```
#Import Necessary Libaries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

from warnings import filterwarnings
filterwarnings(action='ignore')

#Loading Datasets
pd.set_option('display.max_columns',10,'display.width',1000)
train = pd.read_csv(r"C:\Users\\jayaraman\\OneDrive\\Pictures\\
Desktop\\Data science intership\\train.csv")
test = pd.read_csv(r"C:\\Users\\jayaraman\\OneDrive\\Pictures\\
Desktop\\Data science intership\\test.csv")
train.head()
```

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

[5 rows x 12 columns]
```

```
#Display Train shape
train.shape
```

```
(891, 12)
```

```
#Display Test shape
test.shape
```

```
(418, 11)
```

```
#Checking for Null values for Train Data
train.isnull().sum()
```

```
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
```

```
#Checking for Null values for Test Data
test.isnull().sum()
```

```
PassengerId      0
Pclass           0
Name             0
Sex              0
Age             86
SibSp            0
Parch            0
Ticket           0
Fare             1
Cabin          327
Embarked         0
dtype: int64
```

```
#Description of Train dataset
train.describe(include="all")
```

```
        PassengerId    Survived      Pclass                         Name
Sex  ...       Parch  Ticket        Fare    Cabin  Embarked
count    891.000000  891.000000  891.000000                          891
891  ...  891.000000     891  891.000000      204       889
unique          NaN         NaN         NaN                         891
2  ...         NaN     681         NaN      147         3
top             NaN         NaN         NaN  Braund, Mr. Owen Harris
male  ...         NaN  347082         NaN  B96 B98         S
freq            NaN         NaN         NaN                           1
577  ...         NaN       7         NaN        4       644
mean     446.000000    0.383838    2.308642                          NaN
NaN  ...    0.381594     NaN   32.204208      NaN       NaN
std      257.353842    0.486592    0.836071                          NaN
NaN  ...    0.806057     NaN   49.693429      NaN       NaN
min        1.000000    0.000000    1.000000                          NaN
NaN  ...    0.000000     NaN    0.000000      NaN       NaN
25%      223.500000    0.000000    2.000000                          NaN
NaN  ...    0.000000     NaN    7.910400      NaN       NaN
50%      446.000000    0.000000    3.000000                          NaN
```

```
NaN  ...    0.000000     NaN   14.454200      NaN        NaN
75%      668.500000    1.000000    3.000000                    NaN
NaN  ...    0.000000     NaN   31.000000      NaN        NaN
max      891.000000    1.000000    3.000000                    NaN
NaN  ...    6.000000     NaN  512.329200      NaN        NaN

[11 rows x 12 columns]
```

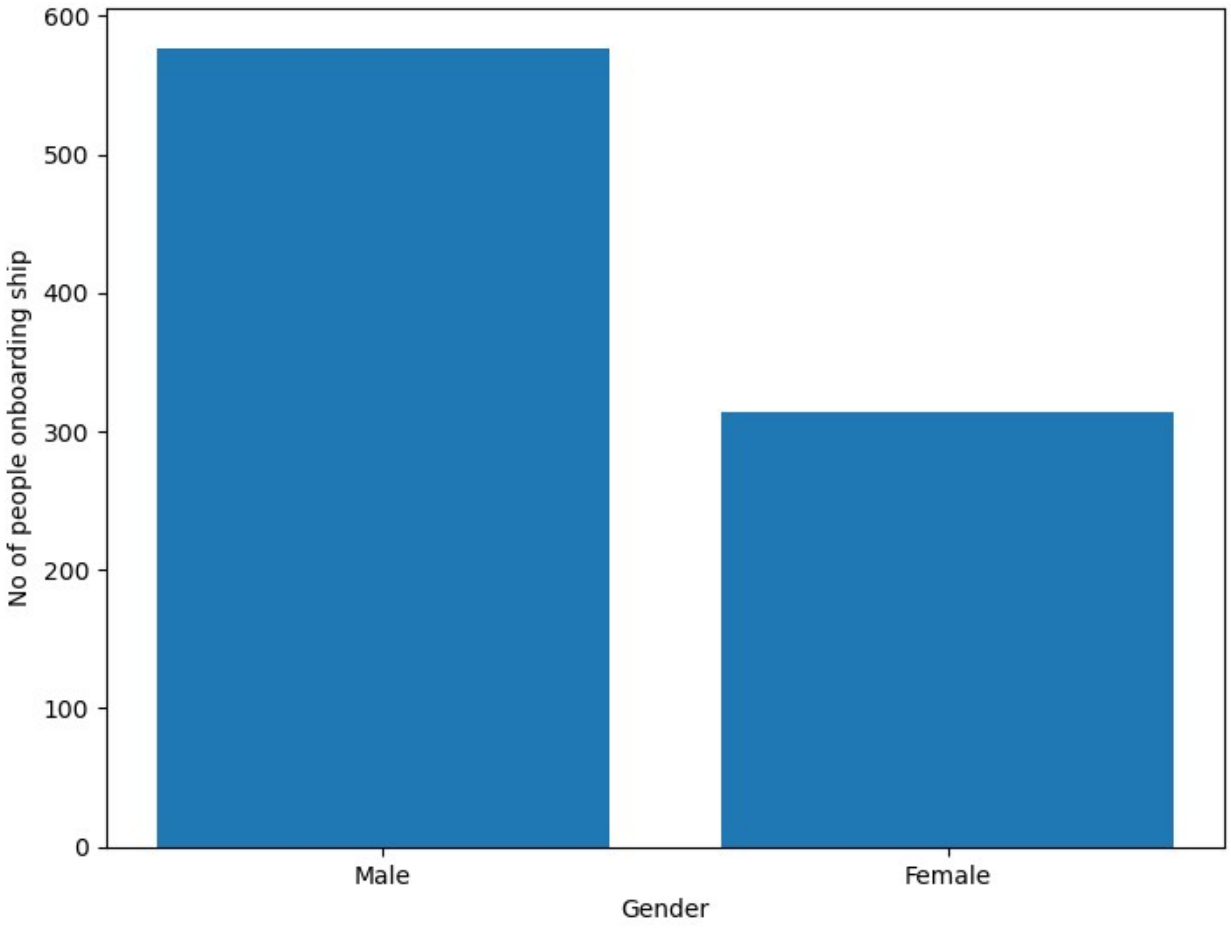
```
male_ind = len(train[train['Sex'] == 'male'])
print("No of Males in Titanic:",male_ind)
```

```
No of Males in Titanic: 577
```

```
female_ind = len(train[train['Sex'] == 'female'])
print("No of Females in Titanic:",female_ind)
```

```
No of Females in Titanic: 314
```

```
#Plotting
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
gender = ['Male','Female']
index = [577,314]
ax.bar(gender,index)
plt.xlabel("Gender")
plt.ylabel("No of people onboarding ship")
plt.show()
```

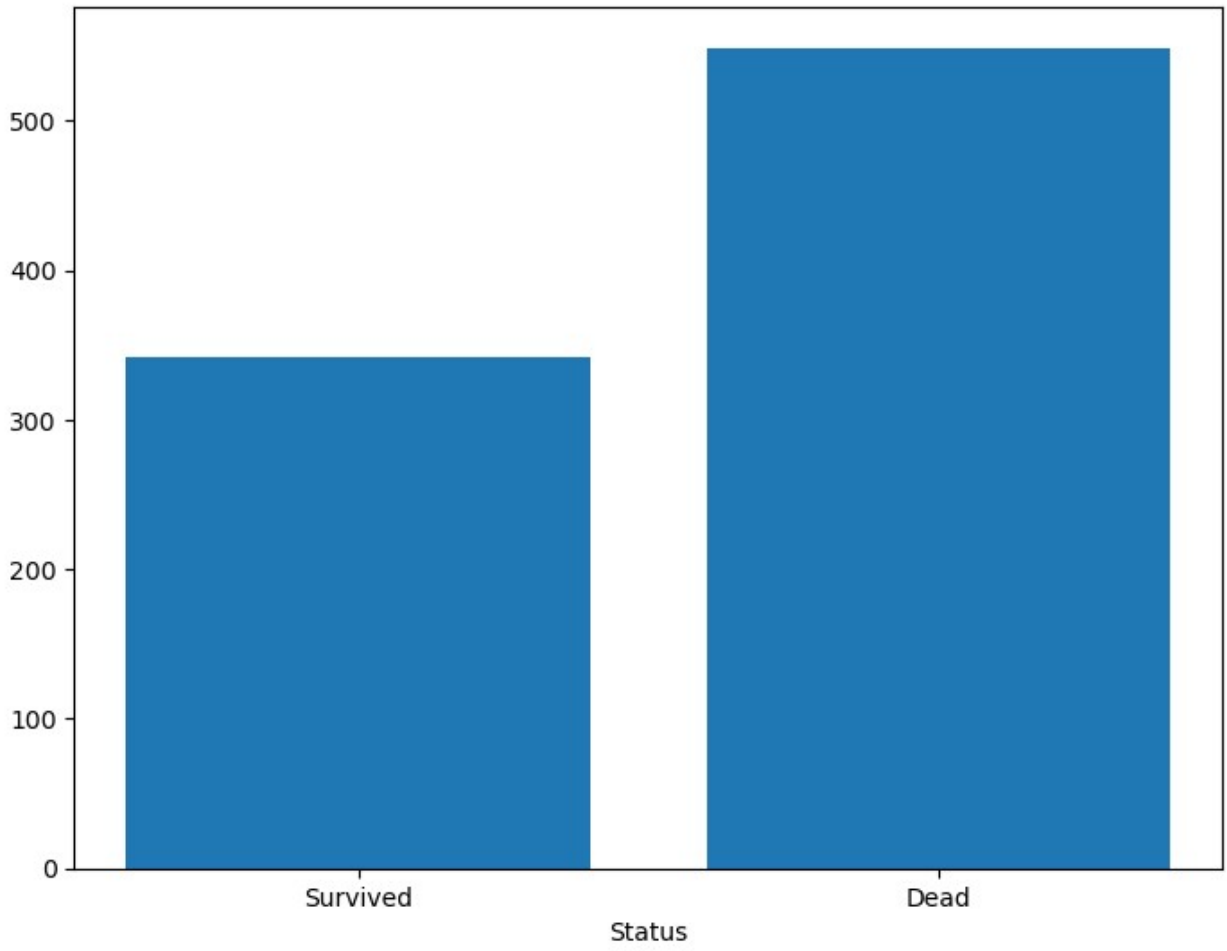



```
alive = len(train[train['Survived'] == 1])
dead = len(train[train['Survived'] == 0])

train.groupby('Sex')[['Survived']].mean()
```

```
        Survived
Sex
female  0.742038
male    0.188908
```

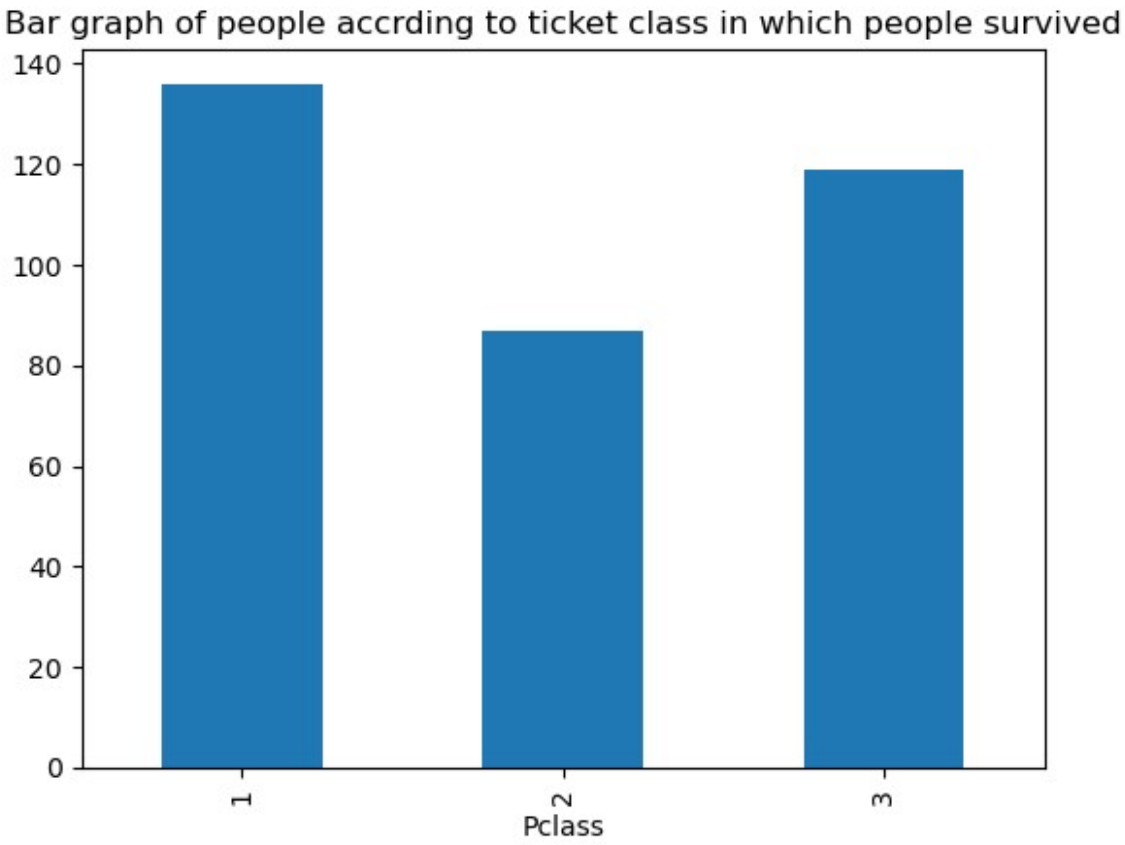
```
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
status = ['Survived','Dead']
ind = [alive,dead]
ax.bar(status,ind)
plt.xlabel("Status")
plt.show()
```

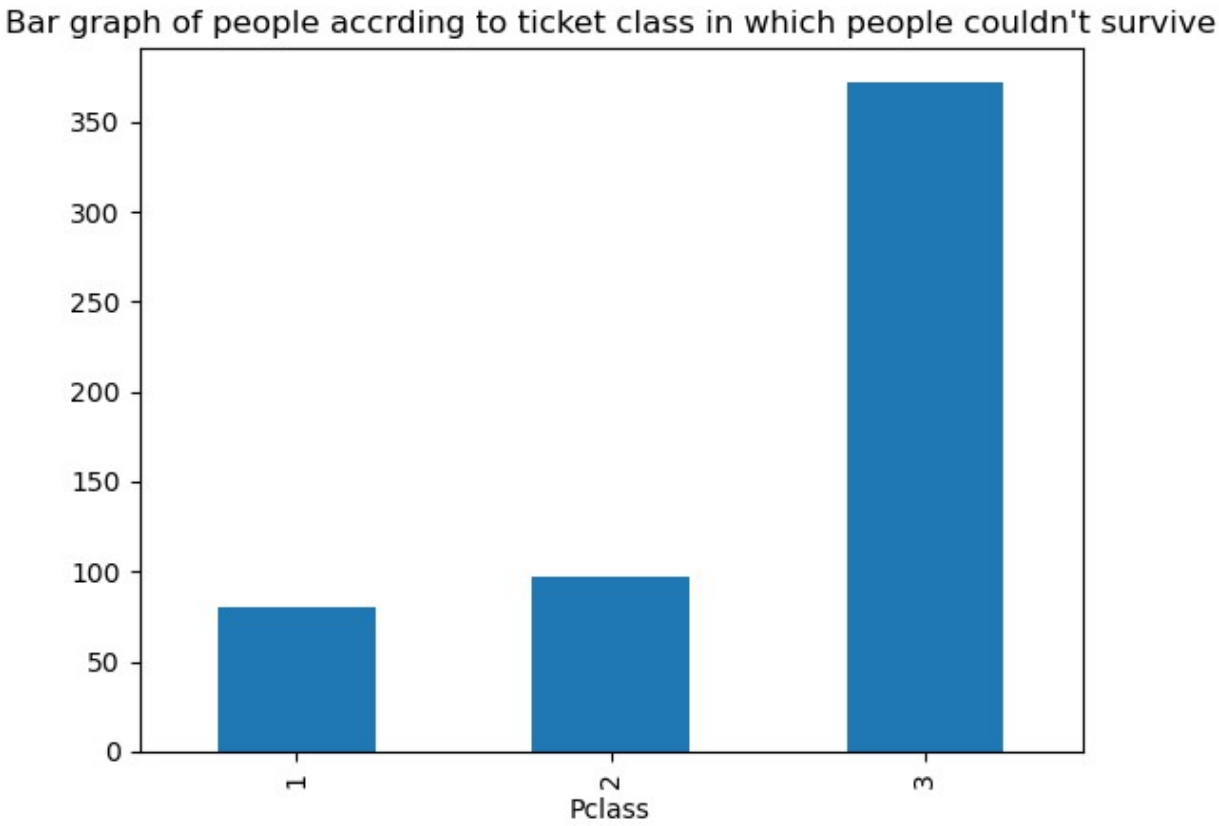



```
plt.figure(1)
train.loc[train['Survived'] == 1,
'Pclass'].value_counts().sort_index().plot.bar()
plt.title('Bar graph of people accrding to ticket class in which
people survived')


plt.figure(2)
train.loc[train['Survived'] == 0,
'Pclass'].value_counts().sort_index().plot.bar()
plt.title('Bar graph of people accrding to ticket class in which
people couldn\'t survive')
```

```
Text(0.5, 1.0, "Bar graph of people accrding to ticket class in which
people couldn't survive")
```


Bar graph of people accrding to ticket class in which people survived
140
120
100
80
60
40
20
0
1
2
3
Pclass

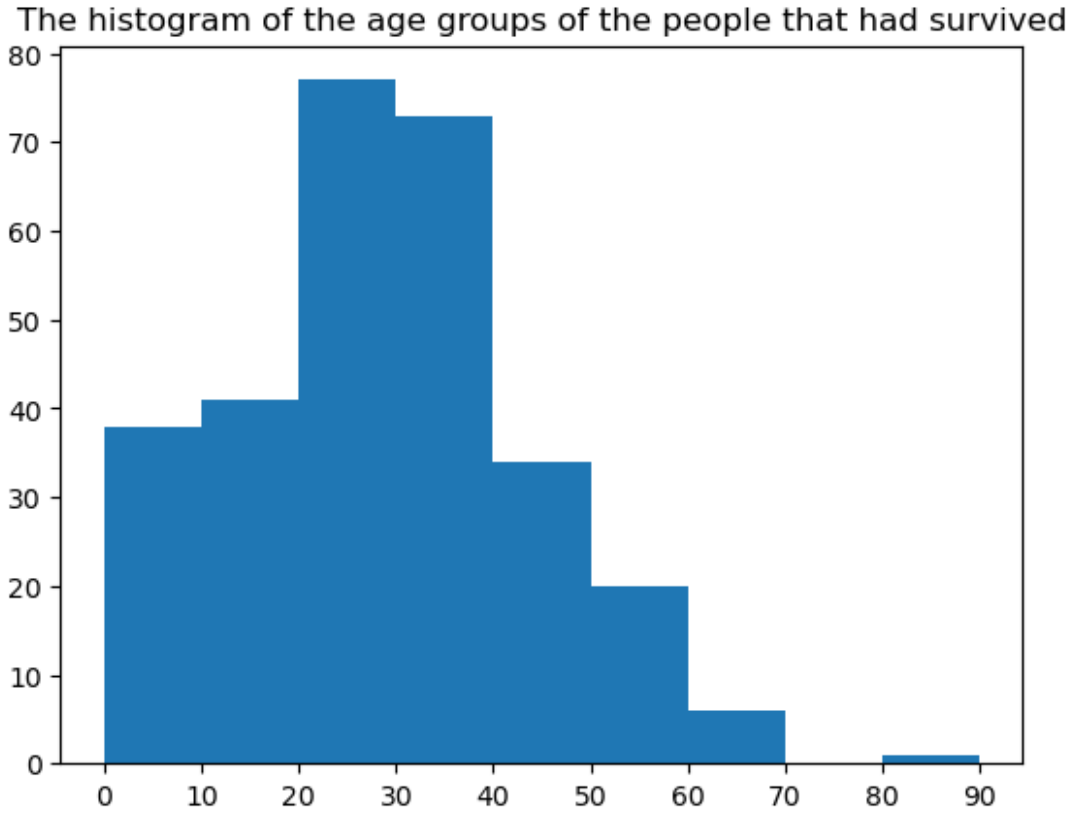


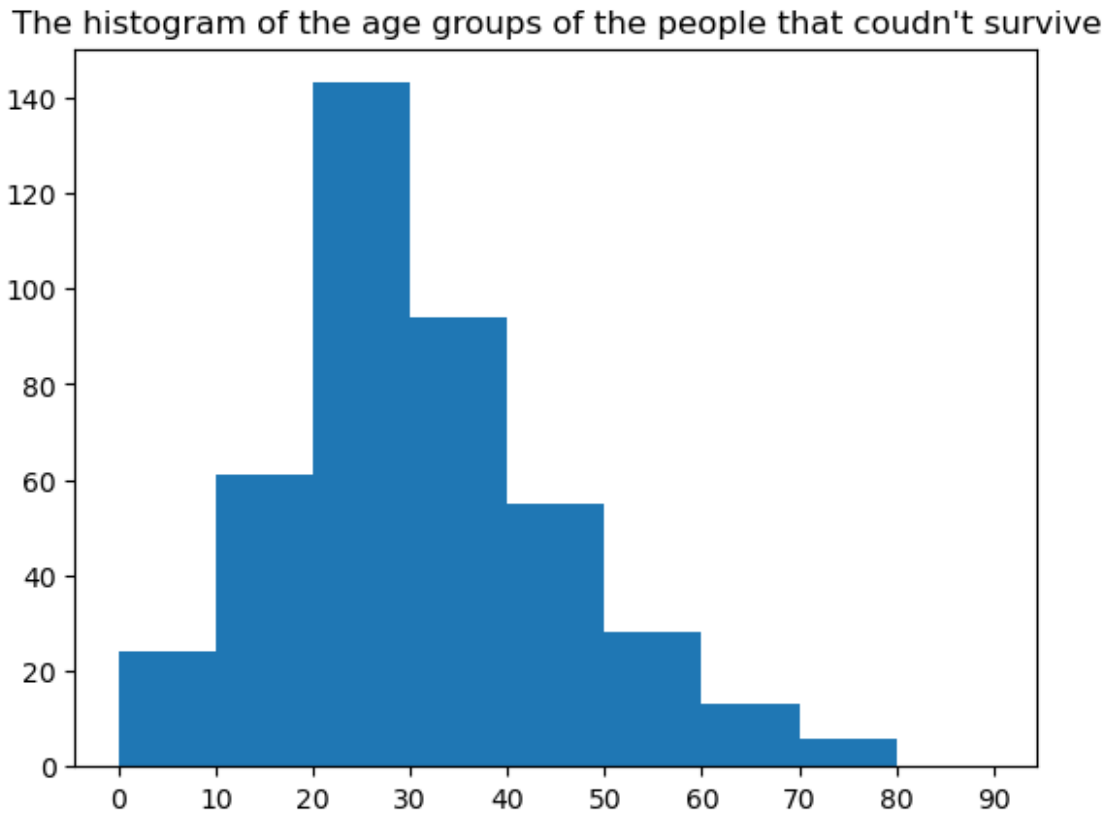

```
plt.figure(1)
age  = train.loc[train.Survived == 1, 'Age']
plt.title('The histogram of the age groups of the people that had
survived')
plt.hist(age, np.arange(0,100,10))
plt.xticks(np.arange(0,100,10))


plt.figure(2)
age  = train.loc[train.Survived == 0, 'Age']
plt.title('The histogram of the age groups of the people that coudn\'t
survive')
plt.hist(age, np.arange(0,100,10))
plt.xticks(np.arange(0,100,10))
```

```
([<matplotlib.axis.XTick at 0x15ba59d7c10>,
  <matplotlib.axis.XTick at 0x15ba604fa90>,
  <matplotlib.axis.XTick at 0x15ba604e1d0>,
  <matplotlib.axis.XTick at 0x15ba608e250>,
  <matplotlib.axis.XTick at 0x15ba6090410>,
  <matplotlib.axis.XTick at 0x15ba6092490>,
  <matplotlib.axis.XTick at 0x15ba6093350>,
  <matplotlib.axis.XTick at 0x15ba60954d0>,
  <matplotlib.axis.XTick at 0x15ba6097550>,
```

```
 <matplotlib.axis.XTick at 0x15ba609d410>],
[Text(0, 0, '0'),
 Text(10, 0, '10'),
 Text(20, 0, '20'),
 Text(30, 0, '30'),
 Text(40, 0, '40'),
 Text(50, 0, '50'),
 Text(60, 0, '60'),
 Text(70, 0, '70'),
 Text(80, 0, '80'),
 Text(90, 0, '90')])
```






```
train[["SibSp", "Survived"]].groupby(['SibSp'],
as_index=False).mean().sort_values(by='Survived', ascending=False)
```

	SibSp	Survived
1	1	0.535885
2	2	0.464286
0	0	0.345395
3	3	0.250000
4	4	0.166667
5	5	0.000000
6	8	0.000000

```
train[["Pclass", "Survived"]].groupby(['Pclass'],
as_index=False).mean().sort_values(by='Survived', ascending=False)
```

	Pclass	Survived
0	1	0.629630
1	2	0.472826
2	3	0.242363

```
train[["Age", "Survived"]].groupby(['Age'],
as_index=False).mean().sort_values(by='Age', ascending=True)
```

	Age	Survived
0	0.42	1.0

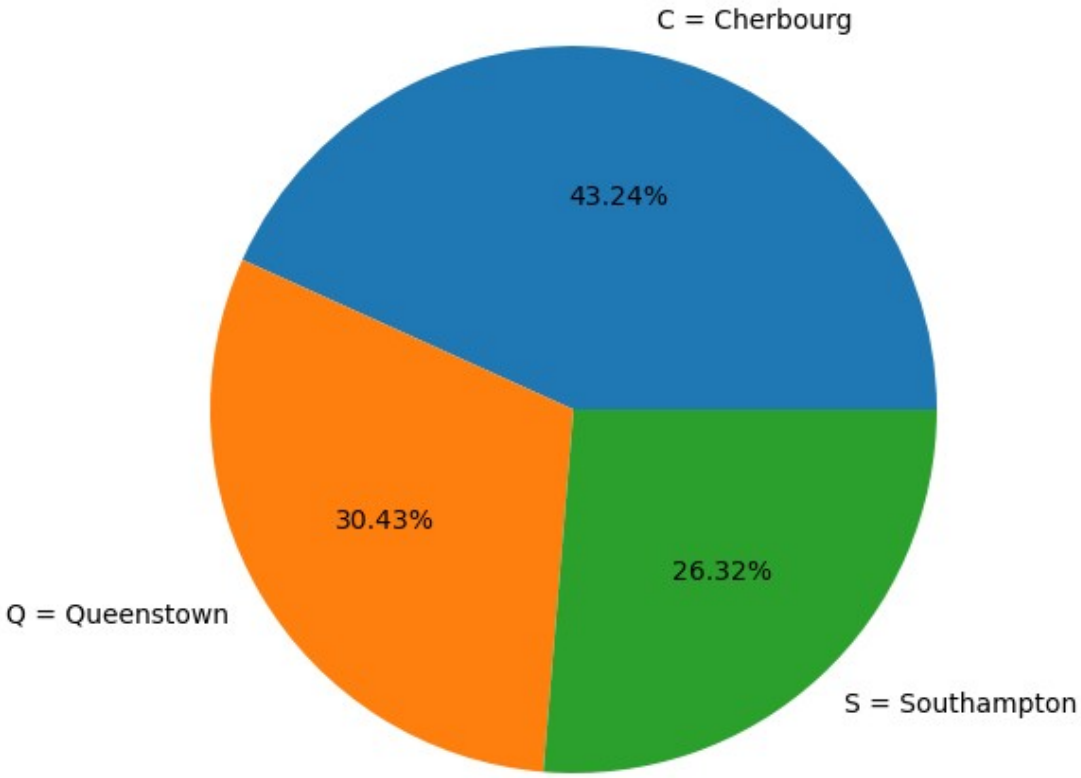
```
1    0.67       1.0
2    0.75       1.0
3    0.83       1.0
4    0.92       1.0
..    ...       ...
83  70.00       0.0
84  70.50       0.0
85  71.00       0.0
86  74.00       0.0
87  80.00       1.0

[88 rows x 2 columns]
```

```
train[["Embarked", "Survived"]].groupby(['Embarked'],
as_index=False).mean().sort_values(by='Survived', ascending=False)
```

```
  Embarked  Survived
0        C  0.553571
1        Q  0.389610
2        S  0.336957
```

```
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
ax.axis('equal')
l = ['C = Cherbourg', 'Q = Queenstown', 'S = Southampton']
s = [0.553571,0.389610,0.336957]
ax.pie(s, labels = l,autopct='%1.2f%%')
plt.show()
```




```
test.describe(include="all")
```

```
        PassengerId      Pclass                Name   Sex
Age  ...       Parch    Ticket        Fare           Cabin Embarked
count    418.000000  418.000000                 418   418
332.000000  ...  418.000000       418  417.000000                91
418
unique          NaN         NaN                 418     2
NaN  ...         NaN       363         NaN                76         3
top             NaN         NaN  Kelly, Mr. James  male
NaN  ...         NaN  PC 17608         NaN  B57 B59 B63 B66         S
freq            NaN         NaN                   1   266
NaN  ...         NaN         5         NaN                3      270
mean    1100.500000    2.265550                 NaN   NaN
30.272590  ...    0.392344       NaN   35.627188                NaN
NaN
std      120.810458    0.841838                 NaN   NaN
14.181209  ...    0.981429       NaN   55.907576                NaN
NaN
min      892.000000    1.000000                 NaN   NaN
0.170000  ...    0.000000       NaN    0.000000                NaN
```

```
NaN
25%      996.250000    1.000000                NaN   NaN
21.000000  ...    0.000000       NaN    7.895800              NaN
NaN
50%     1100.500000    3.000000                NaN   NaN
27.000000  ...    0.000000       NaN   14.454200              NaN
NaN
75%     1204.750000    3.000000                NaN   NaN
39.000000  ...    0.000000       NaN   31.500000              NaN
NaN
max     1309.000000    3.000000                NaN   NaN
76.000000  ...    9.000000       NaN  512.329200              NaN
NaN

[11 rows x 11 columns]
```

```
#Droping Useless Columns
train = train.drop(['Ticket'], axis = 1)
test = test.drop(['Ticket'], axis = 1)

train = train.drop(['Cabin'], axis = 1)
test = test.drop(['Cabin'], axis = 1)

train = train.drop(['Name'], axis = 1)
test = test.drop(['Name'], axis = 1)

#Feature Selection
column_train=['Age','Pclass','SibSp','Parch','Fare','Sex','Embarked']
#training values
X=train[column_train]
#target value
Y=train['Survived']

X['Age'].isnull().sum()
X['Pclass'].isnull().sum()
X['SibSp'].isnull().sum()
X['Parch'].isnull().sum()
X['Fare'].isnull().sum()
X['Sex'].isnull().sum()
X['Embarked'].isnull().sum()
```

```
2
```

```
X['Age']=X['Age'].fillna(X['Age'].median())
X['Age'].isnull().sum()
```

```
0
```

```
X['Embarked'] = train['Embarked'].fillna(method ='pad')
X['Embarked'].isnull().sum()
```

```
0
```

```
d={'male':0, 'female':1}
X['Sex']=X['Sex'].apply(lambda x:d[x])
X['Sex'].head()
```

```
0    0
1    1
2    1
3    1
4    0
Name: Sex, dtype: int64
```

```
e={'C':0, 'Q':1 ,'S':2}
X['Embarked']=X['Embarked'].apply(lambda x:e[x])
X['Embarked'].head()
```

```
0    2
1    0
2    2
3    2
4    2
Name: Embarked, dtype: int64
```

```
from sklearn.model_selection import train_test_split
X_train, X_test, Y_train, Y_test =
train_test_split(X,Y,test_size=0.3,random_state=7)
```

```
from sklearn.linear_model import LogisticRegression
model = LogisticRegression()
model.fit(X_train,Y_train)
Y_pred = model.predict(X_test)
```

```
from sklearn.metrics import accuracy_score
print("Accuracy Score:",accuracy_score(Y_test,Y_pred))
```

```
Accuracy Score: 0.7611940298507462
```

```
from sklearn.metrics import accuracy_score,confusion_matrix
confusion_mat = confusion_matrix(Y_test,Y_pred)
print(confusion_mat)
```

```
[[131  25]
 [ 39  73]]
```

```
from sklearn.svm import SVC
model1 = SVC()
model1.fit(X_train,Y_train)

pred_y = model1.predict(X_test)

from sklearn.metrics import accuracy_score
print("Acc=",accuracy_score(Y_test,pred_y))
```

```
Acc= 0.6604477611940298
```

```
from sklearn.metrics import
accuracy_score,confusion_matrix,classification_report
confusion_mat = confusion_matrix(Y_test,pred_y)
print(confusion_mat)
print(classification_report(Y_test,pred_y))
```

```
[[149   7]
 [ 84  28]]
              precision    recall  f1-score   support

           0       0.64      0.96      0.77       156
           1       0.80      0.25      0.38       112

    accuracy                           0.66       268
   macro avg       0.72      0.60      0.57       268
weighted avg       0.71      0.66      0.61       268
```

```
from sklearn.neighbors import KNeighborsClassifier
model2 = KNeighborsClassifier(n_neighbors=5)
model2.fit(X_train,Y_train)
y_pred2 = model2.predict(X_test)
```

```
from sklearn.metrics import accuracy_score
print("Accuracy Score:",accuracy_score(Y_test,y_pred2))
```

```
Accuracy Score: 0.6604477611940298
```

```
from sklearn.metrics import
accuracy_score,confusion_matrix,classification_report
confusion_mat = confusion_matrix(Y_test,y_pred2)
print(confusion_mat)
print(classification_report(Y_test,y_pred2))
```

```
[[127  29]
 [ 62  50]]
              precision    recall  f1-score   support

           0       0.67      0.81      0.74       156
           1       0.63      0.45      0.52       112

    accuracy                           0.66       268
   macro avg       0.65      0.63      0.63       268
weighted avg       0.66      0.66      0.65       268
```

```
from sklearn.naive_bayes import GaussianNB
model3 = GaussianNB()
model3.fit(X_train,Y_train)
```

```
y_pred3 = model3.predict(X_test)

from sklearn.metrics import accuracy_score
print("Accuracy Score:",accuracy_score(Y_test,y_pred3))
```

```
Accuracy Score: 0.7686567164179104
```

```
from sklearn.metrics import
accuracy_score,confusion_matrix,classification_report
confusion_mat = confusion_matrix(Y_test,y_pred3)
print(confusion_mat)
print(classification_report(Y_test,y_pred3))
```

```
[[129  27]
 [ 35  77]]
              precision    recall  f1-score   support

           0       0.79      0.83      0.81       156
           1       0.74      0.69      0.71       112

    accuracy                           0.77       268
   macro avg       0.76      0.76      0.76       268
weighted avg       0.77      0.77      0.77       268
```

```
from sklearn.tree import DecisionTreeClassifier
model4 = DecisionTreeClassifier(criterion='entropy',random_state=7)
model4.fit(X_train,Y_train)
y_pred4 = model4.predict(X_test)

from sklearn.metrics import accuracy_score
print("Accuracy Score:",accuracy_score(Y_test,y_pred4))
```

```
Accuracy Score: 0.7425373134328358
```

```
from sklearn.metrics import
accuracy_score,confusion_matrix,classification_report
confusion_mat = confusion_matrix(Y_test,y_pred4)
print(confusion_mat)
print(classification_report(Y_test,y_pred4))
```

```
[[132  24]
 [ 45  67]]
              precision    recall  f1-score   support

           0       0.75      0.85      0.79       156
           1       0.74      0.60      0.66       112

    accuracy                           0.74       268
   macro avg       0.74      0.72      0.73       268
weighted avg       0.74      0.74      0.74       268
```

```
results = pd.DataFrame({
    'Model': ['Logistic Regression','Support Vector Machines', 'Naive
Bayes','KNN' ,'Decision Tree'],
    'Score': [0.75,0.66,0.76,0.66,0.74]})

result_df = results.sort_values(by='Score', ascending=False)
result_df = result_df.set_index('Score')
result_df.head(9)
```

Score	Model
0.76	Naive Bayes
0.75	Logistic Regression
0.74	Decision Tree
0.66	Support Vector Machines
0.66	KNN