The Titanic Challenge

The dataset consists of passangers who were on the titanic ship. Some of the passangers survived while some didn't. With the available dataset, we want to determine population of the passaners that survived and didn't survived.

There are several questsion we need to ask to determine what made some of the passangers survived or not

Important questions we want to ask

1. Total number of passangers that survived? Did the gender played a role in the survival chance?
2. Did age played a role in survival chance
3. Did the carbin where each passangers stayed contributed to the chances of survival?

We begin by importing our dataset and necessary libraries.

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
df = pd.read_csv('train.csv')
df.head()
```

Out[2]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Ca
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	

In [3]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  891 non-null    int64  
 1   Survived     891 non-null    int64  
 2   Pclass       891 non-null    int64  
 3   Name         891 non-null    object 
 4   Sex          891 non-null    object 
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64  
 7   Parch        891 non-null    int64  
 8   Ticket       891 non-null    object 
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object 
 11  Embarked     889 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

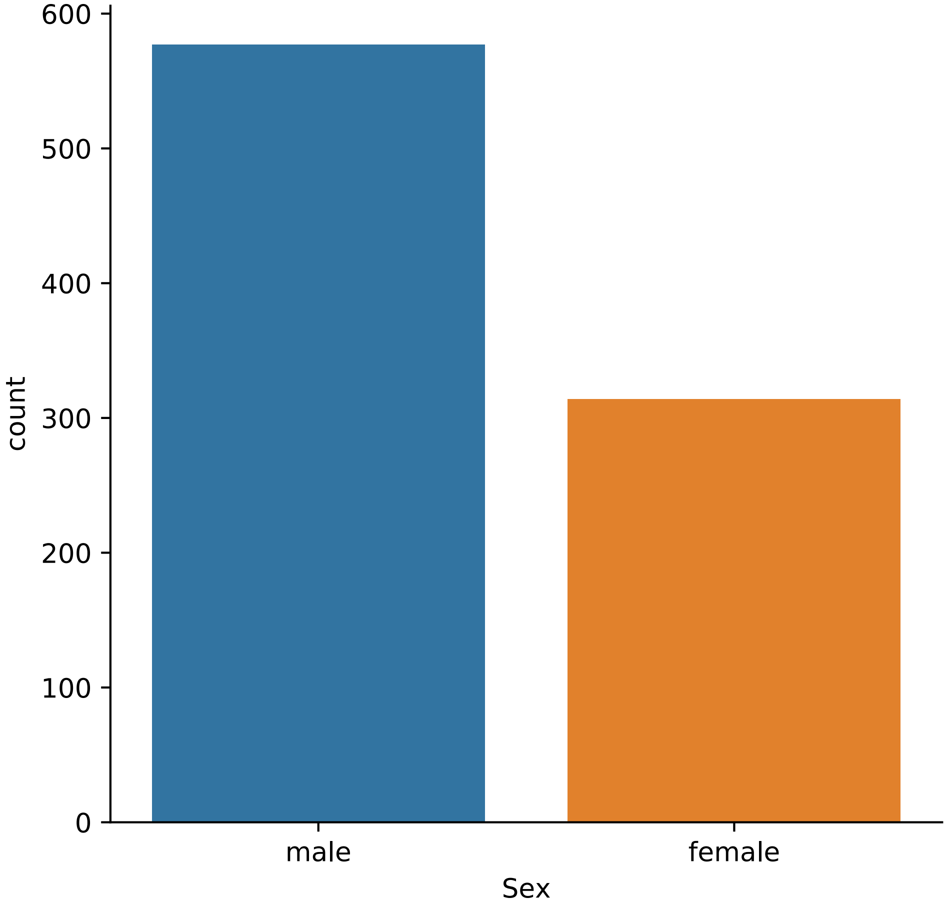
1. Who were the passengers on the titanic? (Age, Gender, Class, e.t.c)
2. What cabin were the passengers on?
3. Who came alone and who came with family?
4. Where did they come from?

In [4]:

```
%matplotlib inline
```

```
In [7]: sns.catplot('Sex', data=df, kind='count')
```

```
Out[7]: <seaborn.axisgrid.FacetGrid at 0x2dcb564fd0>
```



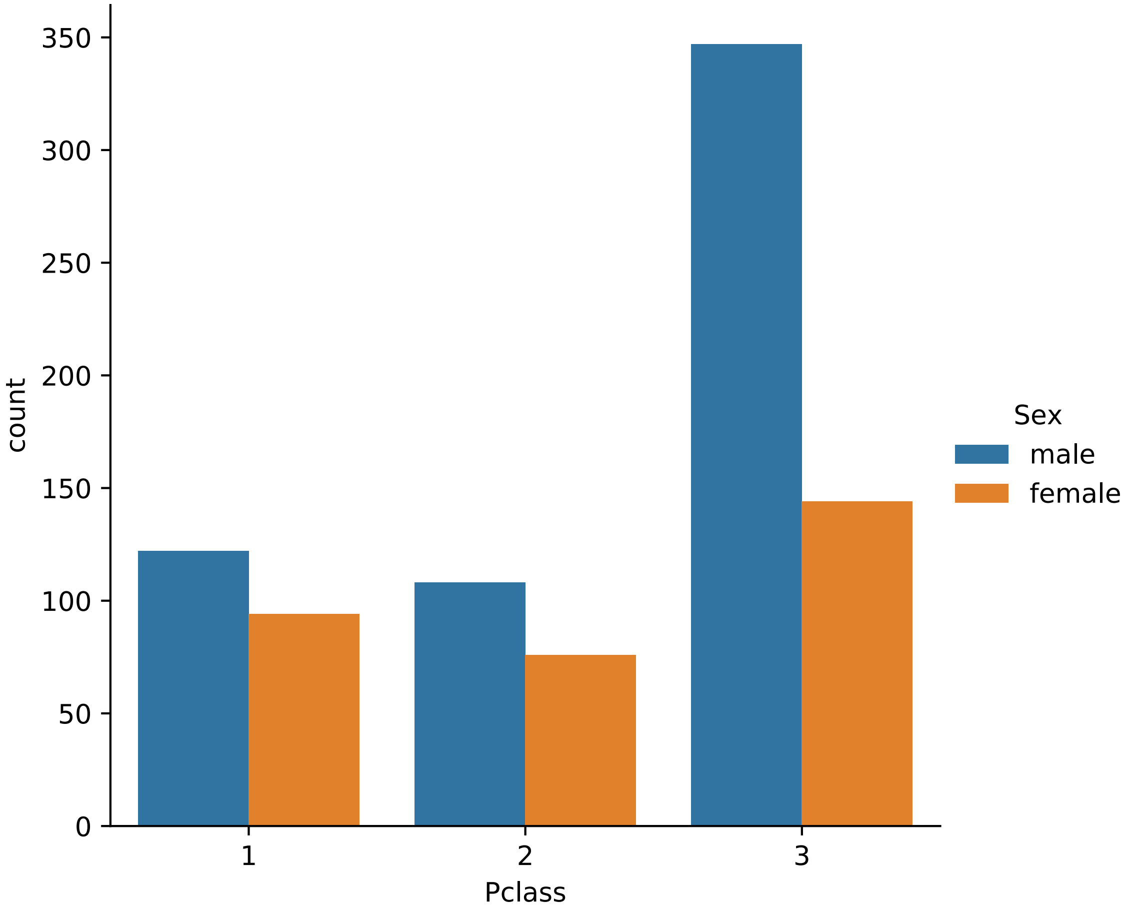
First indication here is there are more males on the ship. Twice as much as females.

In [9]:

