# TITANIC SURVIVAL PREDICTION

In this Task we will learn to predict the survival chances of the Titanic passengers using the given information about their sex, age, etc

# Imoprting libraries

In [1]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report
from sklearn.metrics import accuracy_score
from sklearn.tree import DecisionTreeClassifier
from sklearn.svm import SVC
from sklearn.ensemble import RandomForestClassifier
from sklearn.neighbors import KNeighborsClassifier
```

# Reading and Loading Dataset

In [2]:

```
df=pd.read_csv(r'C:\Users\user\Downloads\tested.csv')
df
```

Out[2]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 892 | 0 | 3 | Kelly, Mr. James | male | 34.5 | 0 | 0 | 330911 | 7.8292 | NaN | Q |
| **1** | 893 | 1 | 3 | Wilkes, Mrs. James (Ellen Needs) | female | 47.0 | 1 | 0 | 363272 | 7.0000 | NaN | S |
| **2** | 894 | 0 | 2 | Myles, Mr. Thomas Francis | male | 62.0 | 0 | 0 | 240276 | 9.6875 | NaN | Q |
| **3** | 895 | 0 | 3 | Wirz, Mr. Albert | male | 27.0 | 0 | 0 | 315154 | 8.6625 | NaN | S |
| **4** | 896 | 1 | 3 | Hirvonen, Mrs. Alexander (Helga E Lindqvist) | female | 22.0 | 1 | 1 | 3101298 | 12.2875 | NaN | S |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **413** | 1305 | 0 | 3 | Spector, Mr. Woolf | male | NaN | 0 | 0 | A.5. 3236 | 8.0500 | NaN | S |
| **414** | 1306 | 1 | 1 | Oliva y Ocana, Dona. Fermina | female | 39.0 | 0 | 0 | PC 17758 | 108.9000 | C105 | C |
| **415** | 1307 | 0 | 3 | Saether, Mr. Simon Sivertsen | male | 38.5 | 0 | 0 | SOTON/O.Q. 3101262 | 7.2500 | NaN | S |
| **416** | 1308 | 0 | 3 | Ware, Mr. Frederick | male | NaN | 0 | 0 | 359309 | 8.0500 | NaN | S |
| **417** | 1309 | 0 | 3 | Peter, Master. Michael J | male | NaN | 1 | 1 | 2668 | 22.3583 | NaN | C |

418 rows × 12 columns

# Exploratory Data Analysis(EDA)

In [3]:

```
df.head()
```

Out[3]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 892 | 0 | 3 | Kelly, Mr. James | male | 34.5 | 0 | 0 | 330911 | 7.8292 | NaN | Q |
| **1** | 893 | 1 | 3 | Wilkes, Mrs. James (Ellen Needs) | female | 47.0 | 1 | 0 | 363272 | 7.0000 | NaN | S |
| **2** | 894 | 0 | 2 | Myles, Mr. Thomas Francis | male | 62.0 | 0 | 0 | 240276 | 9.6875 | NaN | Q |
| **3** | 895 | 0 | 3 | Wirz, Mr. Albert | male | 27.0 | 0 | 0 | 315154 | 8.6625 | NaN | S |
| **4** | 896 | 1 | 3 | Hirvonen, Mrs. Alexander (Helga E Lindqvist) | female | 22.0 | 1 | 1 | 3101298 | 12.2875 | NaN | S |

In [4]:

```
df.tail()
```

Out[4]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **413** | 1305 | 0 | 3 | Spector, Mr. Woolf | male | NaN | 0 | 0 | A.5. 3236 | 8.0500 | NaN | S |
| **414** | 1306 | 1 | 1 | Oliva y Ocana, Dona. Fermina | female | 39.0 | 0 | 0 | PC 17758 | 108.9000 | C105 | C |
| **415** | 1307 | 0 | 3 | Saether, Mr. Simon Sivertsen | male | 38.5 | 0 | 0 | SOTON/O.Q. 3101262 | 7.2500 | NaN | S |
| **416** | 1308 | 0 | 3 | Ware, Mr. Frederick | male | NaN | 0 | 0 | 359309 | 8.0500 | NaN | S |
| **417** | 1309 | 0 | 3 | Peter, Master. Michael J | male | NaN | 1 | 1 | 2668 | 22.3583 | NaN | C |

In [5]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  418 non-null    int64  
 1   Survived     418 non-null    int64  
 2   Pclass       418 non-null    int64  
 3   Name         418 non-null    object 
 4   Sex          418 non-null    object 
 5   Age          332 non-null    float64
 6   SibSp        418 non-null    int64  
 7   Parch        418 non-null    int64  
 8   Ticket       418 non-null    object 
 9   Fare         417 non-null    float64
 10  Cabin        91 non-null     object 
 11  Embarked     418 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 39.3+ KB
```

In [6]:
```
df.describe()
```

Out[6]:

| | PassengerId | Survived | Pclass | Age | SibSp | Parch | Fare |
|---|---|---|---|---|---|---|---|
| **count** | 418.000000 | 418.000000 | 418.000000 | 332.000000 | 418.000000 | 418.000000 | 417.000000 |
| **mean** | 1100.500000 | 0.363636 | 2.265550 | 30.272590 | 0.447368 | 0.392344 | 35.627188 |
| **std** | 120.810458 | 0.481622 | 0.841838 | 14.181209 | 0.896760 | 0.981429 | 55.907576 |
| **min** | 892.000000 | 0.000000 | 1.000000 | 0.170000 | 0.000000 | 0.000000 | 0.000000 |
| **25%** | 996.250000 | 0.000000 | 1.000000 | 21.000000 | 0.000000 | 0.000000 | 7.895800 |
| **50%** | 1100.500000 | 0.000000 | 3.000000 | 27.000000 | 0.000000 | 0.000000 | 14.454200 |
| **75%** | 1204.750000 | 1.000000 | 3.000000 | 39.000000 | 1.000000 | 0.000000 | 31.500000 |
| **max** | 1309.000000 | 1.000000 | 3.000000 | 76.000000 | 8.000000 | 9.000000 | 512.329200 |

In [7]:
```
df.dtypes
```

Out[7]:
```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age            float64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Cabin           object
Embarked        object
dtype: object
```

In [8]:
```
df.isnull().sum()
```

Out[8]:
```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age             86
SibSp            0
Parch            0
Ticket           0
Fare             1
Cabin          327
Embarked         0
dtype: int64
```

In [9]:
```
df['Age'] = df['Age'].fillna(df['Age'].mean())
df['Fare'] = df['Fare'].fillna(df['Fare'].mean())
```

In [10]:
```
Embarked = df['Embarked'].unique()
for Embarkeds in Embarked:
    print("->",Embarkeds)
```

```
-> Q
-> S
-> C
```

In [11]:
```
df['Embarked'] = df['Embarked'].map( {'Q': 0,'S':1,'C':2}).astype(int)
df['Sex'] = df['Sex'].map( {'female': 1,'male':0}).astype(int)
```

In [12]:
```
df.dtypes
```

```
Out[12]:PassengerId      int64
        Survived         int64
        Pclass           int64
        Name            object
        Sex              int32
        Age            float64
        SibSp            int64
        Parch            int64
        Ticket          object
        Fare           float64
        Cabin           object
        Embarked         int32
        dtype: object
```

```
In [13]: df['Age'] = df['Age'].astype(int)
```

```
In [14]: df['Fare'] = df['Fare'].astype(int)
```

```
In [15]: data = df.drop(['PassengerId','Name','Cabin','Ticket'], axis =1, inplace=True)
```

```
In [16]: df.head()
```

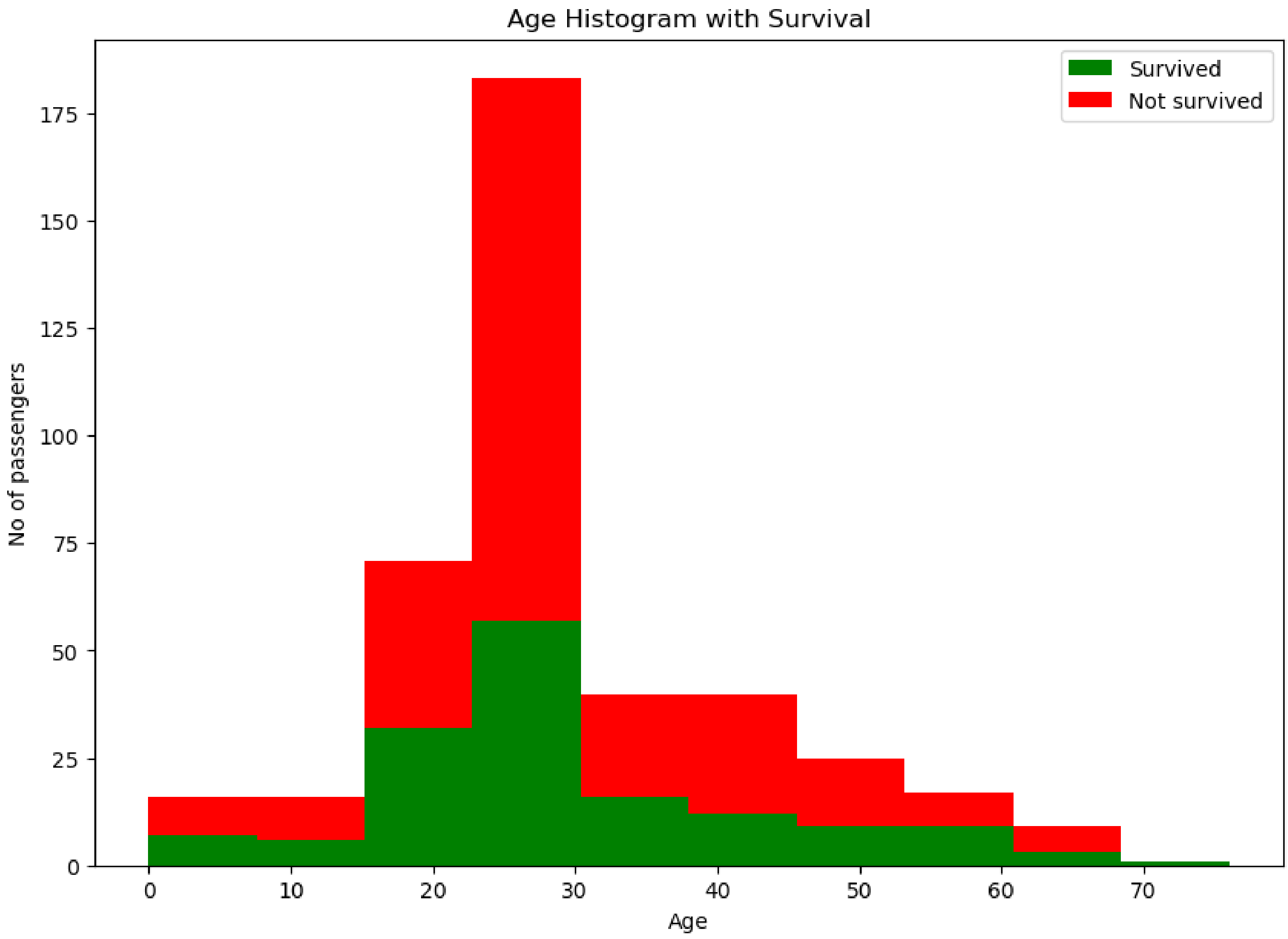
Out[16]:

| | Survived | Pclass | Sex | Age | SibSp | Parch | Fare | Embarked |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 3 | 0 | 34 | 0 | 0 | 7 | 0 |
| **1** | 1 | 3 | 1 | 47 | 1 | 0 | 7 | 1 |
| **2** | 0 | 2 | 0 | 62 | 0 | 0 | 9 | 0 |
| **3** | 0 | 3 | 0 | 27 | 0 | 0 | 8 | 1 |
| **4** | 1 | 3 | 1 | 22 | 1 | 1 | 12 | 1 |

## Data Visualization

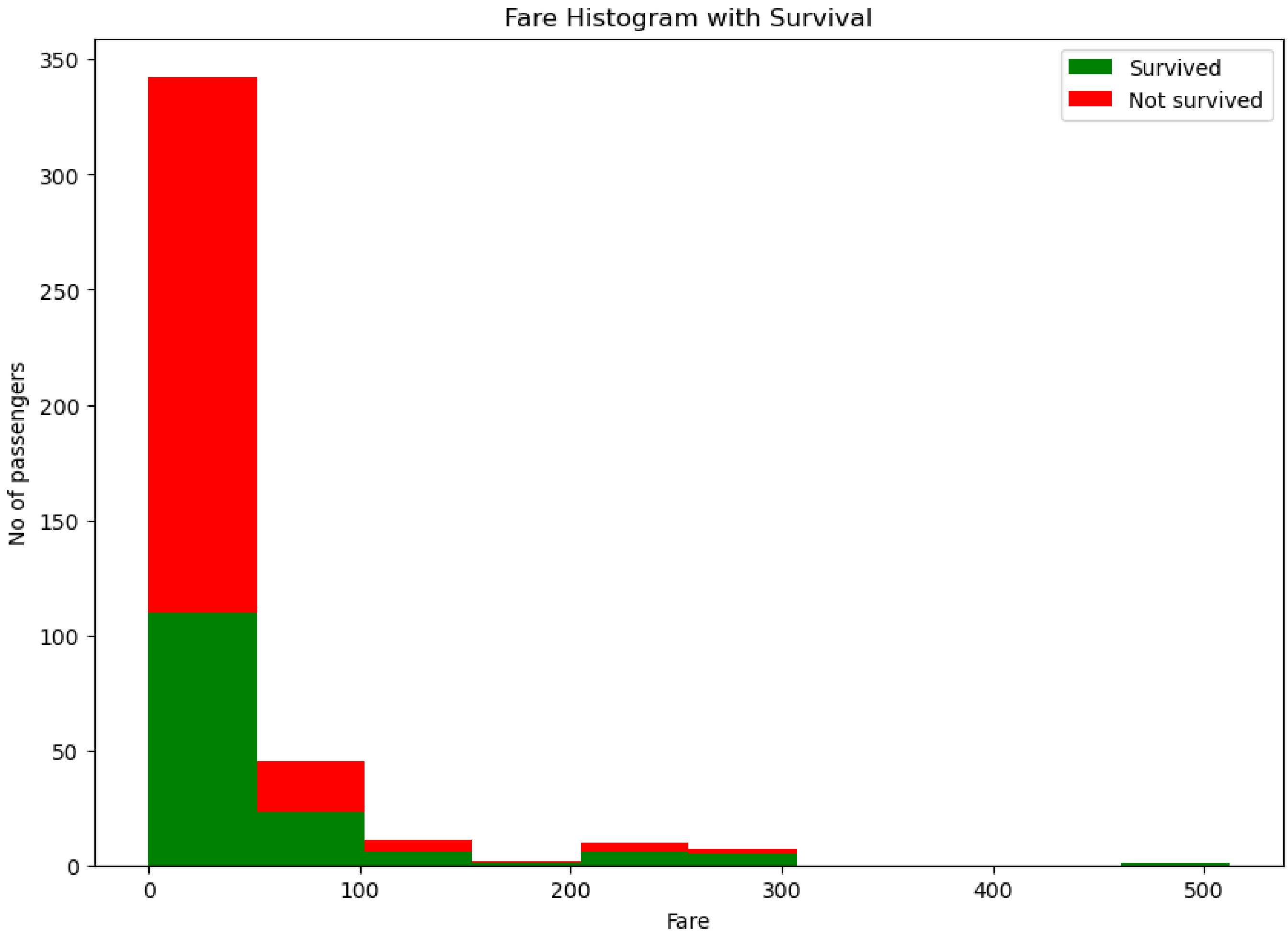
```
In [17]: import matplotlib.pyplot as plt
         fig = plt.figure(figsize =(10, 7))
         plt.hist(x = [df[df['Survived']==1]['Age'], df[df['Survived']==0]['Age']],stacked=True, color = ['g','r'],label = ['Survived','Not survived'])
         plt.title('Age Histogram with Survival')
         plt.xlabel('Age')
         plt.ylabel('No of passengers')
         plt.legend()
```

```
Out[17]:<matplotlib.legend.Legend at 0x14c9e5a3a60>
```



```
In [18]: fig = plt.figure(figsize =(10, 7))
         plt.hist(x = [df[df['Survived']==1]['Fare'], df[df['Survived']==0]['Fare']], stacked=True, color = ['g','r'],label = ['Survived','Not survived'])
         plt.title('Fare Histogram with Survival')
         plt.xlabel('Fare')
         plt.ylabel('No of passengers')
         plt.legend()
```

```
Out[18]:<matplotlib.legend.Legend at 0x14ca30533a0>
```



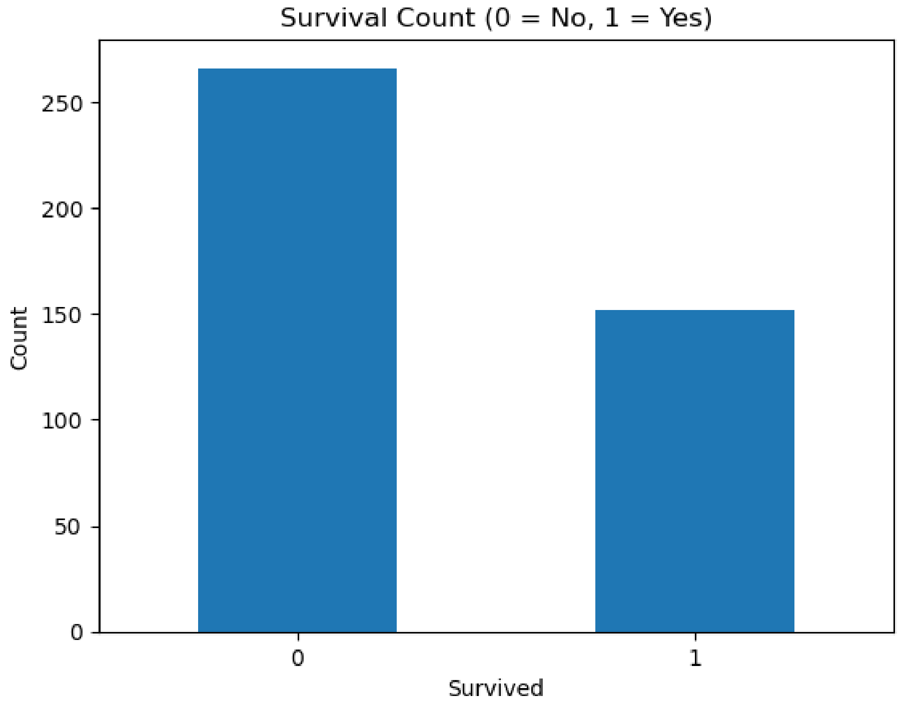
In [19]:

```
column = 'Survived'

# Create a bar chart
survival_counts = df[column].value_counts()
survival_counts.plot(kind='bar', rot=0)

# Adding labels and title
plt.xlabel('Survived')
plt.ylabel('Count')
plt.title('Survival Count (0 = No, 1 = Yes)')

# Show the plot
plt.show()
```



# Spliting the data

In [20]:

```
Train = df.drop(['Survived'], axis=1)
Test = df.iloc[:,1]
x_train, x_test, y_train, y_test = train_test_split(Train, Test, test_size = 0.2, random_state = 1)
```

# Model Building

In [21]:

```
LR = LogisticRegression(solver='liblinear', max_iter=200)
LR.fit(x_train, y_train)
y_pred = LR.predict(x_test)
LRAcc = accuracy_score(y_pred,y_test)
print('Logistic regression accuracy: {:.2f}%'.format(LRAcc*100))
```

```
Logistic regression accuracy: 92.86%
```

In [ ]: