Assignment 9 - Data Visualization 2

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ERP Number :- 38

TE Comp 1

- Use the inbuild dataset 'titanic'. Plot a box plot for distribution of age with respect to each gender along with the information about wheather they survived or not.
- Write observations on the inference form the above statistics.

In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt


data = pd.read_csv("train.csv")
data.head()
```

Out[1]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Eml
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	

In [2]:
```
data.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
```

VARIABLE DESCRIPTIONS

- Pclass Passenger Class (1 = 1st; 2 = 2nd; 3 = 3rd)
- survival Survival (0 = No; 1 = Yes)
- name Name
- sex Sex
- age Age
- sibsp Number of Siblings/Spouses Aboard
- parch Number of Parents/Children Aboard
- ticket Ticket Number
- fare Passenger Fare (British pound)
- cabin Cabin
- embarked Port of Embarkation (C = Cherbourg; Q = Queenstown; S = Southampton)

In [3]:
```
data.shape
```

Out[3]:
```
(891, 12)
```

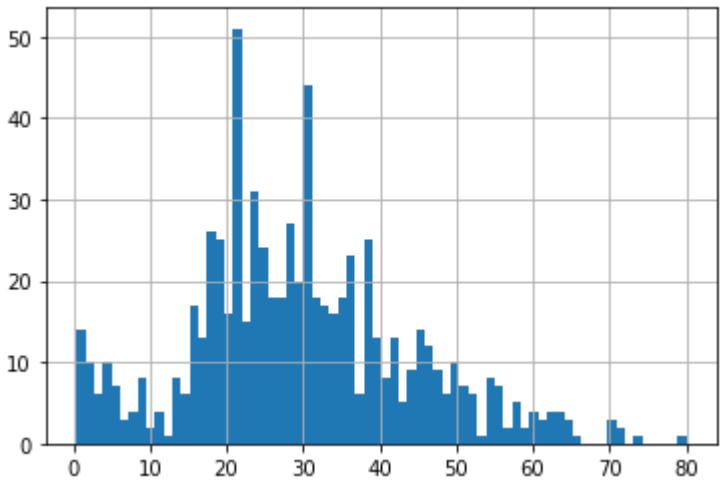
In [4]:
```
data.describe()
```

Out[4]:

	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 [5]:
```
###Now let us look at the ages of the passengers

data['Age'].hist(bins=70)
```

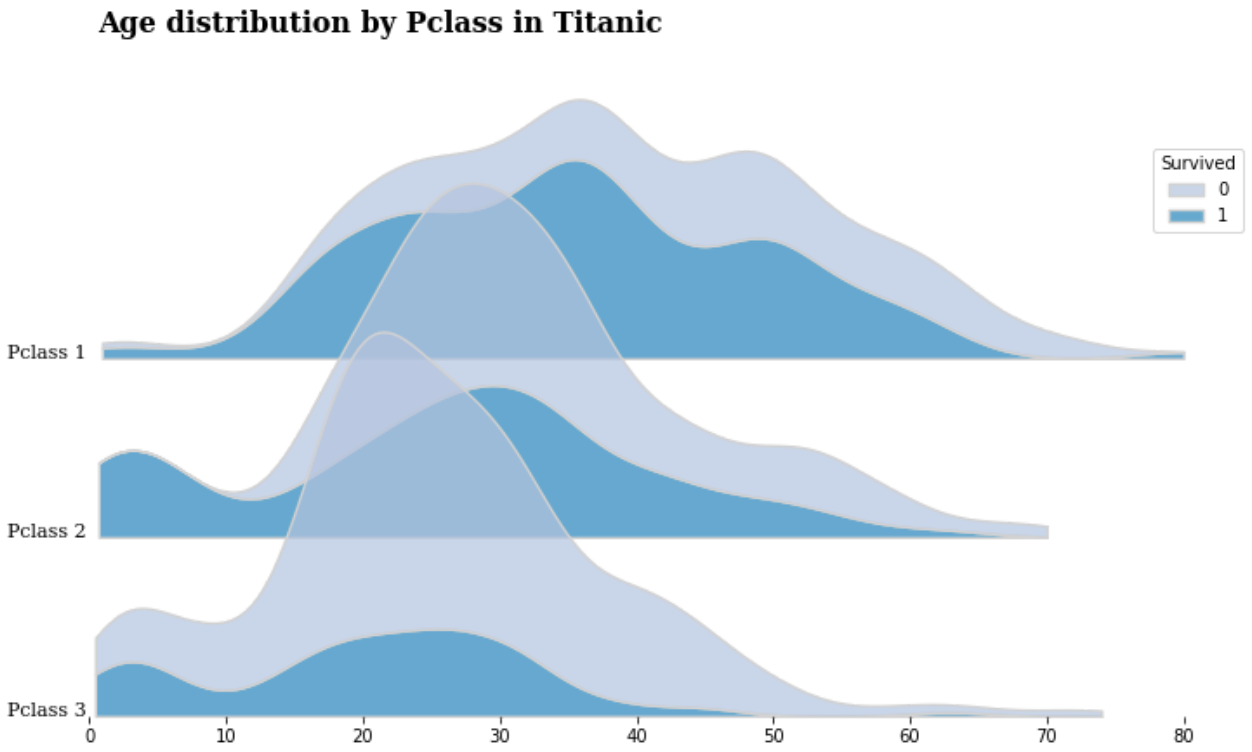
Out[5]:
```
<AxesSubplot:>
```



There are more number of people from age group 15-35 years old.

In [6]:
```
fig = plt.figure(figsize=(12, 8))
gs = fig.add_gridspec(3,1)
gs.update(hspace= -0.55)

axes = list()
colors = ["#022133", "#5c693b", "#51371c"]

for idx, cls, c in zip(range(3), sorted(data['Pclass'].unique()), colors):
    axes.append(fig.add_subplot(gs[idx, 0]))

    # you can also draw density plot with matplotlib + scipy.
    sns.kdeplot(x='Age', data=data[data['Pclass']==cls],
                fill=True, ax=axes[idx], cut=0, bw_method=0.25,
                lw=1.4, edgecolor='lightgray', hue='Survived',
                multiple="stack", palette='PuBu', alpha=0.7
               )

    axes[idx].set_ylim(0, 0.04)
    axes[idx].set_xlim(0, 85)

    axes[idx].set_yticks([])
    if idx != 2 : axes[idx].set_xticks([])
    axes[idx].set_ylabel('')
    axes[idx].set_xlabel('')

    spines = ["top","right","left","bottom"]
    for s in spines:
        axes[idx].spines[s].set_visible(False)

    axes[idx].patch.set_alpha(0)
    axes[idx].text(-0.2,0,f'Pclass {cls}',fontweight="light", fontfamily='serif', fonts
    if idx != 1 : axes[idx].get_legend().remove()

fig.text(0.13,0.81,"Age distribution by Pclass in Titanic", fontweight="bold", fontfami
```

```
plt.show()
```



From above graph, we can infer that there are less numbers of survivers form class 2 & 3 and their age group is between 10-30 years

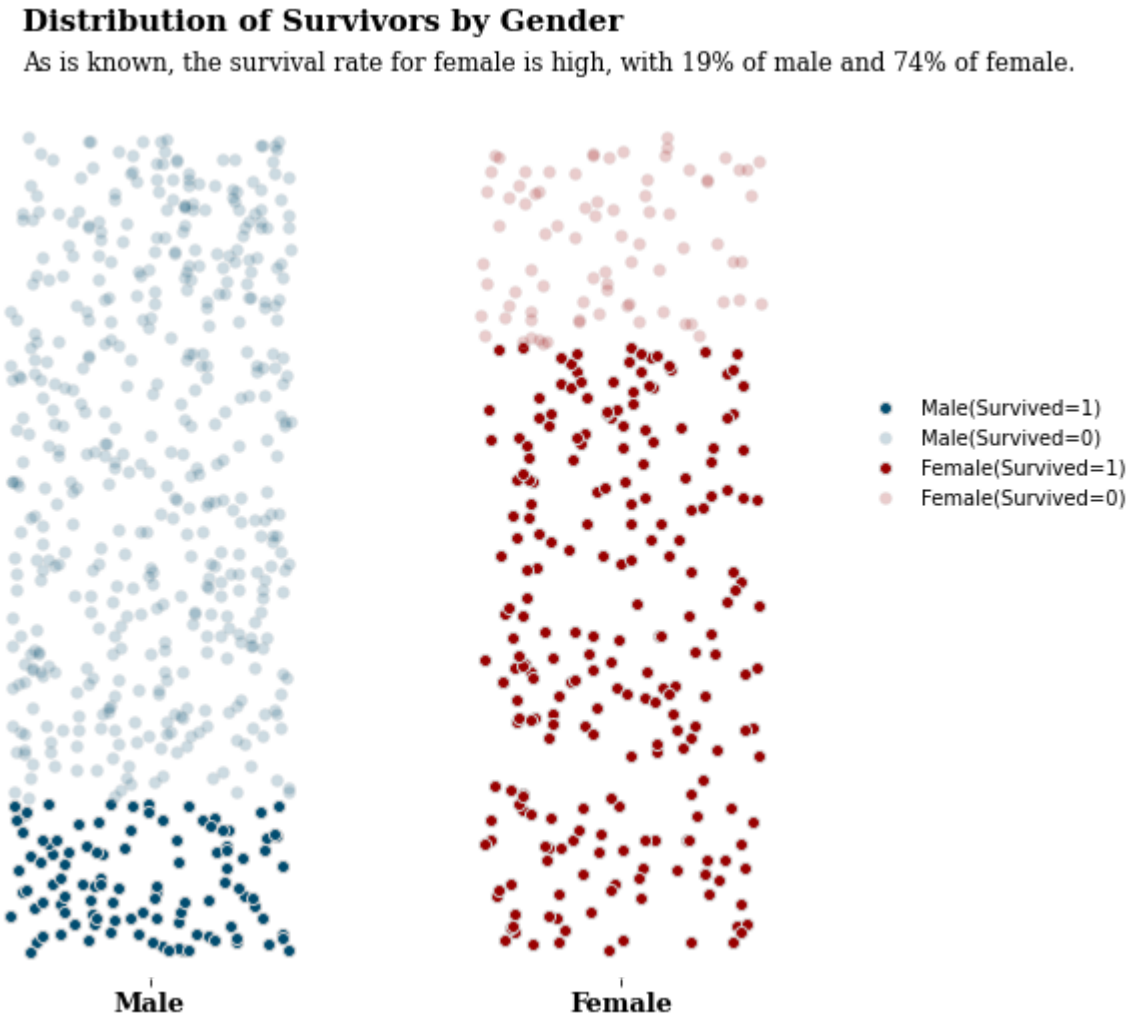
In [7]:
```
survival_rate = data.groupby(['Sex']).mean()[['Survived']]
male_rate = survival_rate.loc['male']
female_rate = survival_rate.loc['female']
display(survival_rate)
```

Sex	Survived
female	0.742038
male	0.188908

In [8]:
```
male_pos = np.random.uniform(0, male_rate, len(data[(data['Sex']=='male') & (data['Surv
male_neg = np.random.uniform(male_rate, 1, len(data[(data['Sex']=='male') & (data['Surv
female_pos = np.random.uniform(0, female_rate, len(data[(data['Sex']=='female') & (data
female_neg = np.random.uniform(female_rate, 1, len(data[(data['Sex']=='female') & (data
```

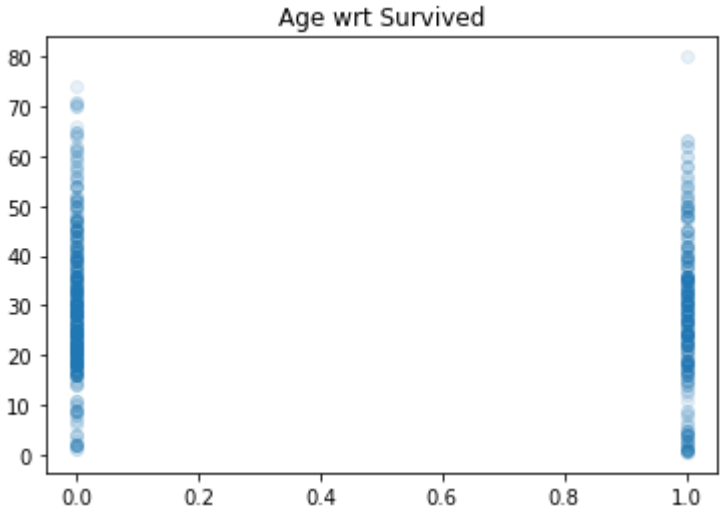
In [9]:
```
fig, ax = plt.subplots(1, 1, figsize=(9, 7))

np.random.seed(42)

# Male Stripplot
ax.scatter(np.random.uniform(-0.3, 0.3, len(male_pos)), male_pos, color='#004c70', edge
```

```
ax.scatter(np.random.uniform(-0.3, 0.3, len(male_neg)), male_neg, color='#004c70', edge

# Female Stripplot
ax.scatter(1+np.random.uniform(-0.3, 0.3, len(female_pos)), female_pos, color='#990000'
ax.scatter(1+np.random.uniform(-0.3, 0.3, len(female_neg)), female_neg, color='#990000'

# Set Figure & Axes
ax.set_xlim(-0.5, 2.0)
ax.set_ylim(-0.03, 1.1)

# Ticks
ax.set_xticks([0, 1])
ax.set_xticklabels(['Male', 'Female'], fontweight='bold', fontfamily='serif', fontsize=
ax.set_yticks([], minor=False)
ax.set_ylabel('')

# Spines
for s in ["top","right","left", 'bottom']:
    ax.spines[s].set_visible(False)


# Title & Explanation
fig.text(0.1, 1, 'Distribution of Survivors by Gender', fontweight='bold', fontfamily='
fig.text(0.1, 0.96, 'As is known, the survival rate for female is high, with 19% of mal

ax.legend(loc=(0.8, 0.5), edgecolor='None')
plt.tight_layout()
plt.show()
```



In [10]:
```
plt.scatter(data.Survived, data.Age, alpha=0.1)   ## here the plot has to be transparen
plt.title("Age wrt Survived")
```

Out[10]:
```
Text(0.5, 1.0, 'Age wrt Survived')
```



So From the above we can understand that, some of the older people died (between 50-70) and some of the younger people (between 20-40) survived more.

In [13]:

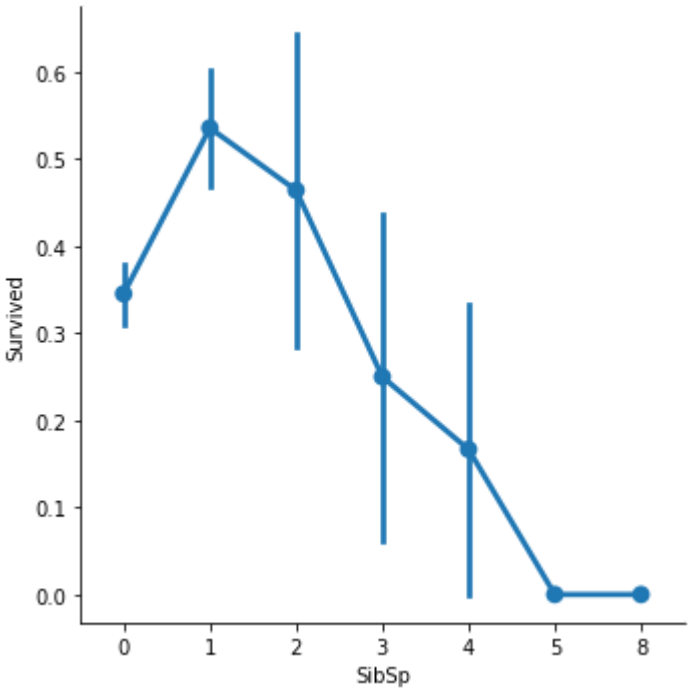
```
g = sns.FacetGrid(data=df,col="Sex",margin_titles=True)
g.map(sns.boxplot,"Survived","Age",order=[False,True])
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
~\AppData\Local\Temp/ipykernel_19964/1993416722.py in <module>
----> 1 g = sns.FacetGrid(data=df,col="Sex",margin_titles=True)
      2 g.map(sns.boxplot,"Survived","Age",order=[False,True])

NameError: name 'df' is not defined
```

In [14]:

```
sns.factorplot(x="SibSp", y="Survived", data=data);
```

```
C:\Users\asus\anaconda3\lib\site-packages\seaborn\categorical.py:3717: UserWarning: The
`factorplot` function has been renamed to `catplot`. The original name will be removed i
n a future release. Please update your code. Note that the default `kind` in `factorplot
` (`'point'`) has changed `'strip'` in `catplot`.
  warnings.warn(msg)
```



More people have survived with family size 2 and less people from family size 5