In [44]:
```
# Importing libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [45]:
```
titanic = pd.read_csv('https://query.data.world/s/i3kphasugbts4cqem257cou37
4ijdh')  # Reading the dataframe
```

In [46]:
```
titanic.head() # Taking glimpse of dataframe
```

Out[46]:

	pclass	survived	name	sex	age	sibsp	parch	ticket	fare	cabin	embarke
0	1.0	1.0	Allen, Miss. Elisabeth Walton	female	29.0000	0.0	0.0	24160	211.3375	B5	S
1	1.0	1.0	Allison, Master. Hudson Trevor	male	0.9167	1.0	2.0	113781	151.5500	C22 C26	S
2	1.0	0.0	Allison, Miss. Helen Loraine	female	2.0000	1.0	2.0	113781	151.5500	C22 C26	S
3	1.0	0.0	Allison, Mr. Hudson Joshua Creighton	male	30.0000	1.0	2.0	113781	151.5500	C22 C26	S
4	1.0	0.0	Allison, Mrs. Hudson J C (Bessie Waldo Daniels)	female	25.0000	1.0	2.0	113781	151.5500	C22 C26	S

In [47]:
```
titanic.describe()   # Viewing the statistics of the daframe
```

Out[47]:

	pclass	survived	age	sibsp	parch	fare	bo
count	1309.000000	1309.000000	1046.000000	1309.000000	1309.000000	1308.000000	121.0000
mean	2.294882	0.381971	29.881135	0.498854	0.385027	33.295479	160.8099
std	0.837836	0.486055	14.413500	1.041658	0.865560	51.758668	97.6969
min	1.000000	0.000000	0.166700	0.000000	0.000000	0.000000	1.0000
25%	2.000000	0.000000	21.000000	0.000000	0.000000	7.895800	72.0000
50%	3.000000	0.000000	28.000000	0.000000	0.000000	14.454200	155.0000
75%	3.000000	1.000000	39.000000	1.000000	0.000000	31.275000	256.0000
max	3.000000	1.000000	80.000000	8.000000	9.000000	512.329200	328.0000

In [48]:
```
titanic.dtypes        # Checking the datatypes of columns
```

Out[48]:
```
pclass       float64
survived     float64
name          object
sex           object
age          float64
sibsp        float64
parch        float64
ticket        object
fare         float64
cabin         object
embarked      object
boat          object
body         float64
home.dest     object
dtype: object
```

In [49]:
```
titanic.shape
```

Out[49]:
```
(1310, 14)
```

In [50]:

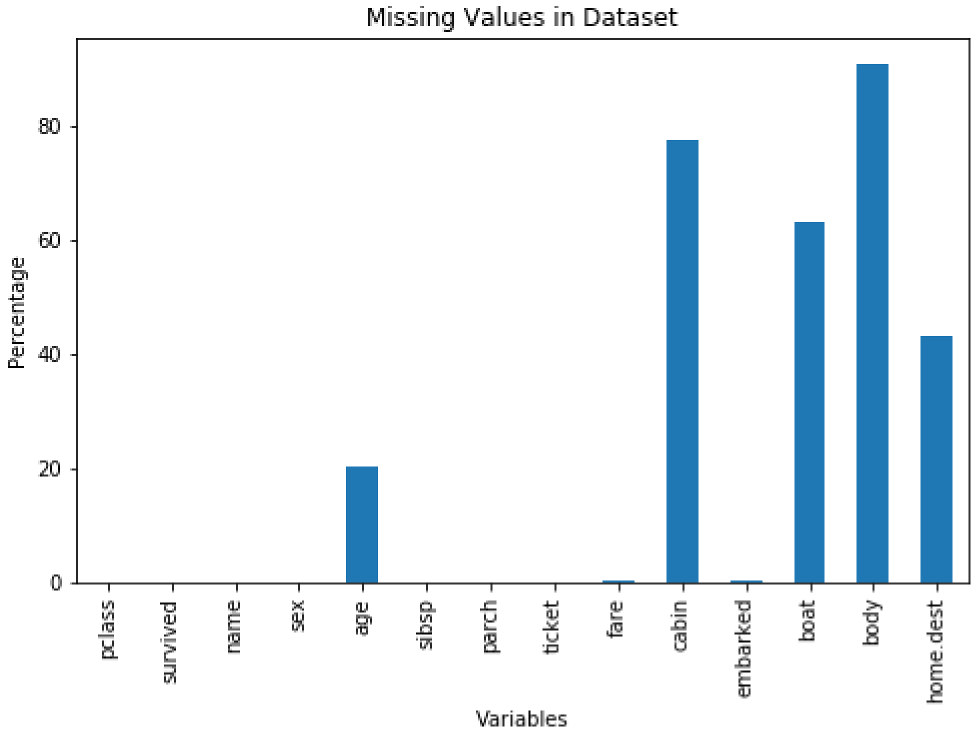
```
null_percentage = round(titanic.isnull().sum() / len(titanic) * 100, 2)
# Counting the percentage of null value in each variable
null_percentage
```

Out[50]:

```
pclass        0.08
survived      0.08
name          0.08
sex           0.08
age          20.15
sibsp         0.08
parch         0.08
ticket        0.08
fare          0.15
cabin        77.48
embarked      0.23
boat         62.90
body         90.76
home.dest    43.13
dtype: float64
```

In [51]:

```
null_percentage.plot.bar( title = "Missing Values in Dataset", figsize=(8,5
)) # plotting percentage of missing values
plt.xlabel('Variables')
plt.ylabel('Percentage')
#plt.savefig('1.png')
plt.show()
```

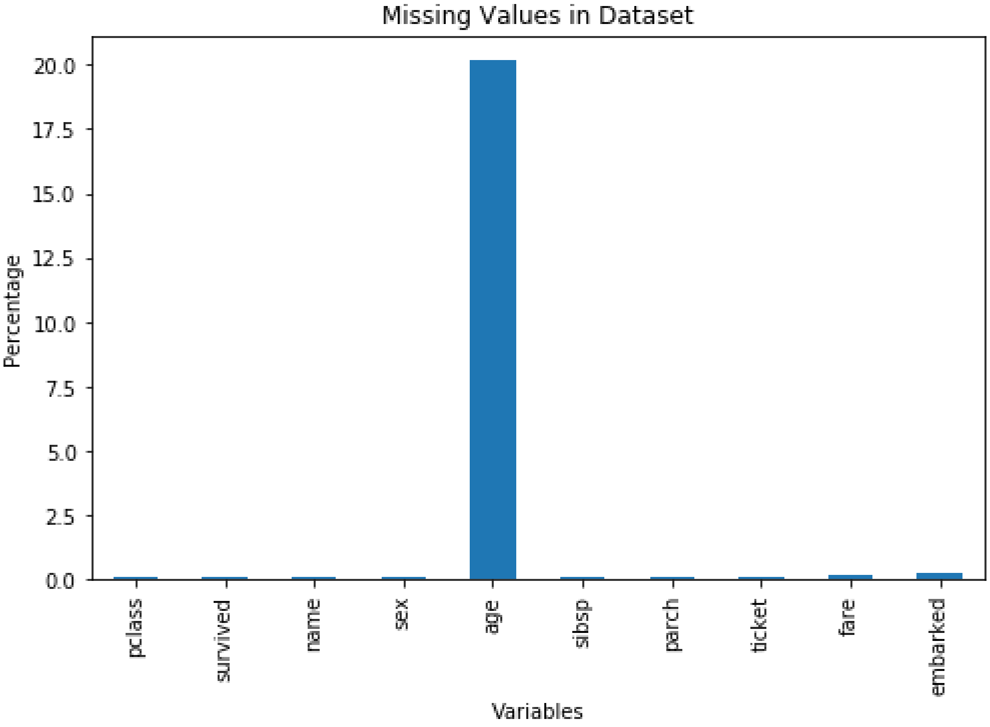


In [52]:

```
titanic = titanic.drop(['boat', 'body', 'home.dest', 'cabin'], axis=1)  # R
emoving the columns with too many missing values
```

In [53]:

```
null_percentage = round(titanic.isnull().sum() / len(titanic) * 100, 2)
# Counting the percentage of null value in each variable
null_percentage.plot.bar( title = "Missing Values in Dataset", figsize=(8,5
))
plt.xlabel('Variables')
plt.ylabel('Percentage')
#plt.savefig('2.png')
plt.show()
```



In [54]:

```
titanic.isnull().sum()          # Counting the number of null value in each
variable again
```

Out[54]:

```
pclass        1
survived      1
name          1
sex           1
age         264
sibsp         1
parch         1
ticket        1
fare          2
embarked      3
dtype: int64
```

In [55]:

```
titanic.drop(index = 1309, inplace = True)   # Removing the row which resul
ted in null value of pclass, survived, name, sex, sibsp, parch, and ticket
```

In [56]:

```
titanic.isnull().sum()          # Counting the number of null value in each variable one more time
```

Out[56]:

```
pclass        0
survived      0
name          0
sex           0
age         263
sibsp         0
parch         0
ticket        0
fare          1
embarked      2
dtype: int64
```

In [57]:

```
titanic['fare'].fillna(titanic['fare'].dropna().median(), inplace=True) # Replacing missing fare with median value
titanic['age'].fillna(titanic['age'].dropna().mean(), inplace = True) # Replacing missing age with median age
titanic['embarked'].fillna(titanic['embarked'].dropna().mode()[0], inplace = True)  # Replacing missing port with mode port
```

In [58]:

```
titanic.isnull().sum()          # Counting the number of null value in each variable one last time
```

Out[58]:

```
pclass      0
survived    0
name        0
sex         0
age         0
sibsp       0
parch       0
ticket      0
fare        0
embarked    0
dtype: int64
```

In [59]:

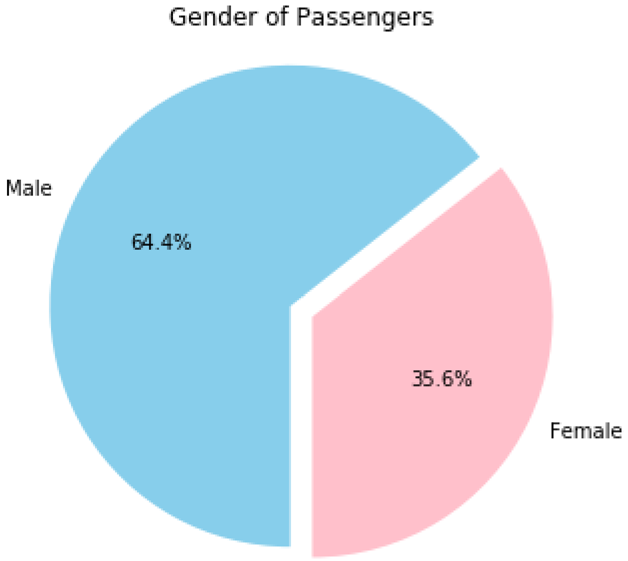
```
sex = titanic.groupby('sex')['sex'].count().reset_index(name='counts') # Finding the population of each gender
sex
```

Out[59]:

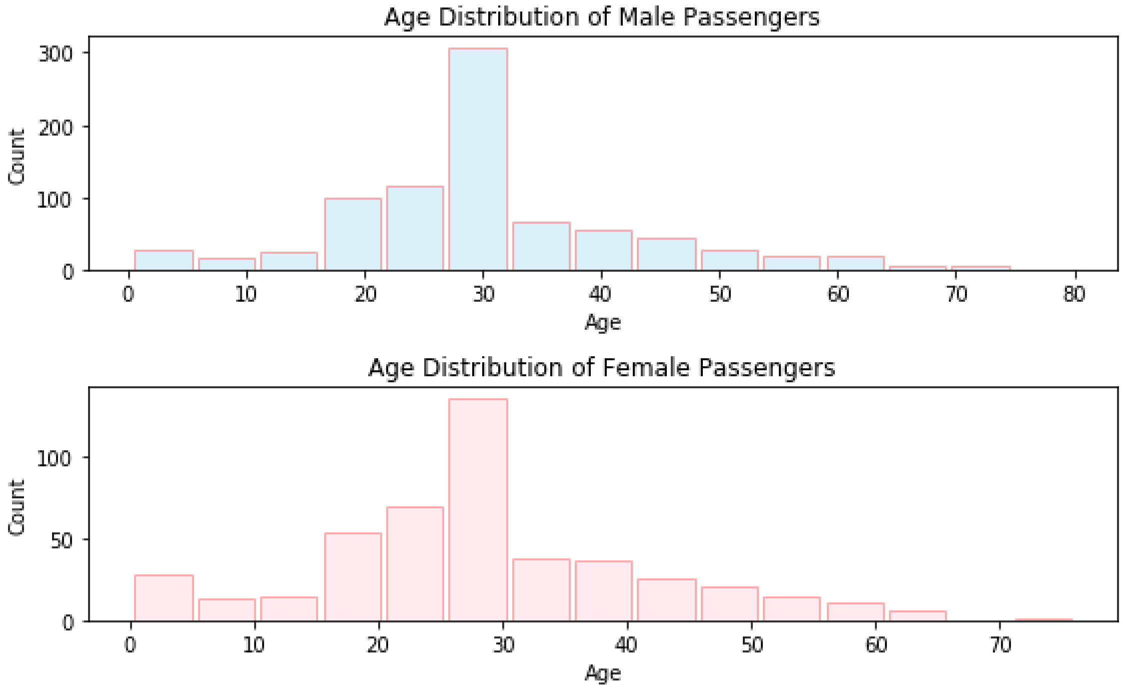
	sex	counts
0	female	466
1	male	843

In [60]:

```
labels = ['Female', 'Male']
values = sex['counts']
colors = ['pink', 'skyblue']
explode = [0.1,0]
plt.figure(figsize=(8,5))
plt.title('Gender of Passengers')
plt.pie(values,labels=labels,colors=colors,explode=explode, autopct='%1.1f%%', startangle=-90)
plt.axis('equal')
#plt.savefig('3.png')
plt.show()
```



In [61]:
```
# Visualizing age distribution in both the genders
plt.figure(figsize=(8,5))
plt.subplot(211)
plt.hist(titanic[titanic['sex'] == 'male']['age'],rwidth=0.9,alpha=0.3,colo
r='skyblue',bins=15, edgecolor='red')
plt.xlabel('Age')
plt.ylabel('Count')
plt.title('Age Distribution of Male Passengers')
plt.subplot(212)
plt.hist(titanic[titanic['sex'] == 'female']['age'],rwidth=0.9,alpha=0.3,co
lor='pink',bins=15, edgecolor='red')
plt.xlabel('Age')
plt.ylabel('Count')
plt.title('Age Distribution of Female Passengers')
plt.tight_layout()  # This prevents overlapping of the labels of two figure
s
#plt.savefig('4.png')
```



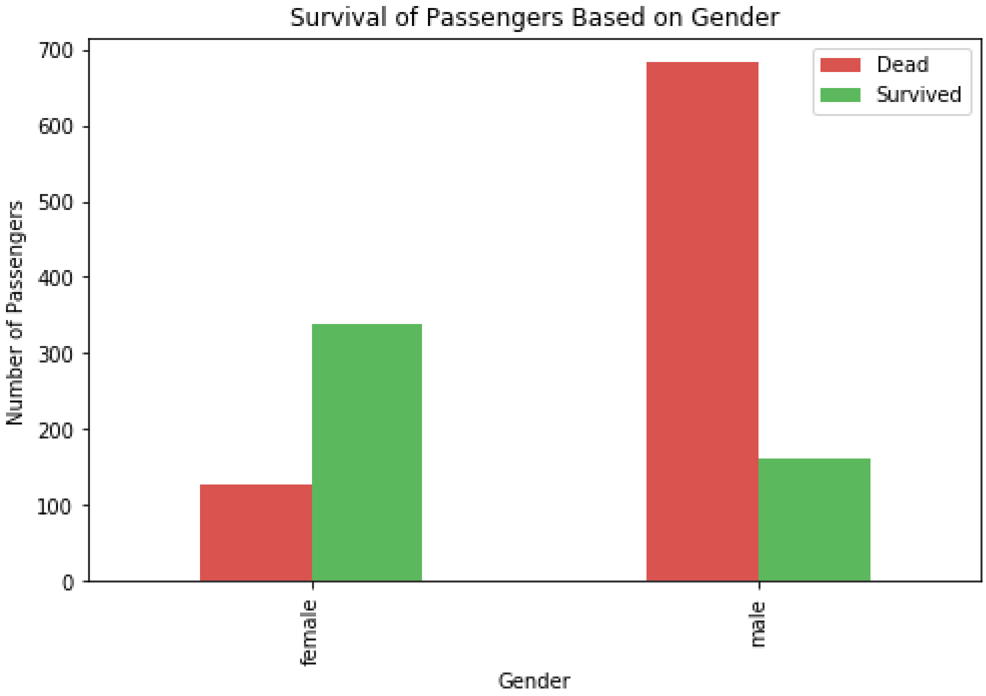
In [62]:
```
titanic.groupby(['sex', 'survived'])['survived'].count().unstack()  # Viewi
ng surived and dead population in each gender
```

Out[62]:

survived	0.0	1.0
sex		
female	127	339
male	682	161

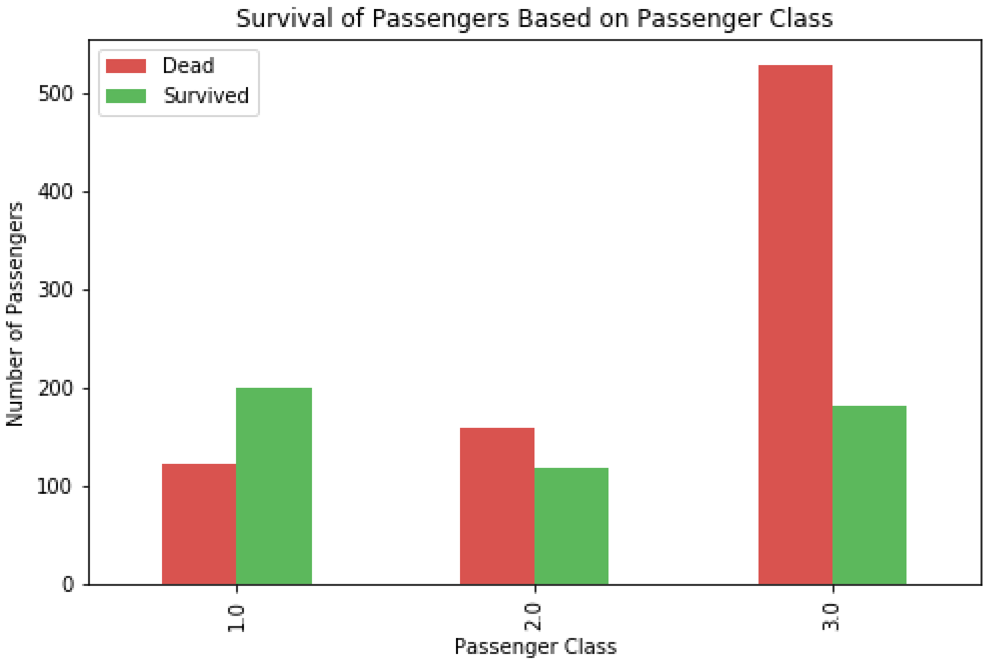
In [63]:

```
# Visualizing surival in each gender
sex_survived = titanic.groupby(['sex', 'survived'])['survived'].count().uns
tack()
sex_survived.plot.bar(color=['#d9534f', '#5cb85c'], title = "Survival of Pa
ssengers Based on Gender", figsize=(8,5))
plt.legend(['Dead', 'Survived'])
plt.xlabel('Gender')
plt.ylabel('Number of Passengers')
#plt.savefig('5.png')
plt.show()
```



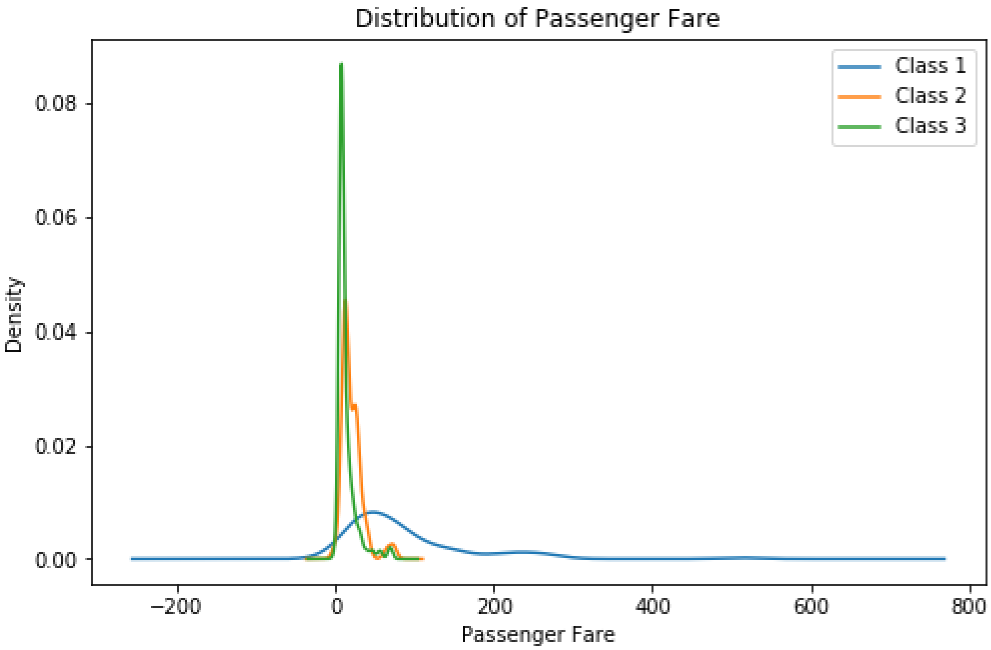
In [64]:

