In [2]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

In [5]:
```
iris = sns.load_dataset('iris')
```

In [6]:
```
iris
```

Out[6]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	virginica
146	6.3	2.5	5.0	1.9	virginica
147	6.5	3.0	5.2	2.0	virginica
148	6.2	3.4	5.4	2.3	virginica
149	5.9	3.0	5.1	1.8	virginica

150 rows × 5 columns

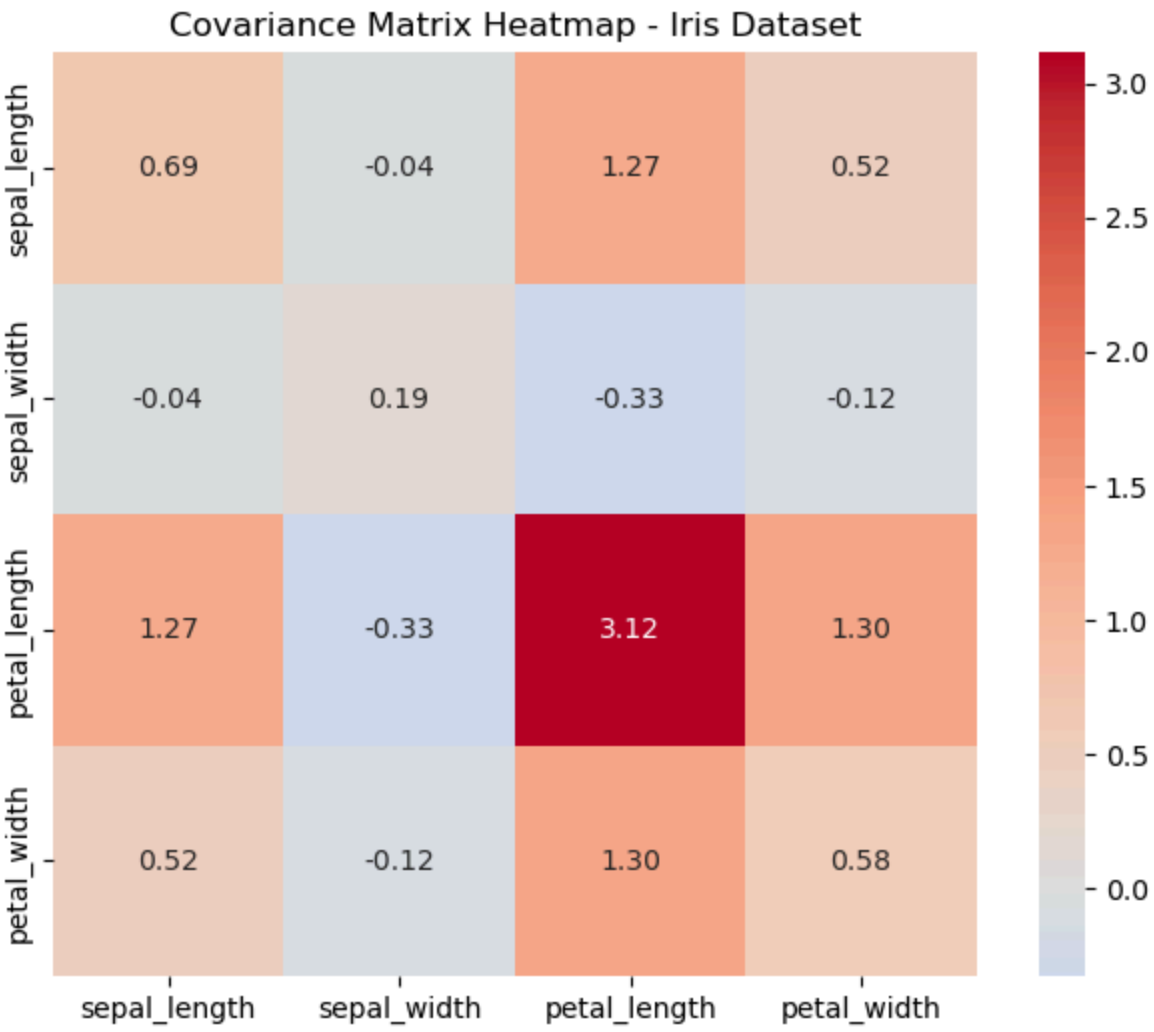
In [7]:
```
# Select only numeric columns for covariance matrix
iris_numeric = iris.select_dtypes(include='number')
# Compute covariance matrix
cov_matrix = iris_numeric.cov()
```

In [8]:
```
cov_matrix
```

Out[8]:

	sepal_length	sepal_width	petal_length	petal_width
sepal_length	0.685694	-0.042434	1.274315	0.516271
sepal_width	-0.042434	0.189979	-0.329656	-0.121639
petal_length	1.274315	-0.329656	3.116278	1.295609
petal_width	0.516271	-0.121639	1.295609	0.581006

In [10]:
```
# Plot covariance matrix heatmap
plt.figure(figsize=(8, 6))
sns.heatmap(cov_matrix, annot=True, fmt=".2f", cmap="coolwarm", center=0, square=Tr
plt.title('Covariance Matrix Heatmap - Iris Dataset')
plt.show()
```



Interpretation:

- Variance (diagonal): Petal length has the largest variance (3.1163 cm^2), meaning it varies most among the features.
- Positive covariance: Petal length & petal width (1.2956) → longer petals tend to come with wider petals.
- Negative covariance: Sepal width & petal length (-0.3297) → wider sepals tend to have slightly shorter petals.