In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

In [2]:

```
df=pd.read_table('iris data.data',sep=',')
df
```

Out[2]:

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

150 rows × 5 columns

In [3]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   sepal length  150 non-null    float64
 1   sepal width   150 non-null    float64
 2   petal length  150 non-null    float64
 3   petal width   150 non-null    float64
 4   variety       150 non-null    object 
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

In [4]:

```
df.isna().sum()
```

Out[4]:

```
sepal length    0
sepal width     0
petal length    0
petal width     0
variety         0
dtype: int64
```

In [5]:

```
df.describe()
```

Out[5]:

	sepal length	sepal width	petal length	petal width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [6]:

```
df.head()
```

Out[6]:

	sepal length	sepal width	petal length	petal width	variety
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [7]:

```
data=df.copy(deep=True)
```

In [8]:

```
numcols=data.select_dtypes("float64").columns
objcols=data.select_dtypes("object").columns
```

In [9]:

```
data[data.duplicated()].index.tolist()
```

Out[9]:

```
[34, 37, 142]
```

In [10]:

```
def duplicate_item():
    duplicate_rows = data[data.duplicated()].index.tolist()
    data.drop(duplicate_rows,axis=0, inplace=True)
    data.reset_index(drop=True)
```

In [11]:

```
duplicate_item()
```

In [12]:

```
data[data.duplicated()].index.tolist()
```

Out[12]:

```
[]
```

In [13]:

```
data
```

Out[13]:

