In [13]:

```
#Import Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

Using Titanic Dataset from Kaggle

In [2]:

```
train = pd.read_csv('titanic_train.csv')
```

In [3]:

```
train.head()
```

Out[3]:

	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	Na
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C8
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	Na
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C1
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	Na

Checking Missing Data

```
In [4]: train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
PassengerId    891 non-null int64
Survived       891 non-null int64
Pclass         891 non-null int64
Name           891 non-null object
Sex            891 non-null object
Age            714 non-null float64
SibSp          891 non-null int64
Parch          891 non-null int64
Ticket         891 non-null object
Fare           891 non-null float64
Cabin          204 non-null object
Embarked       889 non-null object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.6+ KB
```

```
In [6]: train.isna().sum()
```

```
Out[6]: PassengerId      0
        Survived         0
        Pclass           0
        Name             0
        Sex              0
        Age            177
        SibSp            0
        Parch            0
        Ticket           0
        Fare             0
        Cabin          687
        Embarked         2
        dtype: int64
```

```
In [7]: #Percent of data which is not available
        train.isnull().sum()/len(train) * 100
```

```
Out[7]: PassengerId     0.000000
        Survived        0.000000
        Pclass          0.000000
        Name            0.000000
        Sex             0.000000
        Age            19.865320
        SibSp           0.000000
        Parch           0.000000
        Ticket          0.000000
        Fare            0.000000
        Cabin          77.104377
        Embarked        0.224467
        dtype: float64
```

Cabin has more than 70% data missing. So, we can remove it

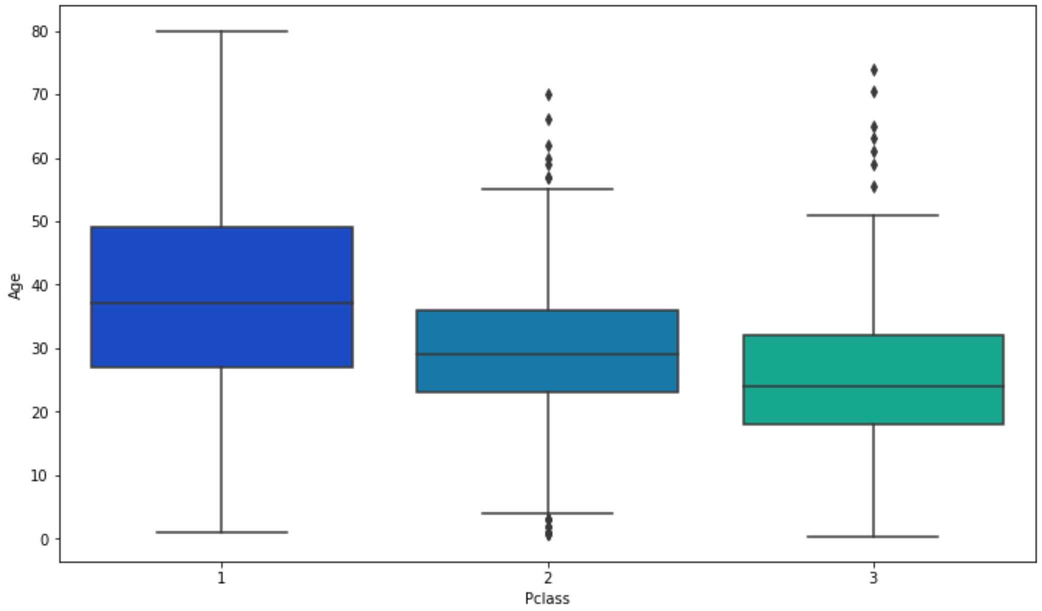
```
In [8]: train = train.drop('Cabin',axis=1)
In [10]: train.describe()
```

```
Out[10]:
```

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

```
In [14]: plt.figure(figsize=(12, 7))
         sns.boxplot(x='Pclass',y='Age',data=train,palette='winter')
```

```
Out[14]: <matplotlib.axes._subplots.AxesSubplot at 0x7f152230bb70>
```



We can see the wealthier passengers in the higher classes tend to be older, which makes sense. We'll use these average age values to impute based on Pclass for Age.

In [15]:

```
def impute_age(cols):
    Age = cols[0]
    Pclass = cols[1]

    if pd.isnull(Age):

        if Pclass == 1:
            return 37

        elif Pclass == 2:
            return 29

        else:
            return 24

    else:
        return Age
```

In [16]:

```
train['Age'] = train[['Age','Pclass']].apply(impute_age,axis=1)
```

In [17]:

```
train.head()
```

Out[17]:

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

In [18]:
```
train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 11 columns):
PassengerId    891 non-null int64
Survived       891 non-null int64
Pclass         891 non-null int64
Name           891 non-null object
Sex            891 non-null object
Age            891 non-null float64
SibSp          891 non-null int64
Parch          891 non-null int64
Ticket         891 non-null object
Fare           891 non-null float64
Embarked       889 non-null object
dtypes: float64(2), int64(5), object(4)
memory usage: 76.6+ KB
```

In [19]:
```
train.dropna(inplace=True)
```

In [20]:
```
train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 889 entries, 0 to 890
Data columns (total 11 columns):
PassengerId    889 non-null int64
Survived       889 non-null int64
Pclass         889 non-null int64
Name           889 non-null object
Sex            889 non-null object
Age            889 non-null float64
SibSp          889 non-null int64
Parch          889 non-null int64
Ticket         889 non-null object
Fare           889 non-null float64
Embarked       889 non-null object
dtypes: float64(2), int64(5), object(4)
memory usage: 83.3+ KB
```

In [21]:
```
sex = pd.get_dummies(train['Sex'],drop_first=True)
embark = pd.get_dummies(train['Embarked'],drop_first=True)
```

In [22]:
```
train.drop(['Sex','Embarked','Name','Ticket'],axis=1,inplace=True)
```

In [23]:
```
train = pd.concat([train,sex,embark],axis=1)
```

In [24]:
```
train.head()
```

Out[24]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare	male	Q	S
0	1	0	3	22.0	1	0	7.2500	1	0	1
1	2	1	1	38.0	1	0	71.2833	0	0	0
2	3	1	3	26.0	0	0	7.9250	0	0	1
3	4	1	1	35.0	1	0	53.1000	0	0	1
4	5	0	3	35.0	0	0	8.0500	1	0	1

In [25]:
```
from sklearn.model_selection import train_test_split
```

In [26]:
```
X_train, X_test, y_train, y_test = train_test_split(train.drop('Survived
',axis=1),
                                                    train['Survived'], t
est_size=0.30)
```

In [27]:
```
from sklearn.linear_model import LogisticRegression
```

In [28]:
```
logmodel = LogisticRegression()
logmodel.fit(X_train,y_train)
```

Out[28]:
```
LogisticRegression(C=1.0, class_weight=None, dual=False, fit_intercept=Tr
ue,
          intercept_scaling=1, max_iter=100, multi_class='ovr', n_jobs=1,
          penalty='l2', random_state=None, solver='liblinear', to
l=0.0001,
          verbose=0, warm_start=False)
```

In [29]:
```
predictions = logmodel.predict(X_test)
print(predictions)
pd.DataFrame(predictions).to_csv('prediction.csv')
```

```
[0 0 1 1 0 1 0 0 1 0 0 0 1 0 1 1 1 0 1 0 1 0 1 0 0 1 1 0 0 0 0 0 1 0 1 1
1
 1 0 1 0 1 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 1 1 0 0 1
0
 1 1 0 0 1 0 0 0 0 0 0 1 0 1 0 0 0 0 0 1 0 1 0 0 0 0 0 1 0 1 0 0 1 1 0 1
0
 1 0 0 0 0 0 1 0 0 1 0 1 0 1 0 1 0 0 1 0 1 0 0 0 0 1 0 0 0 1 1 0 0 1 0 0
0
 0 1 0 0 1 0 0 1 1 1 0 0 0 1 0 0 1 0 0 0 0 0 1 0 0 0 1 1 1 0 0 0 1 0 0 1
0
 1 0 0 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 0 0 0 1
1
 0 1 0 1 1 0 1 1 0 0 1 0 0 0 0 1 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
1
 0 0 0 0 1 0 0 0]
```