Lab-5

Correlation Analysis

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Import Libraries

In [5]:

```
import numpy as np
import pandas as pd
```

In [7]:

```
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

Import Titanic dataset

In [10]:

```
titanic = pd.read_csv("Titanic.csv")
```

Read head of the dataset

In [13]:

```
titanic.head()
```

Out[13]:

	PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	892	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292	NaN	Q
1	893	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272	7.0000	NaN	S
2	894	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276	9.6875	NaN	Q
3	895	3	Wirz, Mr. Albert	male	27.0	0	0	315154	8.6625	NaN	S
4	896	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	female	22.0	1	1	3101298	12.2875	NaN	S

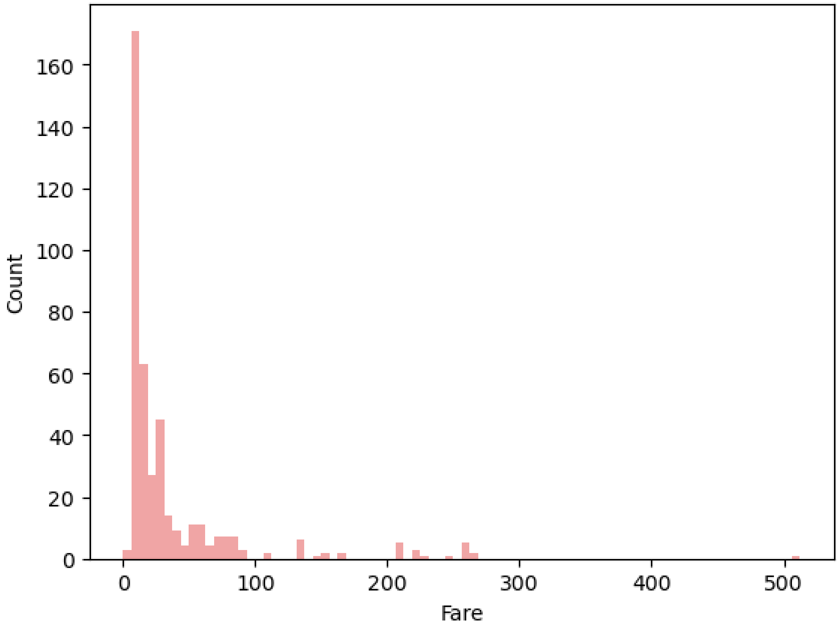
Exercise 1

In [20]:

```
# CODE HERE
sns.histplot(titanic["Fare"], color = "lightcoral", alpha = 0.7, edgecolor = None)
```

Out[20]:

```
<Axes: xlabel='Fare', ylabel='Count'>
```



Exercise 2

In [73]:

```python
# CODE HERE
titanic_new = titanic.drop(columns = ["Name","Sex", "Ticket", "Cabin", "Embarked"])
titanic_new
```

Out[73]:

	PassengerId	Pclass	Age	SibSp	Parch	Fare
0	892	3	34.5	0	0	7.8292
1	893	3	47.0	1	0	7.0000
2	894	2	62.0	0	0	9.6875
3	895	3	27.0	0	0	8.6625
4	896	3	22.0	1	1	12.2875
...	...	...	...	...	...	...
413	1305	3	NaN	0	0	8.0500
414	1306	1	39.0	0	0	108.9000
415	1307	3	38.5	0	0	7.2500
416	1308	3	NaN	0	0	8.0500
417	1309	3	NaN	1	1	22.3583

418 rows × 6 columns

In [75]:

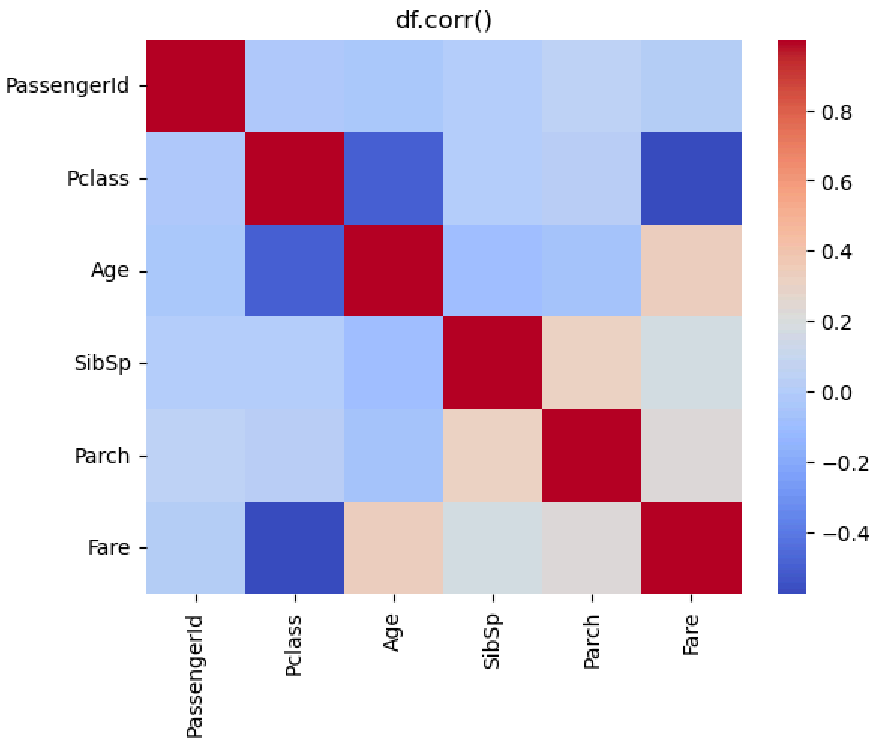
```python
titanic_new.corr()
```

Out[75]:

	PassengerId	Pclass	Age	SibSp	Parch	Fare
PassengerId	1.000000	-0.026751	-0.034102	0.003818	0.043080	0.008211
Pclass	-0.026751	1.000000	-0.492143	0.001087	0.018721	-0.577147
Age	-0.034102	-0.492143	1.000000	-0.091587	-0.061249	0.337932
SibSp	0.003818	0.001087	-0.091587	1.000000	0.306895	0.171539
Parch	0.043080	0.018721	-0.061249	0.306895	1.000000	0.230046
Fare	0.008211	-0.577147	0.337932	0.171539	0.230046	1.000000

In [77]:

```python
levels =  np.arange(-0.4, 1.0, 0.2)
sns.heatmap(titanic_new.corr(), cmap = "coolwarm", cbar_kws = {"ticks": levels})
plt.xticks(rotation = 90)
plt.title("df.corr()")
plt.show()
```

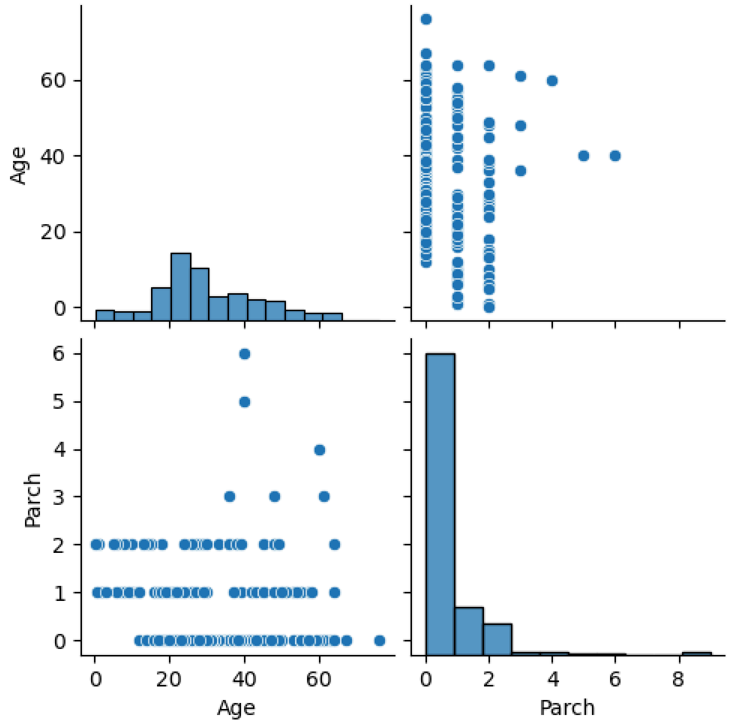


Exercise 3

Find "Pearson correlation" and "Spearman correlation" between "Age" and "Parch" column?

```
In [81]: # CODE HERE
         T = titanic[['Age', 'Parch']]
         sns.pairplot(T)
```

```
Out[81]: <seaborn.axisgrid.PairGrid at 0x200fff34a70>
```



```
In [82]: import scipy
         from scipy.stats import pearsonr, spearmanr
```

```
In [85]: age = titanic['Age']
         parch = titanic['Parch']
         age_parch_cleaned = pd.concat([age, parch], axis=1).dropna()

         age_new = age_parch_cleaned['Age']
         parch_new = age_parch_cleaned['Parch']
```

```
pearsonr_coefficient, p_value = pearsonr(age_new, parch_new)
print('PeasonR Correlation Coefficient %0.3f'% (pearsonr_coefficient))
```

```
PeasonR Correlation Coefficient -0.061
```

In [87]:

```
spearmanr_coefficient, p_value = spearmanr(age_new, parch_new)
print('PeasonR Correlation Coefficient %0.3f'% (spearmanr_coefficient))
```

```
PeasonR Correlation Coefficient -0.130
```

Exercise 4

Calculate the standard deviation, variance and mean of column "Fare" and "Age"

In [91]:

```
# CODE HERE
```

In [93]:

```
fare_mean = titanic['Fare'].mean()
fare_variance = titanic['Fare'].var()
fare_std_dev = titanic['Fare'].std()

age_mean = titanic['Age'].mean()
age_variance = titanic['Age'].var()
age_std_dev = titanic['Age'].std()

print(f"Fare - Mean: {fare_mean:.2f}, Variance: {fare_variance:.2f}, Standard Deviation: {fare_std_dev:.2f}")
print(f"Age - Mean: {age_mean:.2f}, Variance: {age_variance:.2f}, Standard Deviation: {age_std_dev:.2f}")
```

```
Fare - Mean: 35.63, Variance: 3125.66, Standard Deviation: 55.91
Age - Mean: 30.27, Variance: 201.11, Standard Deviation: 14.18
```