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

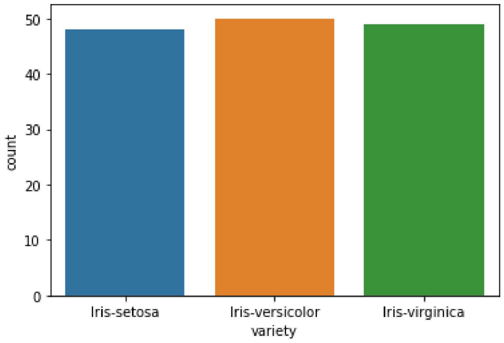
147 rows × 5 columns

In [14]:

```
sns.countplot(data=data, x='variety')
```

Out[14]:

```
<AxesSubplot:xlabel='variety', ylabel='count'>
```

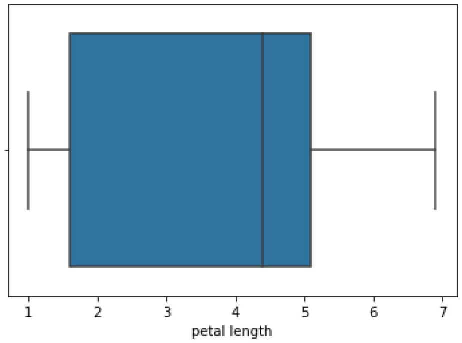


In [15]:

```
sns.boxplot(data=data, x='petal length')
```

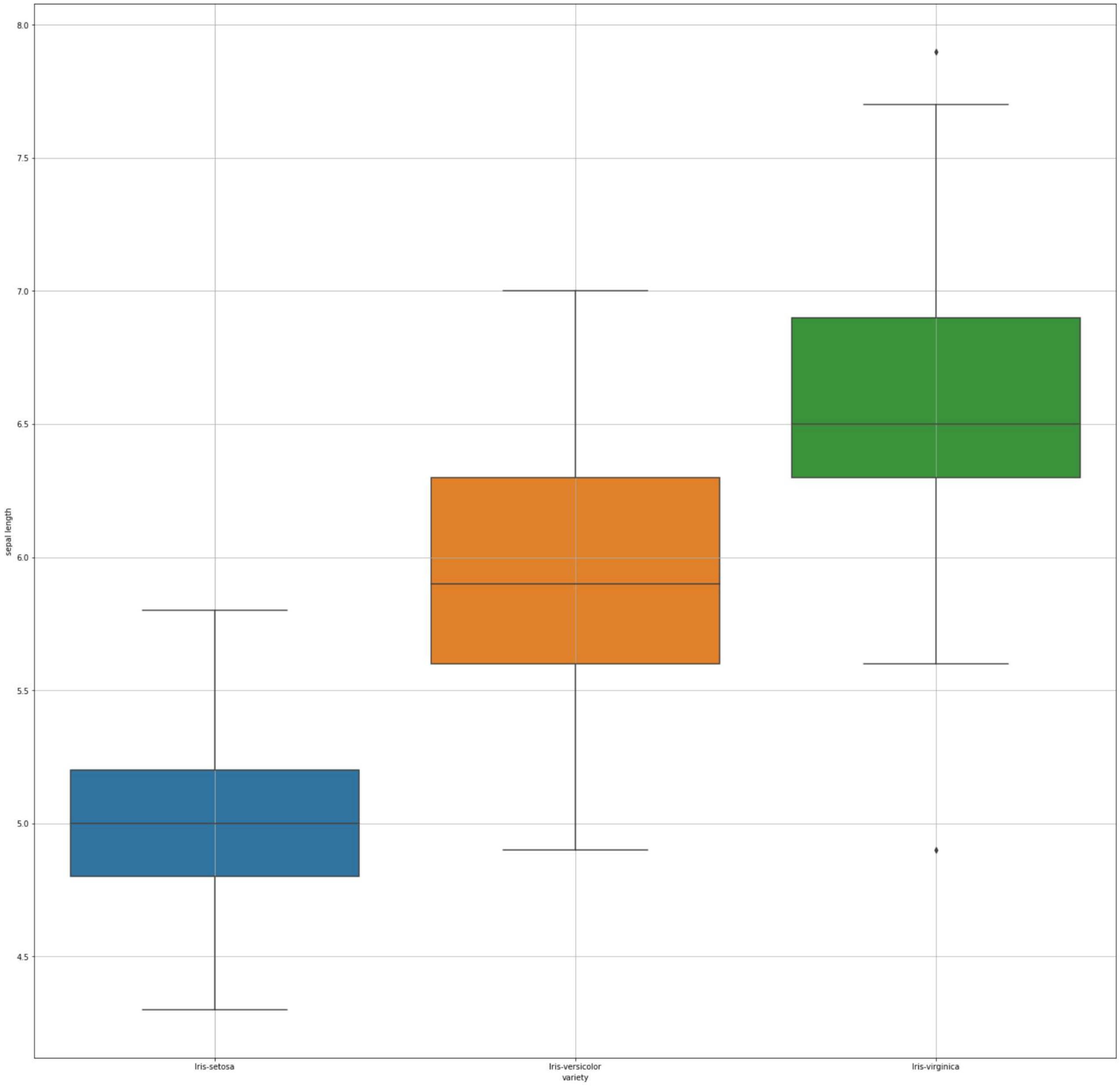
Out[15]:

```
<AxesSubplot:xlabel='petal length'>
```



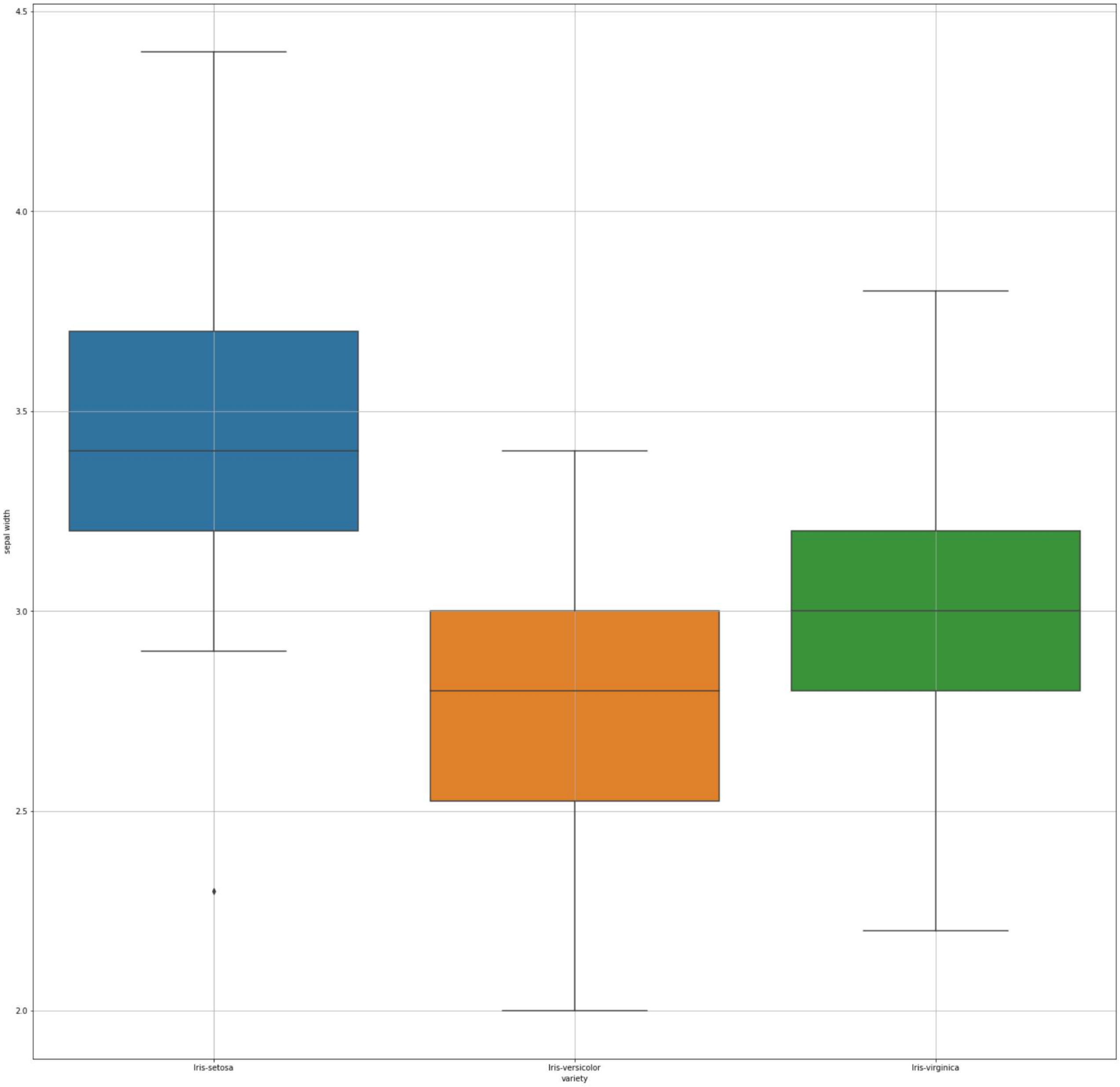
In [16]:

```
plt.figure(figsize=(25,25))
sns.boxplot(data=data,x='variety',y='sepal length');
plt.grid()
```

