Topic 2. Visual data analysis

Practice. Analyzing "Titanic" passengers

Fill in the missing code ("You code here").

Competition Kaggle "Titanic: Machine Learning from Disaster".

In [11]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import itertools

sns.set()
import matplotlib.pyplot as plt
```

Read data

In [2]:

```
train_df = pd.read_csv("titanic_train.csv", index_col="PassengerId")
```

In [3]:

```
train_df.head(2)
```

Out[3]:

	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	
PassengerId									
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71

In [4]:

```
train_df.describe(include="all")
```

Out[4]:

	Survived	Pclass	Name	Sex	Age	SibSp	Pa
count	891.000000	891.000000	891	891	714.000000	891.000000	891.000
unique	NaN	NaN	891	2	NaN	NaN	
top	NaN	NaN	Braund, Mr. Owen Harris	male	NaN	NaN	
freq	NaN	NaN	1	577	NaN	NaN	
mean	0.383838	2.308642	NaN	NaN	29.699118	0.523008	0.381
std	0.486592	0.836071	NaN	NaN	14.526497	1.102743	0.806
min	0.000000	1.000000	NaN	NaN	0.420000	0.000000	0.000
25%	0.000000	2.000000	NaN	NaN	20.125000	0.000000	0.000
50%	0.000000	3.000000	NaN	NaN	28.000000	0.000000	0.000
75%	1.000000	3.000000	NaN	NaN	38.000000	1.000000	0.000
max	1.000000	3.000000	NaN	NaN	80.000000	8.000000	6.000

In [5]:

```
train_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 891 entries, 1 to 891
Data columns (total 11 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   Survived  891 non-null    int64  
 1   Pclass    891 non-null    int64  
 2   Name      891 non-null    object 
 3   Sex       891 non-null    object 
 4   Age       714 non-null    float64
 5   SibSp     891 non-null    int64  
 6   Parch     891 non-null    int64  
 7   Ticket    891 non-null    object 
 8   Fare      891 non-null    float64
 9   Cabin     204 non-null    object 
 10  Embarked  889 non-null    object 
dtypes: float64(2), int64(4), object(5)
memory usage: 83.5+ KB
```

Let's drop `Cabin`, and then – all rows with missing values.

In [6]:

```
train_df = train_df.drop("Cabin", axis=1).dropna()
```

In [7]:

```
train_df.shape
```

Out[7]:

```
(712, 10)
```

1. Build a picture to visualize all scatter plots for each pair of features

h and `Survived`. (`scatter_matrix` from

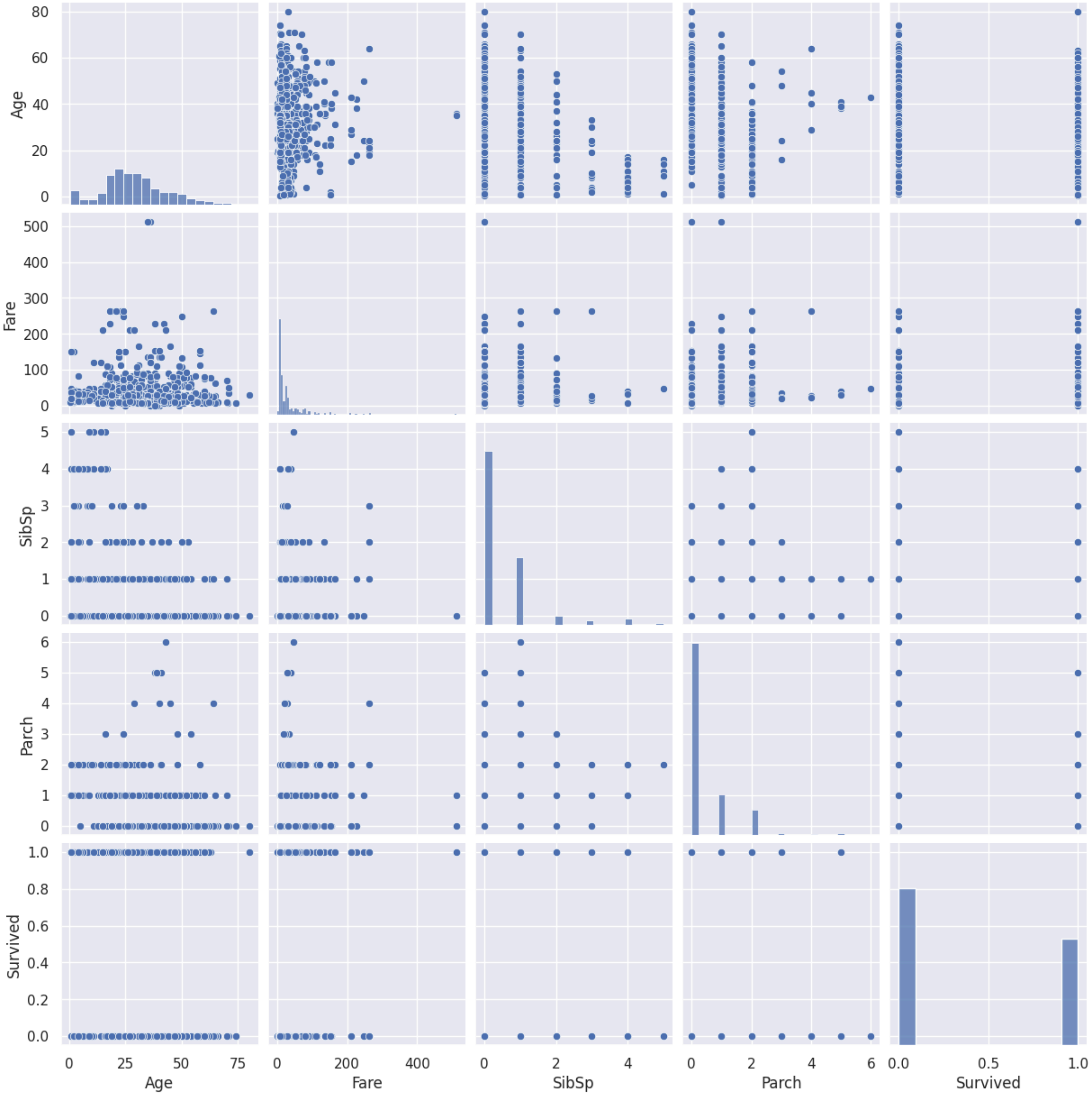
Pandas or `pairplot` from Seaborn)

In [20]:

