, 1.6, 0.6], [5.1, 3.8, 1.9,
0.4], [4.8, 3.0, 1.4, 0.3], [5.1, 3.8, 1.6, 0.2], [4.6, 3.2, 1.4, 0.2], [5.3,
3.7, 1.5, 0.2], [5.0, 3.3, 1.4, 0.2]], 'Iris-versicolor': [[7.0, 3.2, 4.7, 1.
4], [6.4, 3.2, 4.5, 1.5], [6.9, 3.1, 4.9, 1.5], [5.5, 2.3, 4.0, 1.3], [6.5,
2.8, 4.6, 1.5], [5.7, 2.8, 4.5, 1.3], [6.3, 3.3, 4.7, 1.6], [4.9, 2.4, 3.3,
1.0], [6.6, 2.9, 4.6, 1.3], [5.2, 2.7, 3.9, 1.4], [5.0, 2.0, 3.5, 1.0], [5.9,
3.0, 4.2, 1.5], [6.0, 2.2, 4.0, 1.0], [6.1, 2.9, 4.7, 1.4], [5.6, 2.9, 3.6,
1.3], [6.7, 3.1, 4.4, 1.4], [5.6, 3.0, 4.5, 1.5], [5.8, 2.7, 4.1, 1.0], [6.2,
2.2, 4.5, 1.5], [5.6, 2.5, 3.9, 1.1], [5.9, 3.2, 4.8, 1.8], [6.1, 2.8, 4.0,
1.3], [6.3, 2.5, 4.9, 1.5], [6.1, 2.8, 4.7, 1.2], [6.4, 2.9, 4.3, 1.3], [6.6,
3.0, 4.4, 1.4], [6.8, 2.8, 4.8, 1.4], [6.7, 3.0, 5.0, 1.7], [6.0, 2.9, 4.5,
1.5], [5.7, 2.6, 3.5, 1.0], [5.5, 2.4, 3.8, 1.1], [5.5, 2.4, 3.7, 1.0], [5.8,
2.7, 3.9, 1.2], [6.0, 2.7, 5.1, 1.6], [5.4, 3.0, 4.5, 1.5], [6.0, 3.4, 4.5,
1.6], [6.7, 3.1, 4.7, 1.5], [6.3, 2.3, 4.4, 1.3], [5.6, 3.0, 4.1, 1.3], [5.5,
2.5, 4.0, 1.3], [5.5, 2.6, 4.4, 1.2], [6.1, 3.0, 4.6, 1.4], [5.8, 2.6, 4.0,
1.2], [5.0, 2.3, 3.3, 1.0], [5.6, 2.7, 4.2, 1.3], [5.7, 3.0, 4.2, 1.2], [5.7,
2.9, 4.2, 1.3], [6.2, 2.9, 4.3, 1.3], [5.1, 2.5, 3.0, 1.1], [5.7, 2.8, 4.1,
1.3]], 'Iris-virginica': [[6.3, 3.3, 6.0, 2.5], [5.8, 2.7, 5.1, 1.9], [7.1,
3.0, 5.9, 2.1], [6.3, 2.9, 5.6, 1.8], [6.5, 3.0, 5.8, 2.2], [7.6, 3.0, 6.6,
2.1], [4.9, 2.5, 4.5, 1.7], [7.3, 2.9, 6.3, 1.8], [6.7, 2.5, 5.8, 1.8], [7.2,
3.6, 6.1, 2.5], [6.5, 3.2, 5.1, 2.0], [6.4, 2.7, 5.3, 1.9], [6.8, 3.0, 5.5,
2.1], [5.7, 2.5, 5.0, 2.0], [5.8, 2.8, 5.1, 2.4], [6.4, 3.2, 5.3, 2.3], [6.5,
3.0, 5.5, 1.8], [7.7, 3.8, 6.7, 2.2], [7.7, 2.6, 6.9, 2.3], [6.0, 2.2, 5.0,
1.5], [6.9, 3.2, 5.7, 2.3], [5.6, 2.8, 4.9, 2.0], [7.7, 2.8, 6.7, 2.0], [6.3,
2.7, 4.9, 1.8], [6.7, 3.3, 5.7, 2.1], [7.2, 3.2, 6.0, 1.8], [6.2, 2.8, 4.8,
1.8], [6.1, 3.0, 4.9, 1.8], [6.4, 2.8, 5.6, 2.1], [7.2, 3.0, 5.8, 1.6], [7.4,
2.8, 6.1, 1.9], [7.9, 3.8, 6.4, 2.0], [6.4, 2.8, 5.6, 2.2], [6.3, 2.8, 5.1,
1.5], [6.1, 2.6, 5.6, 1.4], [7.7, 3.0, 6.1, 2.3], [6.3, 3.4, 5.6, 2.4], [6.4,
3.1, 5.5, 1.8], [6.0, 3.0, 4.8, 1.8], [6.9, 3.1, 5.4, 2.1], [6.7, 3.1, 5.6,
2.4], [6.9, 3.1, 5.1, 2.3], [5.8, 2.7, 5.1, 1.9], [6.8, 3.2, 5.9, 2.3], [6.7,
3.3, 5.7, 2.5], [6.7, 3.0, 5.2, 2.3], [6.3, 2.5, 5.0, 1.9], [6.5, 3.0, 5.2,
2.0], [6.2, 3.4, 5.4, 2.3], [5.9, 3.0, 5.1, 1.8]]]
```

In [9]:

```
for sp in df['Species'].unique():
    petal = df[df['Species']==sp]['PetalLengthCm']
    print(f"\nSpecies: {sp}")
    print("Mean:", round(petal.mean(), 2))
    print("Std Dev:", round(petal.std(), 2))
    print("25th percentile:", np.percentile(petal, 25))
    print("Median (50th percentile):", np.percentile(petal, 50))
    print("75th percentile:", np.percentile(petal, 75))
```

```
Species: Iris-setosa
Mean: 1.46
Std Dev: 0.17
25th percentile: 1.4
Median (50th percentile): 1.5
75th percentile: 1.5750000000000002
```

```
Species: Iris-versicolor
Mean: 4.26
Std Dev: 0.47
25th percentile: 4.0
Median (50th percentile): 4.35
75th percentile: 4.6
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```
Species: Iris-virginica
Mean: 5.55
Std Dev: 0.55
25th percentile: 5.1
```

Median (50th percentile): 5.55  
75th percentile: 5.875

In [ ]: