TITANIC DATA CLEANING AND ANALYSIS

In [1]:

```
import csv
import pandas as pd
import statistics as stat
from scipy.stats import norm
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

In [2]:

```
data=pd.read_csv('titanic1.csv')
```

In [5]:

```
data.head(8)
```

Out[5]:

	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
5	897	3	Svensson, Mr. Johan Cervin	male	14.0	0	0	7538	9.2250	NaN	S
6	898	3	Connolly, Miss. Kate	female	30.0	0	0	330972	7.6292	NaN	Q
7	899	2	Caldwell, Mr. Albert Francis	male	26.0	1	1	248738	29.0000	NaN	S

In [6]:

```
data.tail(5)
```

Out[6]:

	PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
413	1305	3	Spector, Mr. Woolf	male	NaN	0	0	A.5. 3236	8.0500	NaN	S
414	1306	1	Oliva y Ocana, Dona. Fermina	female	39.0	0	0	PC 17758	108.9000	C105	C
415	1307	3	Saether, Mr. Simon Sivertsen	male	38.5	0	0	SOTON/O.Q. 3101262	7.2500	NaN	S
416	1308	3	Ware, Mr. Frederick	male	NaN	0	0	359309	8.0500	NaN	S
417	1309	3	Peter, Master. Michael J	male	NaN	1	1	2668	22.3583	NaN	C

In [7]:

```
data.shape
```

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Out[7]:
```
(418, 11)
```

In [8]:
```
print("Number of Columns",data.shape[1])
print("Number of rows",data.shape[0])
```

```
Number of Columns 11
Number of rows 418
```

In [9]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 11 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  418 non-null    int64  
 1   Pclass       418 non-null    int64  
 2   Name         418 non-null    object 
 3   Sex          418 non-null    object 
 4   Age          332 non-null    float64
 5   SibSp        418 non-null    int64  
 6   Parch        418 non-null    int64  
 7   Ticket       418 non-null    object 
 8   Fare         417 non-null    float64
 9   Cabin        91 non-null     object 
 10  Embarked     418 non-null    object 
dtypes: float64(2), int64(4), object(5)
memory usage: 36.0+ KB
```

In [11]:
```
print("missing Value? ", data.isnull().values.any())
```

```
missing Value?  True
```

In [12]:
```
data.isnull().sum()
```

Out[12]:
```
PassengerId      0
Pclass           0
Name             0
Sex              0
Age             86
SibSp            0
Parch            0
Ticket           0
Fare             1
Cabin          327
Embarked         0
dtype: int64
```

In [13]:
```
sns.heatmap(data.isnull())
```

Out[13]:
```
<AxesSubplot:>
```

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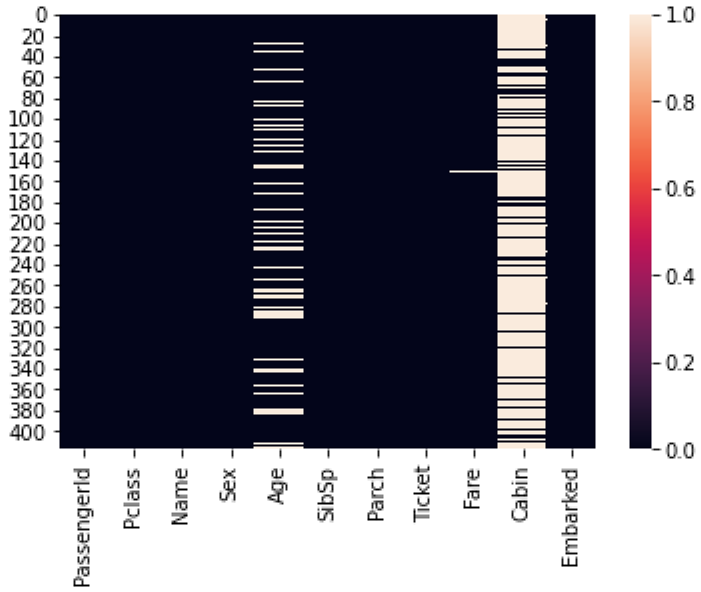

In [14]:
```
per=data.isnull().sum()*100/len(data)
```

In [15]:
```
print(per)
```

```
PassengerId     0.000000
Pclass          0.000000
Name            0.000000
Sex             0.000000
Age            20.574163
SibSp           0.000000
Parch           0.000000
Ticket          0.000000
Fare            0.239234
Cabin          78.229665
Embarked        0.000000
dtype: float64
```

In [16]:
```
data.dropna(axis=0)
```

Out[16]:

	PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
12	904	1	Snyder, Mrs. John Pillsbury (Nelle Stevenson)	female	23.0	1	0	21228	82.2667	B45	S
14	906	1	Chaffee, Mrs. Herbert Fuller (Carrie Constance...	female	47.0	1	0	W.E.P. 5734	61.1750	E31	S
24	916	1	Ryerson, Mrs. Arthur Larned (Emily Maria Borie)	female	48.0	1	3	PC 17608	262.3750	B57 B59 B63 B66	C
26	918	1	Ostby, Miss. Helene Ragnhild	female	22.0	0	1	113509	61.9792	B36	C
28	920	1	Brady, Mr. John Bertram	male	41.0	0	0	113054	30.5000	A21	S
...	...	...	...	...	...	...	...	...	...	...	...
404	1296	1	Frauenthal, Mr. Isaac Gerald	male	43.0	1	0	17765	27.7208	D40	C

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	PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
405	1297	2	Nourney, Mr. Alfred (Baron von Drachstedt")"	male	20.0	0	0	SC/PARIS 2166	13.8625	D38	C
407	1299	1	Widener, Mr. George Dunton	male	50.0	1	1	113503	211.5000	C80	C
411	1303	1	Minahan, Mrs. William Edward (Lillian E Thorpe)	female	37.0	1	0	19928	90.0000	C78	Q
414	1306	1	Oliva y Ocana, Dona. Fermina	female	39.0	0	0	PC 17758	108.9000	C105	C

87 rows × 11 columns

In [17]:

```
data.dropna(inplace=True)
data.isnull().sum()
```

Out[17]:

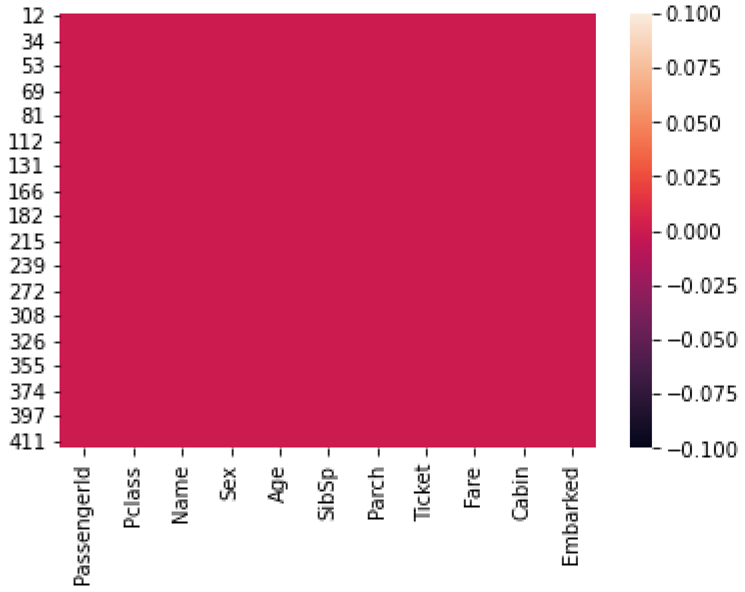
```
PassengerId    0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Cabin          0
Embarked       0
dtype: int64
```

In [18]:

```
sns.heatmap(data.isnull())
```

Out[18]:

```
<AxesSubplot:>
```



In [19]:

```
dup=data.duplicated().any()
print(dup)
```

```
False
```

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In [20]:

```
data.describe()
```

Out[20]:

	PassengerId	Pclass	Age	SibSp	Parch	Fare
count	87.000000	87.000000	87.000000	87.000000	87.000000	87.000000
mean	1102.712644	1.137931	39.247126	0.597701	0.482759	98.109198
std	126.751901	0.435954	15.218730	0.637214	0.860801	88.177319
min	904.000000	1.000000	1.000000	0.000000	0.000000	0.000000
25%	986.000000	1.000000	27.000000	0.000000	0.000000	35.339600
50%	1094.000000	1.000000	39.000000	1.000000	0.000000	71.283300
75%	1216.000000	1.000000	50.000000	1.000000	1.000000	135.066650
max	1306.000000	3.000000	76.000000	3.000000	4.000000	512.329200

In [21]:

```
data.describe(include='all')
```

Out[21]:

	PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Er
count	87.000000	87.000000	87	87	87.000000	87.000000	87.000000	87	87.000000	87	
unique	NaN	NaN	87	2	NaN	NaN	NaN	66	NaN	72	
top	NaN	NaN	Earnshaw, Mrs. Boulton (Olive Potter)	female	NaN	NaN	NaN	PC 17608	NaN	B57 B59 B63 B66	
freq	NaN	NaN	1	44	NaN	NaN	NaN	4	NaN	3	
mean	1102.712644	1.137931	NaN	NaN	39.247126	0.597701	0.482759	NaN	98.109198	NaN	
std	126.751901	0.435954	NaN	NaN	15.218730	0.637214	0.860801	NaN	88.177319	NaN	
min	904.000000	1.000000	NaN	NaN	1.000000	0.000000	0.000000	NaN	0.000000	NaN	
25%	986.000000	1.000000	NaN	NaN	27.000000	0.000000	0.000000	NaN	35.339600	NaN	
50%	1094.000000	1.000000	NaN	NaN	39.000000	1.000000	0.000000	NaN	71.283300	NaN	
75%	1216.000000	1.000000	NaN	NaN	50.000000	1.000000	1.000000	NaN	135.066650	NaN	
max	1306.000000	3.000000	NaN	NaN	76.000000	3.000000	4.000000	NaN	512.329200	NaN	

In [22]:

```
data.columns
data.groupby('Age')['Fare'].mean()
```

Out[22]:

```
Age
1.0      16.700000
6.0     134.500000
12.0     39.000000
13.0    262.375000
18.0     56.550000
18.5     13.000000
20.0     13.862500
22.0     36.239600
23.0     86.308333
24.0     71.133350
25.0     23.440300
26.0     74.889600
27.0    145.433333
              0000
```

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```
28.5     27.720800
29.0    221.779200
30.0    100.041675
31.0     81.518750
32.5    211.500000
33.0     27.720800
35.0    134.625000
36.0    102.073975
37.0     86.579150
39.0     69.961100
41.0     41.181250
42.0     34.525000
43.0     41.581250
45.0     70.028125
46.0     75.241700
47.0    144.350000
48.0    124.623950
49.0      0.000000
50.0    149.666667
51.0     39.400000
53.0     55.179150
54.0     68.650000
55.0     76.208325
57.0    146.520800
58.0    512.329200
59.0     51.479200
60.0    169.645850
61.0    262.375000
63.0    221.779200
64.0     61.652767
67.0    221.779200
76.0     78.850000
Name: Fare, dtype: float64
```

In [23]:

```
data.groupby('Age')['Fare'].mean().sort_values(ascending=False)
```

Out[23]:

```
Age
58.0    512.329200
28.0    263.000000
13.0    262.375000
61.0    262.375000
29.0    221.779200
67.0    221.779200
63.0    221.779200
32.5    211.500000
60.0    169.645850
50.0    149.666667
57.0    146.520800
27.0    145.433333
47.0    144.350000
35.0    134.625000
6.0     134.500000
48.0    124.623950
36.0    102.073975
30.0    100.041675
37.0     86.579150
23.0     86.308333
31.0     81.518750
76.0     78.850000
55.0     76.208325
46.0     75.241700
26.0     74.889600
24.0     71.133350
45.0     70.028125
39.0     69.961100
54.0     68.650000
64.0     61.652767
18.0     56.550000
           9150
```

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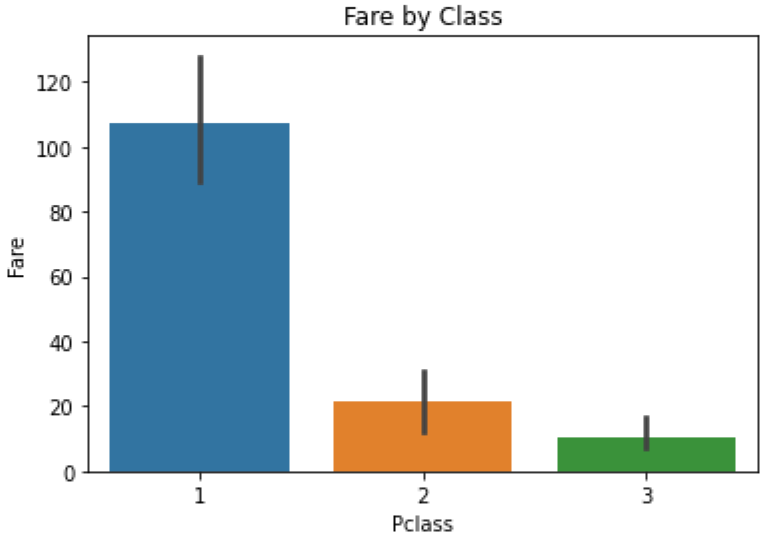
```
59.0     51.479200
43.0     41.581250
41.0     41.181250
51.0     39.400000
12.0     39.000000
22.0     36.239600
42.0     34.525000
33.0     27.720800
28.5     27.720800
25.0     23.440300
1.0      16.700000
20.0     13.862500
18.5     13.000000
49.0      0.000000
Name: Fare, dtype: float64
```

In [24]:

```
sns.barplot(x='Pclass',y='Fare',data=data)
plt.title("Fare by Class")
plt.show
```

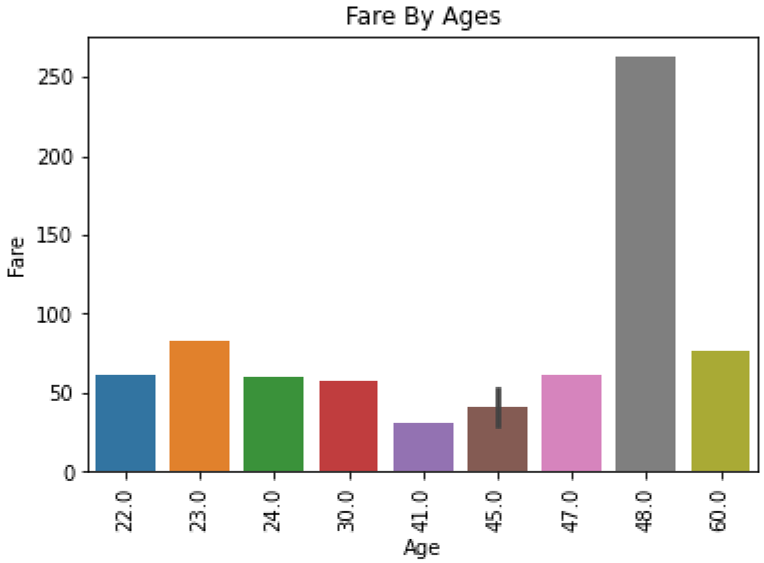
Out[24]:

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



In [25]:

```
sns.barplot(x='Age', y='Fare',data=data.head(10))
plt.title("Fare By Ages")
plt.xticks(rotation=90)
plt.show()
```



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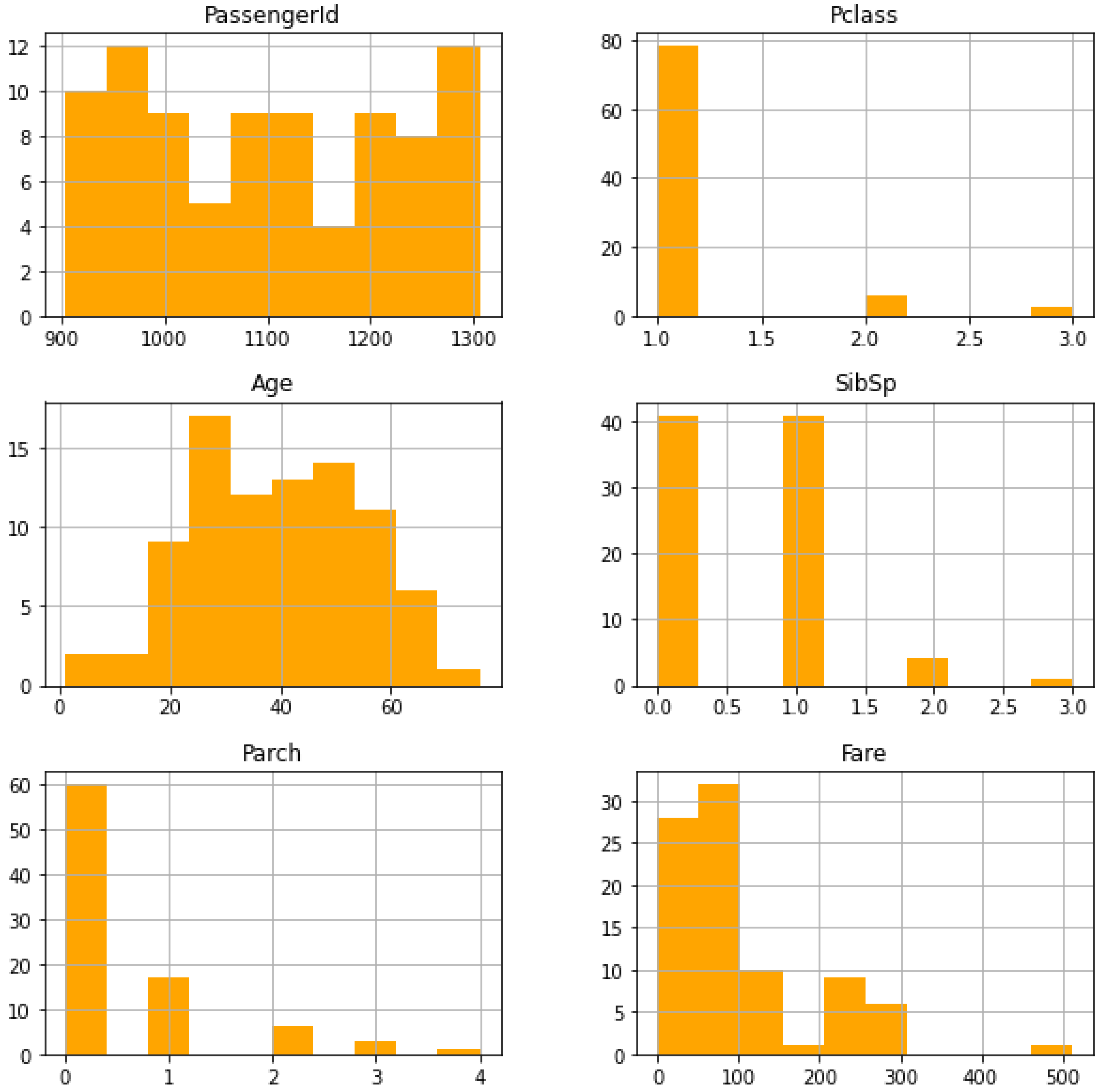
In [43]:

```
data.hist(figsize=(10,10),color='orange')
```

Out[43]:

```
array([[<AxesSubplot:title={'center':'PassengerId'}>,
        <AxesSubplot:title={'center':'Pclass'}>],
       [<AxesSubplot:title={'center':'Age'}>,
        <AxesSubplot:title={'center':'SibSp'}>],
       [<AxesSubplot:title={'center':'Parch'}>,
        <AxesSubplot:title={'center':'Fare'}>]], dtype=object)
```



In [27]:

```
age=data['Age']
fare=data['Fare']
pc=data['Pclass']
plt.hist(age)
```

Out[27]:

```
(array([ 2.,  2.,  9., 17., 12., 13., 14., 11.,  6.,  1.]),
 array([ 1. ,  8.5, 16. , 23.5, 31. , 38.5, 46. , 53.5, 61. , 68.5, 76. ]),
 <BarContainer object of 10 artists>)
```

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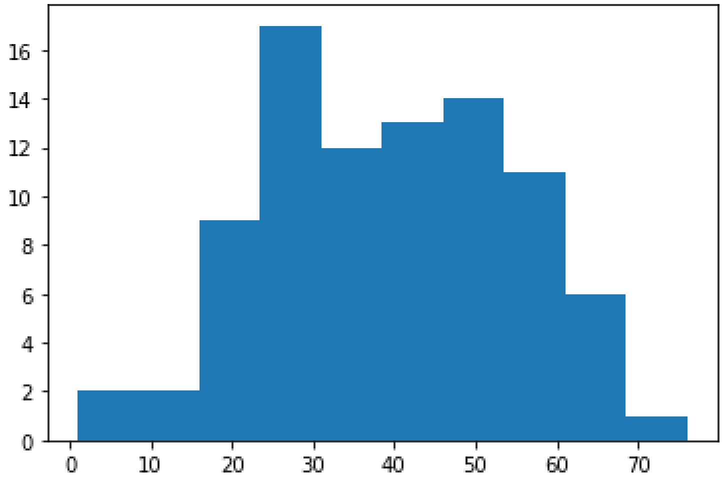
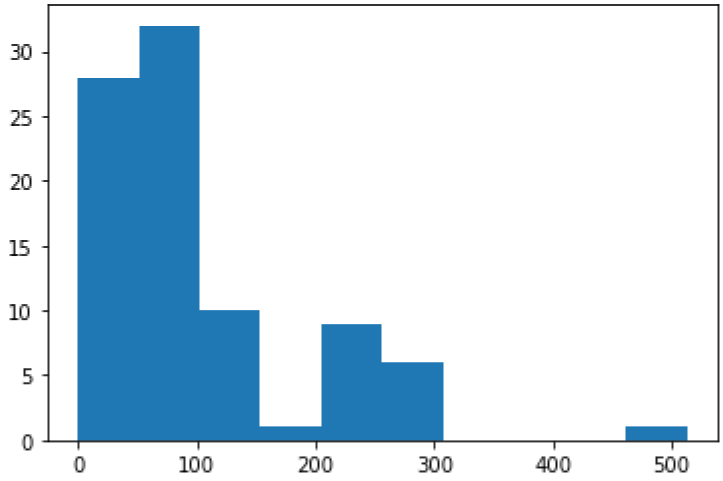


In [28]:

```
plt.hist(fare)
```

Out[28]:

```
(array([28., 32., 10.,  1.,  9.,  6.,  0.,  0.,  0.,  1.]),
 array([  0.       ,  51.23292, 102.46584, 153.69876, 204.93168, 256.1646 ,
        307.39752, 358.63044, 409.86336, 461.09628, 512.3292 ]),
 <BarContainer object of 10 artists>)
```

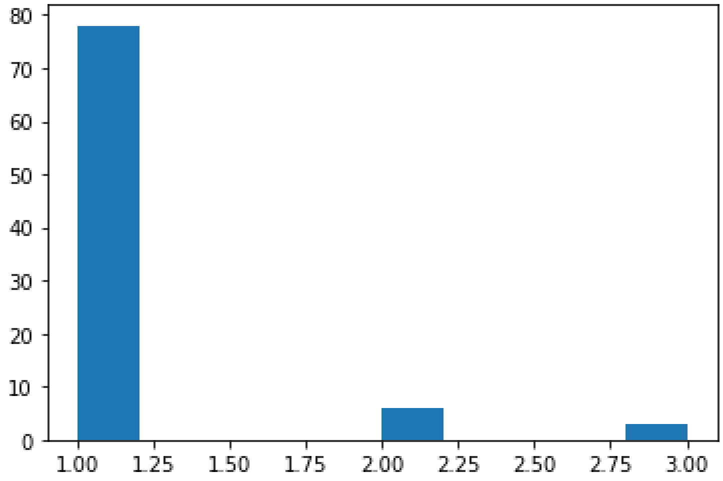


In [30]:

```
plt.hist(pc)
```

Out[30]:

```
(array([78.,  0.,  0.,  0.,  0.,  6.,  0.,  0.,  0.,  3.]),
 array([1. , 1.2, 1.4, 1.6, 1.8, 2. , 2.2, 2.4, 2.6, 2.8, 3. ]),
 <BarContainer object of 10 artists>)
```



In [31]:

```
age_mean=stat.mean(age)
f          t.mean(fare)
```

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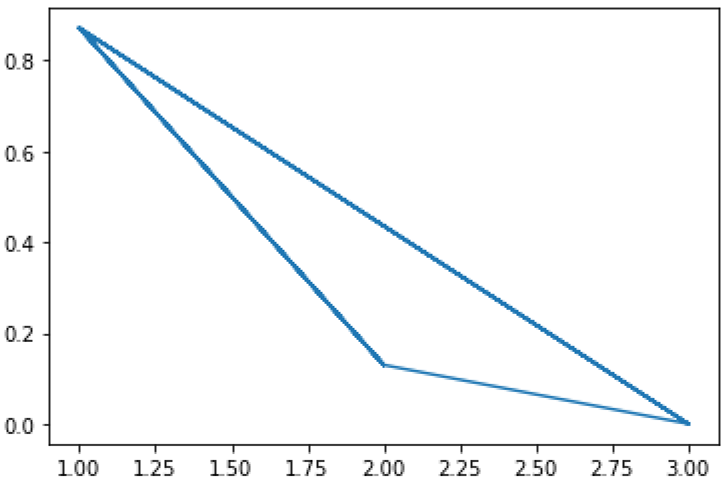
```
class_mean=stat.mean(pc)
age_st=stat.stdev(age)
fare_st=stat.stdev(fare)
class_st=stat.stdev(pc)
plt.plot(pc,norm.pdf(pc,class_mean,class_st))
```

Out[31]:

```
[<matplotlib.lines.Line2D at 0x248279c9160>]
```

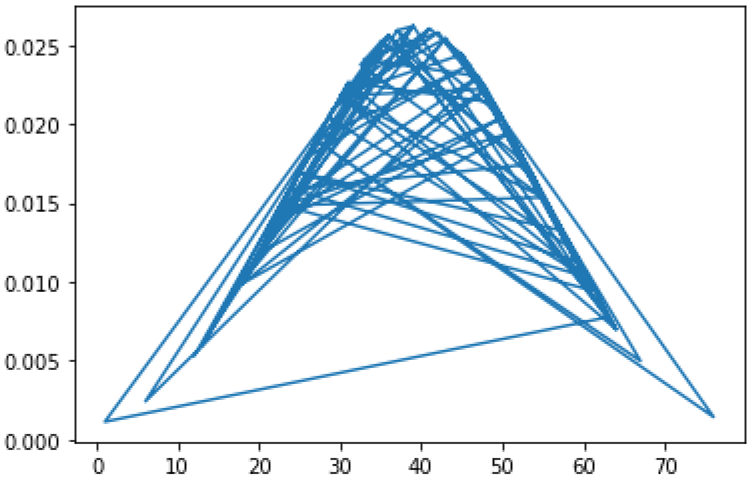


In [32]:

```
plt.plot(age,norm.pdf(age,age_mean,age_st))
```

Out[32]:

```
[<matplotlib.lines.Line2D at 0x24827a1cbb0>]
```



In [33]:

```
plt.plot(fare,norm.pdf(fare,fare_mean,fare_st))
```

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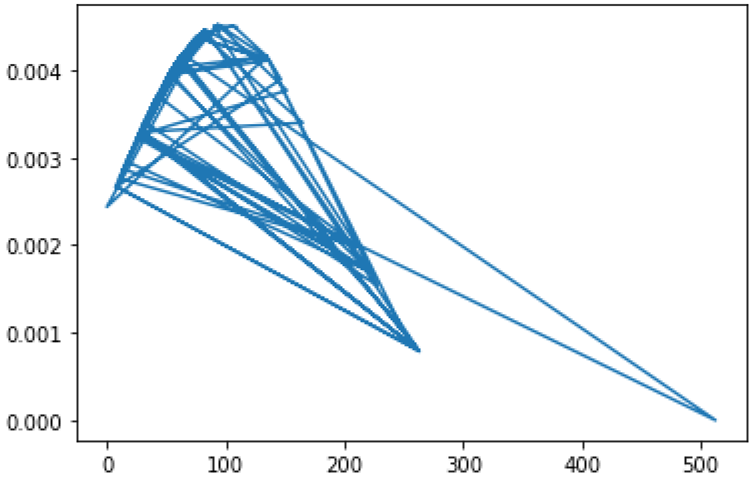
```
Out[33]: [<matplotlib.lines.Line2D at 0x24827a77eb0>]
```

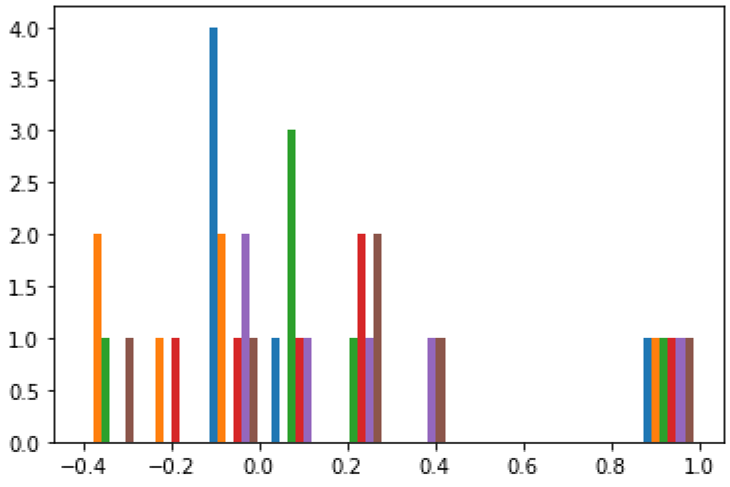


```
In [34]:
data_cor=data.corr()
print(data_cor)
```

```
             PassengerId    Pclass       Age     SibSp     Parch      Fare
PassengerId     1.000000  0.004934  0.055488 -0.087828 -0.122551 -0.097346
Pclass          0.004934  1.000000 -0.410924 -0.132790  0.006411 -0.298186
Age             0.055488 -0.410924  1.000000  0.062530  0.051144  0.180567
SibSp          -0.087828 -0.132790  0.062530  1.000000  0.252194  0.213014
Parch          -0.122551  0.006411  0.051144  0.252194  1.000000  0.395685
Fare           -0.097346 -0.298186  0.180567  0.213014  0.395685  1.000000
```

```
In [35]:
plt.hist(data_cor)
```

```
Out[35]: (array([[0., 0., 4., 1., 0., 0., 0., 0., 0., 1.],
                 [2., 1., 2., 0., 0., 0., 0., 0., 0., 1.],
                 [1., 0., 0., 3., 1., 0., 0., 0., 0., 1.],
                 [0., 1., 1., 1., 2., 0., 0., 0., 0., 1.],
                 [0., 0., 2., 1., 1., 1., 0., 0., 0., 1.],
                 [1., 0., 1., 0., 2., 1., 0., 0., 0., 1.]]),
          array([-0.41092369, -0.26983132, -0.12873895,  0.01235341,  0.15344578,
                  0.29453815,  0.43563052,  0.57672289,  0.71781526,  0.85890763,
                  1.        ]),
          <a list of 6 BarContainer objects>)
```



```
In [36]:
data_cor.hist()
```

```
Out[36]: array([[<AxesSubplot:title={'center':'PassengerId'}>,
                 <AxesSubplot:title={'center':'Pclass'}>],
                [<AxesSubplot:title={'center':'Age'}>,
                 ubplot:title={'center':'SibSp'}>],
```

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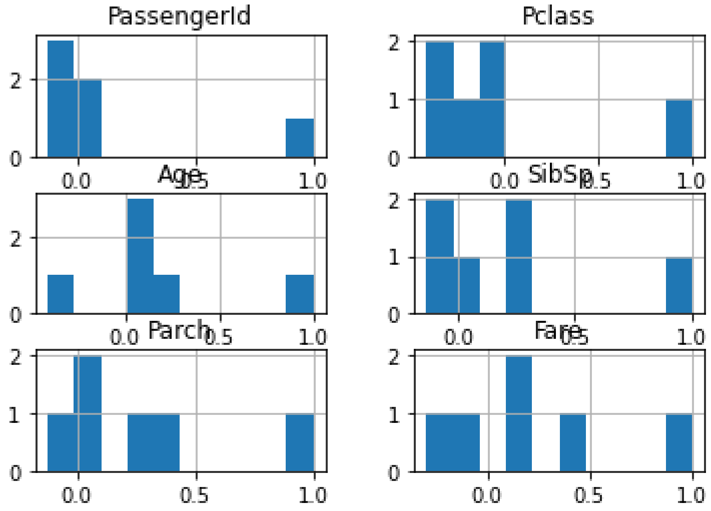
```
       [<AxesSubplot:title={'center':'Parch'}>,
        <AxesSubplot:title={'center':'Fare'}>]], dtype=object)
```

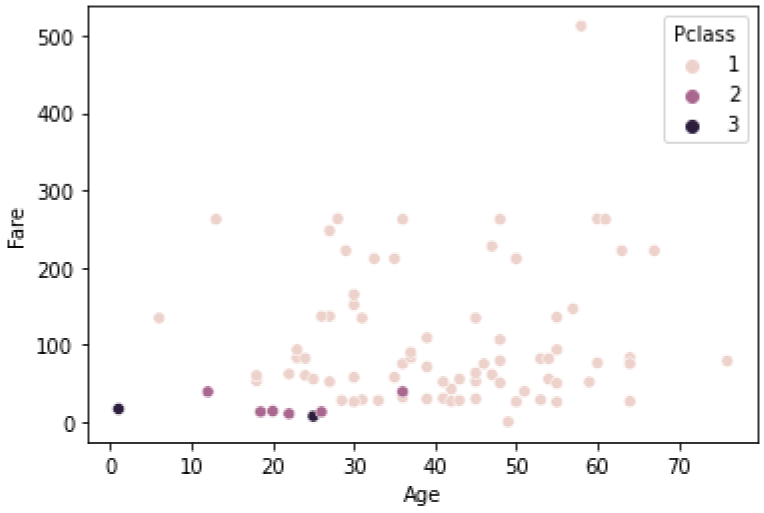


In [37]:

```
sns.scatterplot(x='Age',y='Fare',data=data,hue="Pclass")
```

Out[37]:

```
<AxesSubplot:xlabel='Age', ylabel='Fare'>
```

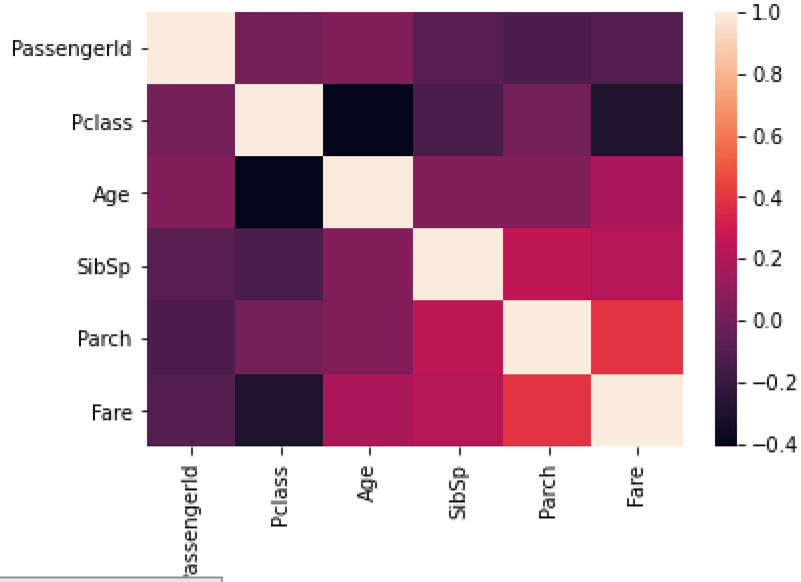


In [38]:

```
sns.heatmap(data_cor)
```

Out[38]:

```
<AxesSubplot:>
```



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In [ ]:

```

```

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