```
features = ["Age", "Fare", "SibSp", "Parch", "Survived"]
sns.pairplot(train_df[features])
```

Out[20]:

```
<seaborn.axisgrid.PairGrid at 0x7bd898aa4ad0>
```



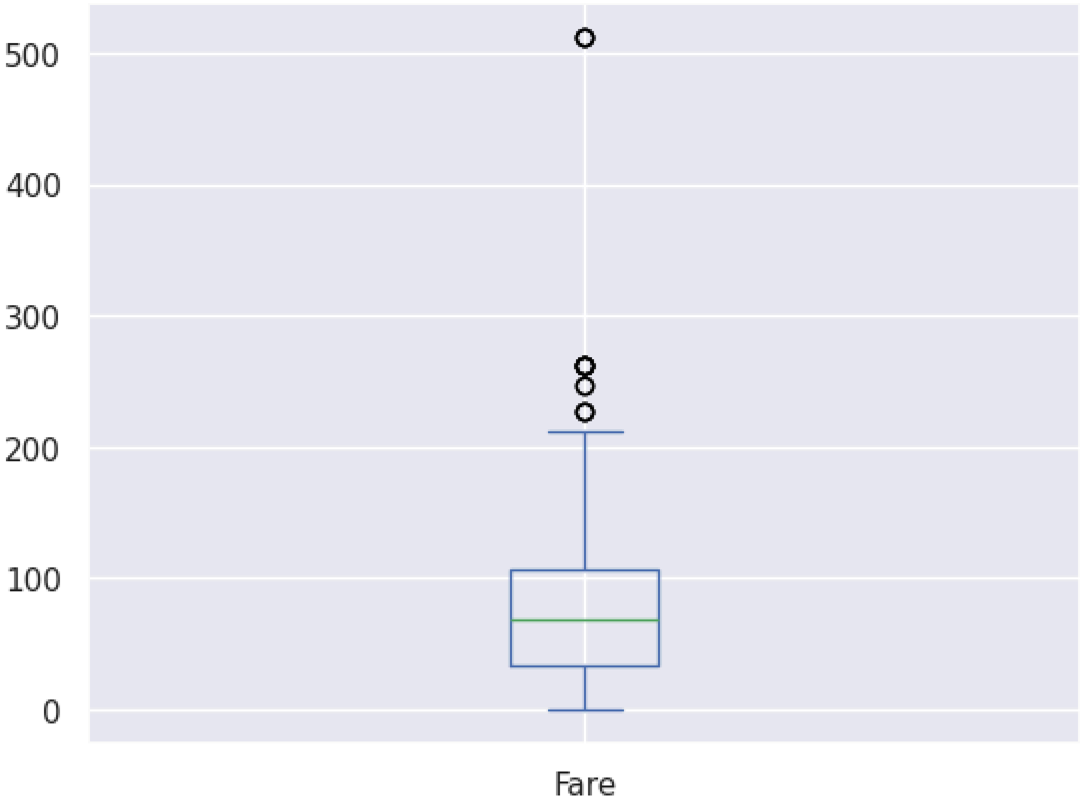
2. How does ticket price (`Fare`) depend on `Pclass` ? Build a boxplot.

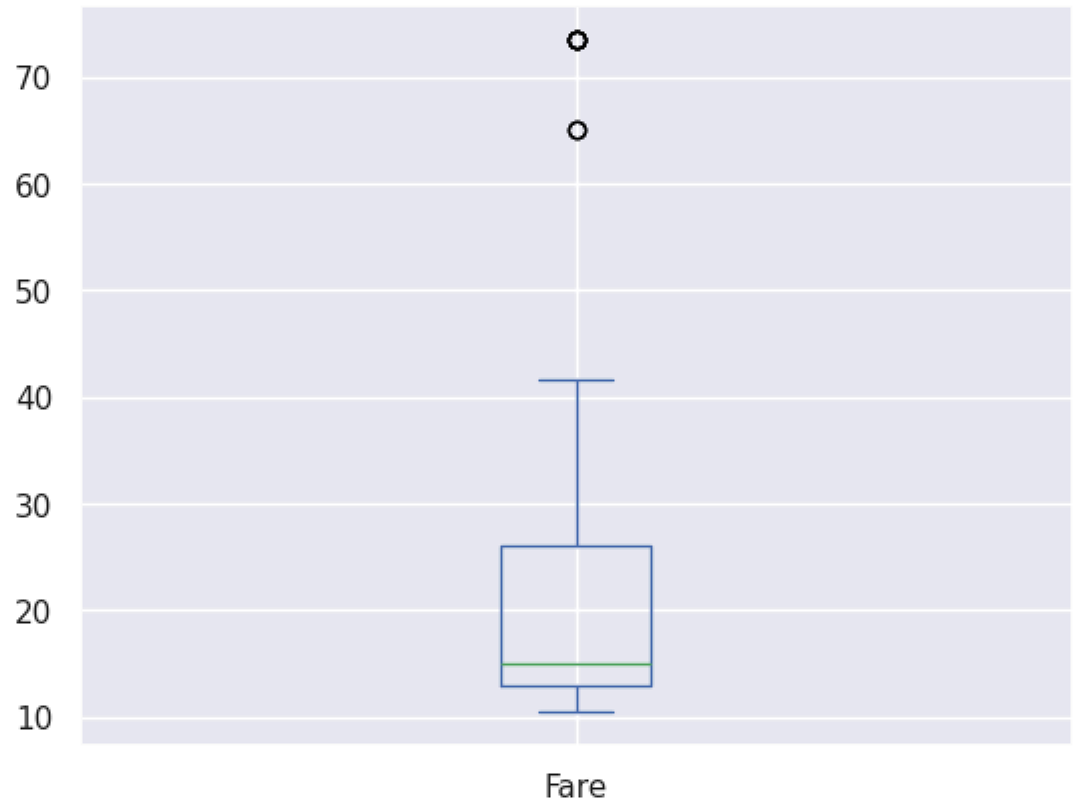
In [38]:

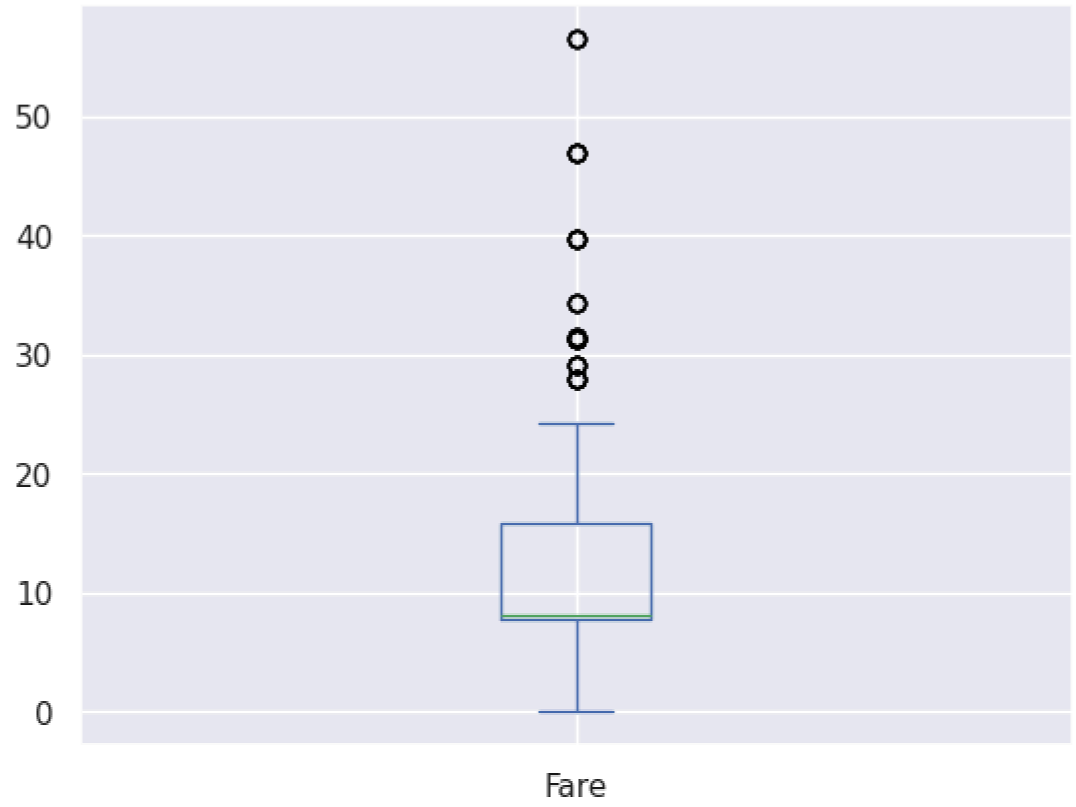
```
train_df.groupby(["Pclass"], as_index=False).plot(
    kind="box", x="Pclass", y="Fare", subplots=False, legend=True
)
```

Out[38]:

	Pclass	None
0	1	Axes(0.125,0.11;0.775x0.77)
1	2	Axes(0.125,0.11;0.775x0.77)
2	3	Axes(0.125,0.11;0.775x0.77)







