

TASK 2

```
In [2]: import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [8]: # Load CSV file (make sure the file is in your working directory)
df = pd.read_csv('Titanic-Dataset.csv')
```

```
In [9]: df.head()
```

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

```
In [10]: df.tail()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.00	NaN	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.00	B42	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W/C. 6607	23.45	NaN	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.00	C148	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.75	NaN	Q

```
In [11]: 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
```

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

	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 [13]: df.columns
```

```
Out[13]: Index(['PassengerId', 'Survived', 'Pclass', 'Name', 'Sex', 'Age', 'SibSp',
              'Parch', 'Ticket', 'Fare', 'Cabin', 'Embarked'],
              dtype='object')
```

```
In [14]: df
```

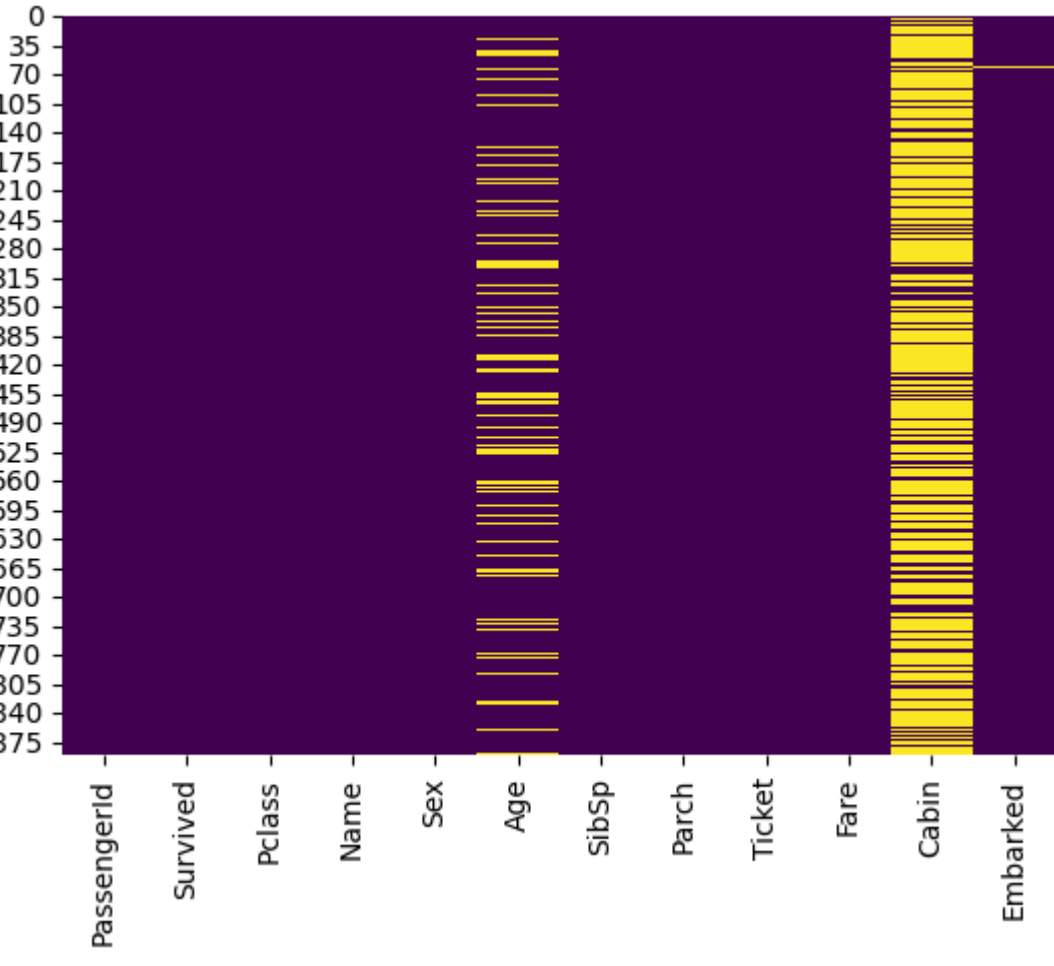
	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cummings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
...	...	...	...	...	...	...	...	...	...	...	...	...
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W/C. 6607	23.4500	NaN	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN	Q

891 rows × 12 columns

Checking the missing values

```
In [16]: df.isnull().sum()
sns.heatmap(df.isnull(), cbar=False, cmap='viridis')
```

```
Out[16]: <Axes: >
```



Data Cleaning

Fill or drop missing values:

```
In [28]: # Fill missing Age values with the median
df['Age'] = df['Age'].fillna(df['Age'].median())
```

```
In [21]: df.isnull().sum()
```

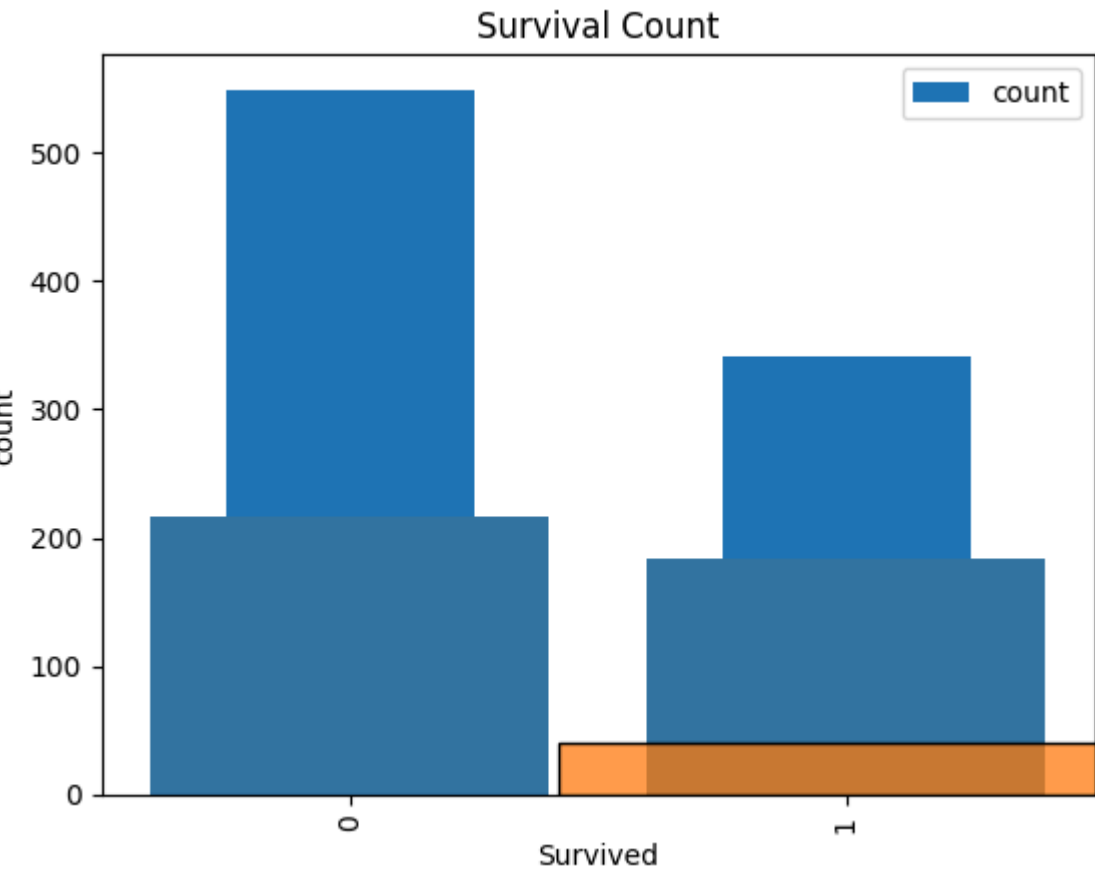
```
Out[21]: PassengerId    0
Survived              0
Pclass               0
Name                 0
Sex                  0
Age                  0
SibSp                0
Parch                0
Ticket               0
Fare                 0
Embarked             0
dtype: int64
```

Exploratory Data Analysis(EDA)

### 1. Univariate Analysis

```
In [22]: df['Survived'].value_counts().plot(kind='bar', title='Survival Count')
sns.countplot(x='Pclass', data=df)
sns.histplot(df['Age'], bins=20)
```

```
Out[22]: <Axes: title={'center': 'Survival Count'}, xlabel='Survived', ylabel='count'>
```



### 2.Bivariate Analysis

```
In [23]: sns.countplot(x='Survived', hue='Sex', data=df)
sns.countplot(x='Survived', hue='Pclass', data=df)

# Age distribution by survival
sns.kdeplot(data=df[df['Survived']== 1], x='Age', label='Survived', shade=True)
sns.kdeplot(data=df[df['Survived']== 0], x='Age', label='Did Not Survive', shade=True)
```

C:\Users\Santhosh\AppData\Local\Temp\ipykernel\_10436\817894607.py:5: FutureWarning:

'shade' is now deprecated in favor of 'fill'; setting 'fill=True'. This will become an error in seaborn v0.14.0; please update your code.

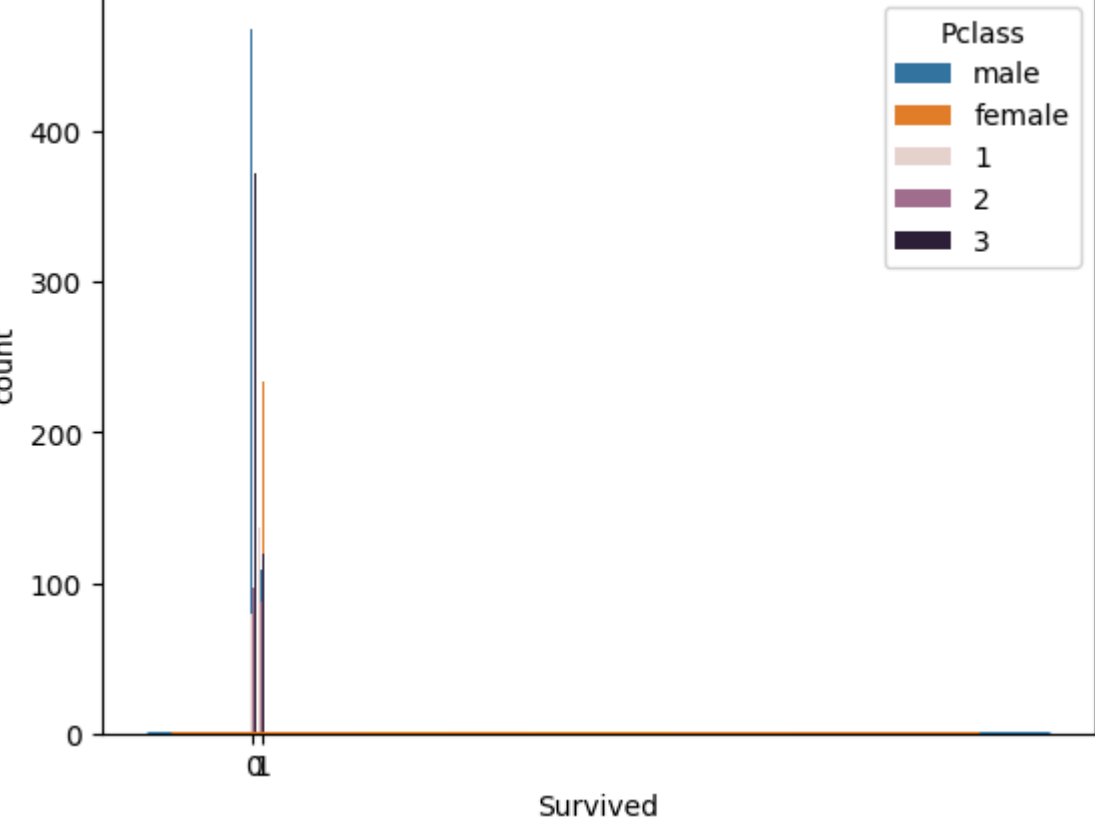
C:\Users\Santhosh\AppData\Local\Temp\ipykernel\_10436\817894607.py:6: FutureWarning:

'shade' is now deprecated in favor of 'fill'; setting 'fill=True'. This will become an error in seaborn v0.14.0; please update your code.

C:\Users\Santhosh\AppData\Local\Temp\ipykernel\_10436\817894607.py:6: FutureWarning:

C:\Users\Santhosh\AppData\Local\Temp\ipykernel\_10436\817894607.py:6: FutureWarning:

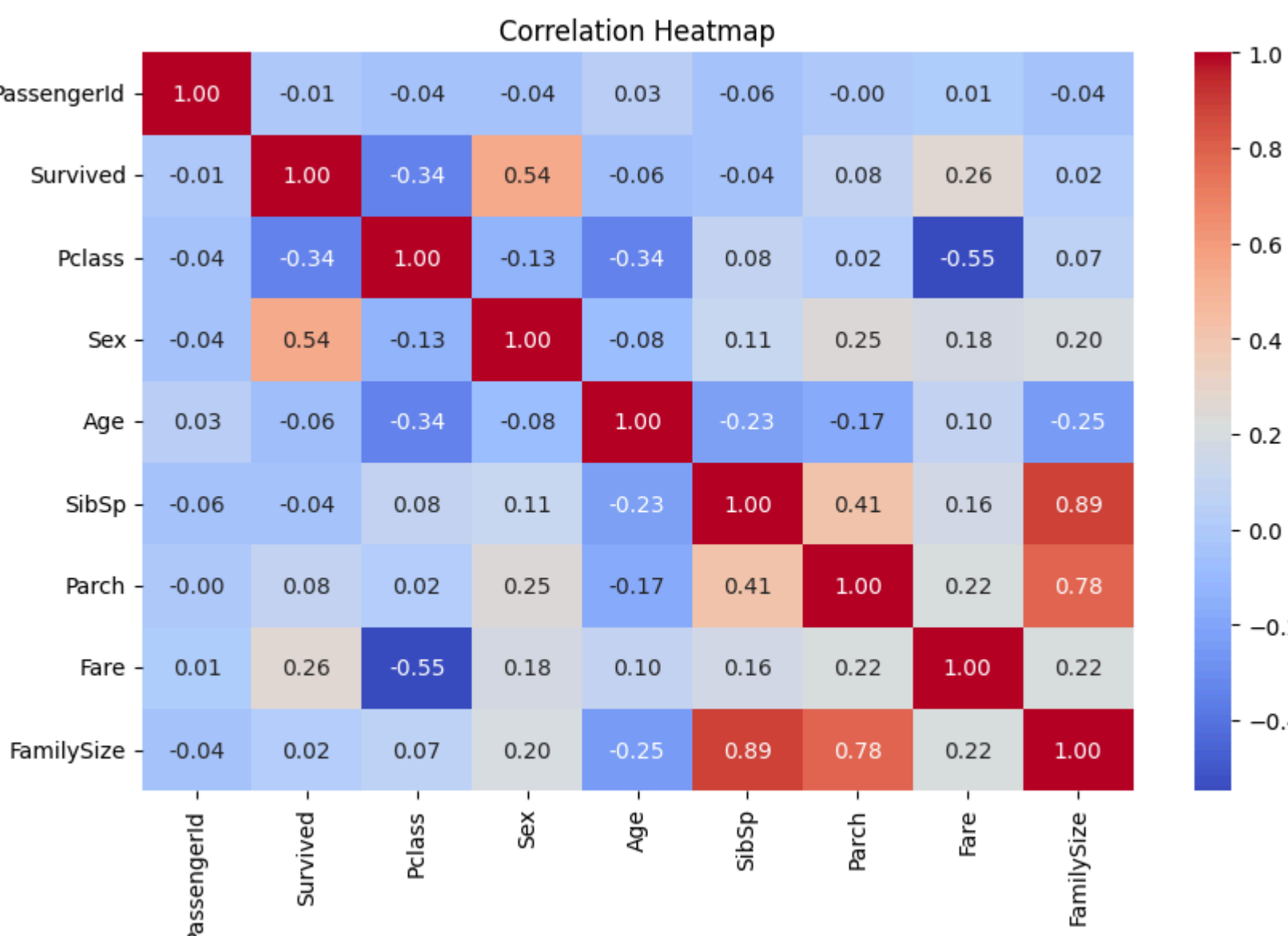
```
Out[23]: <Axes: xlabel='Survived', ylabel='count'>
```



Correlation Matrix

```
In [27]: # Select only numeric columns
numeric_df = df.select_dtypes(include=['number'])

# Plot correlation heatmap
plt.figure(figsize=(10, 6))
sns.heatmap(numeric_df.corr(), annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Heatmap')
plt.show()
```



Feature Engineering

```
In [25]: # Create new feature: FamilySize
df['FamilySize'] = df['SibSp'] + df['Parch'] + 1

# Convert Sex to numeric
df['Sex'] = df['Sex'].map({'male': 0, 'female': 1})

# One-hot encode Embarked
df = pd.get_dummies(df, columns=['Embarked'], drop_first=True)
```

