In [1]:

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

In [2]:

```
# Let's work with Kaggel's Titanic_train dataset
# This is a dataset for training a machine learning algoritham
titanic_train = pd.read_csv('titanic_train.csv')
```

In [41]:

```
# Check out the head
titanic_train.head()
```

Out[41]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare
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
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500

map

In [5]:

```
# map is a series method
# Let's say instead of 'Sex' column with catogaries 'male' and 'female' you would like
 0 and 1
# There are lot of different ways to achieve that and 'map' is one of them
titanic_train['Sex_0_1'] = titanic_train['Sex'].map({'female':1, 'male':0})
titanic_train[['Sex','Sex_0_1']].head()
```

Out[5]:

	Sex	Sex_0_1
0	male	0
1	female	1
2	female	1
3	female	1
4	male	0

apply (series)

In [6]:

```
# Imagine you would like to pass a function which performs certain logic over the serie
s or just one columnof dataframe
# first define the funcion
def Sex_01_applySeriesMethod(oranges):
    if oranges == 'male':
        return 0
    elif oranges == 'female':
        return 1


# Now let's put this function to make a new column(or series)
titanic_train['Sex_01_applySeriesMethod'] = titanic_train['Sex'].apply(Sex_01_applySeri
esMethod)
# Let's check out the head
titanic_train[['Sex','Sex_0_1','Sex_01_applySeriesMethod']].head()
```

Out[6]:

	Sex	Sex_0_1	Sex_01_applySeriesMethod
0	male	0	0
1	female	1	1
2	female	1	1
3	female	1	1
4	male	0	0

In [18]:

```
# How does this work?
# The function name is long but it reflects what to look for in the output
def Sex_01_applySeriesMethod_addPrint(oranges):
    print('stage1')
    if oranges == 'male':
        print('Fizz')
        return 0
    print('stage2')
    if oranges == 'female':
        print('Buzz')
        return 1




titanic_train['Sex_01_applySeriesMethod_addPrint'] = titanic_train['Sex'].apply(Sex_01_
applySeriesMethod_addPrint)
# Let's check out the head
titanic_train[['Sex','Sex_0_1','Sex_01_applySeriesMethod', 'Sex_01_applySeriesMethod_ad
dPrint']].head()
# So this cell explains how it works, you do have move around the print statements to f
igure it out
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Out[18]:

	Sex	Sex_0_1	Sex_01_applySeriesMethod	Sex_01_applySeriesMethod_addPrint
0	male	0	0	0
1	female	1	1	1
2	female	1	1	1
3	female	1	1	1
4	male	0	0	0

apply (DataFrame)

In [46]:

```
# Let's say we would like to change two columns of this dataframe
# 1. Changing 'Sex' to 0 and 1
# 2. Changing 'Embarked' to 10, 20 and 30
#
def Sex_01_applyDFMethod(oranges):
    '''Since we will be working with DF, specifically two columns
    we will have to decide before hand which one is the firt column
    and this will be the 0th or 1th element of 'oranges' '''
    if oranges[0] == 'male':
        if oranges[1]=='C':
            return (0,10)#oranges[0] = 0 and oranges[1] = 10)
        elif oranges[1]=='Q':
            return (0,20)#oranges[0] = 0 and oranges[1] = 20)
        elif oranges[1]=='S':
            return (0,30)#oranges[0] = 0 and oranges[1] = 30)
        else:
            return (0,'unknown embarked')#oranges[0] = 0 and oranges[1] = 'unknown emba
rked')
    elif oranges[0] == 'female':
        if oranges[1]=='C':
            return (1,10)#oranges[0] = 1 and oranges[1] = 10)
        elif oranges[1]=='Q':
            return (1,20)#oranges[0] = 1 and oranges[1] = 20)
        elif oranges[1]=='S':
            return (1,30)#oranges[0] = 1 and oranges[1] = 30)
        else:
            return (1,'unknown embarked')# oranges[0] = 1 and oranges[1] = 'unknown emb
arked')
    else:
        if oranges[1]=='C':
            return ('unknown sex',10)#oranges[0] = 'unknown sex' and oranges[1] = 10)
        elif oranges[1]=='Q':
            return ('unknown sex',20)#oranges[0] = 'unknown sex' and oranges[1] = 20)
        elif oranges[1]=='S':
            return ('unknown sex',30)#oranges[0] = 'unknown sex' and oranges[1] = 30)
        else:
            return ('unknown sex','unknown embarked')#oranges[0] = 'unknown sex' and or
anges[1] = 'unknown embarked')


df_sex_embarked = titanic_train[['Sex','Embarked']].apply(Sex_01_applyDFMethod, axis=1)
print(type(df_sex_embarked))
print(type(df_sex_embarked[0]))
print((df_sex_embarked))

titanic_train['Sex_applyDF'] = df_sex_embarked.apply(lambda x:x[0])
titanic_train['Embarked_applyDF'] = df_sex_embarked.apply(lambda x:x[1])


titanic_train[['Sex_applyDF','Embarked_applyDF']].head()
```

```
<class 'pandas.core.series.Series'>
<class 'tuple'>
0      (0, 30)
1      (1, 10)
2      (1, 30)
3      (1, 30)
4      (0, 30)
5      (0, 20)
6      (0, 30)
7      (0, 30)
8      (1, 30)
9      (1, 10)
10     (1, 30)
11     (1, 30)
12     (0, 30)
13     (0, 30)
14     (1, 30)
15     (1, 30)
16     (0, 20)
17     (0, 30)
18     (1, 30)
19     (1, 10)
20     (0, 30)
21     (0, 30)
22     (1, 20)
23     (0, 30)
24     (1, 30)
25     (1, 30)
26     (0, 10)
27     (0, 30)
28     (1, 20)
29     (0, 30)
         ...
861    (0, 30)
862    (1, 30)
863    (1, 30)
864    (0, 30)
865    (1, 30)
866    (1, 10)
867    (0, 30)
868    (0, 30)
869    (0, 30)
870    (0, 30)
871    (1, 30)
872    (0, 30)
873    (0, 30)
874    (1, 10)
875    (1, 10)
876    (0, 30)
877    (0, 30)
878    (0, 30)
879    (1, 10)
880    (1, 30)
881    (0, 30)
882    (1, 30)
883    (0, 30)
884    (0, 30)
885    (1, 20)
886    (0, 30)
887    (1, 30)
888    (1, 30)
```

```
889    (0, 10)
890    (0, 20)
Length: 891, dtype: object
```

Out[46]:

	Sex_applyDF	Embarked_applyDF
0	0	30
1	1	10
2	1	30
3	1	30
4	0	30

apply DF another example

In [51]:

```
# Find if there are any null values in Age column
print(titanic_train['Age'].isnull().sum()) # Adding up all the True(s)(1) and False(s)(0) from the below command
titanic_train['Age'].isnull()
# So it turns out it 'Age' has 177 missing values
# Can we fill these up by using average value from each Pclass?
```

```
177
```

Out[51]:

```
0      False
1      False
2      False
3      False
4      False
5       True
6      False
7      False
8      False
9      False
10     False
11     False
12     False
13     False
14     False
15     False
16     False
17      True
18     False
19      True
20     False
21     False
22     False
23     False
24     False
25     False
26      True
27     False
28      True
29      True
       ...  
861    False
862    False
863     True
864    False
865    False
866    False
867    False
868     True
869    False
870    False
871    False
872    False
873    False
874    False
875    False
876    False
877    False
878     True
879    False
880    False
881    False
882    False
883    False
884    False
885    False
886    False
887    False
888     True
```

```
889    False
890    False
Name: Age, Length: 891, dtype: bool
```

In [65]:

```
print(type(pd.isnull))
print(type(np.isnan))
```

```
<class 'function'>
<class 'numpy.ufunc'>
```

In [68]:

```
# Let's define a function
def Ave_age_per_Pclass(oranges):
    if np.isnan(oranges[0]):
        if oranges[1]==1:
            return'1st class missing Age'
        elif oranges[1]==2:
            return '2nd class missing Age'
        elif oranges[1]==3:
            return '3rd class missing Age'
    else:
        return oranges[0]



titanic_train['Age_per_Pclass'] = titanic_train[['Age', 'Pclass']].apply(Ave_age_per_Pc
lass, axis=1)
# The axis can be zero if you would like to apply the function on axis zero
titanic_train['Age_per_Pclass']
```

Out[68]:

```
0                         22
1                         38
2                         26
3                         35
4                         35
5      3rd class missing Age
6                         54
7                          2
8                         27
9                         14
10                         4
11                        58
12                        20
13                        39
14                        14
15                        55
16                         2
17     2nd class missing Age
18                        31
19     3rd class missing Age
20                        35
21                        34
22                        15
23                        28
24                         8
25                        38
26     3rd class missing Age
27                        19
28     3rd class missing Age
29     3rd class missing Age
               ...
861                       21
862                       48
863    3rd class missing Age
864                       24
865                       42
866                       27
867                       31
868    3rd class missing Age
869                        4
870                       26
871                       47
872                       33
873                       47
874                       28
875                       15
876                       20
877                       19
878    3rd class missing Age
879                       56
880                       25
881                       33
882                       22
883                       28
884                       25
885                       39
886                       27
887                       19
888    3rd class missing Age
```

```
889                        26
890                        32
Name: Age_per_Pclass, Length: 891, dtype: object
```

applymap

In [69]:

```
# Lets check the info method
titanic_train.info()
# there are some columns in int and float type
# Let's say we want to convert these all the int types and float types in float types
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 18 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
Sex_0_1                              891 non-null int64
Sex_01_applySeriesMethod             891 non-null int64
Sex_01_applySeriesMethod_addPrint    891 non-null int64
Sex_applyDF                          891 non-null int64
Embarked_applyDF                     891 non-null object
Age_per_Pclass                       891 non-null object
dtypes: float64(2), int64(9), object(7)
memory usage: 125.4+ KB
```

In [75]:

```
# there are some columns in int and float type
# Let's say we want to convert these all the int types and float types in float types
# The best way of getting these column names are from describe method
titanic_train.describe().columns
titanic_train_floats = titanic_train[titanic_train.describe().columns].applymap(float)
titanic_train_floats.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 11 columns):
PassengerId                          891 non-null float64
Survived                             891 non-null float64
Pclass                               891 non-null float64
Age                                  714 non-null float64
SibSp                                891 non-null float64
Parch                                891 non-null float64
Fare                                 891 non-null float64
Sex_0_1                              891 non-null float64
Sex_01_applySeriesMethod             891 non-null float64
Sex_01_applySeriesMethod_addPrint    891 non-null float64
Sex_applyDF                          891 non-null float64
dtypes: float64(11)
memory usage: 76.6 KB
```