3. Let's build the same plot but restricting values of `Fare` to be less than 95% quantile of the initial vector (to drop outliers that make the plot less clear).

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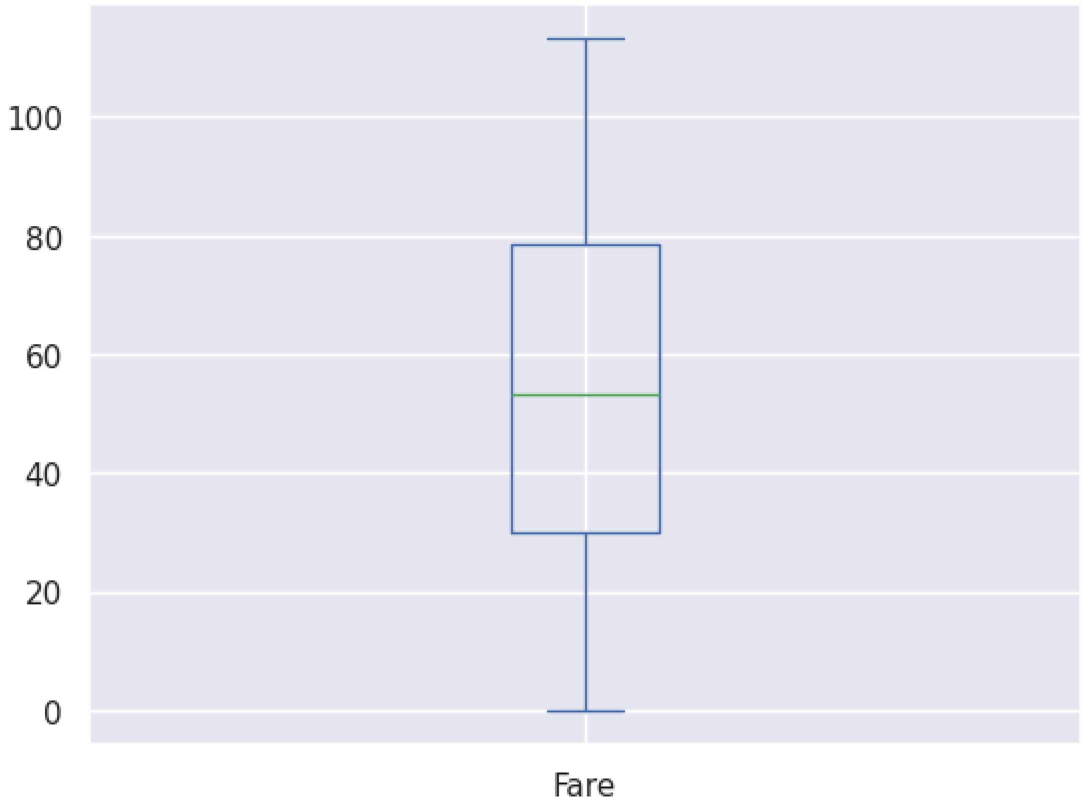
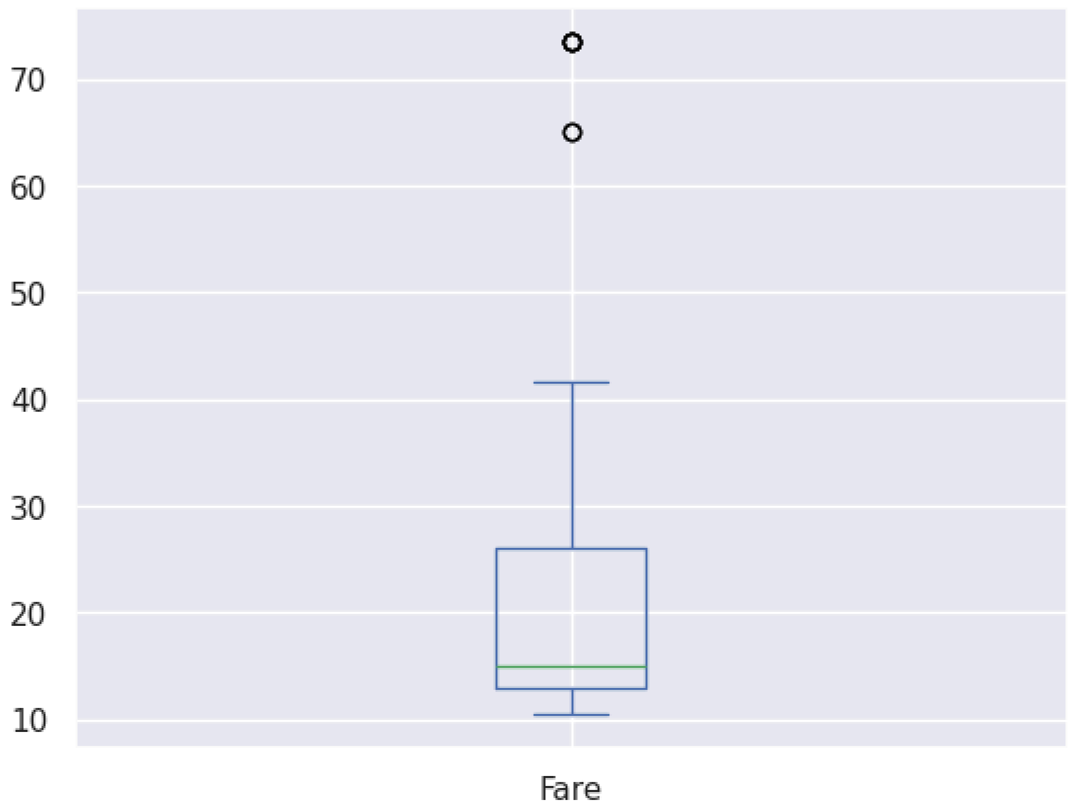
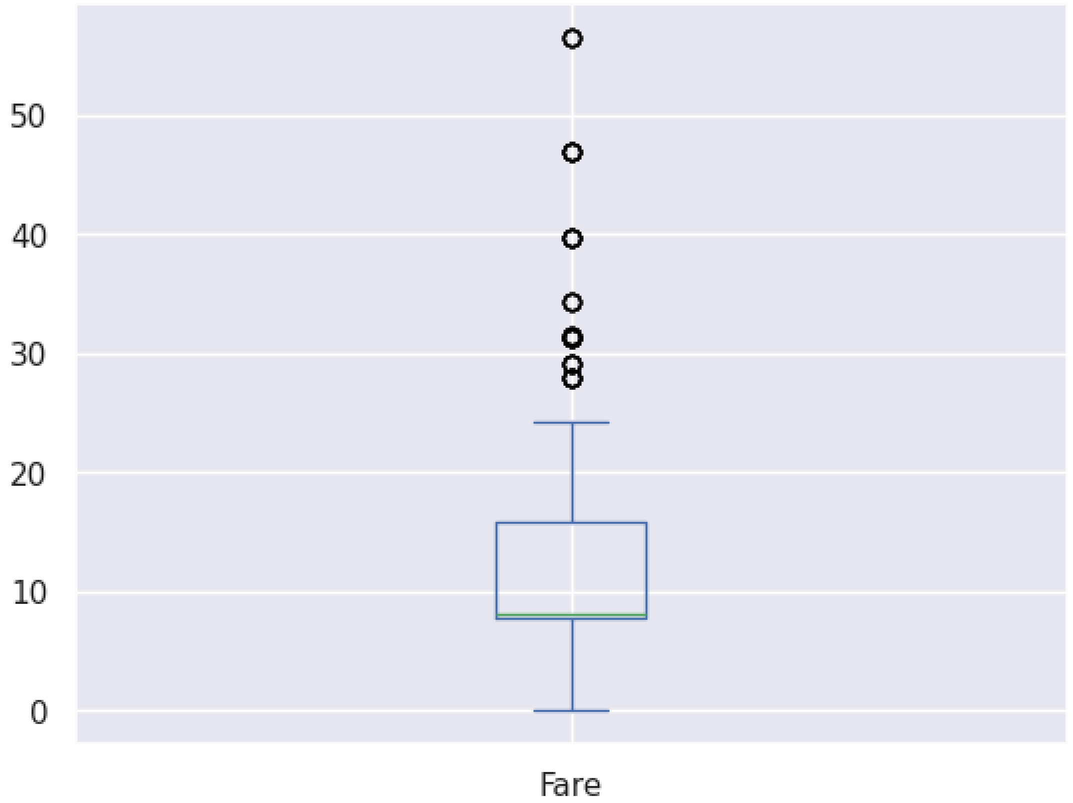
In [39]:
```
train_df[train_df["Fare"] < train_df["Fare"].quantile(0.95)].groupby(
    ["Pclass"], as_index=False
).plot(kind="box", x="Pclass", y="Fare", subplots=False, legend=True)
```

Out[39]:

	Pclass	None
0	1	Axes(0.125,0.11;0.775x0.77)
1	2	Axes(0.125,0.11;0.775x0.77)
2	3	Axes(0.125,0.11;0.775x0.77)







4. How is the percentage of surviving passengers dependent on passengers' gender? Depict it with `Seaborn.countplot` using the `hue` argument.

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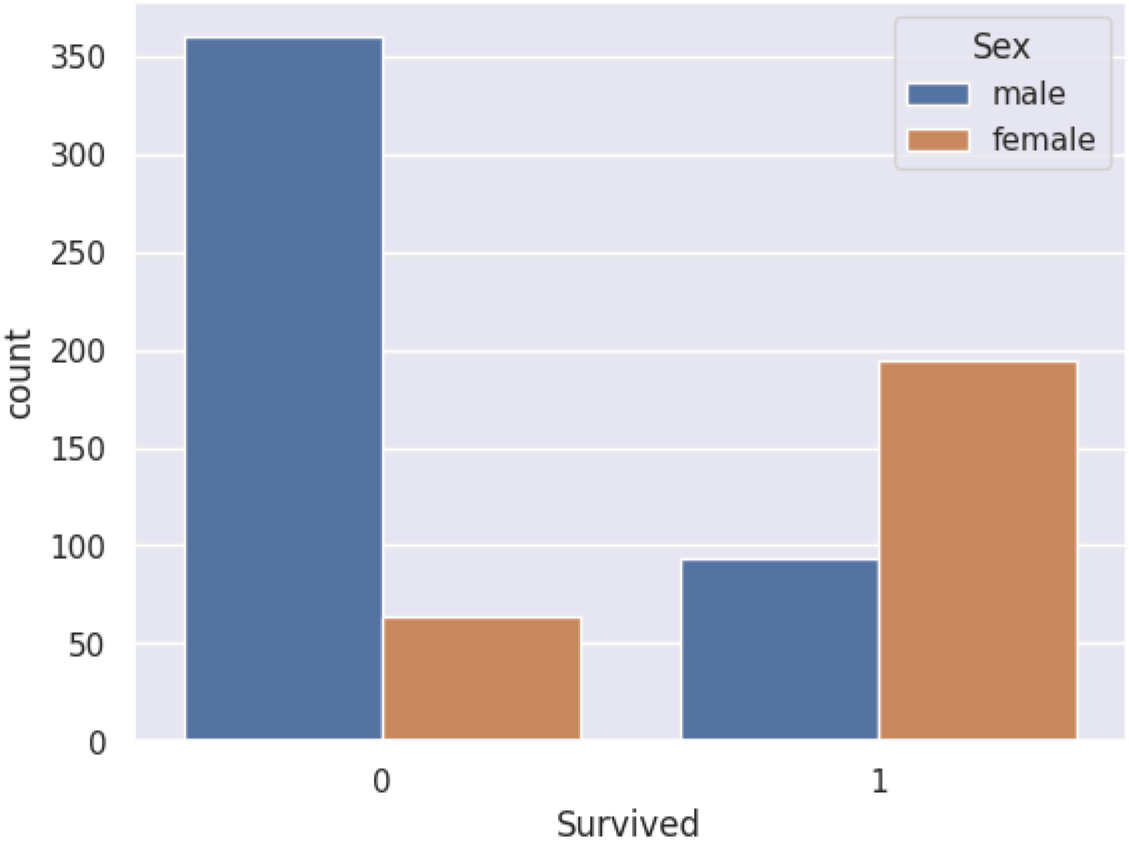
```
In [43]: sns.countplot(train_df, x="Survived", hue="Sex")
```

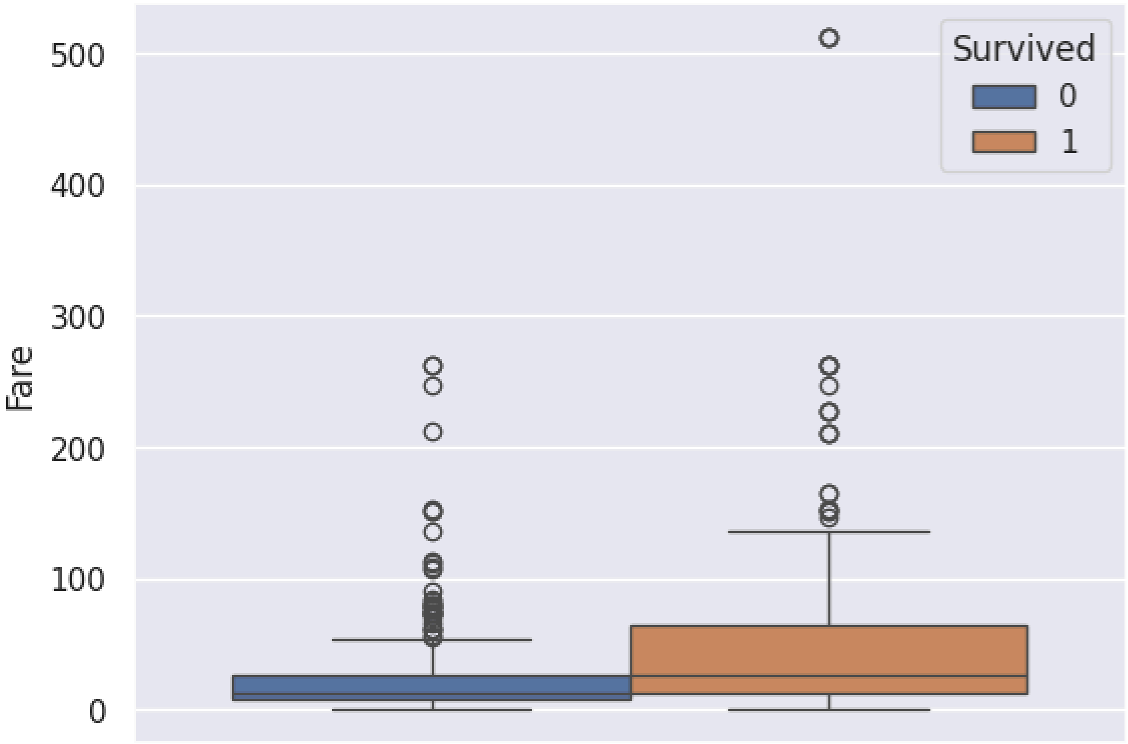
```
Out[43]: <Axes: xlabel='Survived', ylabel='count'>
```



5. How does the distribution of ticket prices differ for those who survived and those who didn't. Depict it with `Seaborn.boxplot`

```
In [44]: sns.boxplot(train_df, y="Fare", hue="Survived")
```

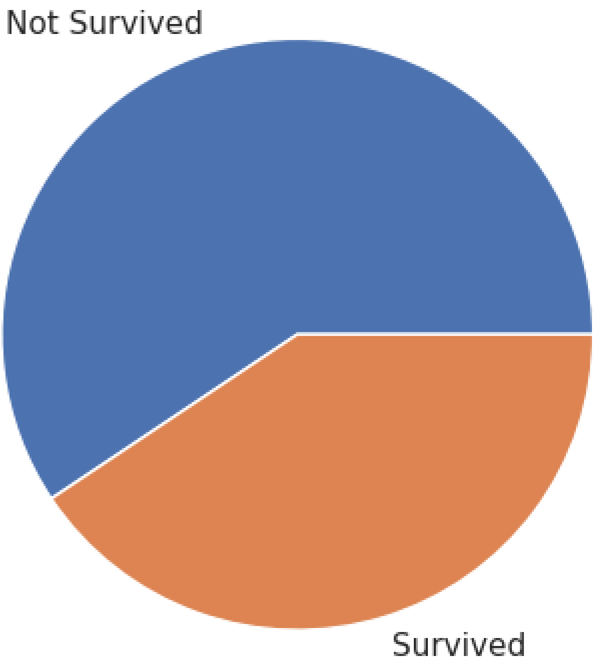
```
Out[44]: <Axes: ylabel='Fare'>
```



6. How does survival depend on passengers' age? Verify (graphically) an assumption that youngsters (< 30 y.o.) survived more frequently than old people (> 55 y.o.).

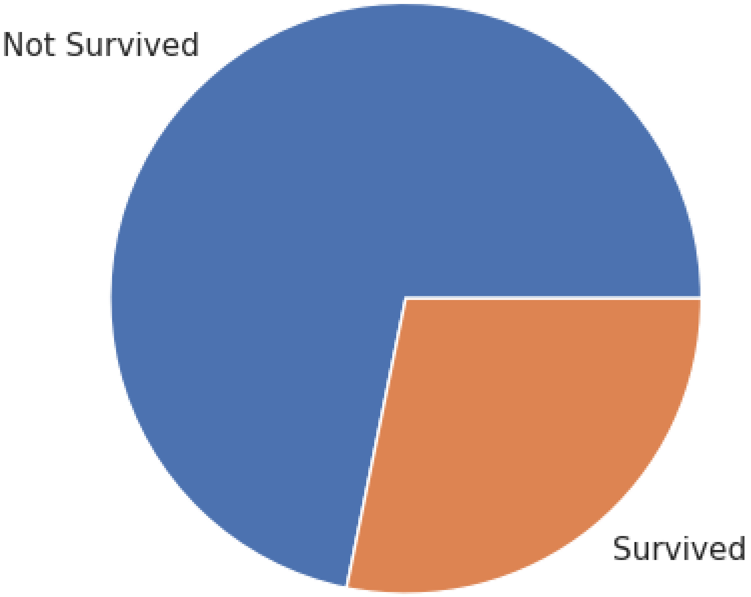
```
In [65]: young = train_df[train_df["Age"] < 30]
         old = train_df[train_df["Age"] > 55]
         plt.pie(
             young.groupby("Survived")["Survived"].value_counts(),
             labels=["Not Survived", "Survived"],
         )
```

```
Out[65]: ([<matplotlib.patches.Wedge at 0x7bd88f111250>,
            <matplotlib.patches.Wedge at 0x7bd88f3938d0>],
           [Text(-0.3193131449799084, 1.0526343693054299, 'Not Survived'),
            Text(0.31931314497990826, -1.0526343693054299, 'Survived')])
```



```
In [68]: plt.pie(
             old.groupby("Survived")["Survived"].value_counts(),
             labels=["Not Survived", "Survived"],
         )
```

```
Out[68]: ([<matplotlib.patches.Wedge at 0x7bd88f0ff4d0>,
            <matplotlib.patches.Wedge at 0x7bd88f0e0490>],
          [Text(-0.695689958156831, 0.8520654212674911, 'Not Survived'),
            Text(0.6956900379329504, -0.8520653561322924, 'Survived')])
```



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