```
sns.catplot('Pclass', data=df, hue='Sex', kind='count')
```

Out[9]:

```
<seaborn.axisgrid.FacetGrid at 0x2db8c55dc0>
```



The chart above indicated that there are more males in each class of ticket.

In [10]:

```
def male_female_child(passenger):
    passenger  = age, sex

    if age < 16:
        return 'child'
    else:
        return sex
```

In [11]:

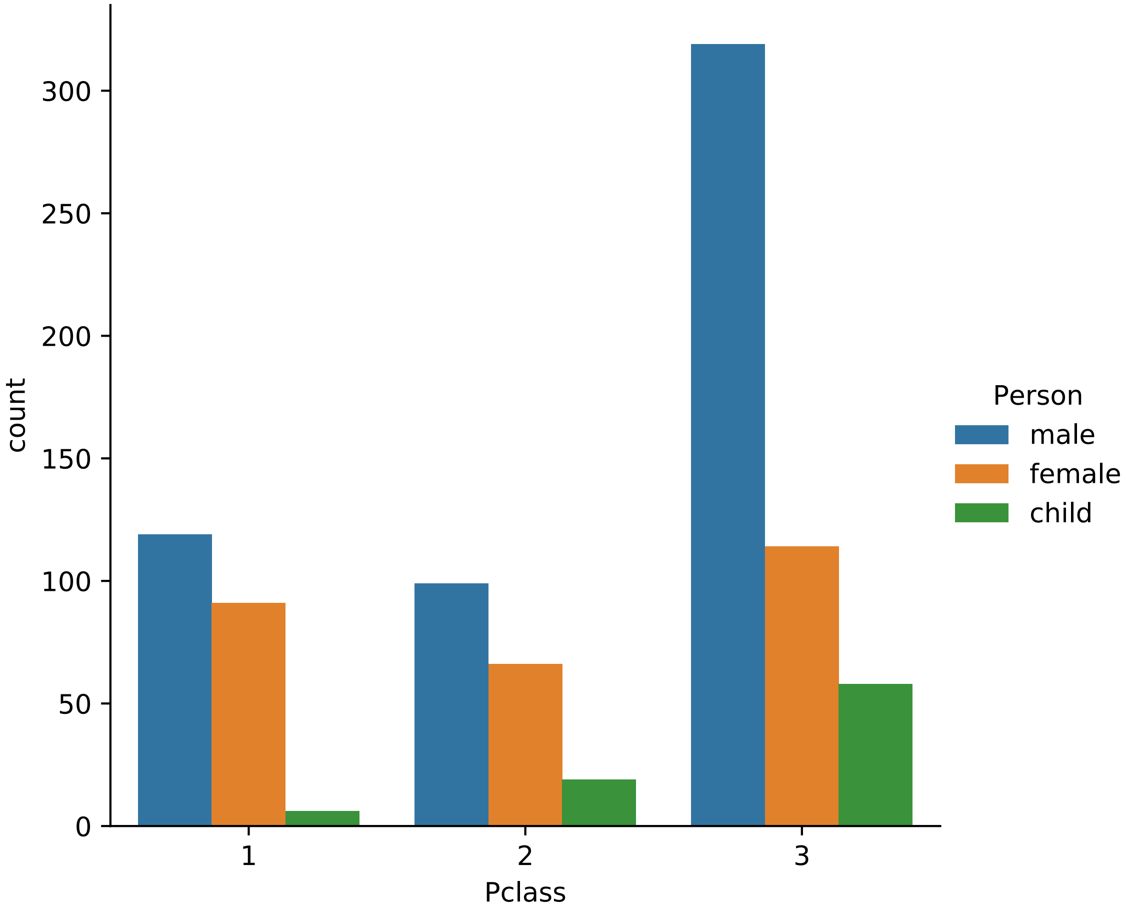
```
df['Person'] = df[['Age', 'Sex']].apply(male_female_child, axis=1)
```

```
In [12]: df.head()
```

Out[12]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Ca
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	

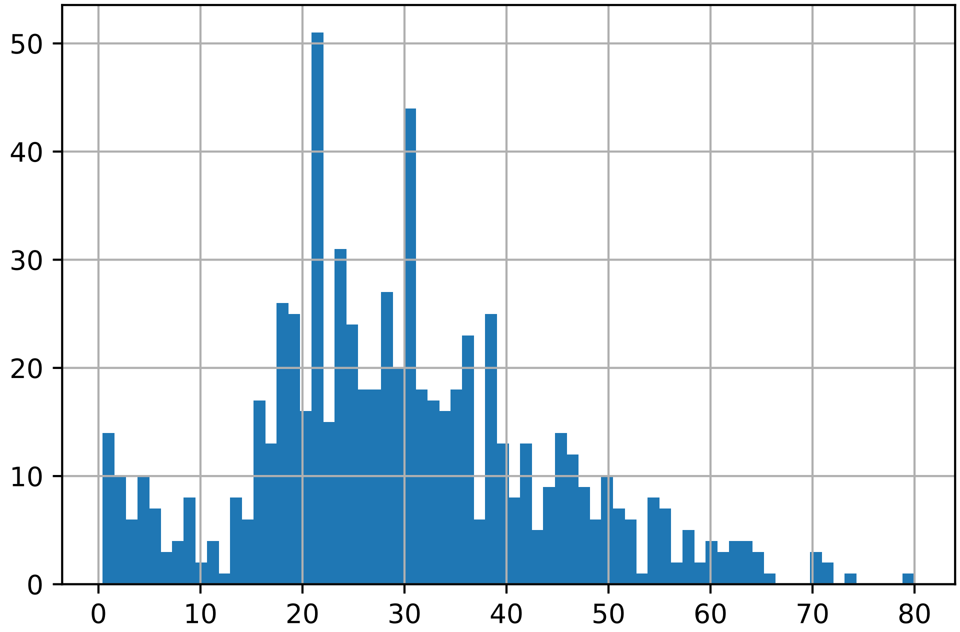
```
In [13]: sns.catplot('Pclass', data=df, hue='Person', kind='count')

Out[13]: <seaborn.axisgrid.FacetGrid at 0x2dcf809f40>
```



Visual representation indicating that male passengers where the overall largest in all of the class of tickets followed by the females then the under 16 year old which are classified as children here having both gender

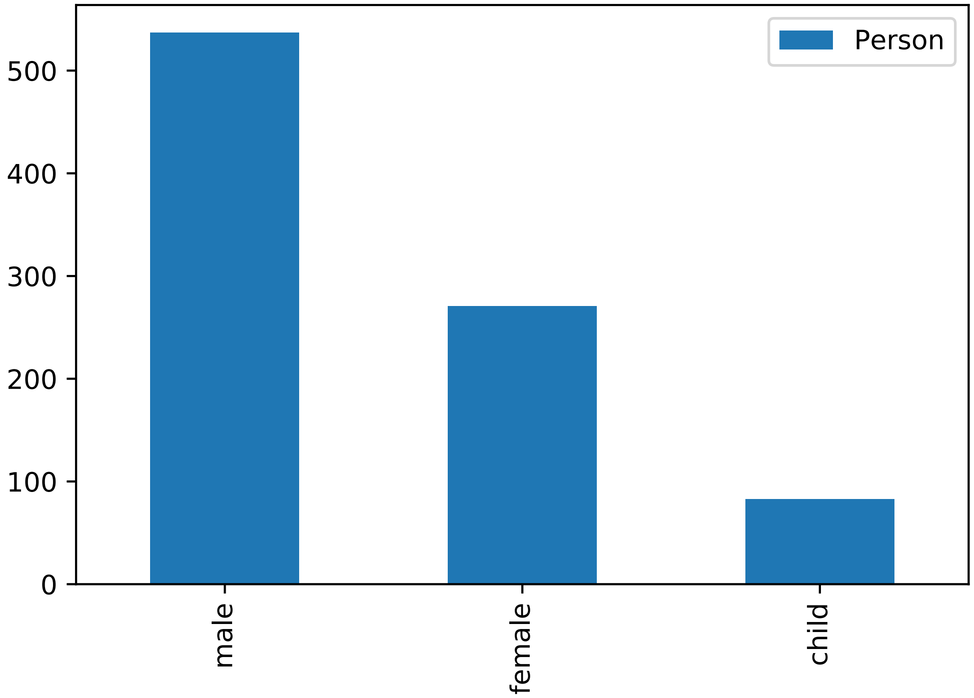
```
In [14]: df['Age'].hist(bins=70)
```

```
Out[14]: <matplotlib.axes._subplots.AxesSubplot at 0x2dcf9cd6d0>
```



```
In [17]: Pers = df['Person'].value_counts()
         Pers_his = pd.DataFrame(Pers)
         Pers_his.plot.bar()
         print(Pers_his)
```

```
Person
male       537
female     271
child       83
```



In [20]:
```
male_age = df['Age'][df['Sex'] == 'male'].mean()
print('The average age of males:', male_age)
```

```
The average age of males: 30.72664459161148
```

In [21]:
```
fe_age = df['Age'][df['Sex'] == 'female'].mean()
print('The average age of females: ', fe_age)
```

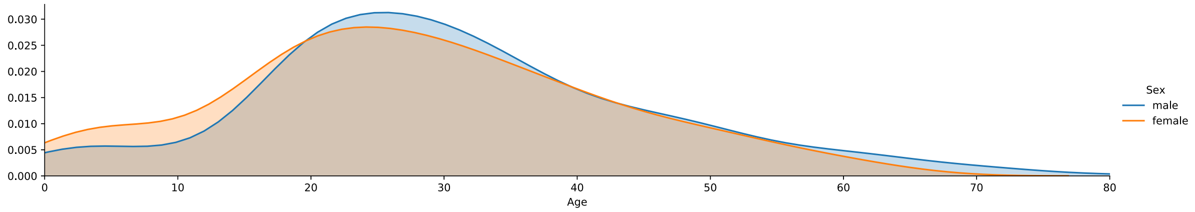
```
The average age of females:  27.915708812260537
```

In [22]:
```
O_age = df['Age'].mean()
print('Over all mean age: ', O_age)
```

```
Over all mean age:  29.69911764705882
```

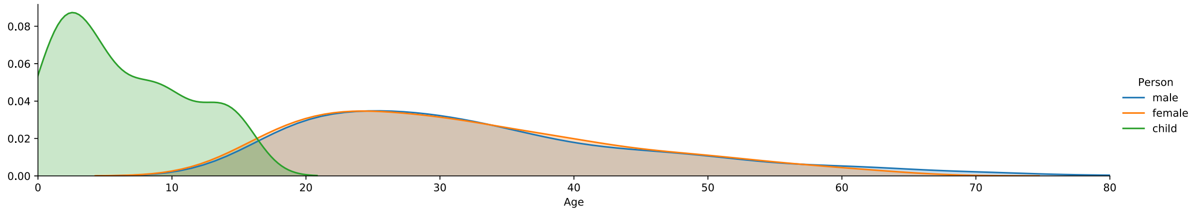
In [31]:
```
fg = sns.FacetGrid(df, hue='Sex', aspect =5)
fg.map(sns.kdeplot, 'Age', shade=True)
old = df['Age'].max()
fg.set(xlim=(0, old))
fg.add_legend()
```

Out[31]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd3c447f0>
```



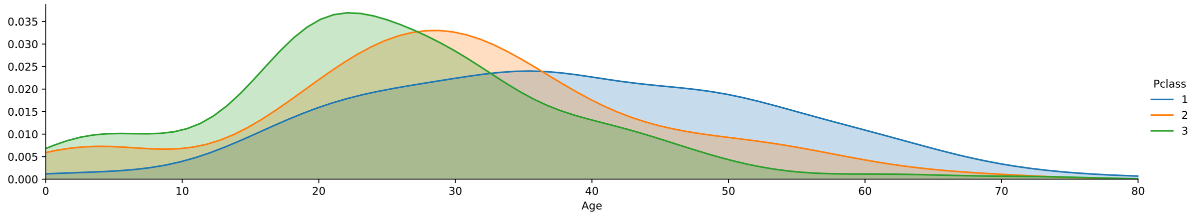
In [32]:
```
fg = sns.FacetGrid(df, hue='Person', aspect =5)
fg.map(sns.kdeplot, 'Age', shade=True)
old = df['Age'].max()
fg.set(xlim=(0, old))
fg.add_legend()
```

Out[32]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd360e2e0>
```



In [33]:
```
fg = sns.FacetGrid(df, hue='Pclass', aspect =5)
fg.map(sns.kdeplot, 'Age', shade=True)
old = df['Age'].max()
fg.set(xlim=(0, old))
fg.add_legend()
```

Out[33]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd3871bb0>
```



In [36]:
```
df[['Cabin']].info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 1 columns):
 #   Column  Non-Null Count  Dtype 
---  ------  --------------  ----- 
 0   Cabin   204 non-null    object
dtypes: object(1)
memory usage: 7.1+ KB
```

In [37]:
```
df.shape
```

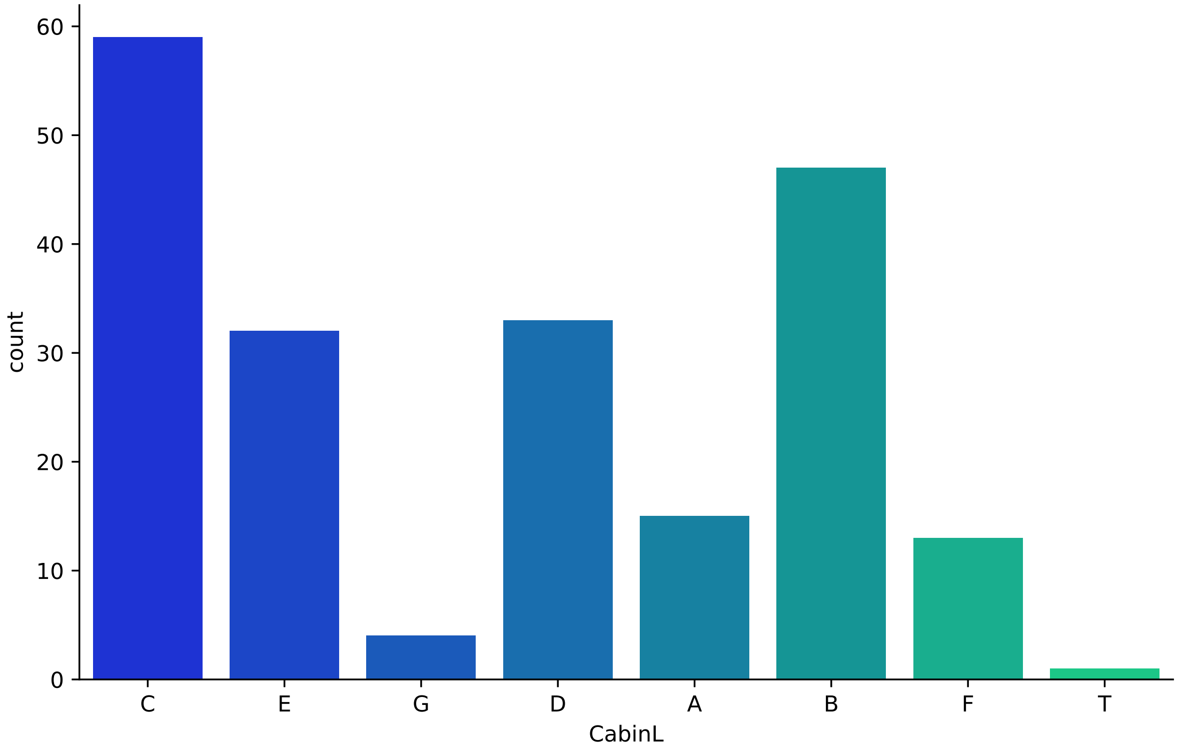
Out[37]:
```
(891, 13)
```

In [38]:
```
cabin = df['Cabin'].dropna()
```

In [49]:
```
level = []

for item in cabin:
    level.append(item[0])

cab_df = pd.DataFrame(level)
cab_df.columns = ['CabinL']
```

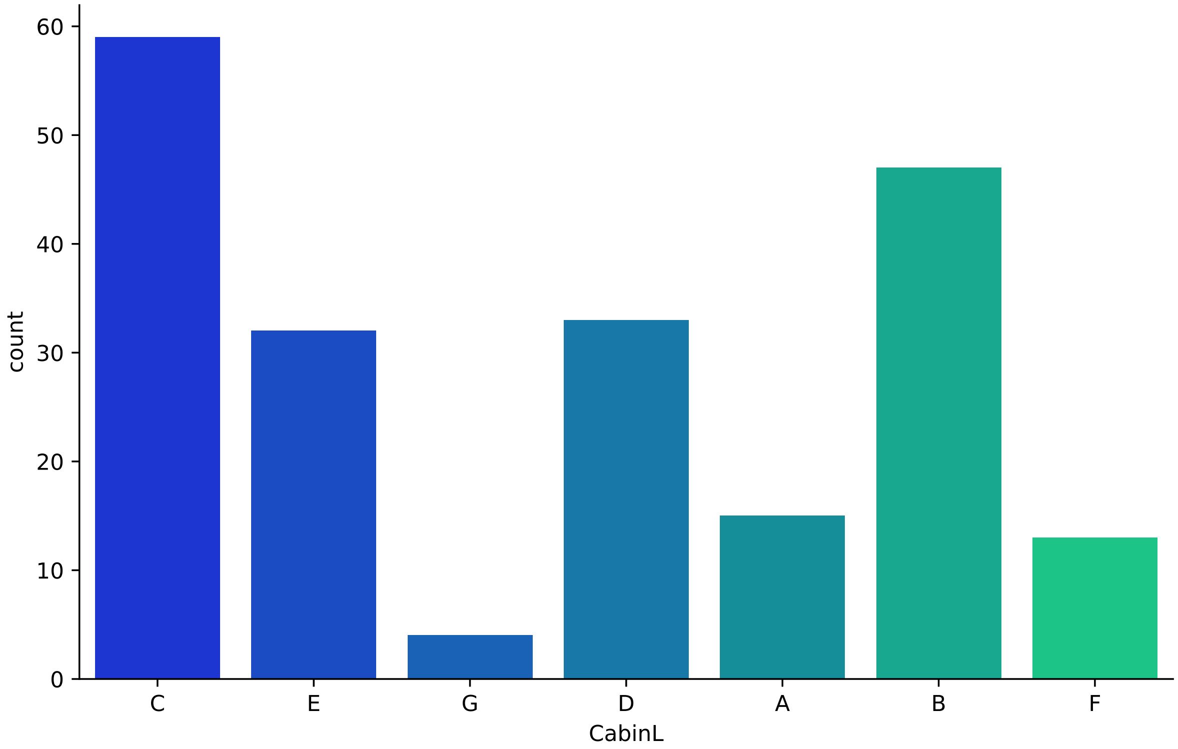
```
In [50]: sns.catplot('CabinL', data= cab_df, kind ='count',aspect= 1.5, palette='winte
         r' )
```

```
Out[50]: <seaborn.axisgrid.FacetGrid at 0x2dd2bb4d90>
```



```
In [51]: cab_df = cab_df[cab_df.CabinL != 'T']
         sns.catplot('CabinL', data= cab_df, kind ='count',aspect= 1.5, palette='winte
         r' )
```

```
Out[51]: <seaborn.axisgrid.FacetGrid at 0x2dd279e4c0>
```



Where did the passengers come from?

The embarked column gives a good insight into that. The alphabets in the Embarked column represent name of the cities where they come from

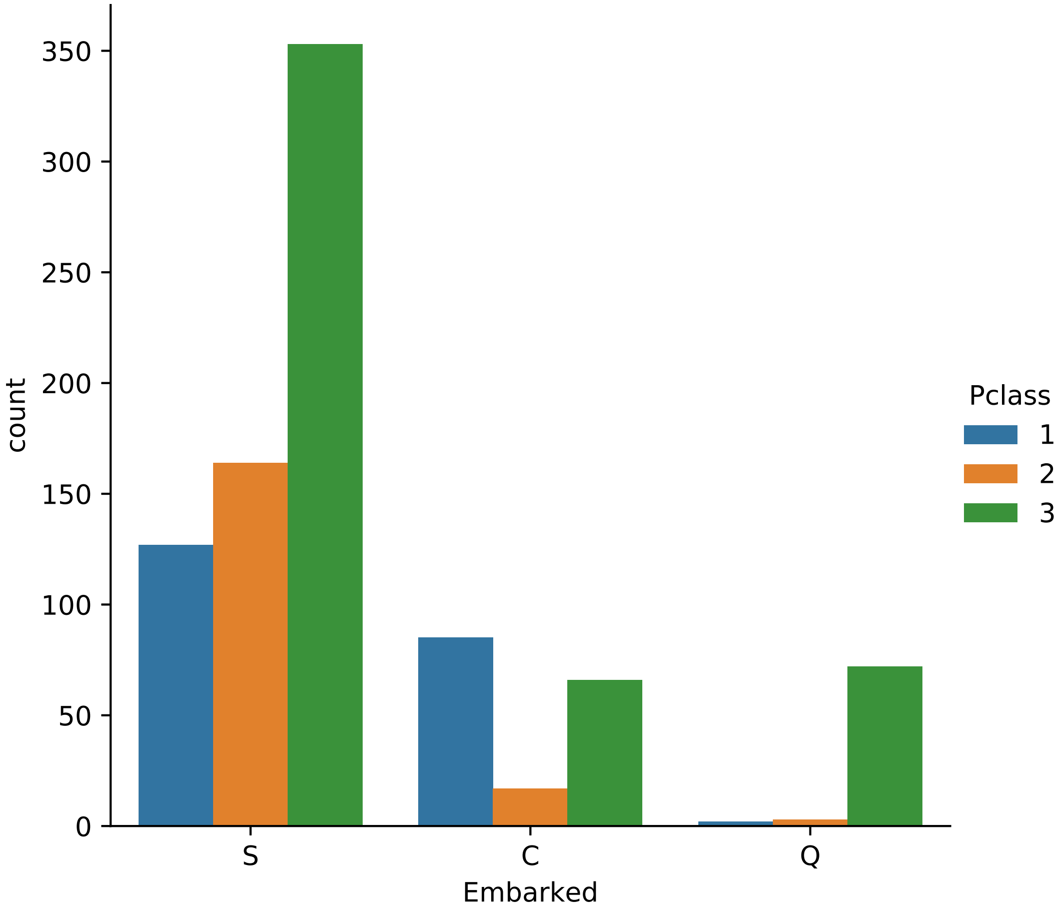
S for Southampton, C for Cherbourg and Q is for Queenstown

In [54]:

```python
sns.catplot('Embarked', data=df, hue='Pclass', kind='count')
```

Out[54]:

```
<seaborn.axisgrid.FacetGrid at 0x2dd5cb6850>
```



In [55]:

```
df.head()
```

Out[55]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	C
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	

In [56]:

```
df['Alone'] = df['SibSp'] + df['Parch']
```

In [57]:

```
df.head()
```

Out[57]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	C
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	

In [66]:

```
def alone_sib(stat):
    if stat == 0:
        return 'No'
    else:
        return 'Yes'
```

In [67]:

```
df['Relatives'] = df['Alone'].apply(alone_sib)
```

In [68]:

```
df['Relatives']
```

Out[68]:

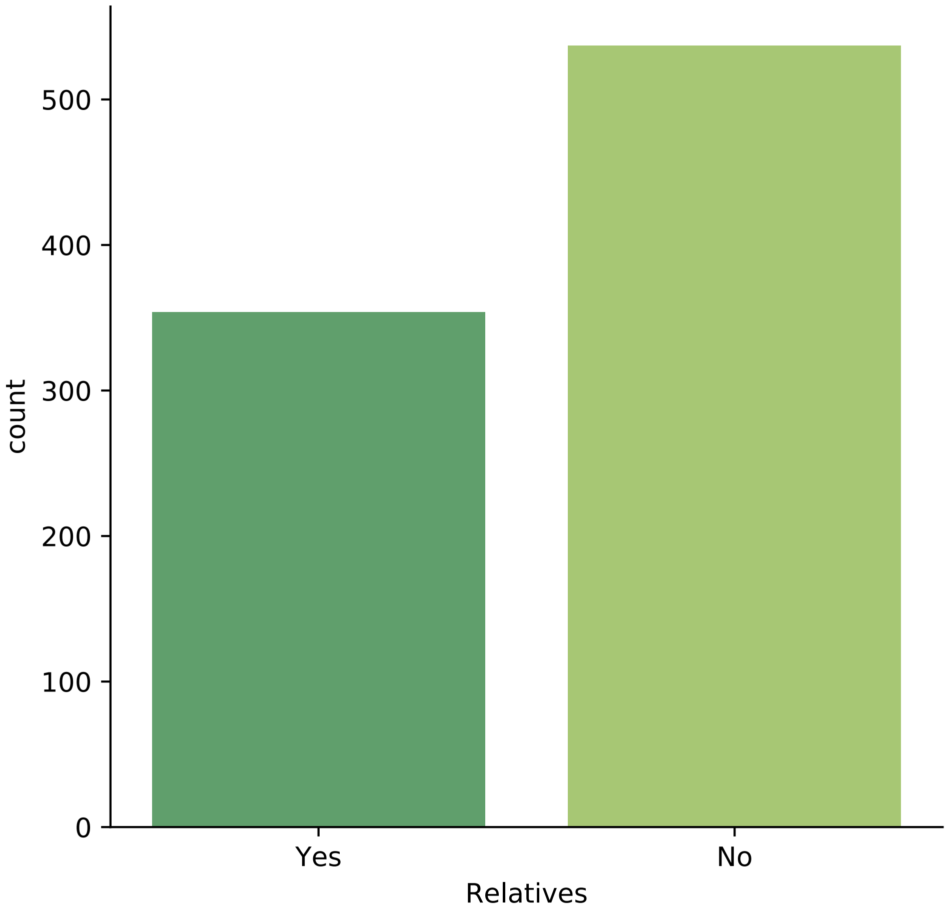
```
0      Yes
1      Yes
2       No
3      Yes
4       No
      ...
886     No
887     No
888    Yes
889     No
890     No
Name: Relatives, Length: 891, dtype: object
```

In [69]:

```
sns.catplot('Relatives', data=df, palette='summer', kind='count')
```

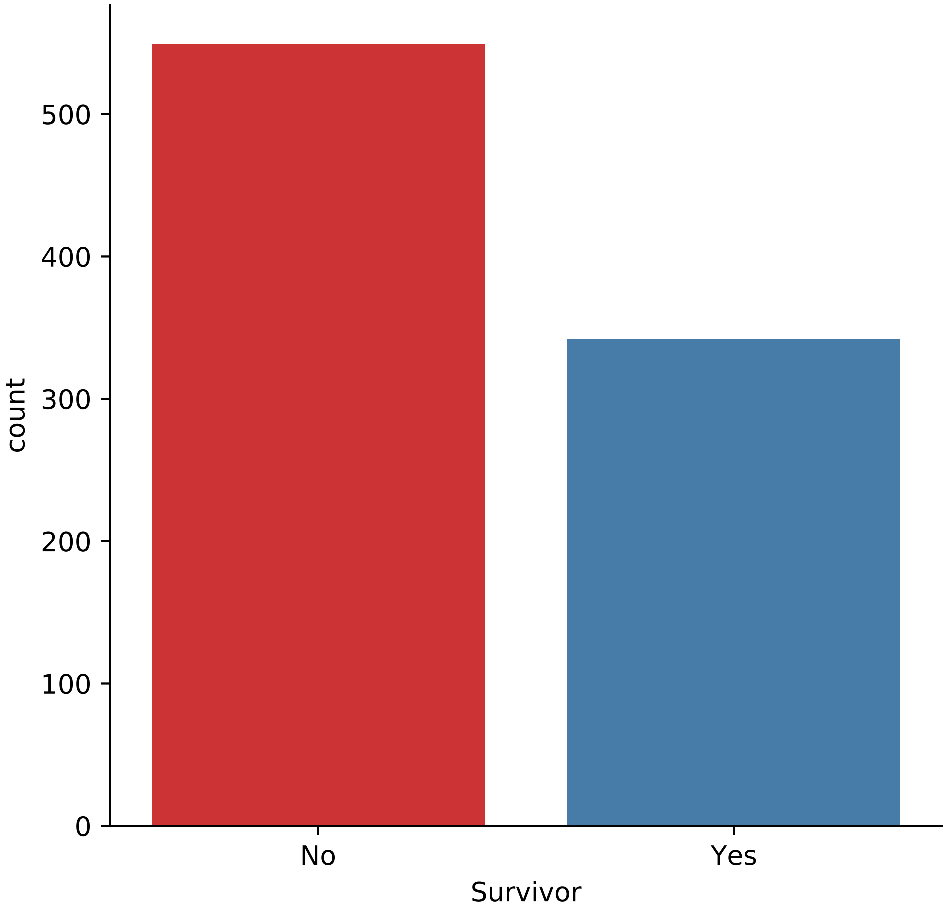
Out[69]:

```
<seaborn.axisgrid.FacetGrid at 0x2dd754a7c0>
```



In [77]:
```
df['Survivor'] = df.Survived.map({0:'No', 1:'Yes'})
sns.catplot('Survivor', data=df, palette='Set1', kind='count')
```

Out[77]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd3285040>
```

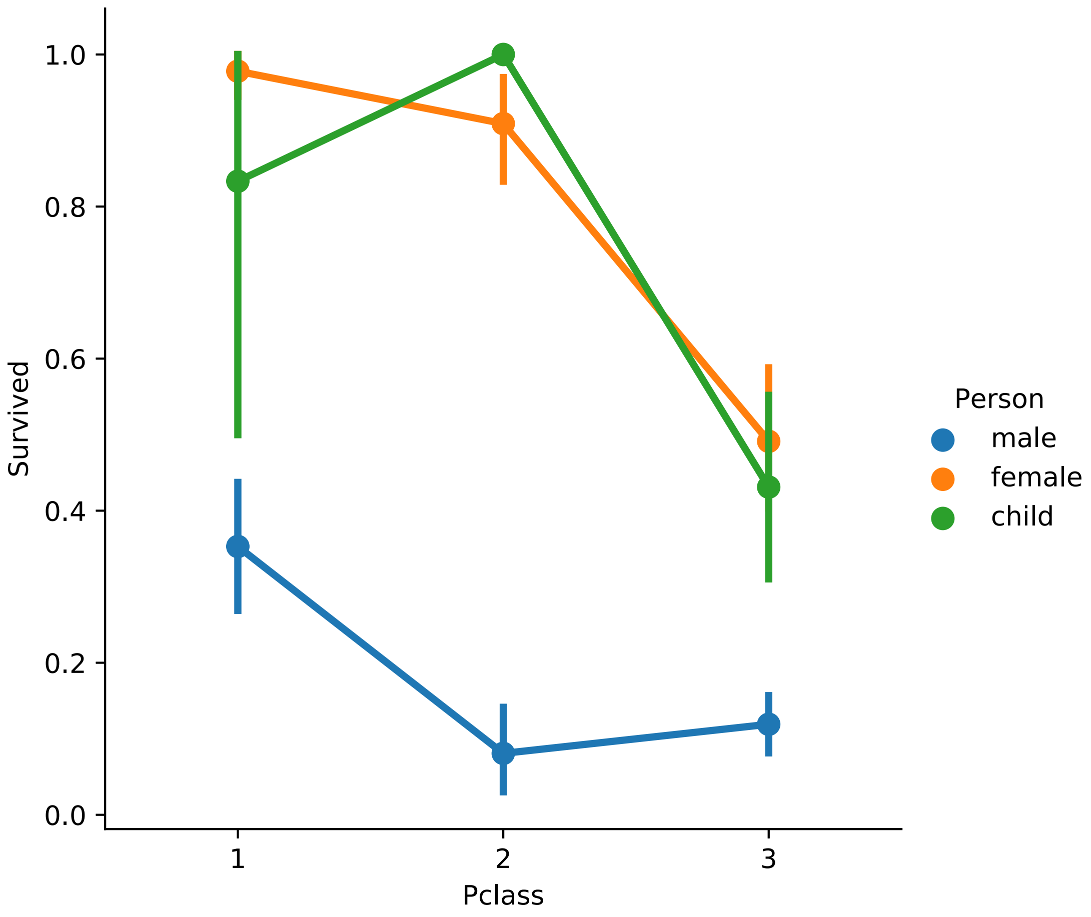


In [83]:

```
sns.catplot('Pclass', 'Survived', data=df, hue='Person', kind='point')
```

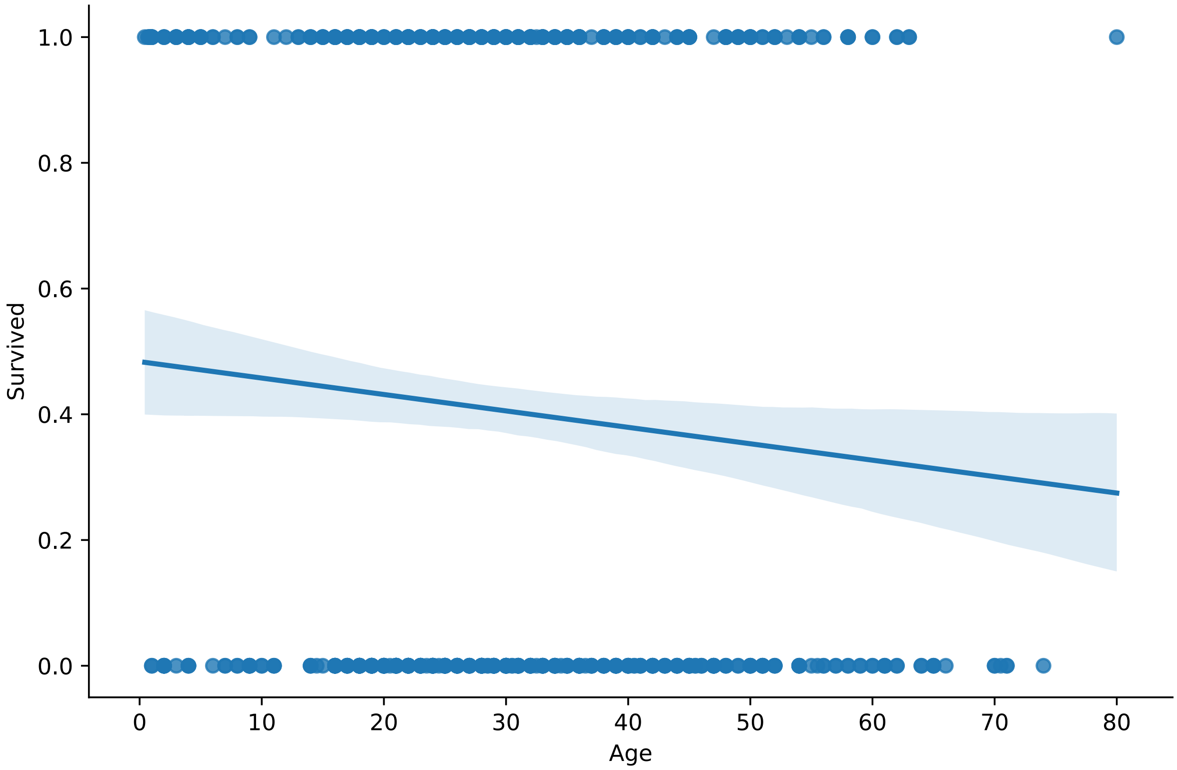
Out[83]:

```
<seaborn.axisgrid.FacetGrid at 0x2dd76738e0>
```



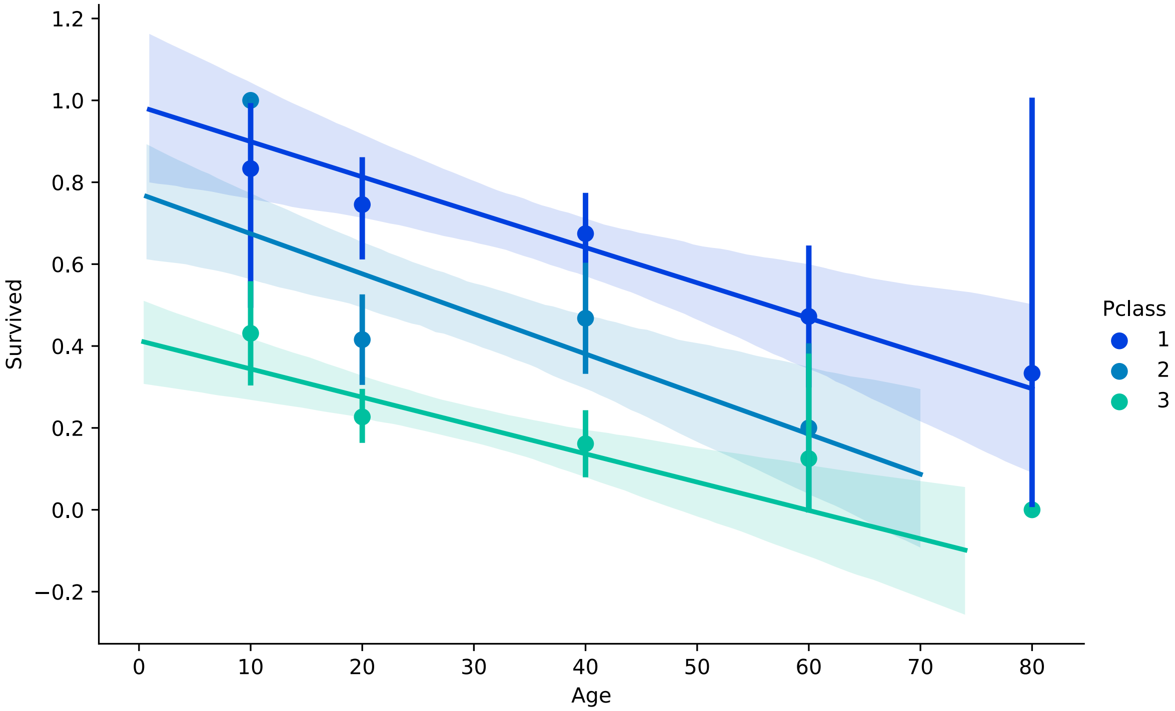
In [85]:
```
sns.lmplot('Age', 'Survived', data=df, aspect=1.5)
```

Out[85]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd8a3b3a0>
```



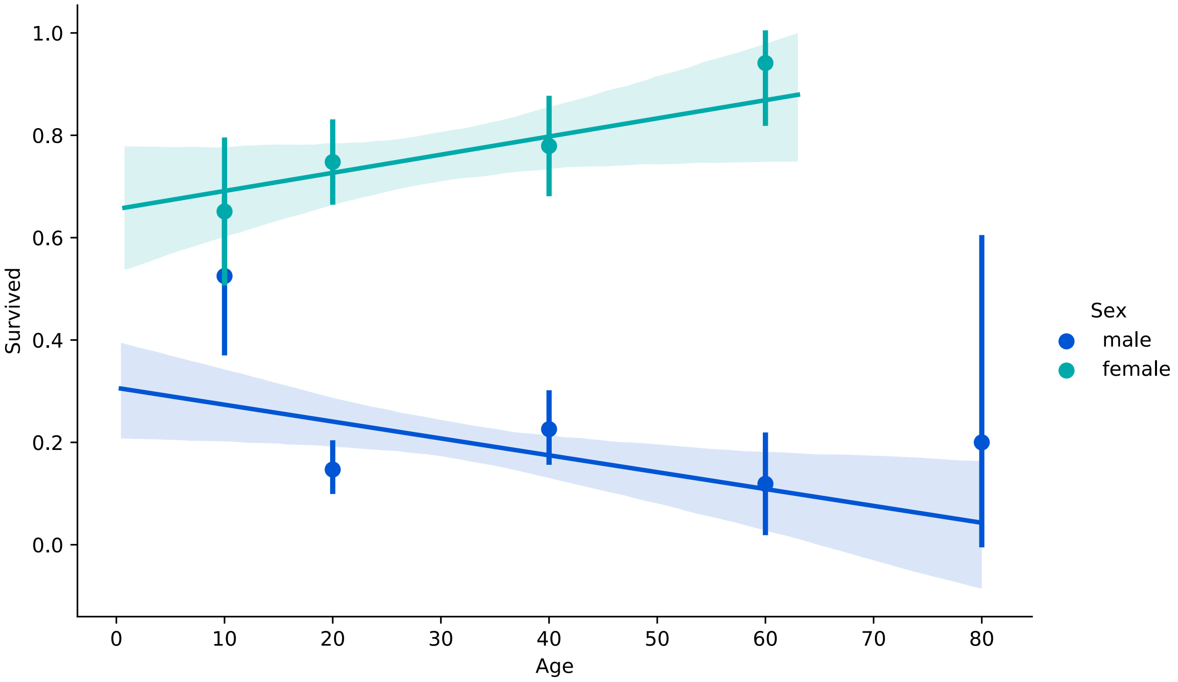
In [89]:
```
generations = [10, 20, 40, 60, 80]
sns.lmplot('Age', 'Survived', data=df, aspect=1.5, hue='Pclass', palette='wint
er', x_bins = generations)
```

