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

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

In [2]:
```
pd.set_option('display.max_columns',10,'display.width',1000)
test = pd.read_csv('C:\\Users\\vidya\\Downloads\\test.csv')
train=pd.read_csv('C:\\Users\\vidya\\Downloads\\train.csv')
```

In [3]:
```
test.head()
```

Out[3]:

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

5 rows × 11 columns

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

Out[4]:

	PassengerId	Survived	Pclass	Name	Sex	...	Parch	Ticket	Fare	Cabi
0	1	0	3	Braund, Mr. Owen Harris	male	...	0	A/5 21171	7.2500	Na
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	...	0	PC 17599	71.2833	C8
2	3	1	3	Heikkinen, Miss. Laina	female	...	0	STON/O2. 3101282	7.9250	Na
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	...	0	113803	53.1000	C12
4	5	0	3	Allen, Mr. William Henry	male	...	0	373450	8.0500	Na

5 rows × 12 columns

In [5]:
```
train.shape
```

Out[5]:
```
(891, 12)
```

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

Out[6]:
```
(418, 11)
```

In [7]:
```
train.isnull().sum()
```

Out[7]:
```
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 [8]:
```
test.isnull().sum()
```

Out[8]:
```
PassengerId      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]:
```
train.describe(include="all")
```

Out[9]:

	PassengerId	Survived	Pclass	Name	Sex	...	Parch	Ticket	
count	891.000000	891.000000	891.000000	891	891	...	891.000000	891	89
unique	NaN	NaN	NaN	891	2	...	NaN	681	
top	NaN	NaN	NaN	Braund, Mr. Owen Harris	male	...	NaN	347082	
freq	NaN	NaN	NaN	1	577	...	NaN	7	
mean	446.000000	0.383838	2.308642	NaN	NaN	...	0.381594	NaN	3
std	257.353842	0.486592	0.836071	NaN	NaN	...	0.806057	NaN	4
min	1.000000	0.000000	1.000000	NaN	NaN	...	0.000000	NaN	
25%	223.500000	0.000000	2.000000	NaN	NaN	...	0.000000	NaN	
50%	446.000000	0.000000	3.000000	NaN	NaN	...	0.000000	NaN	1
75%	668.500000	1.000000	3.000000	NaN	NaN	...	0.000000	NaN	3
max	891.000000	1.000000	3.000000	NaN	NaN	...	6.000000	NaN	51

11 rows × 12 columns

In [10]:
```
import numpy as np
numeric_columns =train.select_dtypes (include=[np.number]).columns
train[numeric_columns].groupby('Survived').mean()
```

Out[10]:

Survived	PassengerId	Pclass	Age	SibSp	Parch	Fare
0	447.016393	2.531876	30.626179	0.553734	0.329690	22.117887
1	444.368421	1.950292	28.343690	0.473684	0.464912	48.395408

In [11]:
```
import numpy as np
numeric_columns= train.select_dtypes (include=[np.number])
```

```
correlation_matrix= numeric_columns.corr()
correlation_matrix
```

Out[11]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fa
PassengerId	1.000000	-0.005007	-0.035144	0.036847	-0.057527	-0.001652	0.01265
Survived	-0.005007	1.000000	-0.338481	-0.077221	-0.035322	0.081629	0.2573(
Pclass	-0.035144	-0.338481	1.000000	-0.369226	0.083081	0.018443	-0.5495(
Age	0.036847	-0.077221	-0.369226	1.000000	-0.308247	-0.189119	0.09606
SibSp	-0.057527	-0.035322	0.083081	-0.308247	1.000000	0.414838	0.15965
Parch	-0.001652	0.081629	0.018443	-0.189119	0.414838	1.000000	0.21622
Fare	0.012658	0.257307	-0.549500	0.096067	0.159651	0.216225	1.00000

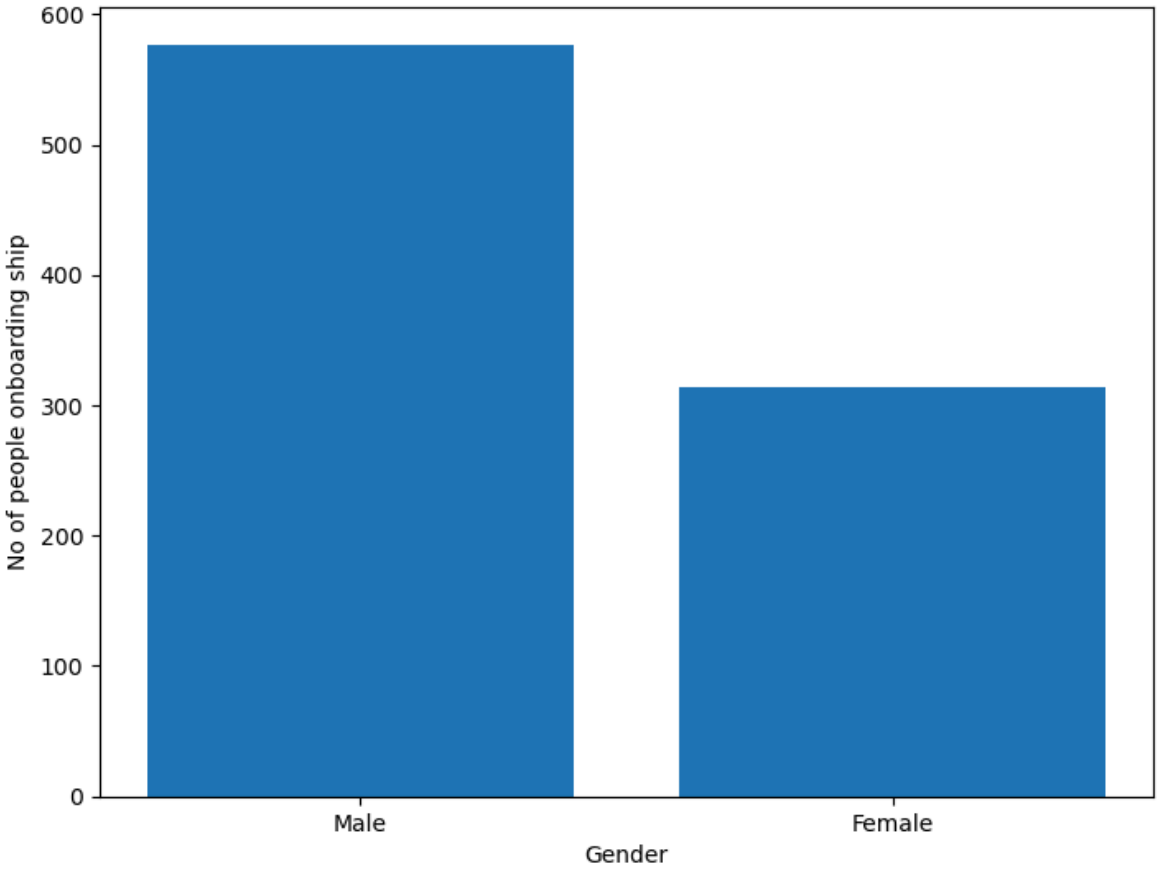
In [12]:
```
male_ind = len(train[train['Sex'] == 'male'])
print("No of Males in Titanic:",male_ind)
```

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

In [13]:
```
female_ind = len(train[train['Sex'] == 'female'])
print("No of Females in Titanic:",female_ind)
```

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

In [14]:
```
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()
```



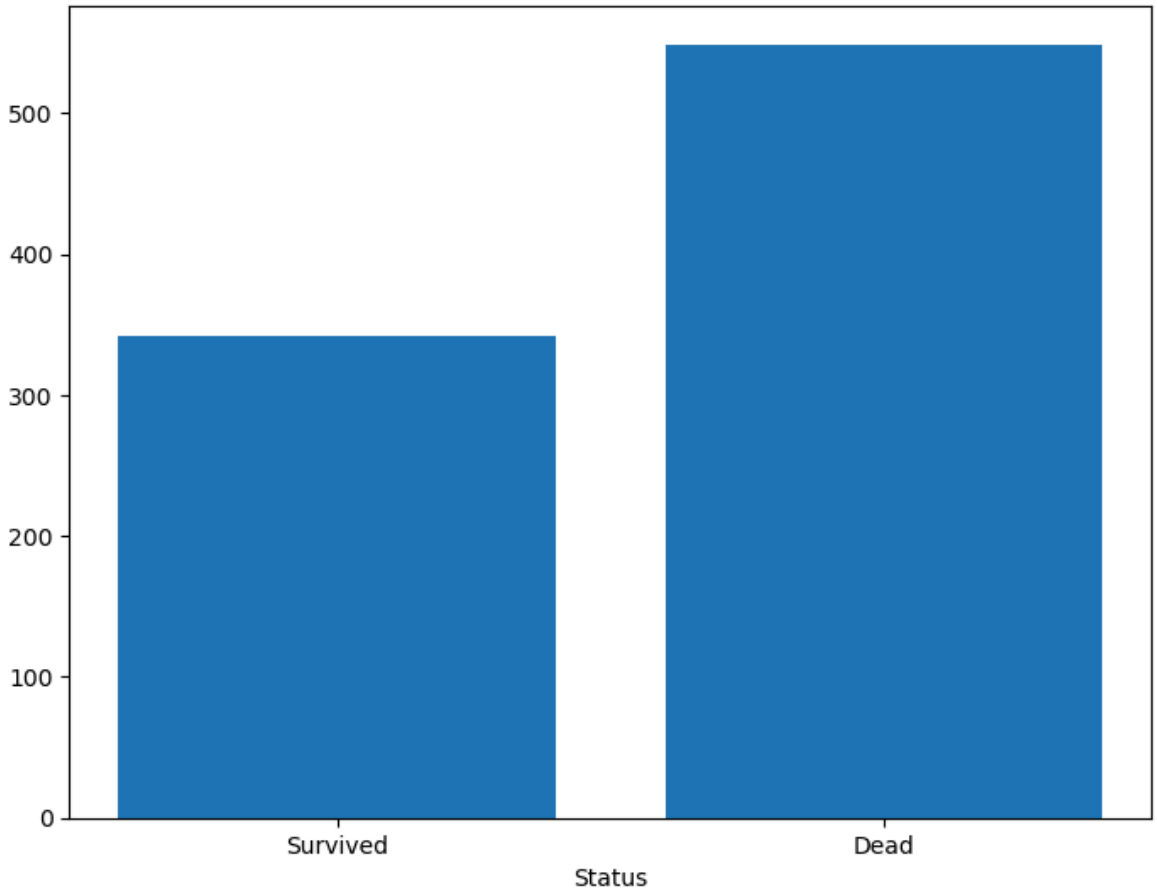
In [15]:
```
alive = len(train[train['Survived'] == 1])
dead = len(train[train['Survived'] == 0])
```

In [16]:
```
train.groupby('Sex')[['Survived']].mean()
```

Out[16]:

Sex	Survived
female	0.742038
male	0.188908

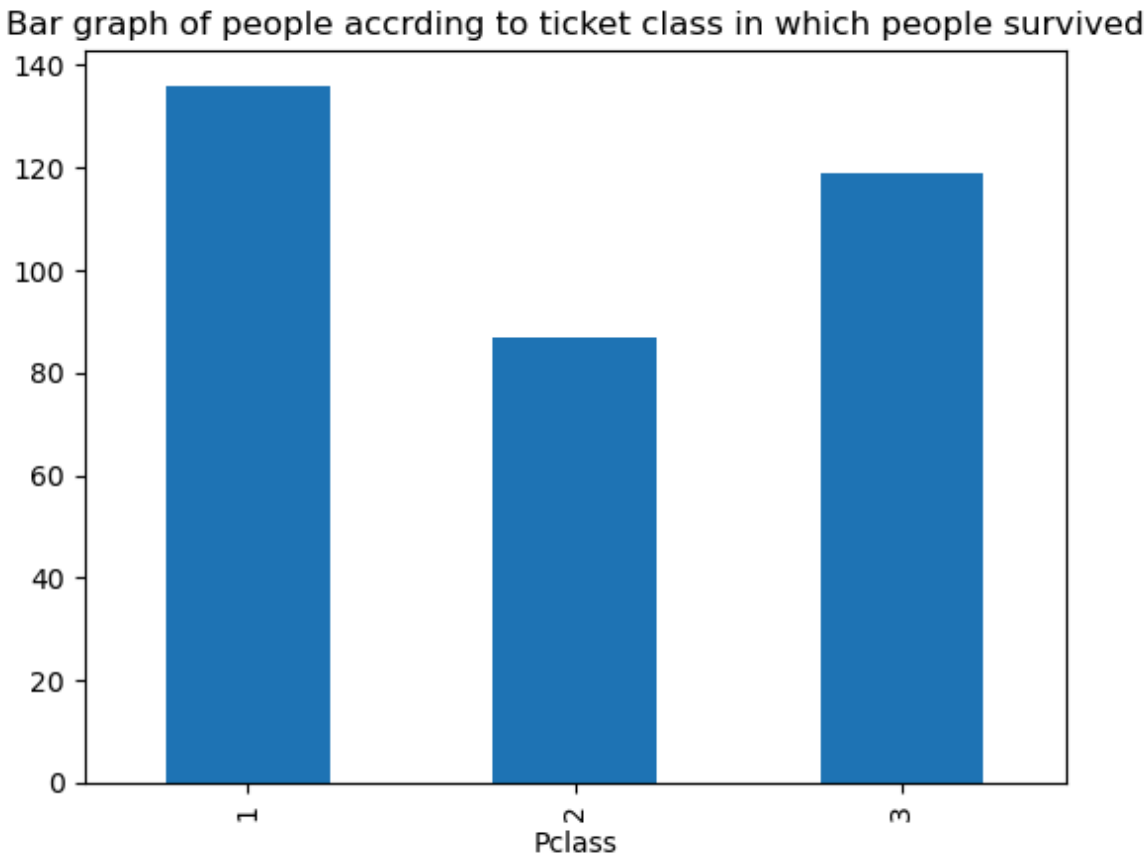
In [17]:
```
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
status = ['Survived','Dead']
ind = [alive,dead]
ax.bar(status,ind)
plt.xlabel("Status")
plt.show()
```

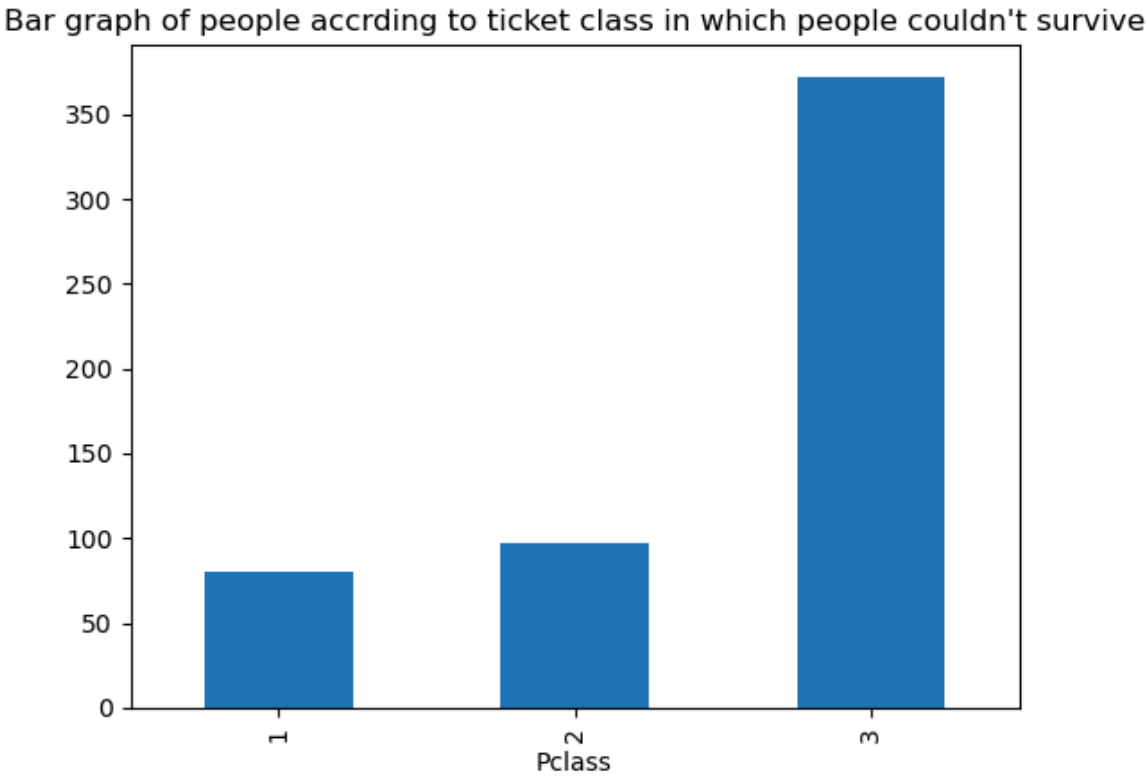


In [18]:
```
plt.figure(1)
train.loc[train['Survived'] == 1, 'Pclass'].value_counts().sort_index().plot.bar
plt.title('Bar graph of people accrding to ticket class in which people survived


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\'
```

Out[18]:
```
Text(0.5, 1.0, "Bar graph of people accrding to ticket class in which people co
uldn't survive")
```



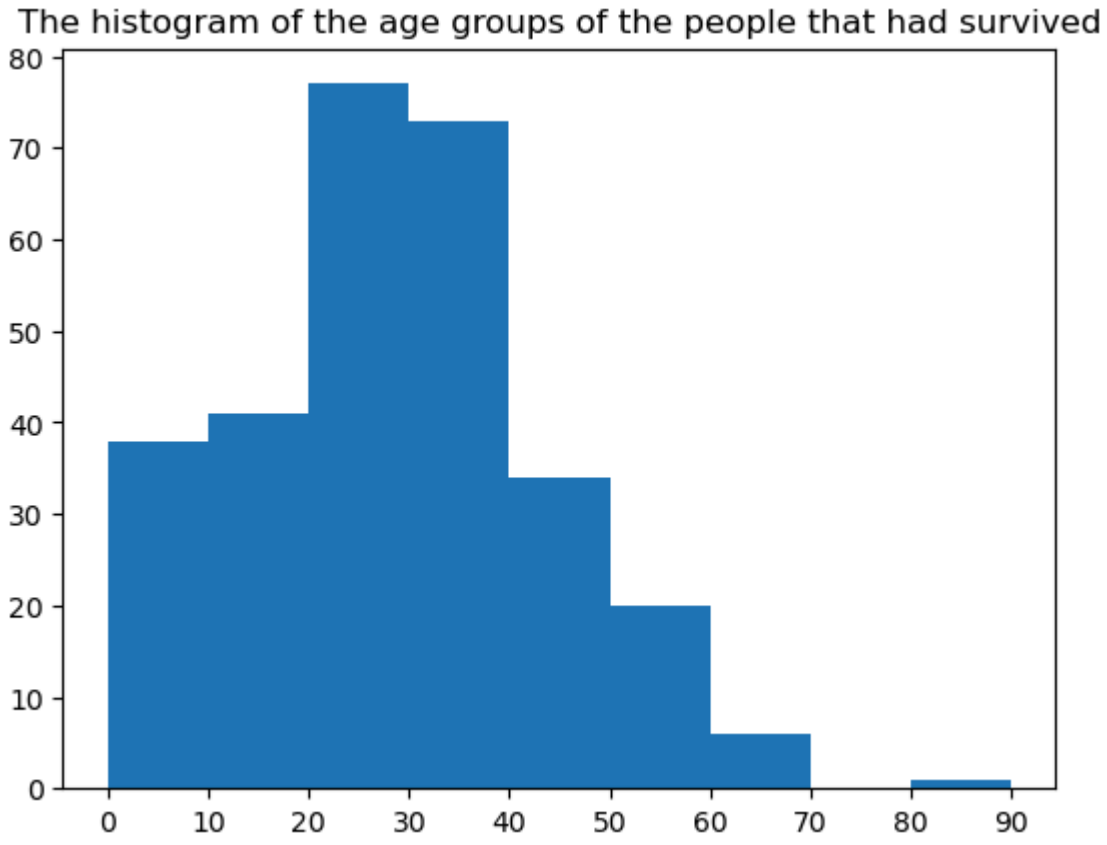


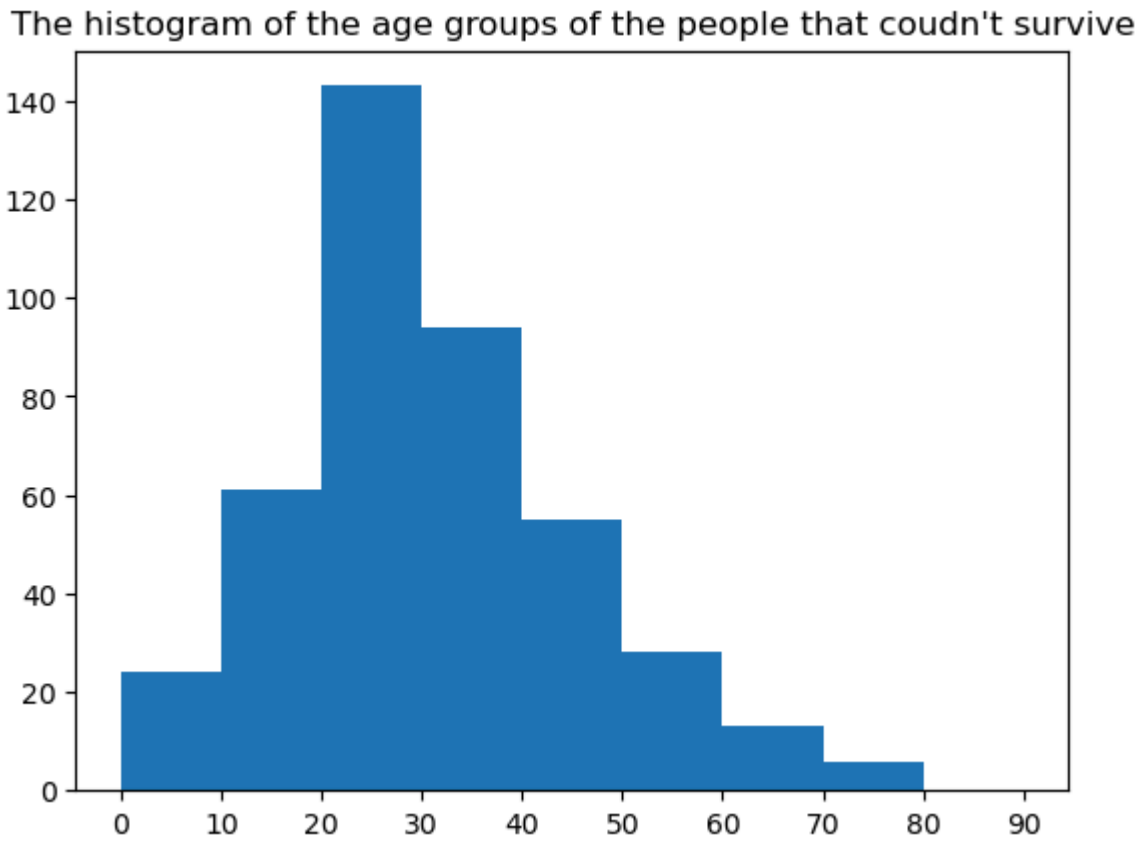
In [19]:
```
plt.figure(1)
age  = train.loc[train.Survived == 1, 'Age']
plt.title('The histogram of the age groups of the people that had survived')
plt.hist(age, np.arange(0,100,10))
plt.xticks(np.arange(0,100,10))


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))
```

Out[19]:
```
([<matplotlib.axis.XTick at 0x1259ffdd990>,
  <matplotlib.axis.XTick at 0x1259ffdc290>,
  <matplotlib.axis.XTick at 0x1259fcba810>,
  <matplotlib.axis.XTick at 0x125a036bd10>,
  <matplotlib.axis.XTick at 0x125a0375ed0>,
  <matplotlib.axis.XTick at 0x125a0377fd0>,
  <matplotlib.axis.XTick at 0x125a037a290>,
  <matplotlib.axis.XTick at 0x125a037c390>,
  <matplotlib.axis.XTick at 0x125a0379690>,
  <matplotlib.axis.XTick at 0x125a037ea90>],
 [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')])
```





In [20]:
```
train[["SibSp", "Survived"]].groupby(['SibSp'], as_index=False).mean().sort_valu
```

Out[20]:

	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

In [21]:
```
train[["Pclass", "Survived"]].groupby(['Pclass'], as_index=False).mean().sort_va
```

Out[21]:

	Pclass	Survived
0	1	0.629630
1	2	0.472826
2	3	0.242363

In [22]:
```
train[["Age", "Survived"]].groupby(['Age'], as_index=False).mean().sort_values(b
```

Out[22]:

	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

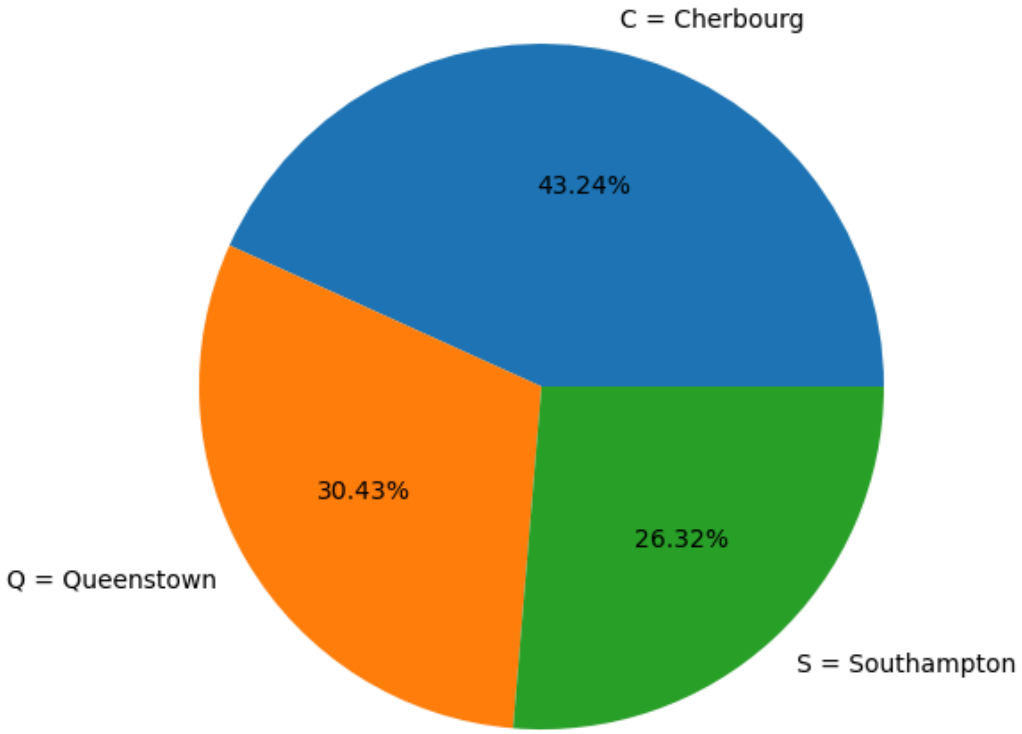
88 rows × 2 columns

In [23]:
```
train[["Embarked", "Survived"]].groupby(['Embarked'], as_index=False).mean().sor
```

Out[23]:

	Embarked	Survived
0	C	0.553571
1	Q	0.389610
2	S	0.336957

In [24]:
```
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()
```



In [25]:
```
test.describe(include="all")
```

Out[25]:

	PassengerId	Pclass	Name	Sex	Age	...	Parch	Ticket	
count	418.000000	418.000000	418	418	332.000000	...	418.000000	418	417.0
unique	NaN	NaN	418	2	NaN	...	NaN	363	
top	NaN	NaN	Kelly, Mr. James	male	NaN	...	NaN	PC 17608	
freq	NaN	NaN	1	266	NaN	...	NaN	5	
mean	1100.500000	2.265550	NaN	NaN	30.272590	...	0.392344	NaN	35.6
std	120.810458	0.841838	NaN	NaN	14.181209	...	0.981429	NaN	55.9
min	892.000000	1.000000	NaN	NaN	0.170000	...	0.000000	NaN	0.0
25%	996.250000	1.000000	NaN	NaN	21.000000	...	0.000000	NaN	7.8
50%	1100.500000	3.000000	NaN	NaN	27.000000	...	0.000000	NaN	14.4
75%	1204.750000	3.000000	NaN	NaN	39.000000	...	0.000000	NaN	31.5
max	1309.000000	3.000000	NaN	NaN	76.000000	...	9.000000	NaN	512.3

11 rows × 11 columns

In [26]:
```
train = train.drop(['Ticket'], axis = 1)
```

```
test = test.drop(['Ticket'], axis = 1)
```

In [27]:
```
train = train.drop(['Cabin'], axis = 1)
test = test.drop(['Cabin'], axis = 1)
```

In [28]:
```
train = train.drop(['Name'], axis = 1)
test = test.drop(['Name'], axis = 1)
```

In [29]:
```
column_train=['Age','Pclass','SibSp','Parch','Fare','Sex','Embarked']
#training values
X=train[column_train]
#target value
Y=train['Survived']
```

In [30]:
```
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()
```

Out[30]:
```
2
```

In [31]:
```
X['Age']=X['Age'].fillna(X['Age'].median())
X['Age'].isnull().sum()
```

Out[31]:
```
0
```

In [32]:
```
X['Embarked'] = train['Embarked'].fillna(method ='pad')
X['Embarked'].isnull().sum()
0
```

Out[32]:
```
0
```

In [33]:
```
d={'male':0, 'female':1}
X['Sex']=X['Sex'].apply(lambda x:d[x])
X['Sex'].head()
```

Out[33]:
```
0    0
1    1
2    1
3    1
4    0
Name: Sex, dtype: int64
```

In [34]:
```
e={'C':0, 'Q':1 ,'S':2}
X['Embarked']=X['Embarked'].apply(lambda x:e[x])
X['Embarked'].head()
```

Out[34]:
```
0    2
1    0
2    2
3    2
4    2
Name: Embarked, dtype: int64
```

In [36]:
```
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_sta
```

In [37]:
```
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: 0.7574626865671642
```

In [38]:
```
from sklearn.metrics import accuracy_score,confusion_matrix
confusion_mat = confusion_matrix(Y_test,Y_pred)
print(confusion_mat)
```

```
[[130  26]
 [ 39  73]]
```

In [39]:
```
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
```

In [40]:
```
from sklearn.metrics import accuracy_score,confusion_matrix,classification_repor
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
```

In [41]:
```
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
```

In [42]:
```
from sklearn.metrics import accuracy_score,confusion_matrix,classification_repor
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
```

In [43]:
```
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
```

In [44]:
```
from sklearn.metrics import accuracy_score,confusion_matrix,classification_repor
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
```

In [45]:
```
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
```

In [46]:
```
from sklearn.metrics import accuracy_score,confusion_matrix,classification_repor
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
```

In [47]:
```
results = pd.DataFrame({
    'Model': ['Logistic Regression','Support Vector Machines', 'Naive Bayes','KN
    '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)
```

Out[47]:

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