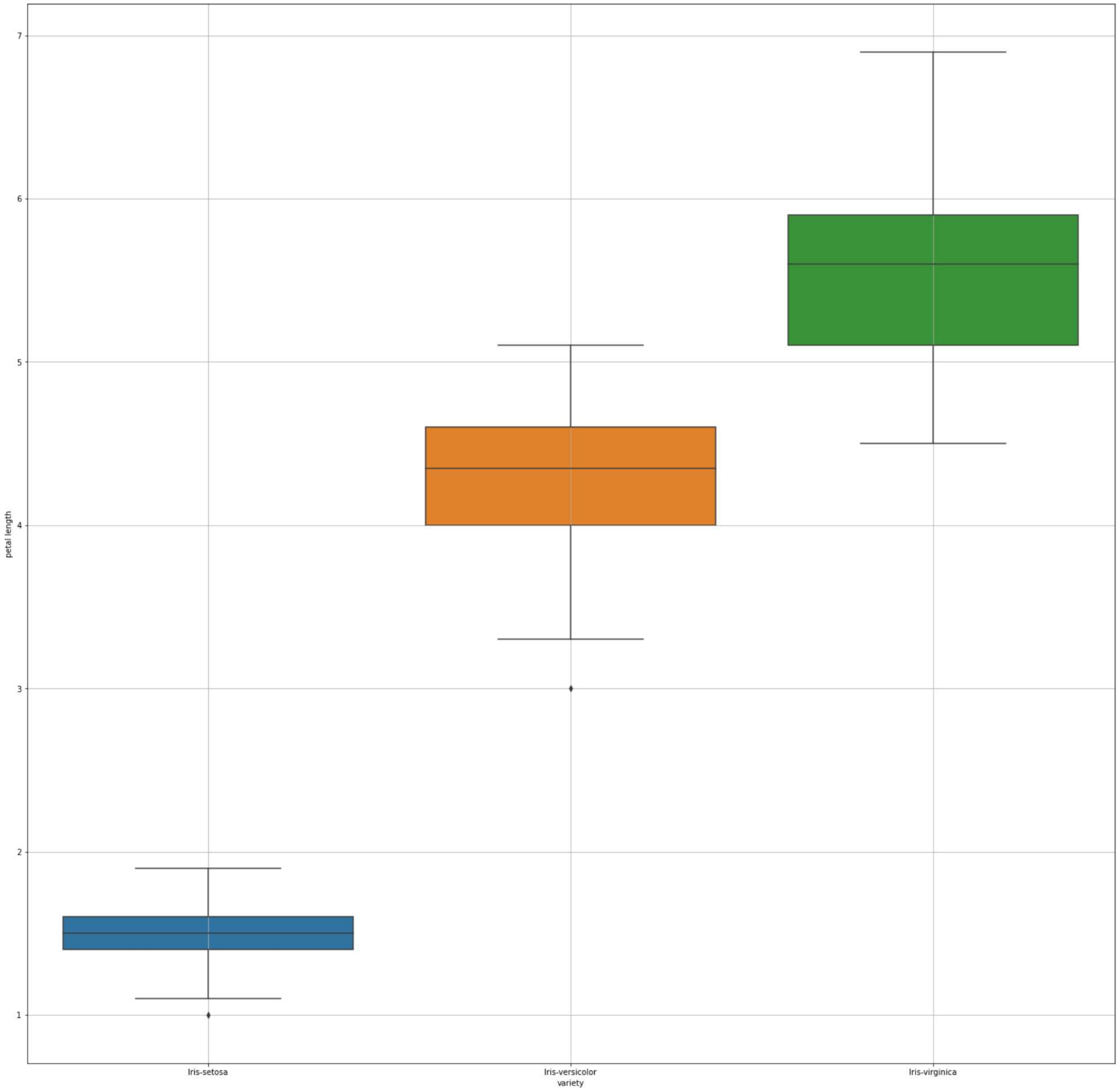


In [17]:

```
plt.figure(figsize=(25,25))
sns.boxplot(data=data,x='variety',y='sepal width');
plt.grid()
```

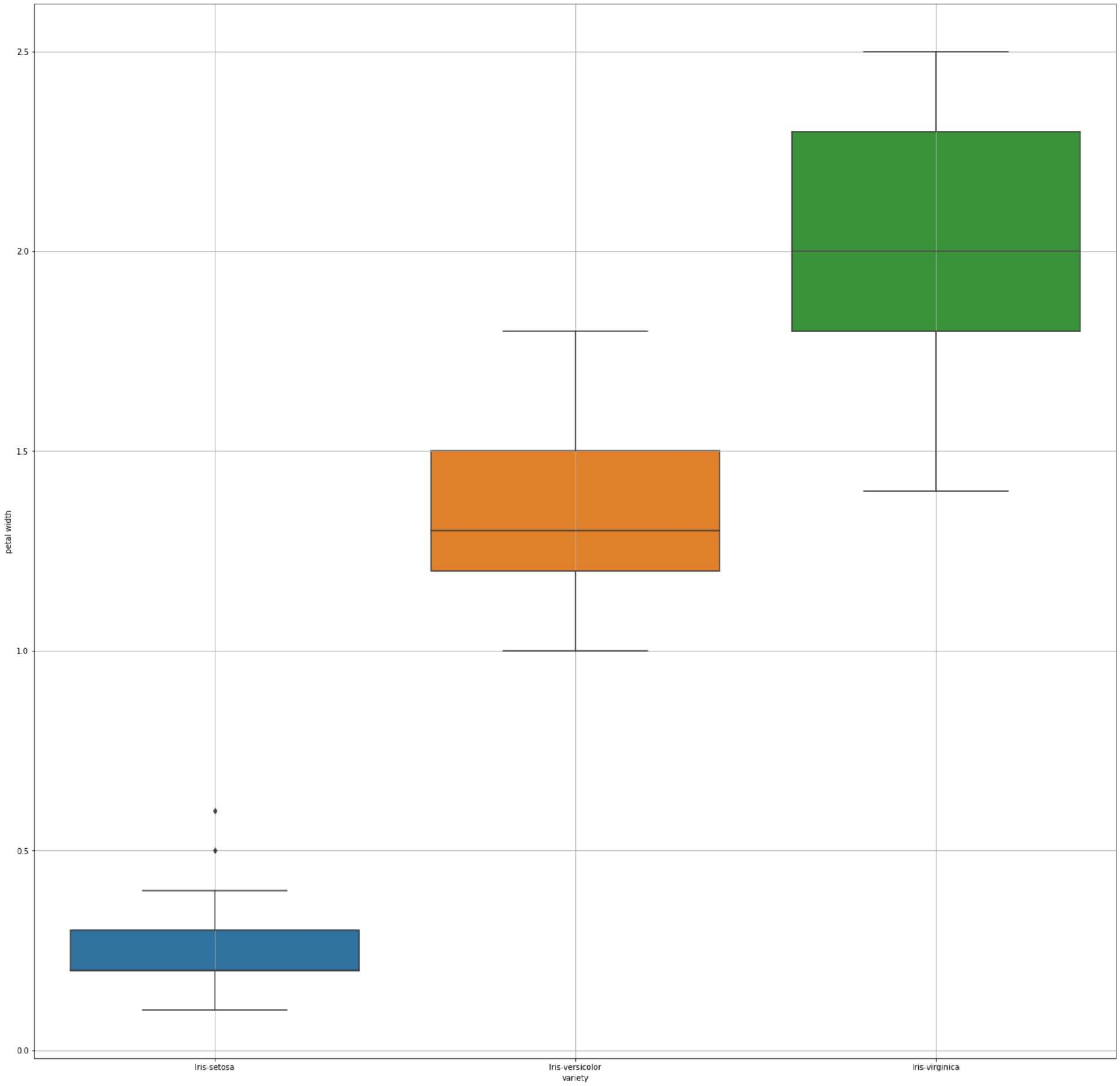


```
In [18]: plt.figure(figsize=(25,25))
         sns.boxplot(data=data,x='variety',y='petal length');
         plt.grid()
```



In [19]:

```
plt.figure(figsize=(25,25))
sns.boxplot(data=data,x='variety',y='petal width');
plt.grid()
```



In [20]:

```
def iqr_outliers(data):
    data = sorted(data)
    n = len(data)
    q1 = data[int(n * 0.25)]
    q3 = data[int(n * 0.75)]
    iqr = q3-q1
    lower_wisker = q1-1.5*iqr
    upper_wisker = q3+1.5*iqr

    outliers = []
    for index,value in enumerate(data):
        if value > upper_wisker or value < lower_wisker:
            outliers.append(index)
    return outliers
```

In [21]:

```
iqr_outliers(data["sepal width"])
```

Out[21]:

```
[0, 144, 145, 146]
```

In [22]:

```
iqr_outliers(data["sepal length"])
```

Out[22]:

```
[]
```

In [23]:
```
iqr_outliers(data["petal width"])
```

Out[23]:
```
[]
```

In [24]:
```
iqr_outliers(data["petal length"])
```

Out[24]:
```
[]
```

In [25]:
```
data.head()
```

Out[25]:

	sepal length	sepal width	petal length	petal width	variety
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [26]:
```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
data['variety'] = le.fit_transform(data.variety.values)
```

In [27]:
```
data.head()
```

Out[27]:

	sepal length	sepal width	petal length	petal width	variety
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

In [28]:
```
feature=data.iloc[:,:-1]
```

In [29]:
```
feature
```

Out[29]:

	sepal length	sepal width	petal length	petal width
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
...	...	...	...	...
145	6.7	3.0	5.2	2.3
146	6.3	2.5	5.0	1.9
147	6.5	3.0	5.2	2.0
148	6.2	3.4	5.4	2.3
149	5.9	3.0	5.1	1.8

147 rows × 4 columns

In [30]:
```
target=data.iloc[:,-1]
```

```
In [31]:  target

Out[31]: 0      0
         1      0
         2      0
         3      0
         4      0
               ..
         145    2
         146    2
         147    2
         148    2
         149    2
         Name: variety, Length: 147, dtype: int32
```

```
In [89]:  from sklearn.model_selection import train_test_split
          xtrain, xtest, ytrain, ytest = train_test_split(feature, target, test_size=0.3, random_state=2)
```

```
In [90]:  from sklearn.neighbors import KNeighborsClassifier
          knn = KNeighborsClassifier(n_neighbors=9)
          knn.fit(xtrain,ytrain)
          ypred = knn.predict(xtest)
```

```
In [91]:  trainacc = knn.score(xtrain,ytrain)
          testacc = knn.score(xtest,ytest)
```

```
In [92]:  trainacc

Out[92]: 0.9803921568627451
```

```
In [93]:  testacc

Out[93]: 0.9777777777777777
```

```
In [94]:  from sklearn.linear_model import LogisticRegression
          lr = LogisticRegression()
          lr.fit(xtrain,ytrain)
          ypred = lr.predict(xtest)
```

```
In [95]:  trainacc = lr.score(xtrain,ytrain)
```

```
In [96]:  testacc = lr.score(xtest,ytest)
```

```
In [98]:  trainacc

Out[98]: 0.9803921568627451
```

```
In [97]:  testacc

Out[97]: 0.9777777777777777
```

```
In [ ]:
```