Out[89]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd8cceb20>
```



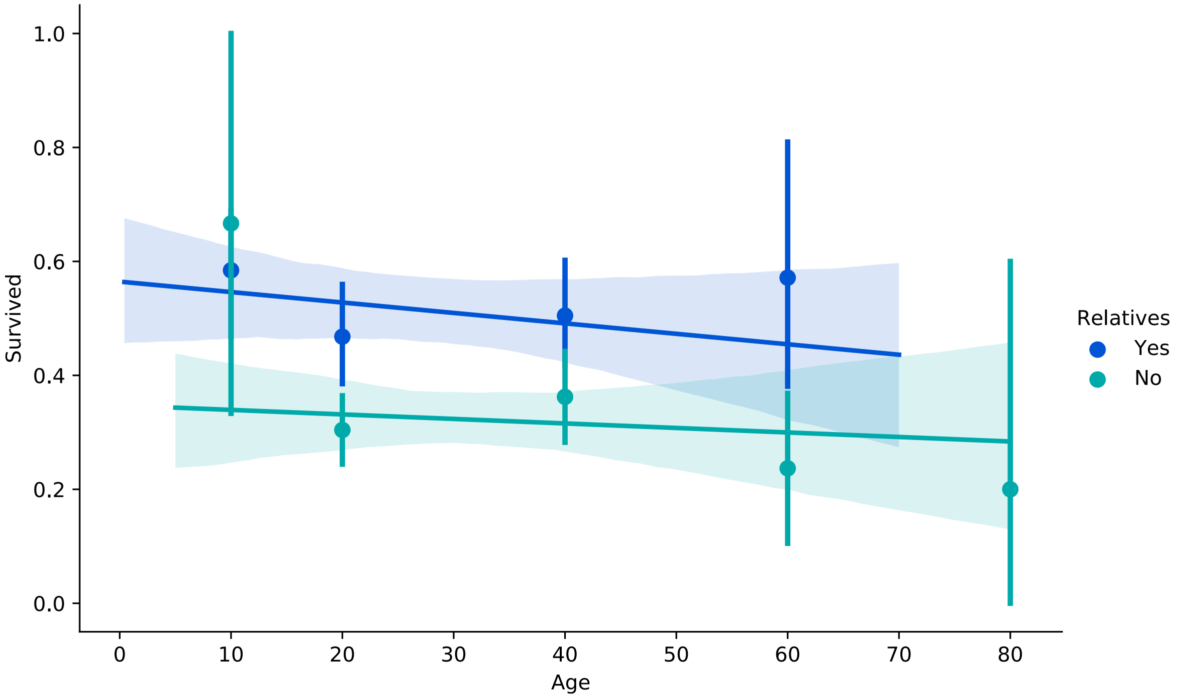
In [90]:
```
sns.lmplot('Age', 'Survived', data=df, aspect=1.5, hue='Sex', palette='winter'
, x_bins = generations)
```

Out[90]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd8d71610>
```



In [91]:
```
sns.lmplot('Age', 'Survived', data=df, aspect=1.5, hue='Relatives', palette='w
inter', x_bins = generations)
```

Out[91]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd8d80d30>
```



In [92]:
```
df_c_analysis = df
```

```
In [93]: df_c_analysis.head()
```

```
Out[93]:
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Ca
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	

```
In [99]: df_c_analysis.dropna(inplace=True)
```

```
In [100]: df_c_analysis.shape
```

```
Out[100]: (183, 16)
```

In [101]:
```
df_c_analysis.head()
```

Out[101]:

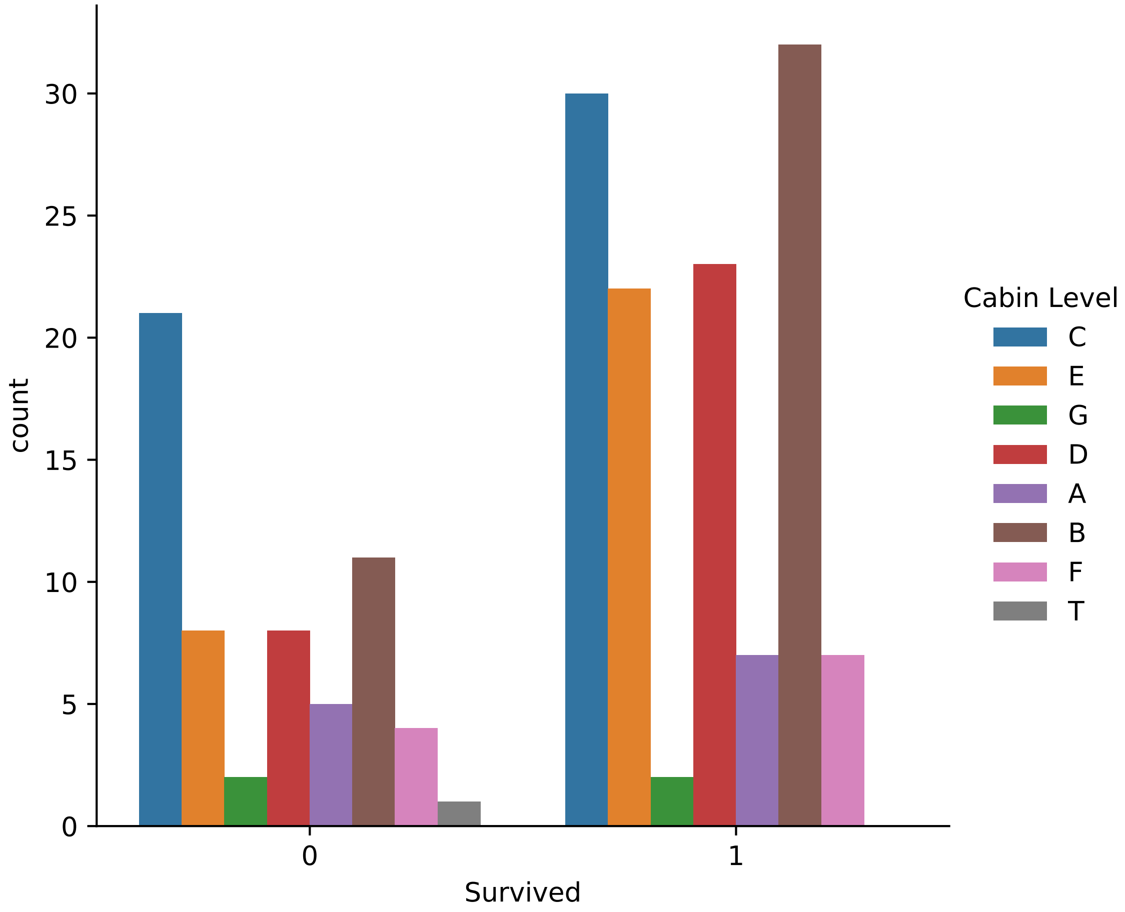
	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Ca
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	(
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C
6	7	0	1	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625	I
10	11	1	3	Sandstrom, Miss. Marguerite Rut	female	4.0	1	1	PP 9549	16.7000	
11	12	1	1	Bonnell, Miss. Elizabeth	female	58.0	0	0	113783	26.5500	C

In [102]:
```
def role(c):
    for i in c:
        return i[0]
```

In [104]:
```
df_c_analysis['Cabin Level'] = df_c_analysis['Cabin'].apply(role)
```

In [106]:
```
sns.catplot('Survived', data=df_c_analysis, hue='Cabin Level', kind='count')
```

Out[106]:
```
<seaborn.axisgrid.FacetGrid at 0x2dd7429820>
```


count
Survived
Cabin Level
C
E
G
D
A
B
F
T