5. Taking Iris data, plot the following with proper legend and axis labels: (Download IRIS data from: https://archive.ics.uci.edu/ml/datasets/iris (https://archive.ics.uci.edu/ml/datasets/iris) or import it from sklearn.datasets)
a. Plot bar chart to show the frequency of each class label in the data.
b. Draw a scatter plot for Petal width vs sepal width.
c. Plot density distribution for feature petal length.
d. Use a pair plot to show pairwise bivariate distribution in the Iris Dataset

In [90]:

```
import numpy as np
import pandas as pd
import sklearn.datasets as sns
import matplotlib.pyplot as plt
import seaborn as sns
```

In [73]:

```
iris=sns.load_iris()
```

In [74]:

```
print(iris.DESCR)
```

```
.. _iris_dataset:

Iris plants dataset
--------------------

**Data Set Characteristics:**

    :Number of Instances: 150 (50 in each of three classes)
    :Number of Attributes: 4 numeric, predictive attributes and the class
    :Attribute Information:
        - sepal length in cm
        - sepal width in cm
        - petal length in cm
        - petal width in cm
        - class:
                - Iris-Setosa
                - Iris-Versicolour
                - Iris-Virginica

    :Summary Statistics:

    ============== ==== ==== ======= ===== ====================
                    Min  Max   Mean    SD   Class Correlation
    ============== ==== ==== ======= ===== ====================
    sepal length:   4.3  7.9   5.84   0.83    0.7826
    sepal width:    2.0  4.4   3.05   0.43   -0.4194
    petal length:   1.0  6.9   3.76   1.76    0.9490  (high!)
    petal width:    0.1  2.5   1.20   0.76    0.9565  (high!)
    ============== ==== ==== ======= ===== ====================

    :Missing Attribute Values: None
    :Class Distribution: 33.3% for each of 3 classes.
    :Creator: R.A. Fisher
    :Donor: Michael Marshall (MARSHALL%PLU@io.arc.nasa.gov)
    :Date: July, 1988

The famous Iris database, first used by Sir R.A. Fisher. The dataset is taken
from Fisher's paper. Note that it's the same as in R, but not as in the UCI
Machine Learning Repository, which has two wrong data points.

This is perhaps the best known database to be found in the
pattern recognition literature.  Fisher's paper is a classic in the field and
is referenced frequently to this day.  (See Duda & Hart, for example.)  The
data set contains 3 classes of 50 instances each, where each class refers to a
type of iris plant.  One class is linearly separable from the other 2; the
latter are NOT linearly separable from each other.

.. topic:: References

   - Fisher, R.A. "The use of multiple measurements in taxonomic problems"
     Annual Eugenics, 7, Part II, 179-188 (1936); also in "Contributions to
     Mathematical Statistics" (John Wiley, NY, 1950).
   - Duda, R.O., & Hart, P.E. (1973) Pattern Classification and Scene Analysi
s.
     (Q327.D83) John Wiley & Sons.  ISBN 0-471-22361-1.  See page 218.
   - Dasarathy, B.V. (1980) "Nosing Around the Neighborhood: A New System
     Structure and Classification Rule for Recognition in Partially Exposed
     Environments".  IEEE Transactions on Pattern Analysis and Machine
     Intelligence, Vol. PAMI-2, No. 1, 67-71.
   - Gates, G.W. (1972) "The Reduced Nearest Neighbor Rule".  IEEE Transaction
s
     on Information Theory, May 1972, 431-433.
   - See also: 1988 MLC Proceedings, 54-64.  Cheeseman et al"s AUTOCLASS II
     conceptual clustering system finds 3 classes in the data.
   - Many, many more ...
```

In [75]:

```
iris.feature_names
```

Out[75]:

```
['sepal length (cm)',
 'sepal width (cm)',
 'petal length (cm)',
 'petal width (cm)']
```

In [76]:

```
iris.target
```

Out[76]:

```
array([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, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

In [77]:

```
df=pd.DataFrame(data=iris.data,columns=iris.feature_names)
```

In [78]:

```
df.head()
```

Out[78]:

	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

In [79]:

```
df['Iris type'] = iris['target']
```

In [80]:

```
df
```

Out[80]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	Iris type
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	2
146	6.3	2.5	5.0	1.9	2
147	6.5	3.0	5.2	2.0	2
148	6.2	3.4	5.4	2.3	2
149	5.9	3.0	5.1	1.8	2

150 rows × 5 columns

In [81]:

```
def convert(x):
    if x == 0:
        val = 'setosa'
    elif x == 1:
        val = 'versicolor'
    else:
        val = 'virginica'
    return val
```

In [86]:

```
df['type name']=df['Iris type'].apply(convert)
```

In [87]:

```
df.head()
```

Out[87]:

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

A-> Plot bar chart to show the frequency of each class label in the data.

In [89]:

```
df.groupby('type name').count()
```

Out[89]:

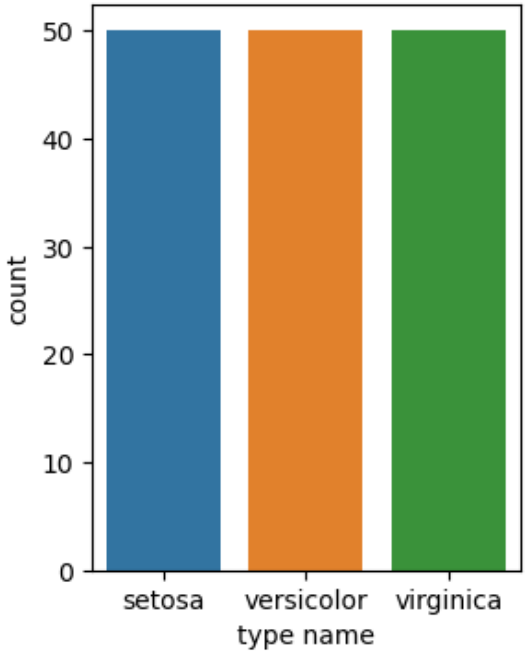
type name	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	Iris type
setosa	50	50	50	50	50
versicolor	50	50	50	50	50
virginica	50	50	50	50	50

In [97]:

```
plt.figure(figsize=(3,4))
sns.countplot(x='type name',data=df)
```

Out[97]:

```
<Axes: xlabel='type name', ylabel='count'>
```



B -> Draw a scatter plot for Petal width vs sepal width.

In [98]:

```
df.columns
```

Out[98]:

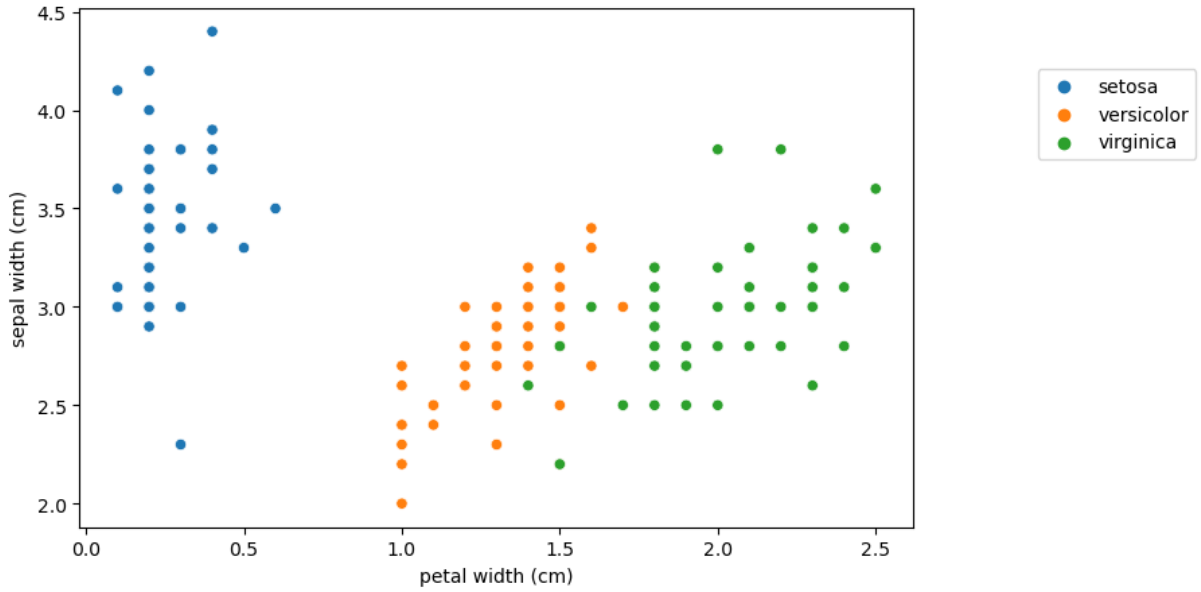
```
Index(['sepal length (cm)', 'sepal width (cm)', 'petal length (cm)',
       'petal width (cm)', 'Iris type', 'type name'],
      dtype='object')
```

In [108]:

```
plt.figure(figsize=(8,5))
sns.scatterplot(x='petal width (cm)',y='sepal width (cm)',data=df,hue='type name')
plt.legend(bbox_to_anchor=(1.35,0.9))
```

Out[108]:

```
<matplotlib.legend.Legend at 0x12c41ab90>
```



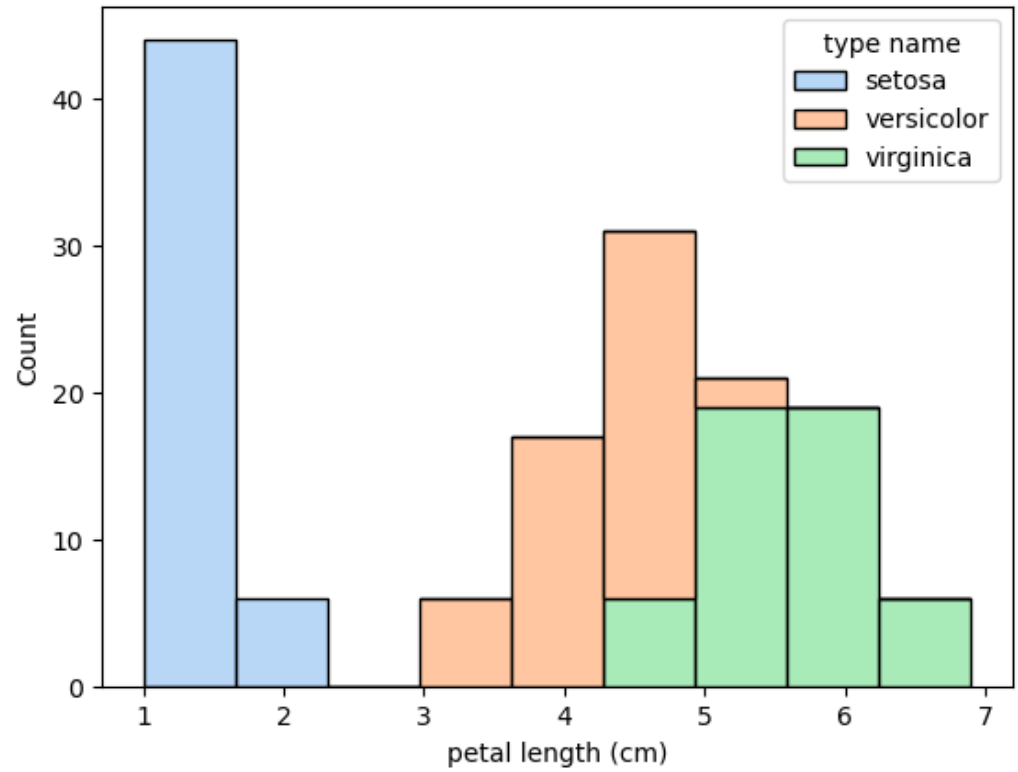
C -> Plot density distribution for feature petal length.

In [127]:

```
sns.histplot(x='petal length (cm)',data=df,hue='type name',multiple='stack',palette='pastel
```

Out[127]:

```
<Axes: xlabel='petal length (cm)', ylabel='Count'>
```



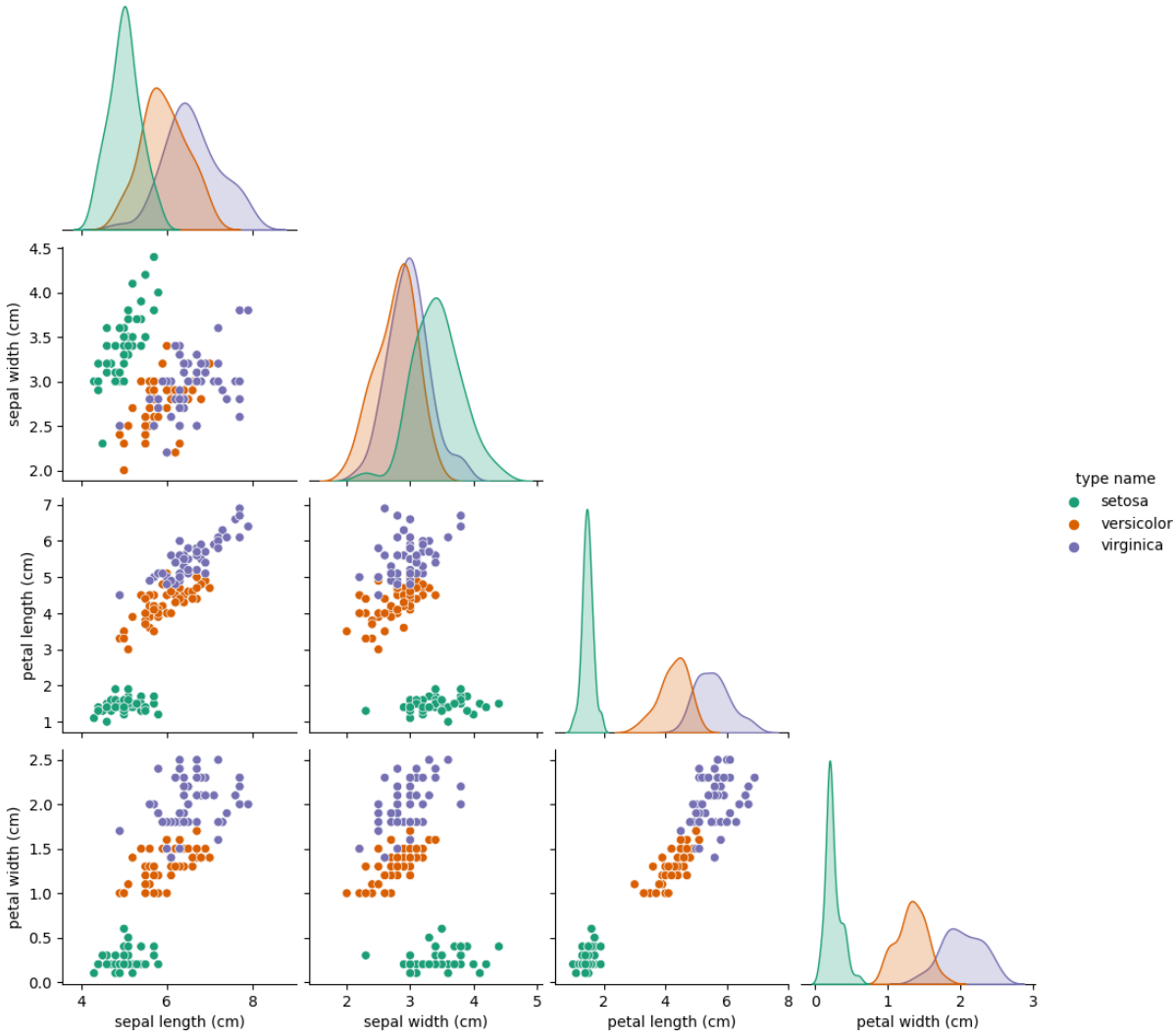
D -> Use a pair plot to show pairwise bivariate distribution in the Iris Dataset

In [133]:

```
sns.pairplot(df.drop('Iris type',axis=1),corner=1,hue='type name',palette='Dark2')
```

Out[133]:

```
<seaborn.axisgrid.PairGrid at 0x16af3b280>
```



In [ ]: