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
import scipy

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]:

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Far
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.250
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.283

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
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.

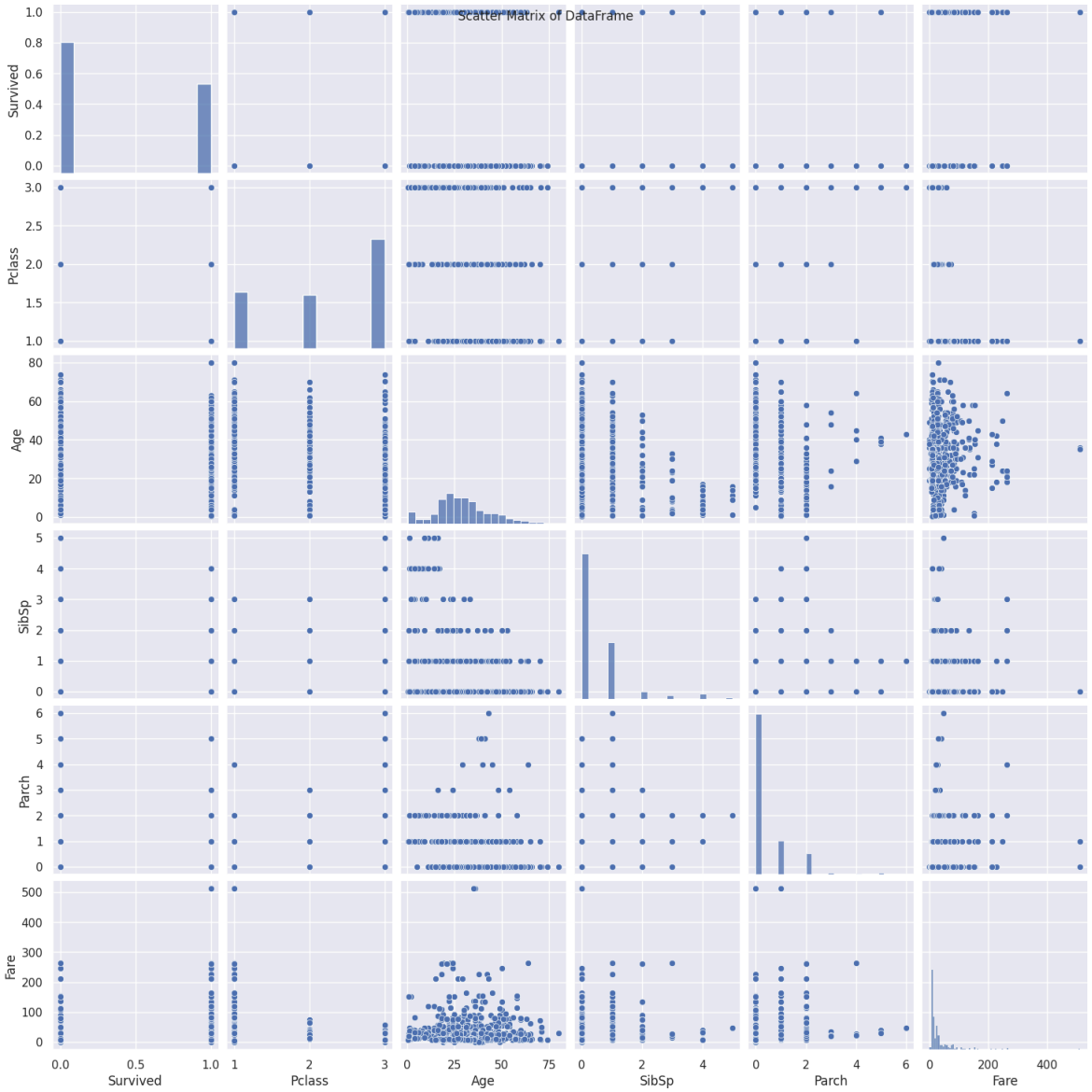
In [6]:
```
train_df = train_df.drop("Cabin", axis=1).dropna()
```

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)

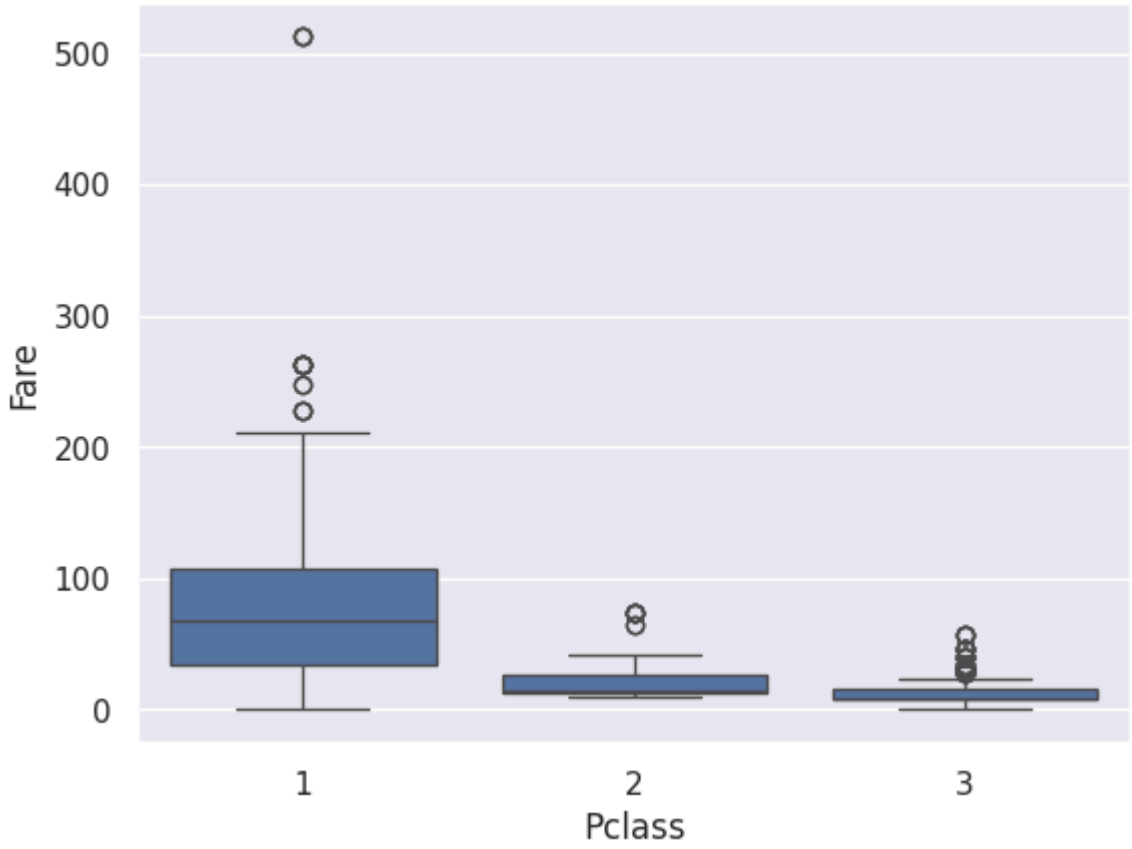
In [8]:
```
sns.pairplot(train_df)
plt.suptitle("Scatter Matrix of DataFrame", fontsize=12)
plt.show()
```



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

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

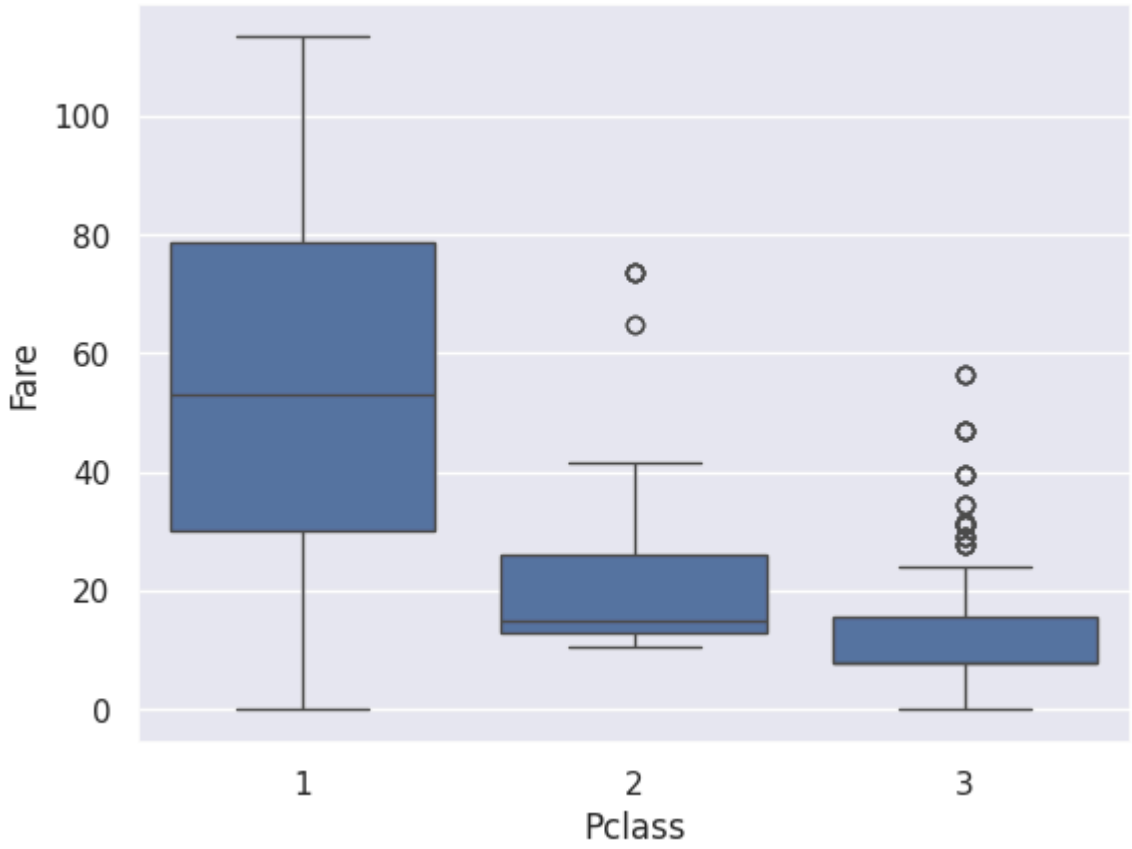
Out[9]: <Axes: xlabel='Pclass', ylabel='Fare'>



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_quantile_95 = train_df[train_df["Fare"] < train_df['Fare'].quant
sns.boxplot(y=train_df_quantile_95["Fare"], x=train_df_quantile_95["Pclas
```

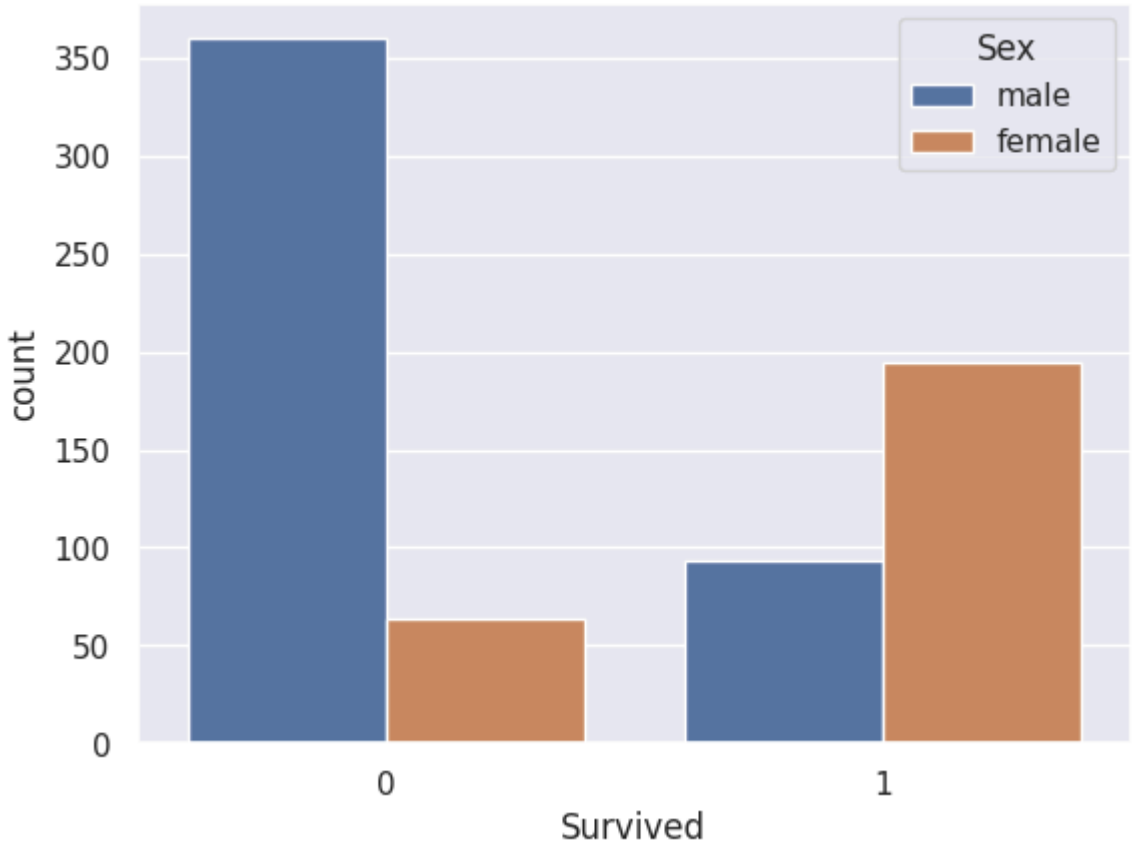
Out[10]:
```
<Axes: xlabel='Pclass', ylabel='Fare'>
```



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(x=train_df["Survived"], hue=train_df["Sex"])
```

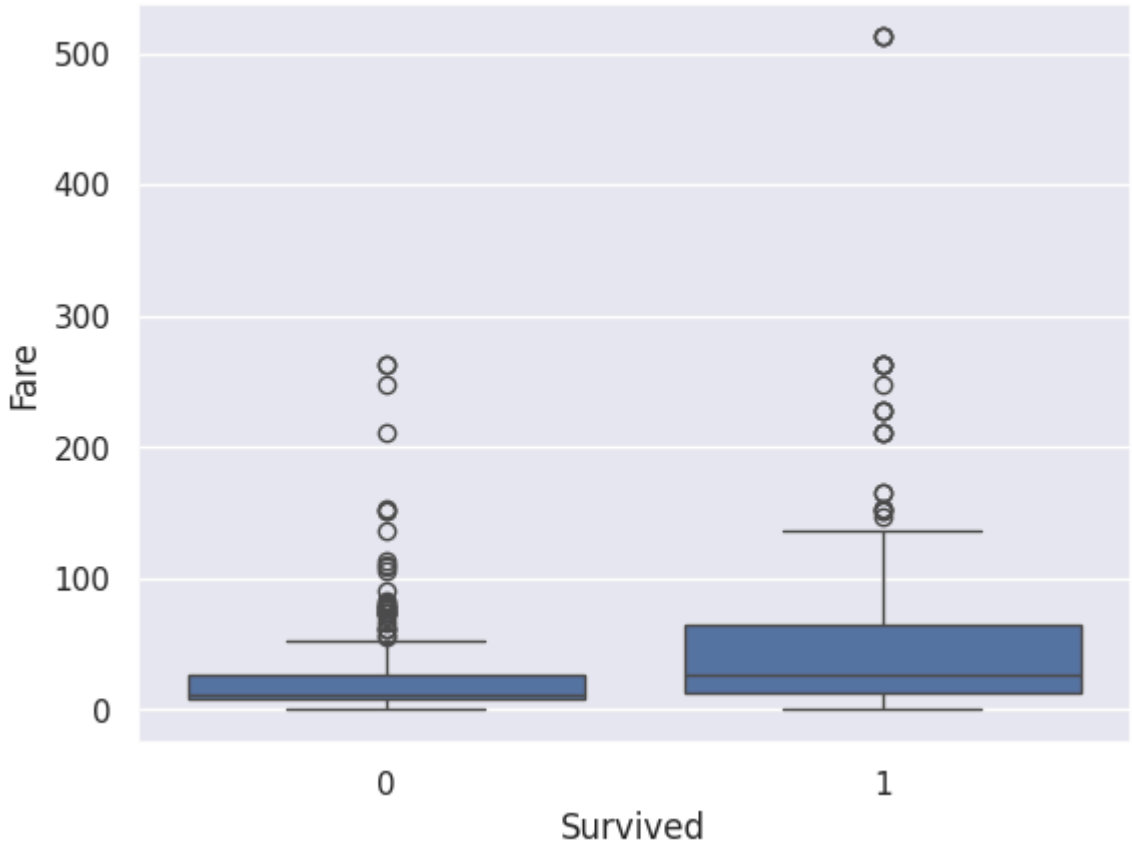
Out[11]:
```
<Axes: xlabel='Survived', ylabel='count'>
```



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

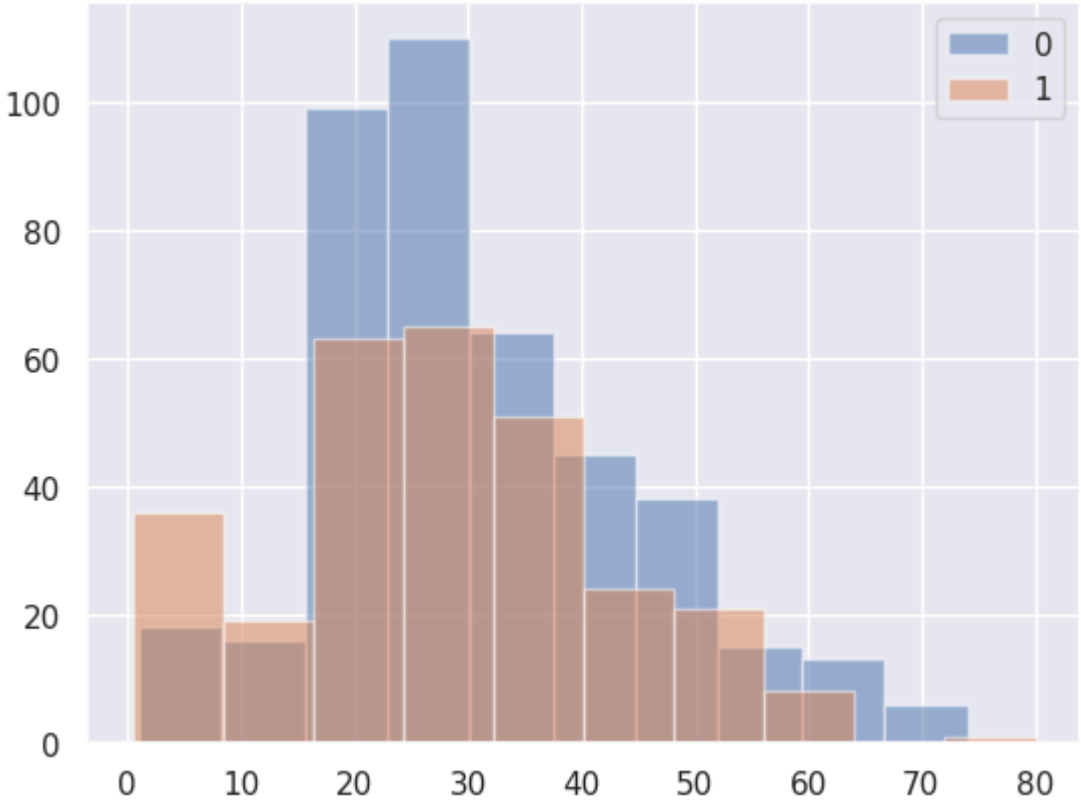
In [12]:
```
sns.boxplot(y=train_df["Fare"], x=train_df["Survived"])
```

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]:
```
for is_survived in train_df["Survived"].unique():
    plt.hist(train_df[train_df['Survived'] == is_survived]['Age'], label=
    plt.legend()
```

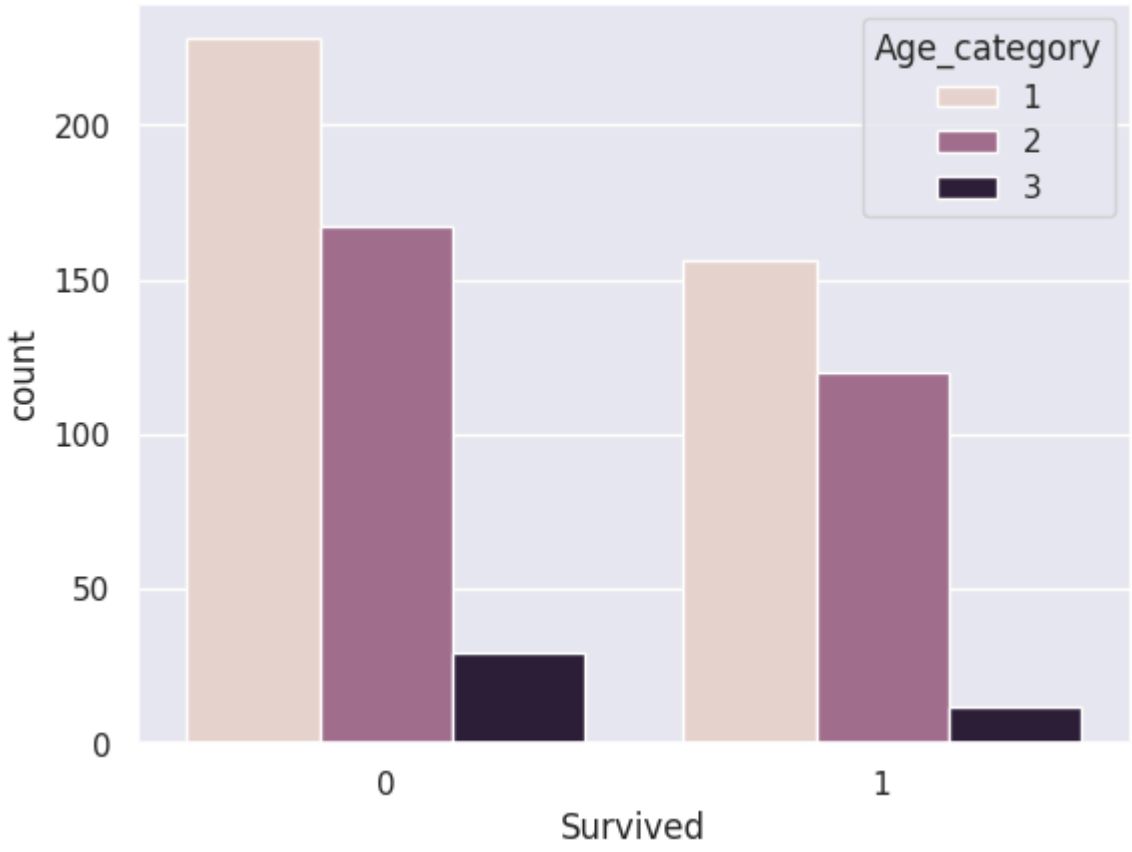


In [14]:
```
def age_category(age):
    if age < 30:
        return 1
    elif age < 55:
        return 2
    elif age >= 55:
        return 3
```

In [15]:
```
train_df["Age_category"] = train_df["Age"].apply(age_category)
```

In [16]:
```
sns.countplot(x=train_df["Survived"], hue=train_df["Age_category"])
```

Out[16]:
```
<Axes: xlabel='Survived', ylabel='count'>
```



In [ ]: