Import the libraries

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

Import the Dataset

In [2]:
```
dataset=pd.read_csv("Titanic-Dataset.csv")
```

In [3]:
```
dataset
```

Out[3]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	F
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0
...	...	...	...	...	...	...	...	...	...	
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7

891 rows × 12 columns

In [4]:
```
dataset.head()
```

Out[4]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Far
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.250
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.283
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.925
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.100
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.050

In [5]:
```
dataset.tail()
```

Out[5]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.00
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.00
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.45
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.00
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.75

In [6]:
```
dataset.shape
```

Out[6]:
```
(891, 12)
```

In [7]:
```
dataset.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
```

In [8]:
```
dataset.describe()
```

Out[8]:

	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 [11]:
```
corr1=dataset.corr()
corr1
```

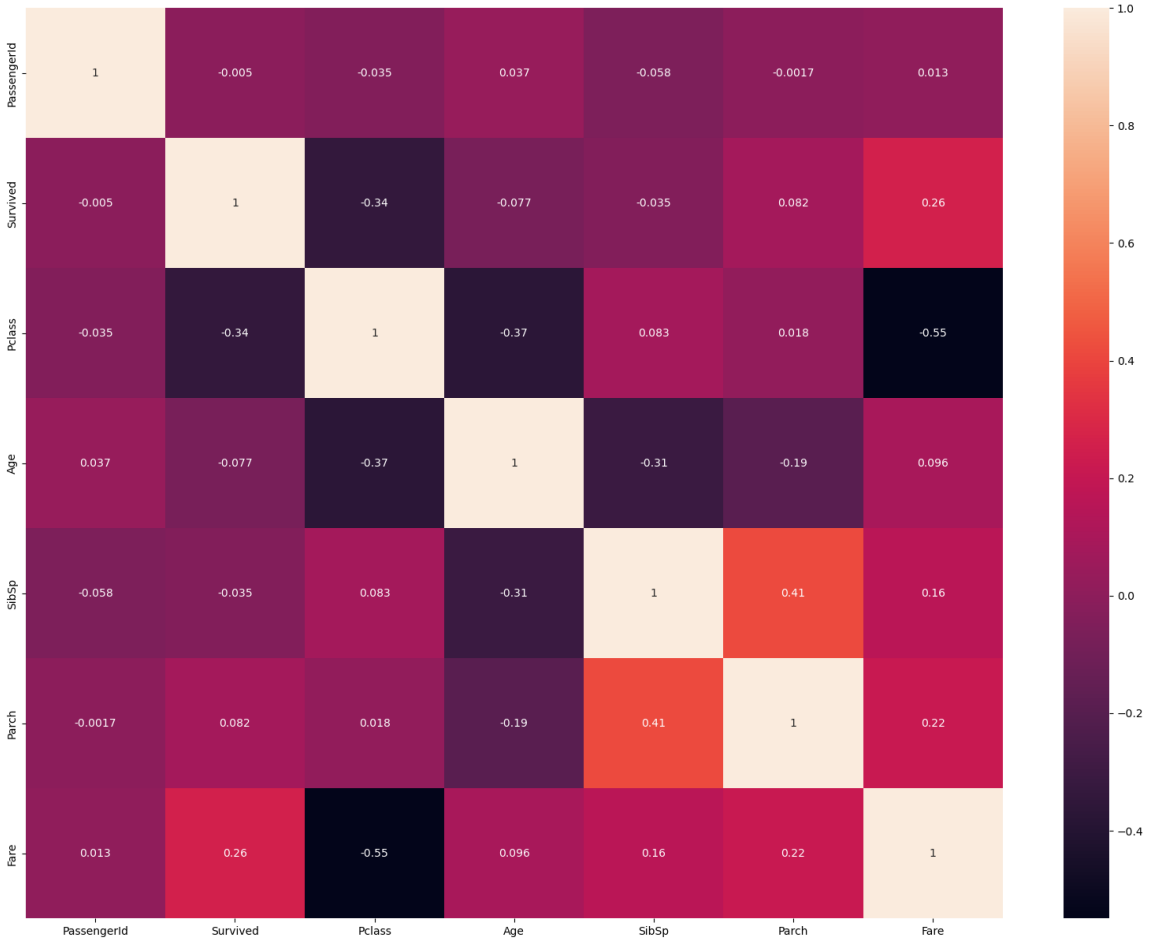
```
C:\Users\bunny\AppData\Local\Temp\ipykernel_11192\1291402269.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.
  corr1=dataset.corr()
```

Out[11]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
PassengerId	1.000000	-0.005007	-0.035144	0.036847	-0.057527	-0.001652	0.012658
Survived	-0.005007	1.000000	-0.338481	-0.077221	-0.035322	0.081629	0.257307
Pclass	-0.035144	-0.338481	1.000000	-0.369226	0.083081	0.018443	-0.549500
Age	0.036847	-0.077221	-0.369226	1.000000	-0.308247	-0.189119	0.096067
SibSp	-0.057527	-0.035322	0.083081	-0.308247	1.000000	0.414838	0.159651
Parch	-0.001652	0.081629	0.018443	-0.189119	0.414838	1.000000	0.216225
Fare	0.012658	0.257307	-0.549500	0.096067	0.159651	0.216225	1.000000

In [12]:
```
plt.subplots(figsize=(20,15))
sns.heatmap(corr1,annot=True)
```

Out[12]:
```
<Axes: >
```



In [13]:
```
dataset.Fare.value_counts()
```

Out[13]:
```
8.0500     43
13.0000    42
7.8958     38
7.7500     34
26.0000    31
           ..
35.0000     1
28.5000     1
6.2375      1
14.0000     1
10.5167     1
Name: Fare, Length: 248, dtype: int64
```

In [14]:
```
dataset.Survived.value_counts()
```

Out[14]:
```
0    549
1    342
Name: Survived, dtype: int64
```

In [15]:
```
dataset.Pclass.value_counts()
```

Out[15]:
```
3    491
1    216
2    184
Name: Pclass, dtype: int64
```

Handling nul values

In [16]:
```
dataset.isnull().any()
```

```
PassengerId    False
```

Out[16]:
```
Survived       False
Pclass         False
Name           False
Sex            False
Age             True
SibSp          False
Parch          False
Ticket         False
Fare           False
Cabin           True
Embarked        True
dtype: bool
```

In [17]:
```
dataset.isnull().sum()
```

Out[17]:
```
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 [18]:
```
dataset.head()
```

Out[18]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Far
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.250
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.283
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.925
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.100
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.050

Data Visualization

In [19]:
```
pip install seaborn
```

```
Requirement already satisfied: seaborn in d:\python\lib\site-packages (0.
12.2)Note: you may need to restart the kernel to use updated packages.
```

```
Requirement already satisfied: numpy!=1.24.0,>=1.17 in d:\python\lib\site
-packages (from seaborn) (1.24.3)
Requirement already satisfied: pandas>=0.25 in d:\python\lib\site-package
s (from seaborn) (1.5.3)
Requirement already satisfied: matplotlib!=3.6.1,>=3.1 in d:\python\lib\s
ite-packages (from seaborn) (3.7.1)
Requirement already satisfied: contourpy>=1.0.1 in d:\python\lib\site-pac
kages (from matplotlib!=3.6.1,>=3.1->seaborn) (1.0.5)
Requirement already satisfied: cycler>=0.10 in d:\python\lib\site-package
s (from matplotlib!=3.6.1,>=3.1->seaborn) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in d:\python\lib\site-pa
ckages (from matplotlib!=3.6.1,>=3.1->seaborn) (4.25.0)
Requirement already satisfied: kiwisolver>=1.0.1 in d:\python\lib\site-pa
ckages (from matplotlib!=3.6.1,>=3.1->seaborn) (1.4.4)
Requirement already satisfied: packaging>=20.0 in c:\users\bunny\appdata
\roaming\python\python311\site-packages (from matplotlib!=3.6.1,>=3.1->se
aborn) (23.1)
Requirement already satisfied: pillow>=6.2.0 in d:\python\lib\site-packag
es (from matplotlib!=3.6.1,>=3.1->seaborn) (9.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in d:\python\lib\site-pac
kages (from matplotlib!=3.6.1,>=3.1->seaborn) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\bunny\app
data\roaming\python\python311\site-packages (from matplotlib!=3.6.1,>=3.1
->seaborn) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in d:\python\lib\site-package
s (from pandas>=0.25->seaborn) (2022.7)
Requirement already satisfied: six>=1.5 in c:\users\bunny\appdata\roaming
\python\python311\site-packages (from python-dateutil>=2.7->matplotlib!=
3.6.1,>=3.1->seaborn) (1.16.0)
```

In [20]:
```
import seaborn as sns
print(sns.get_dataset_names())
```

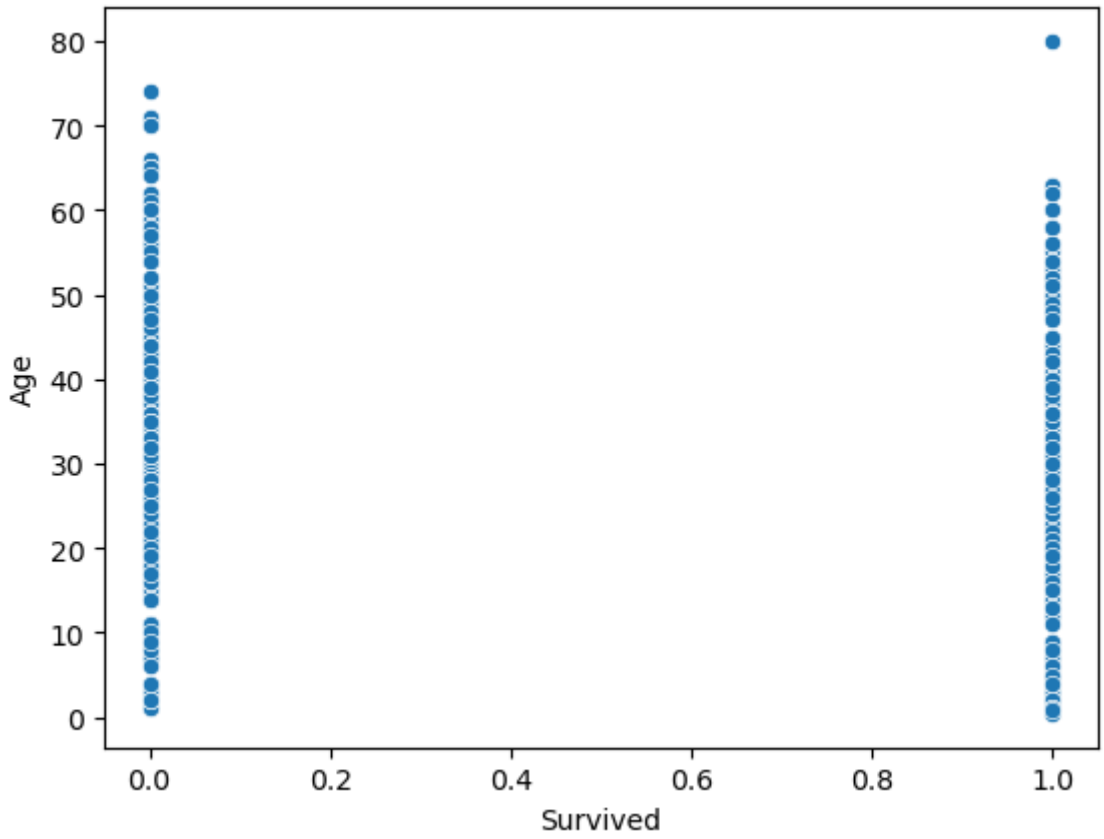
```
['anagrams', 'anscombe', 'attention', 'brain_networks', 'car_crashes', 'd
iamonds', 'dots', 'dowjones', 'exercise', 'flights', 'fmri', 'geyser', 'g
lue', 'healthexp', 'iris', 'mpg', 'penguins', 'planets', 'seaice', 'taxi
s', 'tips', 'titanic']
```

In [21]:
```
sns.__version__
```

Out[21]:
```
'0.12.2'
```

In [32]:
```
sns.scatterplot(x="Survived",y="Age",data=dataset)
```

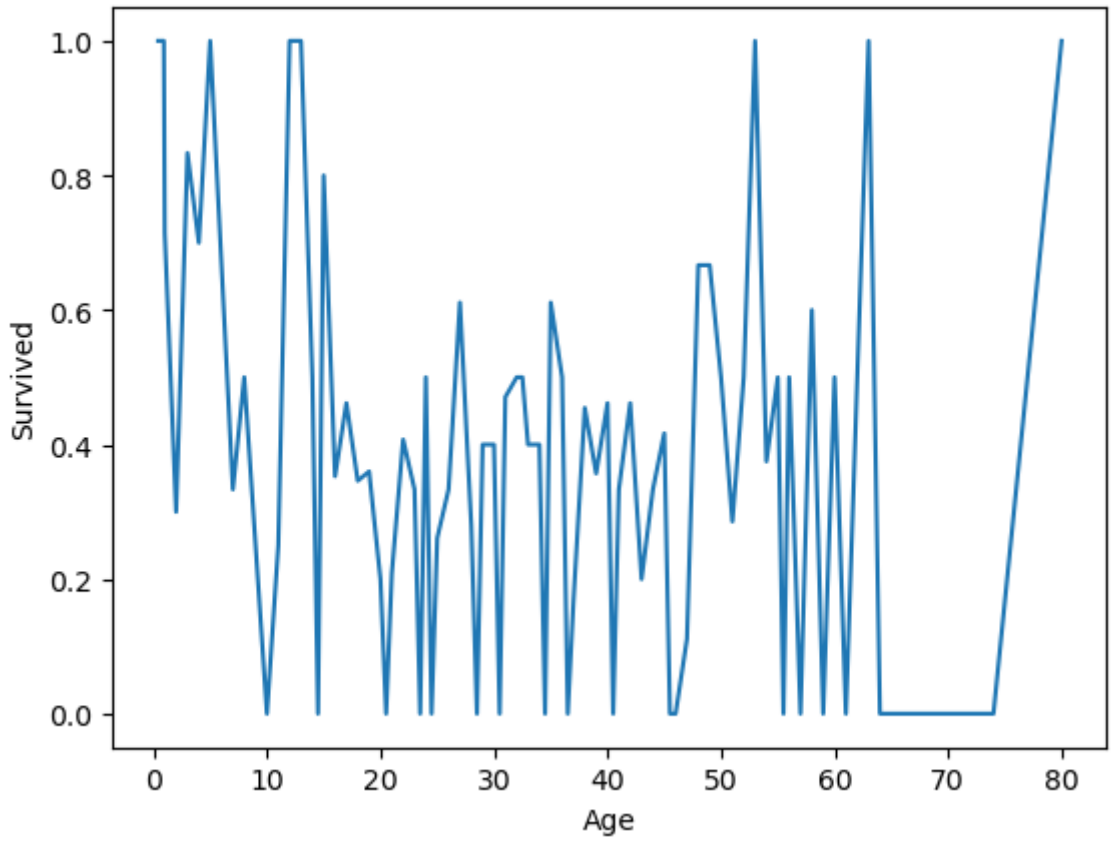
Out[32]:
```
<Axes: xlabel='Survived', ylabel='Age'>
```



In [34]:
```
sns.lineplot(x="Age",y="Survived",data=dataset,ci=None)
```

```
C:\Users\bunny\AppData\Local\Temp\ipykernel_11192\2977963200.py:1: Future
Warning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effec
t.

  sns.lineplot(x="Age",y="Survived",data=dataset,ci=None)
```

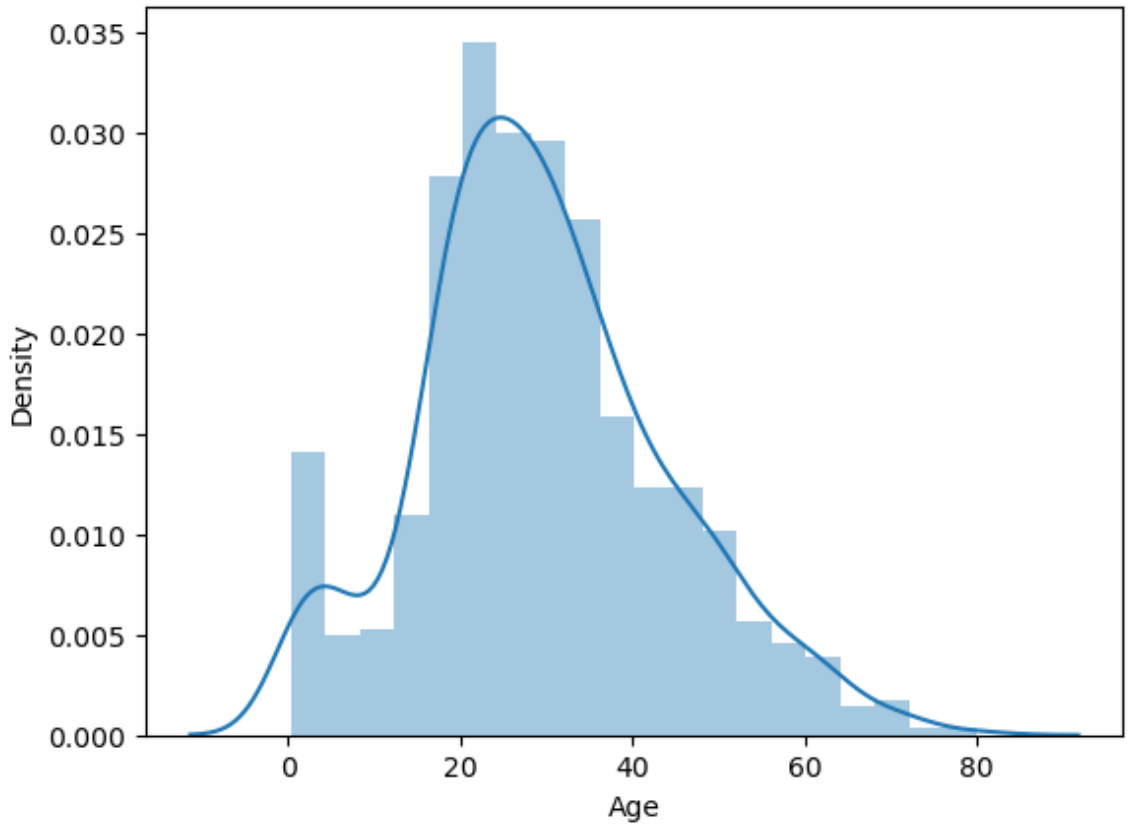
Out[34]:
```
<Axes: xlabel='Age', ylabel='Survived'>
```



In [36]:
```
sns.distplot(dataset["Age"])
```

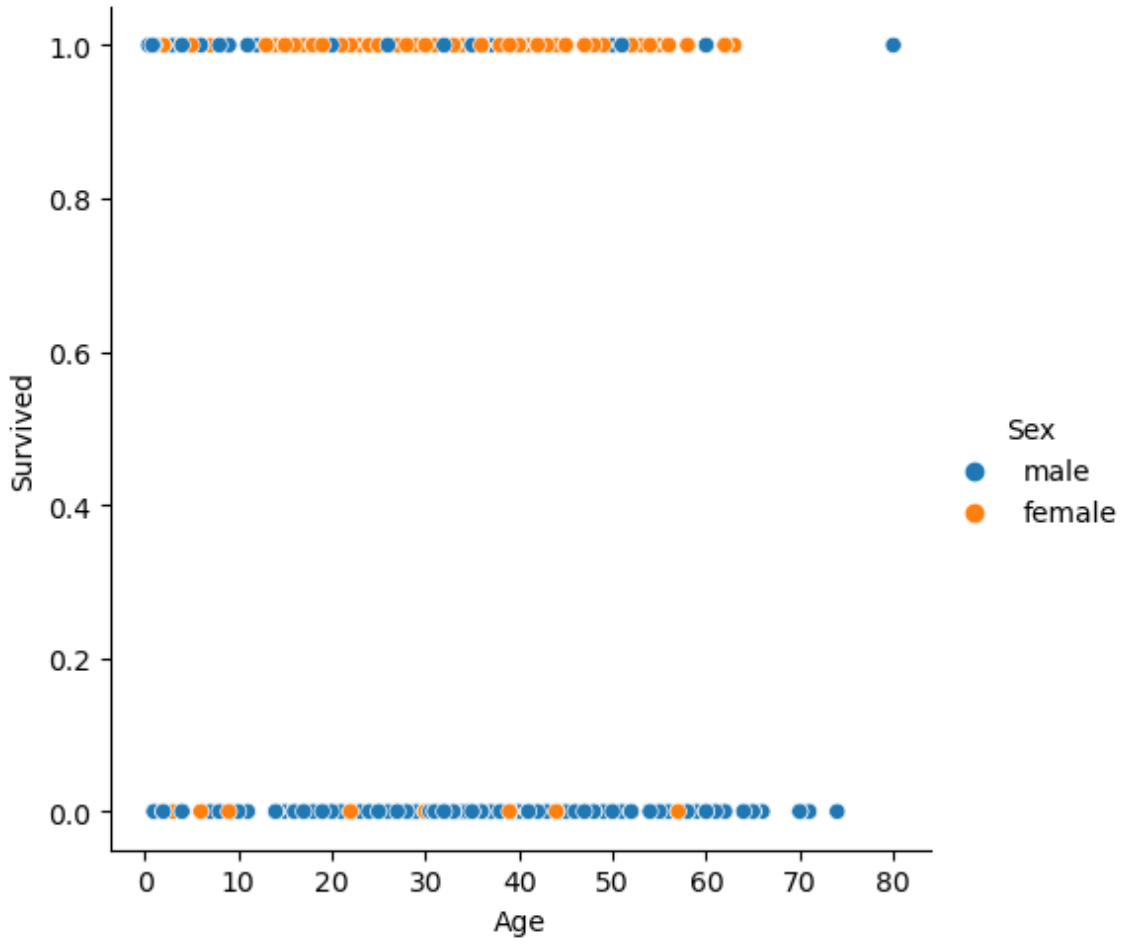
```
C:\Users\bunny\AppData\Local\Temp\ipykernel_11192\642544636.py:1: UserWar
ning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.
0.

Please adapt your code to use either `displot` (a figure-level function w
ith
similar flexibility) or `histplot` (an axes-level function for histogram
s).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(dataset["Age"])
```

Out[36]:
```
<Axes: xlabel='Age', ylabel='Density'>
```



In [44]:
```
sns.relplot(x="Age",y="Survived",data=dataset,hue="Sex")
```

Out[44]:
```
<seaborn.axisgrid.FacetGrid at 0x22ef5f667d0>
```



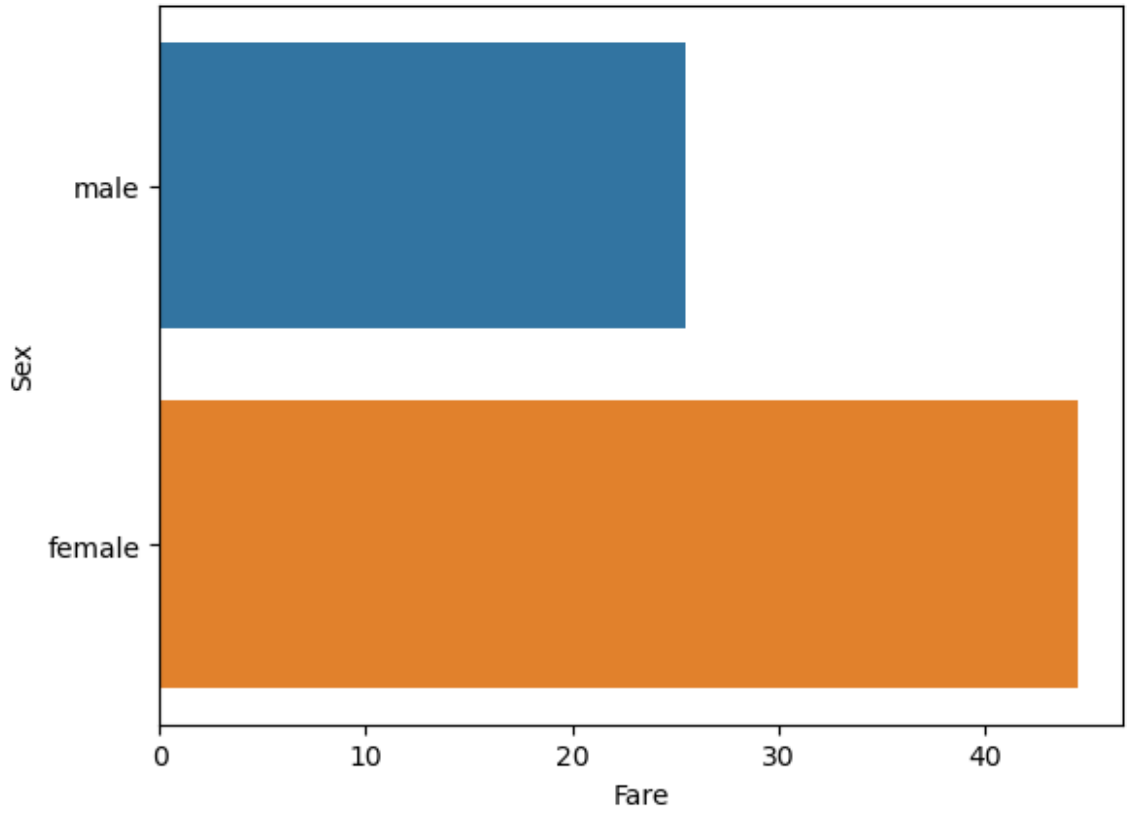
In [45]:
```
dataset["Fare"].value_counts()
```

Out[45]:
```
8.0500     43
13.0000    42
7.8958     38
7.7500     34
26.0000    31
           ..
35.0000     1
28.5000     1
6.2375      1
14.0000     1
10.5167     1
Name: Fare, Length: 248, dtype: int64
```

In [50]:
```
sns.barplot(data=dataset,x="Fare",y="Sex",ci=None)
```

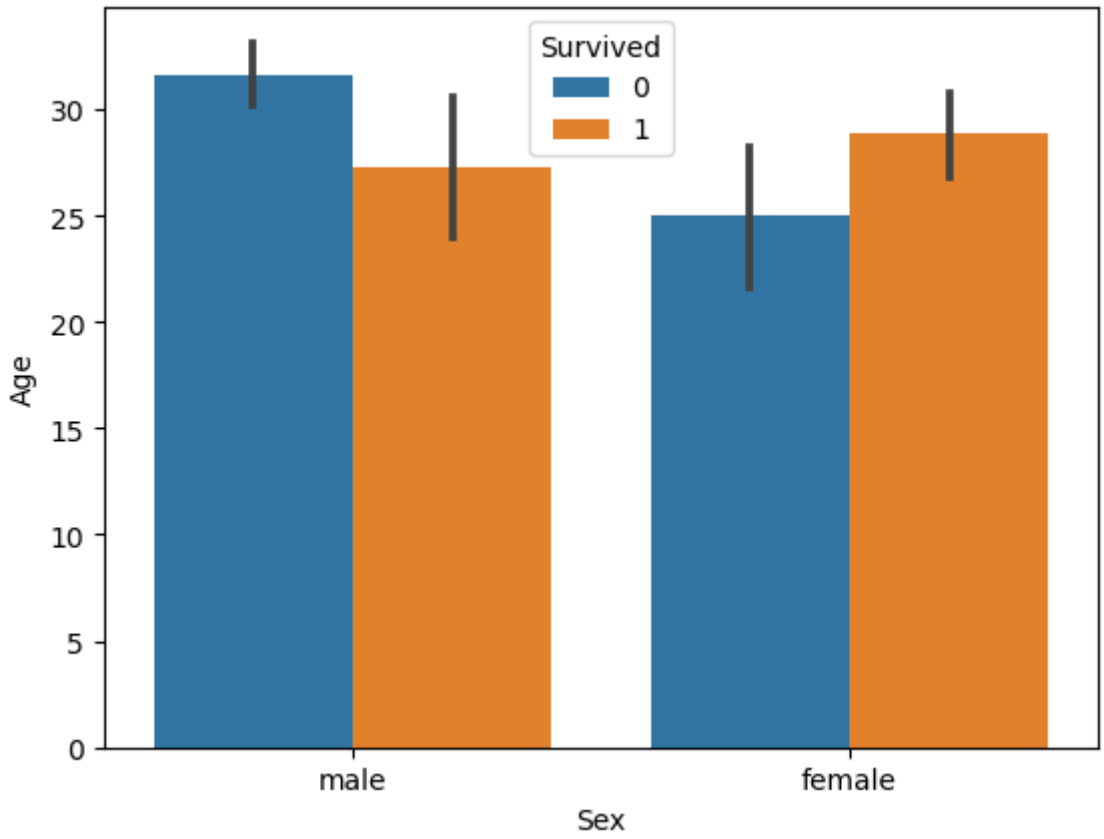
```
C:\Users\bunny\AppData\Local\Temp\ipykernel_11192\3052055135.py:1: Future
Warning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effec
t.

  sns.barplot(data=dataset,x="Fare",y="Sex",ci=None)
```

Out[50]:
```
<Axes: xlabel='Fare', ylabel='Sex'>
```



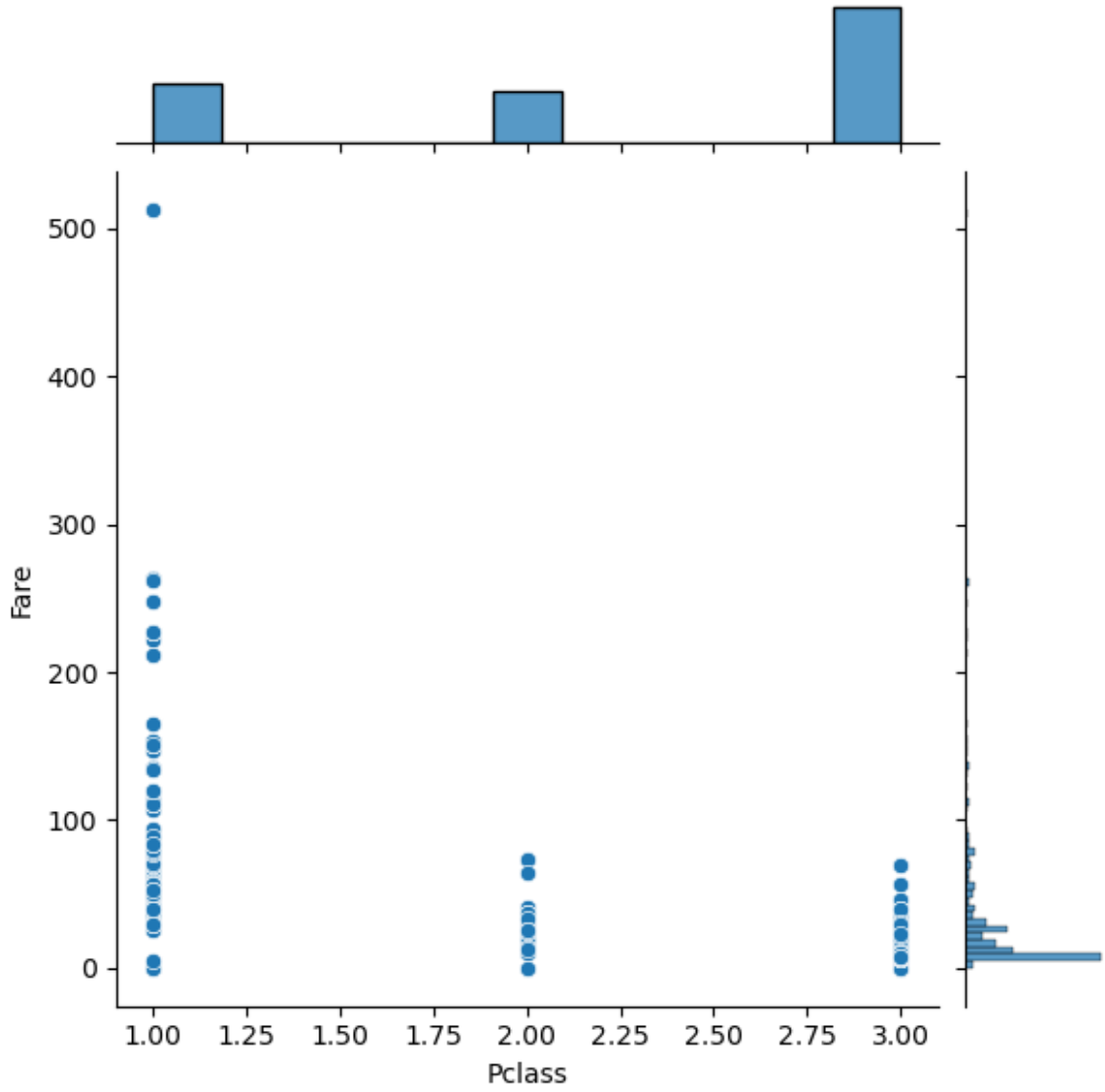
In [57]:
```
sns.barplot(data=dataset,x="Sex",y="Age",hue="Survived")
```

Out[57]:
```
<Axes: xlabel='Sex', ylabel='Age'>
```



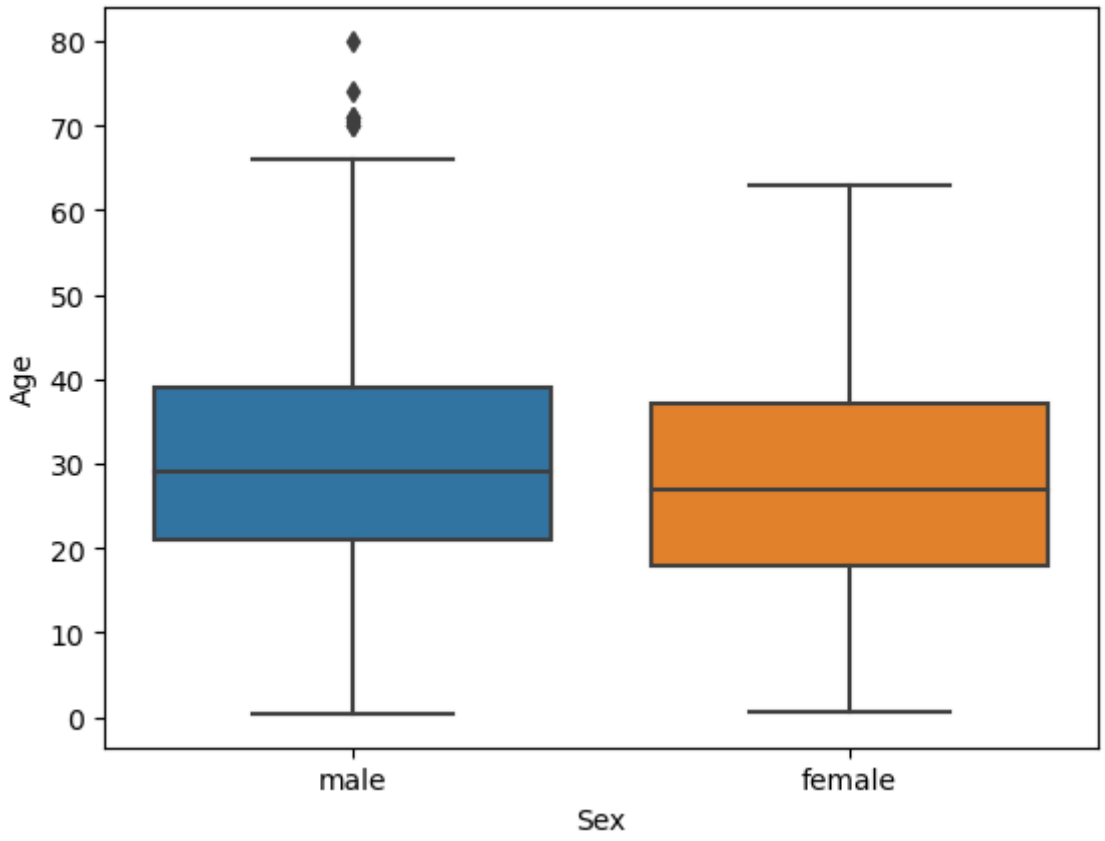
In [58]:
```
sns.jointplot(x="Pclass",y="Fare",data=dataset)
```

Out[58]:
```
<seaborn.axisgrid.JointGrid at 0x22e81faee10>
```



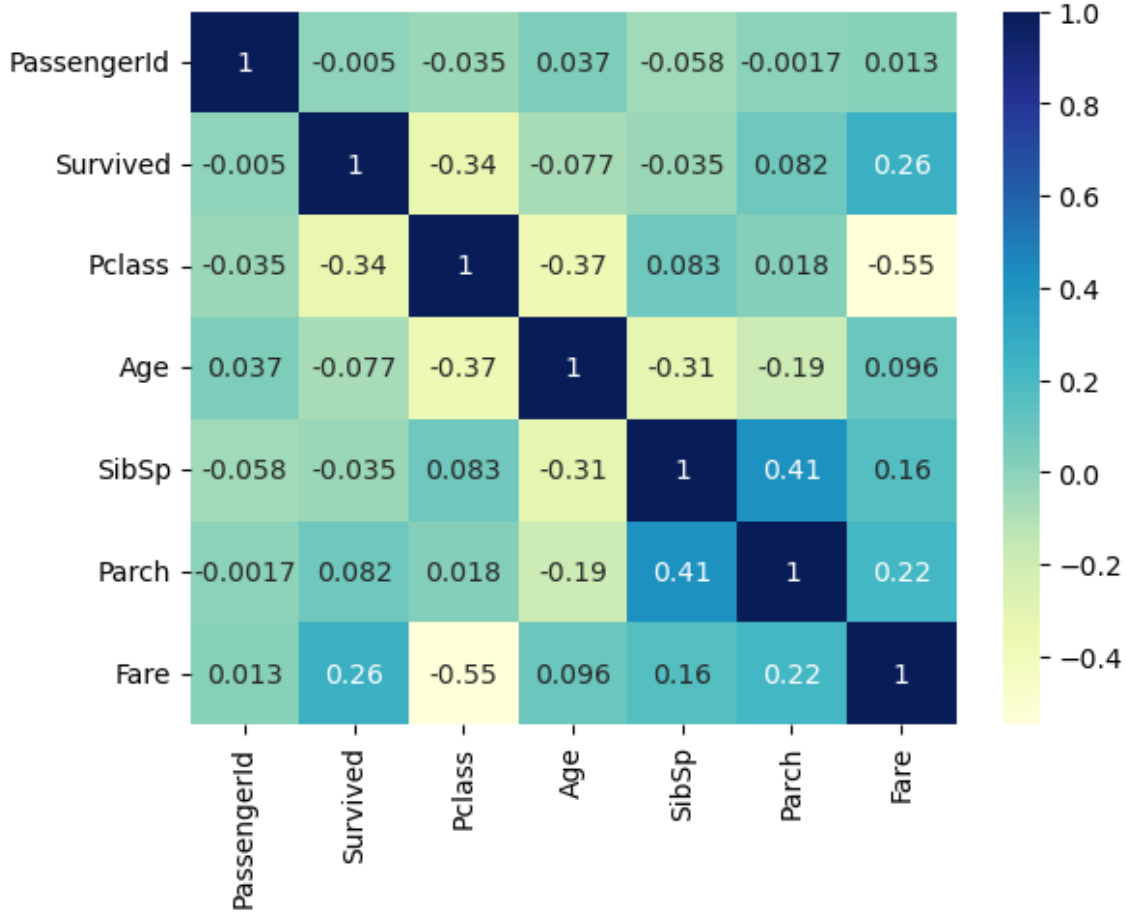
In [63]:
```
sns.boxplot(x="Sex",y="Age",data=dataset)
```

Out[63]:
```
<Axes: xlabel='Sex', ylabel='Age'>
```



In [64]:
```
sns.heatmap(corr1,annot=True,cmap="YlGnBu")
```

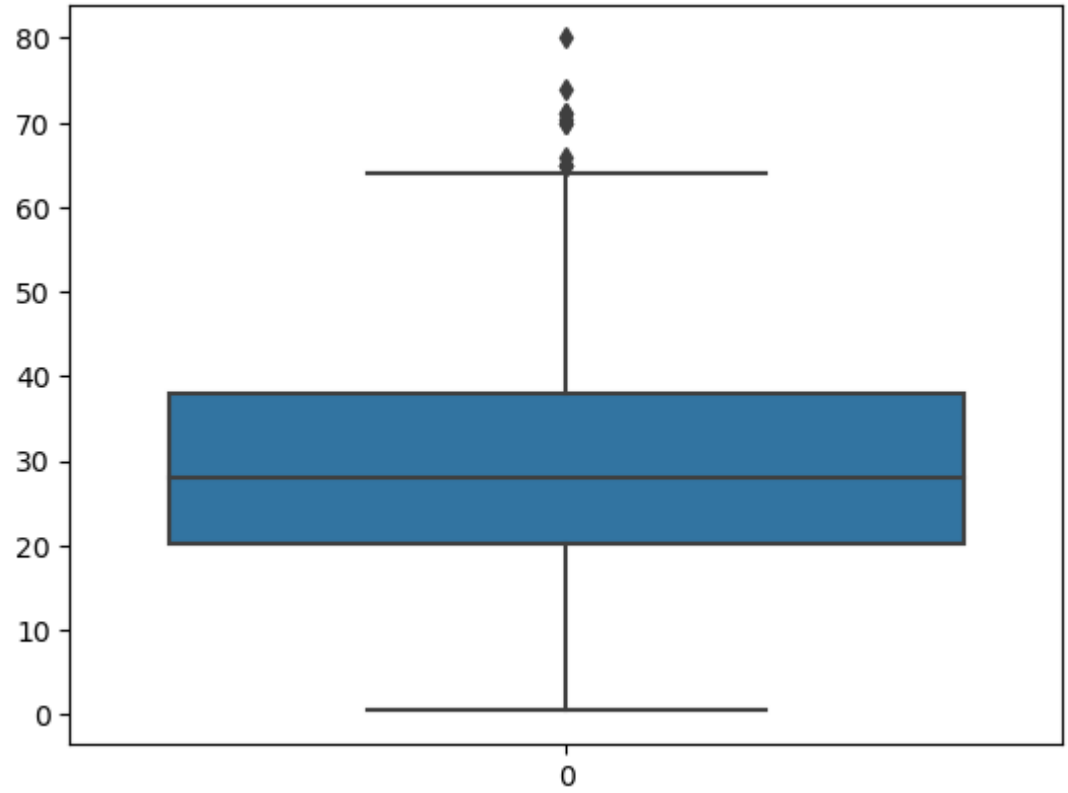
Out[64]:
```
<Axes: >
```



Outlier Detection

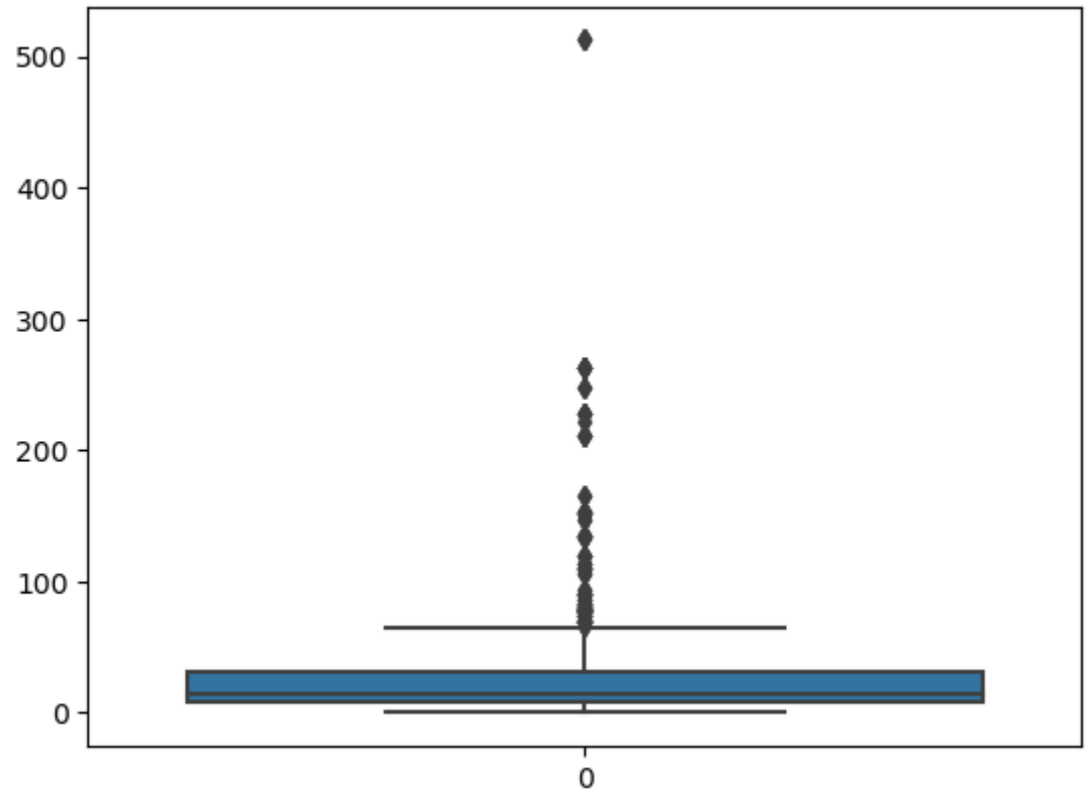
In [65]:
```
sns.boxplot(dataset.Age)
```

Out[65]:
```
<Axes: >
```



In [75]:
```
sns.boxplot(dataset.Fare)
```

Out[75]:
```
<Axes: >
```



Splitting dependent and independent variables

In [213…
```
x=dataset.iloc[:,3:13]
y=dataset.iloc[:,10:12]
```

In [214…
```
x.head()
```

Out[214]:

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

In [185…
```
y.head()
```

Out[185]:

	Cabin	Embarked
0	NaN	S
1	C85	C
2	NaN	S
3	C123	S
4	NaN	S

Perform Encoding

In [76]:
```
from sklearn.preprocessing import LabelEncoder
```

In [77]:
```
le=LabelEncoder()
```

In [190…
```
x["Name"]=le.fit_transform(x["Name"])

x["Name"]
```

Out[190]:
```
0       108
1       190
2       353
3       272
4        15
       ...
886     548
```

```
887    303
888    413
889     81
890    220
Name: Name, Length: 891, dtype: int32
```

In [170…
```
x["Sex"]
```

Out[170]:
```
0        male
1      female
2      female
3      female
4        male
       ...
886      male
887    female
888    female
889      male
890      male
Name: Sex, Length: 891, dtype: object
```

In [172…
```
x["Sex"].value_counts()
```

Out[172]:
```
male      577
female    314
Name: Sex, dtype: int64
```

In [158…
```
x.Name.value_counts()
```

Out[158]:
```
108    1
98     1
267    1
284    1
566    1
      ..
431    1
518    1
411    1
428    1
220    1
Name: Name, Length: 891, dtype: int64
```

In [173…
```
x["Sex"].nunique()
```

Out[173]:
```
2
```

In [177…
```
Name=pd.get_dummies(x["Name"],drop_first=True)
```

In [178…
```
Name
```

Out[178]:

	1	2	3	4	5	6	7	8	9	10	...	881	882	883	884	885	886	887	888	8
0	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
886	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	

887	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
888	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
889	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
890	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0

891 rows × 890 columns

In [203…
```
x=pd.concat([x,Name],axis=1)
```

In [204…
```
x
```

Out[204]:

	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked	1	...
0	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S	0	...
1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C	0	...
2	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S	0	...
3	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S	0	...
4	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S	0	...
...	...	...	...	...	...	...	...	...	...	...	...
886	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN	S	0	...
887	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42	S	0	...
888	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN	S	0	...
889	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148	C	0	...
890	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN	Q	0	...

891 rows × 899 columns

splitting into training and testing set

In [206…
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(k,y,test_size=0.3,random_s
```

In [216…
```
x_train.shape,x_test.shape,y_train.shape,y_test.shape
```

Out[216]:

	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked	1	...
857	Daly, Mr. Peter Denis	male	51.0	0	0	113055	26.5500	E17	S	0	...
52	Harper, Mrs. Henry Sleeper (Myna Haxtun)	female	49.0	1	0	PC 17572	76.7292	D33	C	0	...
386	Goodwin, Master. Sidney Leonard	male	1.0	5	2	CA 2144	46.9000	NaN	S	0	...
124	White, Mr. Percival Wayland	male	54.0	0	1	35281	77.2875	D26	S	0	...
578	Caram, Mrs. Joseph (Maria Elias)	female	NaN	1	0	2689	14.4583	NaN	C	0	...
...	...	...	...	...	...	...	...	...	...	...	...
835	Compton, Miss. Sara Rebecca	female	39.0	1	1	PC 17756	83.1583	E49	C	0	...
192	Andersen-Jensen, Miss. Carla Christine Nielsine	female	19.0	1	0	350046	7.8542	NaN	S	0	...
629	O'Connell, Mr. Patrick D	male	NaN	0	0	334912	7.7333	NaN	Q	0	...
559	de Messemaeker, Mrs. Guillaume Joseph (Emma)	female	36.0	1	0	345572	17.4000	NaN	S	0	...
684	Brown, Mr. Thomas William Solomon	male	60.0	1	1	29750	39.0000	NaN	S	0	...

623 rows × 899 columns

In [223…
```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
```

In [224…
```
x_train
```

Out[224]:

	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked	1	...
857	Daly, Mr. Peter Denis	male	51.0	0	0	113055	26.5500	E17	S	0	...

52	Harper, Mrs. Henry Sleeper (Myna Haxtun)	female	49.0	1	0	PC 17572	76.7292	D33	C	0	...
386	Goodwin, Master. Sidney Leonard	male	1.0	5	2	CA 2144	46.9000	NaN	S	0	...
124	White, Mr. Percival Wayland	male	54.0	0	1	35281	77.2875	D26	S	0	...
578	Caram, Mrs. Joseph (Maria Elias)	female	NaN	1	0	2689	14.4583	NaN	C	0	...
...	...	...	...	...	...	...	...	...	...	...	...
835	Compton, Miss. Sara Rebecca	female	39.0	1	1	PC 17756	83.1583	E49	C	0	...
192	Andersen-Jensen, Miss. Carla Christine Nielsine	female	19.0	1	0	350046	7.8542	NaN	S	0	...
629	O'Connell, Mr. Patrick D	male	NaN	0	0	334912	7.7333	NaN	Q	0	...
559	de Messemaeker, Mrs. Guillaume Joseph (Emma)	female	36.0	1	0	345572	17.4000	NaN	S	0	...
684	Brown, Mr. Thomas William Solomon	male	60.0	1	1	29750	39.0000	NaN	S	0	...

623 rows × 899 columns

In [225…
```
x_test
```

Out[225]:

	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked	1	...
495	Yousseff, Mr. Gerious	male	NaN	0	0	2627	14.4583	NaN	C	0	...
648	Willey, Mr. Edward	male	NaN	0	0	S.O./P.P. 751	7.5500	NaN	S	0	...
278	Rice, Master. Eric	male	7.0	4	1	382652	29.1250	NaN	Q	0	...
31	Spencer, Mrs. William Augustus (Marie Eugenie)	female	NaN	1	0	PC 17569	146.5208	B78	C	0	...
255	Touma, Mrs. Darwis	female	29.0	0	2	2650	15.2458	NaN	C	0	...

	(Hanne Youssef Razi)										
...	...	...	...	...	...	...	...	...	...	...	...
263	Harrison, Mr. William	male	40.0	0	0	112059	0.0000	B94	S	0	...
718	McEvoy, Mr. Michael	male	NaN	0	0	36568	15.5000	NaN	Q	0	...
620	Yasbeck, Mr. Antoni	male	27.0	1	0	2659	14.4542	NaN	C	0	...
786	Sjoblom, Miss. Anna Sofia	female	18.0	0	0	3101265	7.4958	NaN	S	0	...
64	Stewart, Mr. Albert A	male	NaN	0	0	PC 17605	27.7208	NaN	C	0	...

268 rows × 899 columns

In [226…
```
y_train
```

Out[226]:

	Cabin	Embarked
857	E17	S
52	D33	C
386	NaN	S
124	D26	S
578	NaN	C
...	...	...
835	E49	C
192	NaN	S
629	NaN	Q
559	NaN	S
684	NaN	S

623 rows × 2 columns

In [227…
```
y_test
```

Out[227]:

	Cabin	Embarked
495	NaN	C
648	NaN	S
278	NaN	Q
31	B78	C
255	NaN	C

...	...	...
263	B94	S
718	NaN	Q
620	NaN	C
786	NaN	S
64	NaN	C

268 rows × 2 columns

In [234…
```
x.columns = x.columns.astype(str)
x.columns
```

Out[234]:
```
Index(['Name', 'Sex', 'Age', 'SibSp', 'Parch', 'Ticket', 'Fare', 'Cabi
n',
       'Embarked'],
      dtype='object')
```

In [ ]:
```
x_train=sc.fit_transform(x_train)
x_test=sc.fit_transform(x_test)
```

In [228…
```
a=[3,4,5,6,7,8]
b=[0,1,3,4,2,7]

for i in range(10):
    a_train,a_test,b_train,b_test=train_test_split(a,b,test_size=0.3,rand
    print("with random state",a_train)
```

```
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
with random state [7, 6, 8, 3]
```

In [121…
```
a=[3,4,5,6,7,8]
b=[0,1,3,4,2,7]

for i in range(10):
    a_train,a_test,b_train,b_test=train_test_split(a,b,test_size=0.3)
    print("without random state",a_train)
```

```
without random state [8, 4, 5, 7]
without random state [5, 8, 4, 7]
without random state [7, 4, 5, 8]
without random state [8, 7, 6, 3]
without random state [5, 7, 6, 3]
without random state [5, 4, 8, 6]
without random state [4, 3, 5, 6]
without random state [8, 5, 4, 3]
without random state [3, 5, 7, 8]
without random state [8, 6, 4, 5]
```