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 [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns

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	Fare
PassengerId									
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833

In [4]:
```
train_df.describe(include="all")
```

Out[4]:

	Survived	Pclass	Name	Sex	Age	SibSp	Parch	
count	891.000000	891.000000	891	891	714.000000	891.000000	891.000000	
unique	NaN	NaN	891	2	NaN	NaN	NaN	
top	NaN	NaN	Dooley, Mr. Patrick	male	NaN	NaN	NaN	3
freq	NaN	NaN	1	577	NaN	NaN	NaN	
mean	0.383838	2.308642	NaN	NaN	29.699118	0.523008	0.381594	
std	0.486592	0.836071	NaN	NaN	14.526497	1.102743	0.806057	
min	0.000000	1.000000	NaN	NaN	0.420000	0.000000	0.000000	
25%	0.000000	2.000000	NaN	NaN	20.125000	0.000000	0.000000	
50%	0.000000	3.000000	NaN	NaN	28.000000	0.000000	0.000000	
75%	1.000000	3.000000	NaN	NaN	38.000000	1.000000	0.000000	
max	1.000000	3.000000	NaN	NaN	80.000000	8.000000	6.000000	

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.

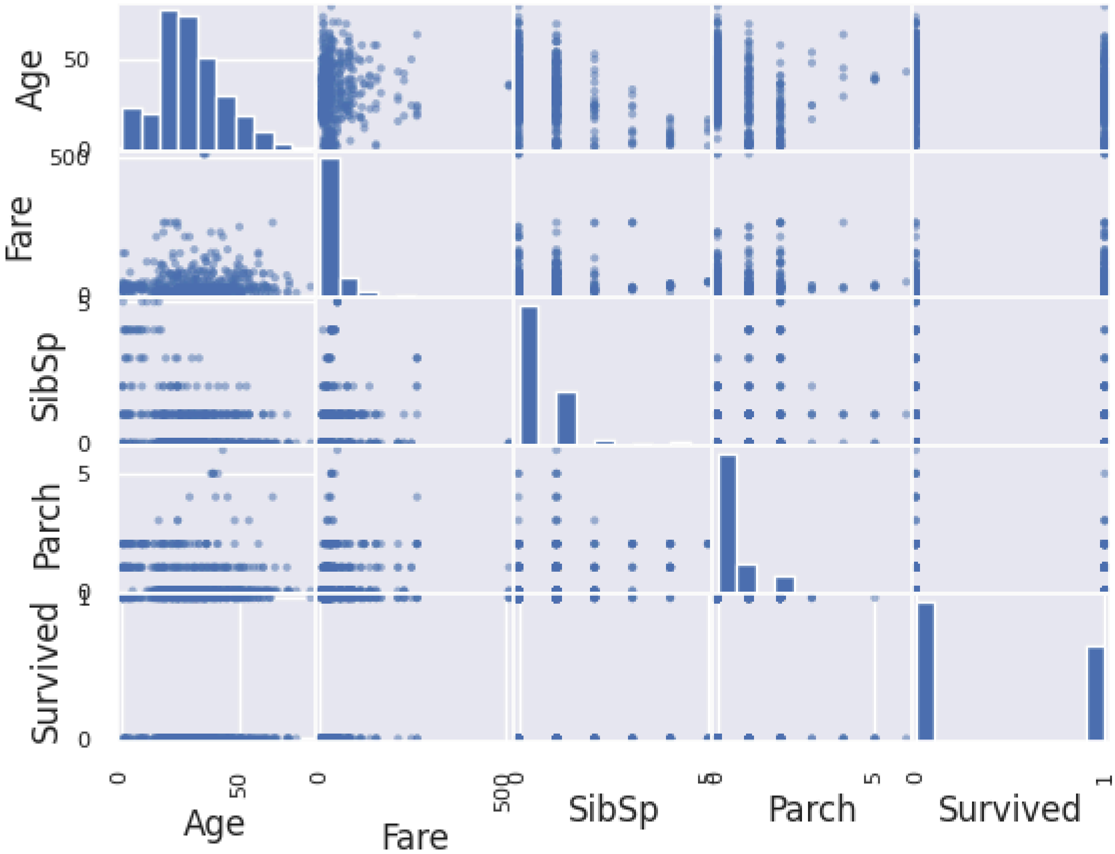
In [6]:
```
train_df = train_df.drop("Cabin", axis=1).dropna()
```

In [7]:
```
train_df.shape
```

Out[7]:
```
(712, 10)
```

1. Build a picture to visualize all scatter plots for each pair of features `Age`, `Fare`, `SibSp`, `Parch` and `Survived`. (`scatter_matrix` from Pandas or `pairplot` from Seaborn)

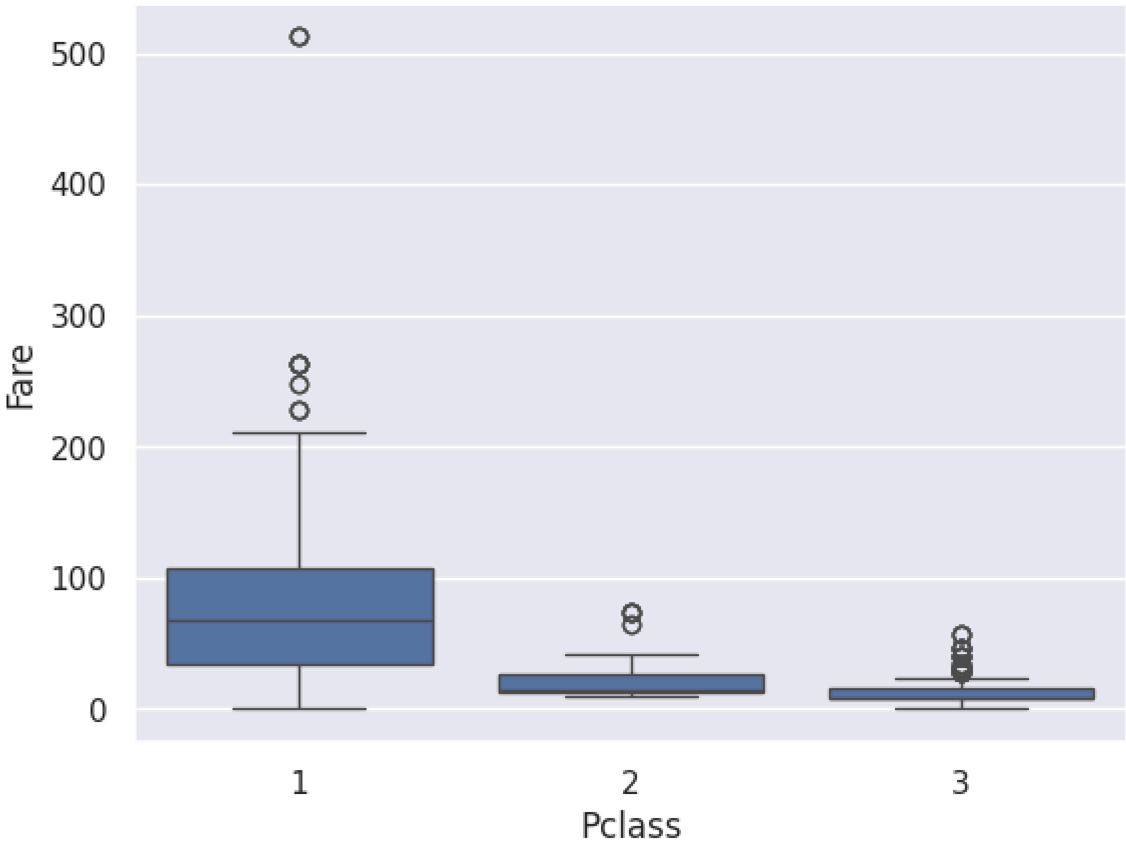
In [8]:
```
from pandas.plotting import scatter_matrix

features = ['Age', 'Fare', 'SibSp', 'Parch', 'Survived']
scatter_matrix(train_df[features])
plt.show()
```



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

In [9]:
```
sns.boxplot(x="Pclass", y="Fare", data=train_df)
```

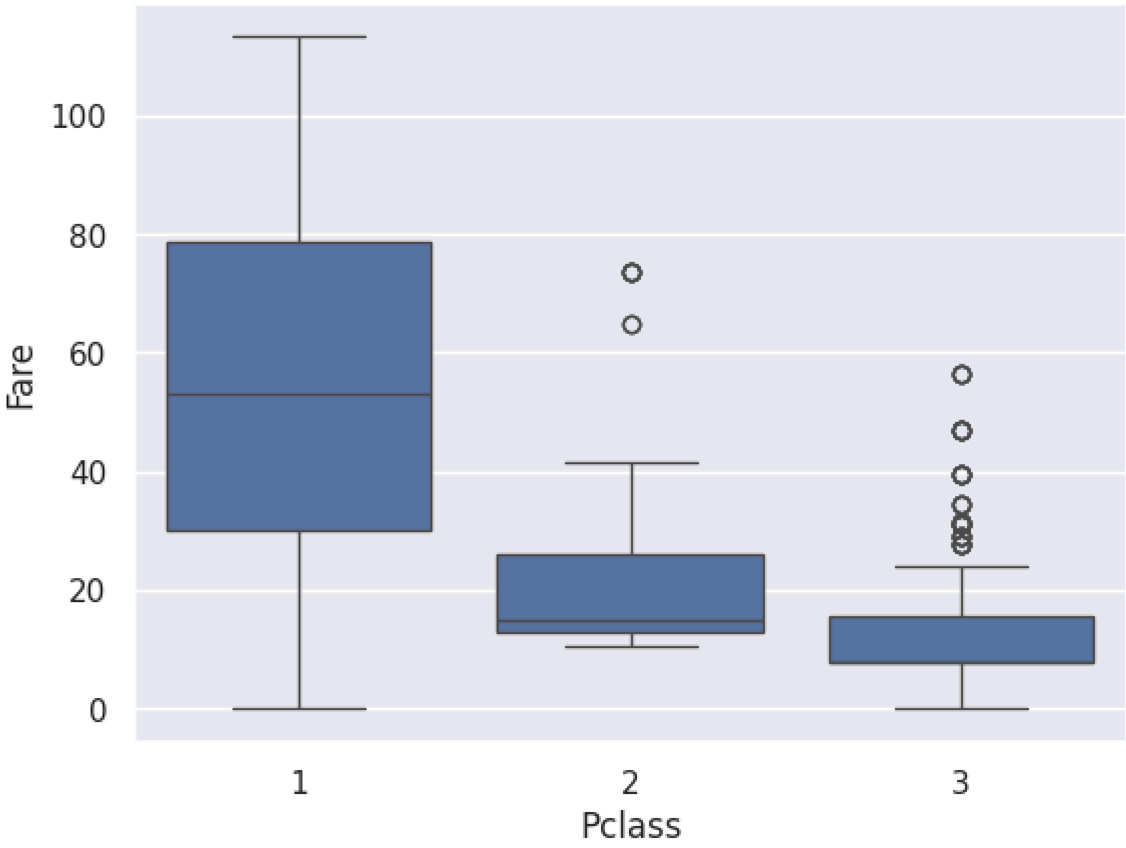
Out[9]: `<Axes: xlabel='Pclass', ylabel='Fare'>`



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).

In [10]:
```
train_df_95_quantile = train_df[train_df["Fare"] < train_df["Fare"].quant
sns.boxplot(x="Pclass", y="Fare", data=train_df_95_quantile)
```

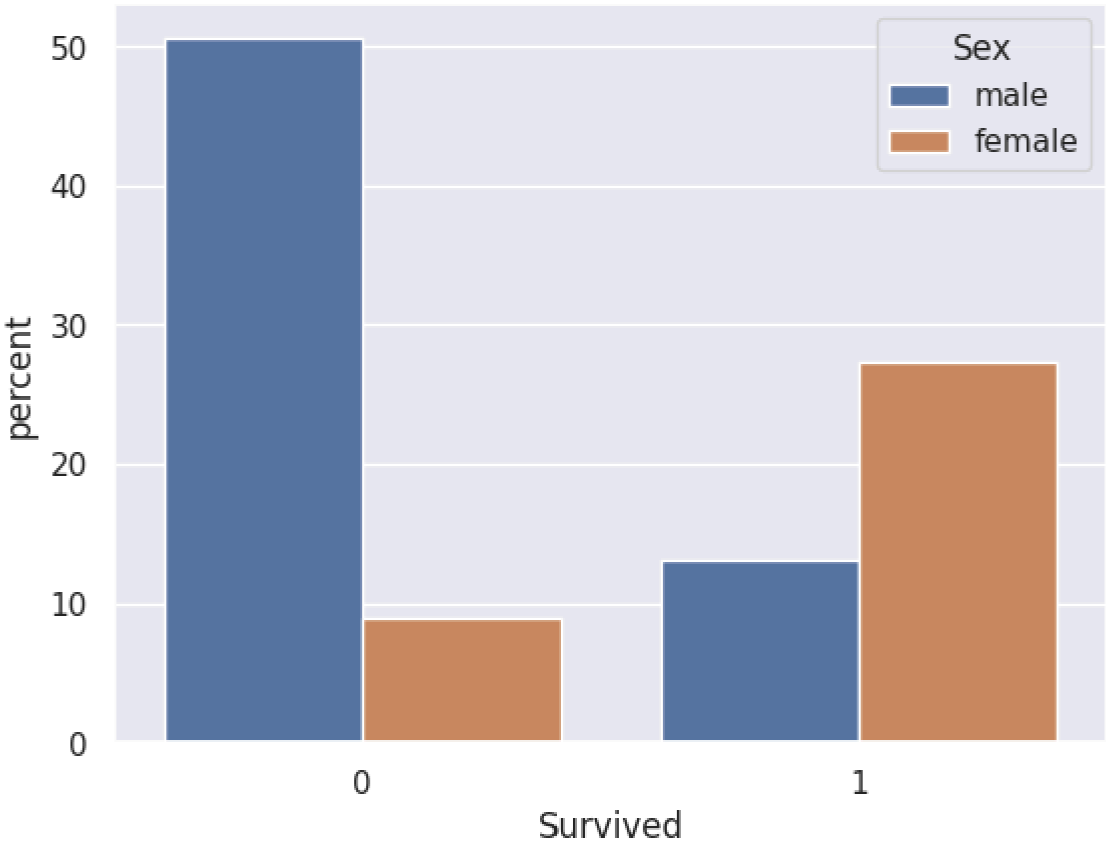
Out[10]: <Axes: xlabel='Pclass', ylabel='Fare'>



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

In [11]:
```
sns.countplot(train_df, x="Survived", hue="Sex", stat="percent")
```

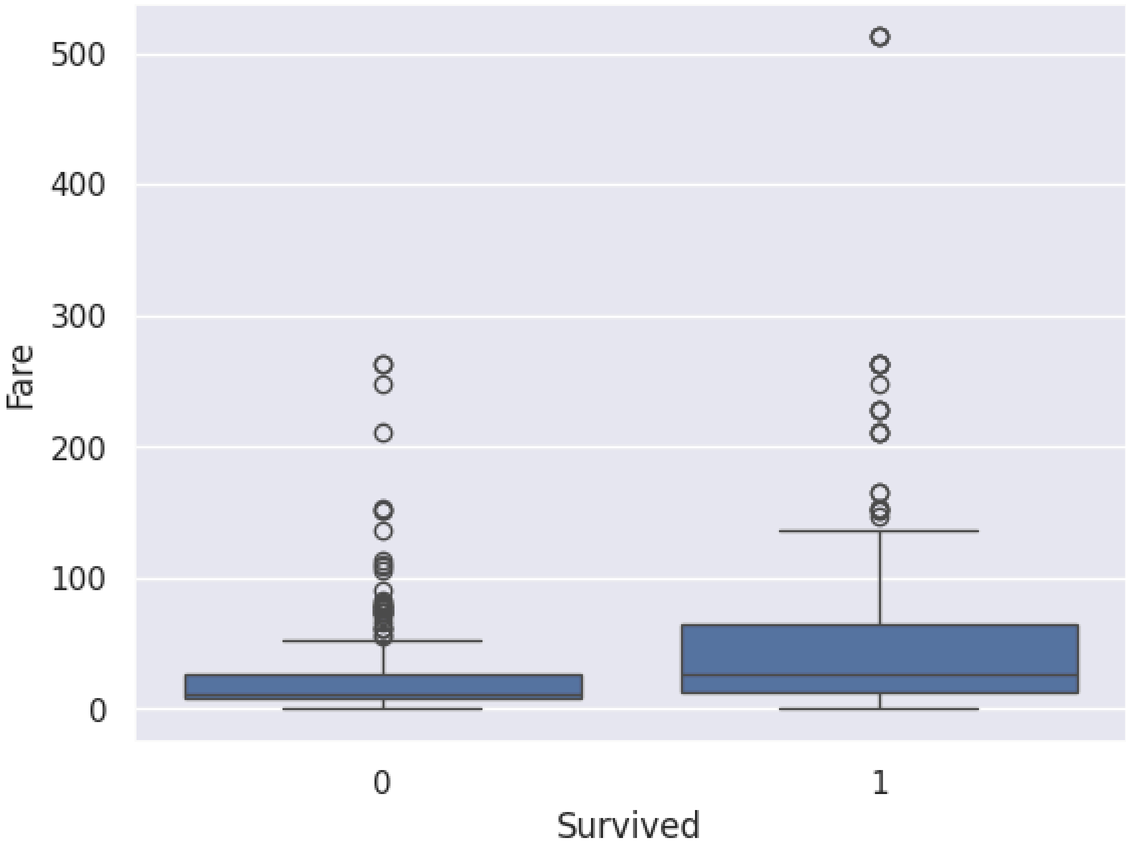
Out[11]: `<Axes: xlabel='Survived', ylabel='percent'>`



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

In [12]:
```
sns.boxplot(x="Survived", y="Fare", data=train_df)
```

Out[12]:
```
<Axes: xlabel='Survived', ylabel='Fare'>
```



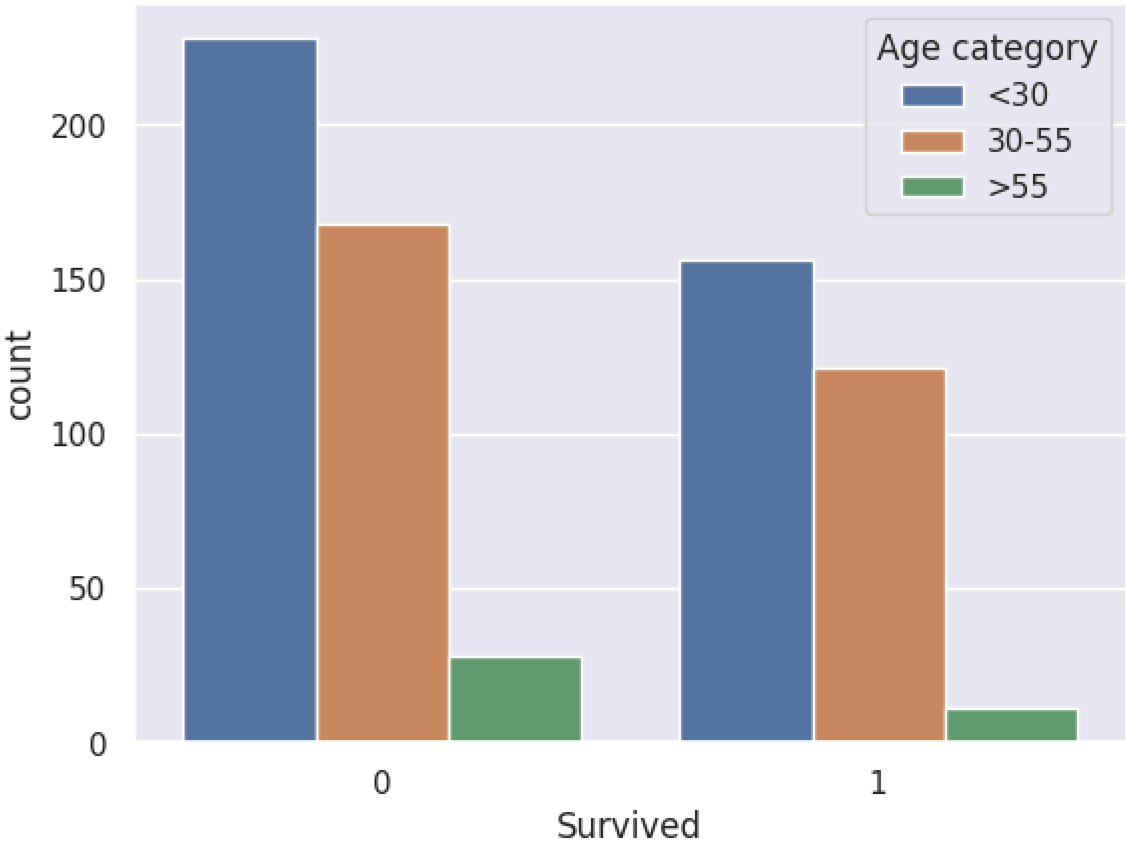
6. How does survival depend on passengers' age? Verify (graphically) an assumption that youngsters (< 30 y.o.) survived more frequently than old people (> 55 y.o.).

In [13]:
```
def get_age_category(age: int) -> str:
    if age < 30:
        return "<30"
    elif age > 55:
        return ">55"
    else:
        return "30-55"
```

In [14]:
```
age_category = [get_age_category(age) for age in train_df.Age]
train_df["Age category"] = age_category
```

In [15]:
```
sns.countplot(train_df, x="Survived", hue="Age category")
```

Out[15]:
```
<Axes: xlabel='Survived', ylabel='count'>
```


Age category
<30
30-55
>55
count
0
50
100
150
200
0
1
Survived