```
# Visualizing survival in each passenger class
class_survived = titanic.groupby(['pclass', 'survived'])['survived'].count
().unstack()
class_survived.plot.bar(color=['#d9534f', '#5cb85c'], title = "Survival of
 Passengers Based on Passenger Class", figsize=(8,5))
plt.legend(['Dead', 'Survived'])
plt.xlabel('Passenger Class')
plt.ylabel('Number of Passengers')
#plt.savefig('6.png')
plt.show()
```



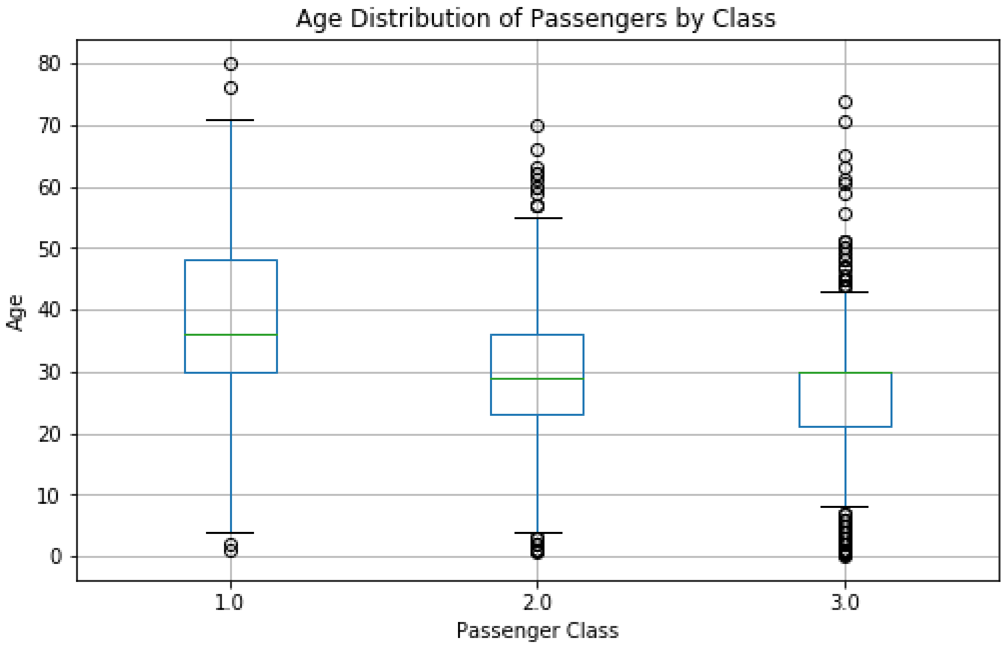
In [65]:

```
# Visualizing distribution of fare in each passenger class
titanic[titanic['pclass'] == 1]['fare'] .plot.kde(figsize=(8,5))
titanic[titanic['pclass'] == 2]['fare'] .plot.kde()
titanic[titanic['pclass'] == 3]['fare'] .plot.kde()
plt.legend(['Class 1', 'Class 2', 'Class 3'])
plt.title('Distribution of Passenger Fare')
plt.xlabel('Passenger Fare')
#plt.savefig('7.png')
plt.show()
```



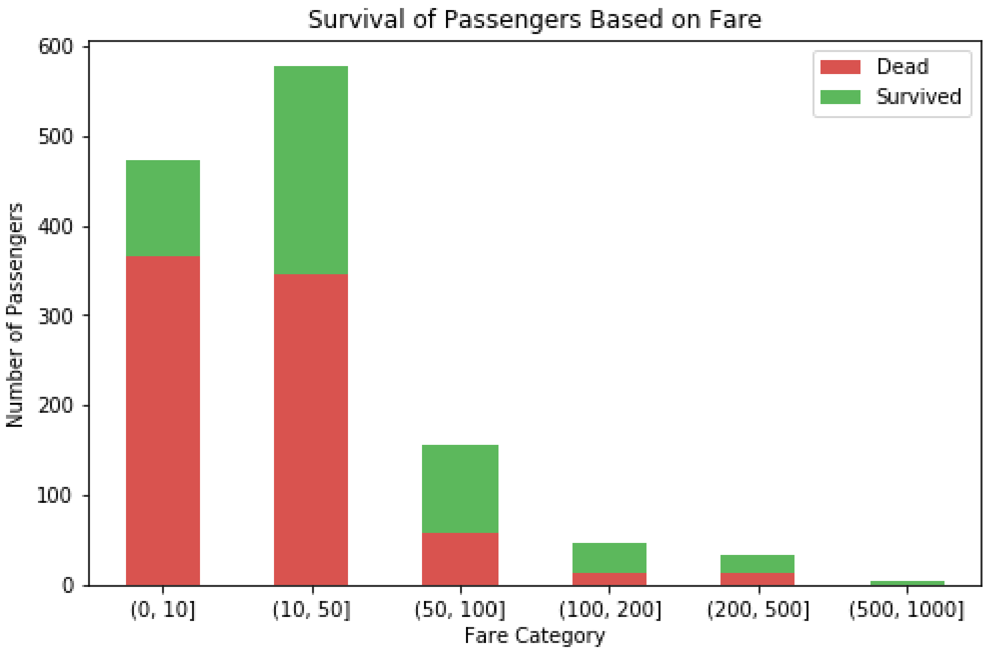
In [76]:

```
# Visualizing distribution of age in each passenger class
titanic.boxplot(column = 'age', by='pclass', figsize=(8,5))
plt.xlabel('Passenger Class')
plt.ylabel('Age')
plt.title('Age Distribution of Passengers by Class')
plt.suptitle('')   # This removes the non essential automatically generated title in the figure
#plt.savefig('8.png')
plt.show()
```



In [67]:
```
# Dividing our fare into categories
bins = [0,10,50,100,200,500,1000]
titanic['fare_cat'] = pd.cut(titanic['fare'], bins)


# Visualizing survival based on fare class
fare_survived = titanic.groupby(['fare_cat', 'survived'])['survived'].count
().unstack()
fare_survived.plot.bar(color=['#d9534f', '#5cb85c'], title = "Survival of P
assengers Based on Fare", figsize=(8,5), stacked = True)
plt.legend(['Dead', 'Survived'])
plt.xlabel('Fare Category')
plt.ylabel('Number of Passengers')
plt.xticks(rotation='horizontal') # For rotating x axis labels
#plt.savefig('9.png')
plt.show()
```



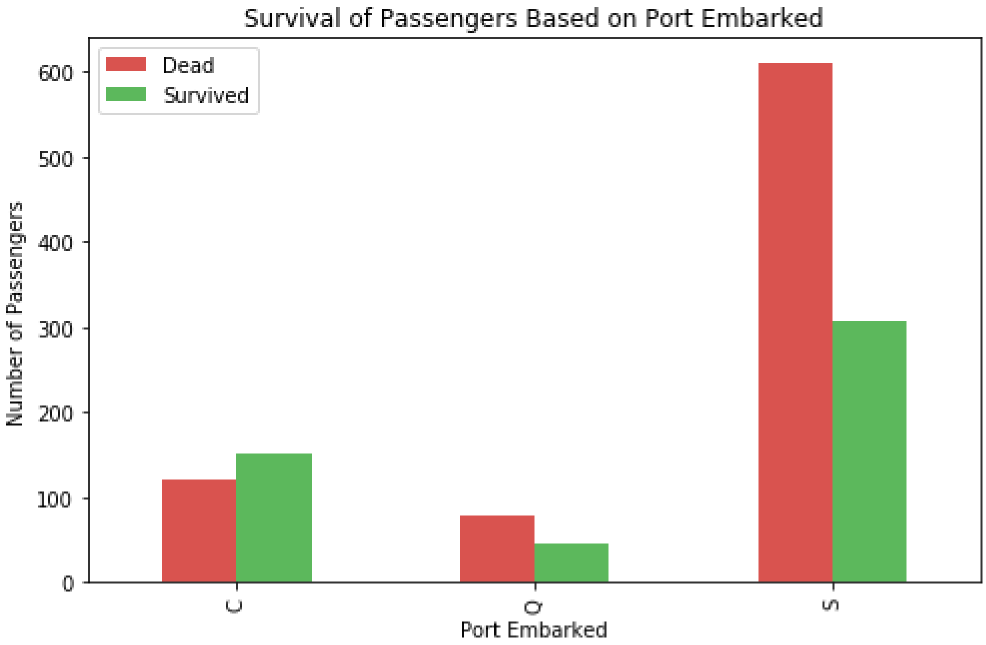
In [68]:
```
# Survival based on passenger class and port
embarked = titanic.groupby(['embarked', 'survived'])['survived'].count().un
stack()
embarked
```

Out[68]:

survived	0.0	1.0
embarked		
C	120	150
Q	79	44
S	610	306

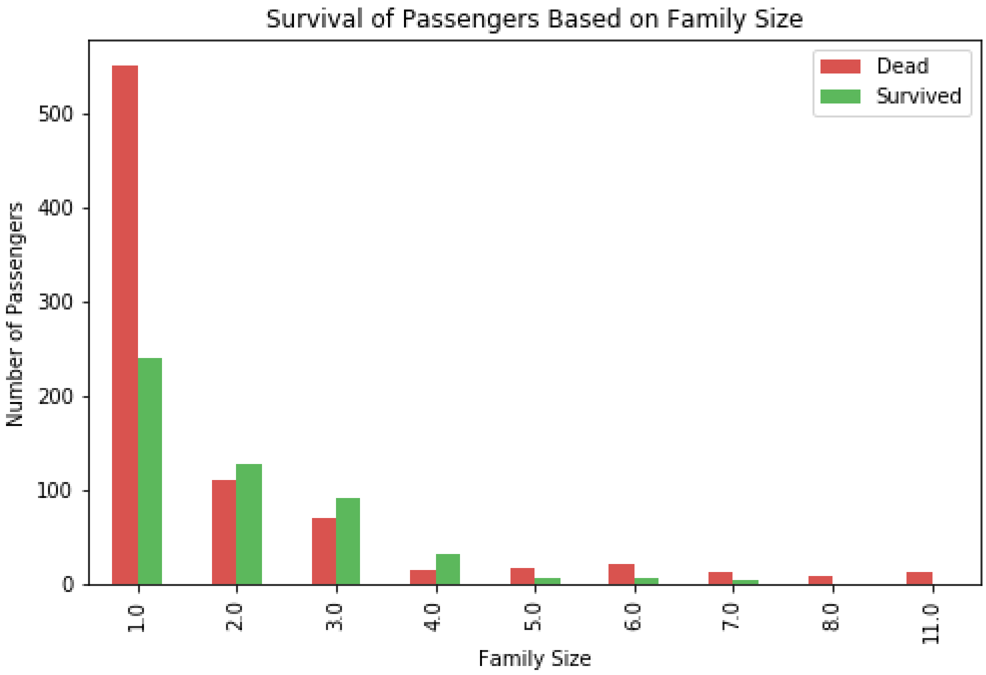
In [69]:

```
embarked.plot.bar(title = "Survival of Passengers Based on Port Embarked",
figsize=(8,5), color=['#d9534f', '#5cb85c'])
plt.legend(['Dead', 'Survived'])
plt.xlabel('Port Embarked')
plt.ylabel('Number of Passengers')
#plt.savefig('10.png')
plt.show()
```



In [70]:

```
# Visualizing the effects of family size on survival
titanic['familysize'] = titanic['sibsp'] + titanic['parch'] + 1    # creati
ng a new variable called family size
family_survived = titanic.groupby(['familysize', 'survived'])['survived'].c
ount().unstack()
family_survived.plot.bar(color=['#d9534f', '#5cb85c'], title = "Survival of
Passengers Based on Family Size", figsize=(8,5))
plt.legend(['Dead', 'Survived'])
plt.xlabel('Family Size')
plt.ylabel('Number of Passengers')
#plt.savefig('11.png')
plt.show()
```



In [71]:

```
# Creating a new variable called title by splitting the name variable
titanic['title'] = titanic.name.str.extract(' ([A-Za-z]+)\.', expand=False)
title = titanic.groupby(['title', 'sex'])['survived'].count().unstack()
title
```

Out[71]:

sex	female	male
title		
Capt	NaN	1.0
Col	NaN	4.0
Countess	1.0	NaN
Don	NaN	1.0
Dona	1.0	NaN
Dr	1.0	7.0
Jonkheer	NaN	1.0
Lady	1.0	NaN
Major	NaN	2.0
Master	NaN	61.0
Miss	260.0	NaN
Mlle	2.0	NaN
Mme	1.0	NaN
Mr	NaN	757.0
Mrs	197.0	NaN
Ms	2.0	NaN
Rev	NaN	8.0
Sir	NaN	1.0

In [72]:

```
# Converting the uncommon titles into common ones
titanic['title'] = titanic['title'].replace(['Lady', 'Countess','Capt', 'Col','Don', 'Dr', 'Major', 'Rev', 'Sir', 'Jonkheer', 'Dona'], 'Rare')
titanic['title'] = titanic['title'].replace('Mlle', 'Miss')
titanic['title'] = titanic['title'].replace('Ms', 'Miss')
titanic['title'] = titanic['title'].replace('Mme', 'Mrs')
title = titanic.groupby(['title', 'sex'])['survived'].count().unstack()
title
```

Out[72]:

sex	female	male
title		
Master	NaN	61.0
Miss	264.0	NaN
Mr	NaN	757.0
Mrs	198.0	NaN
Rare	4.0	25.0

In [73]:

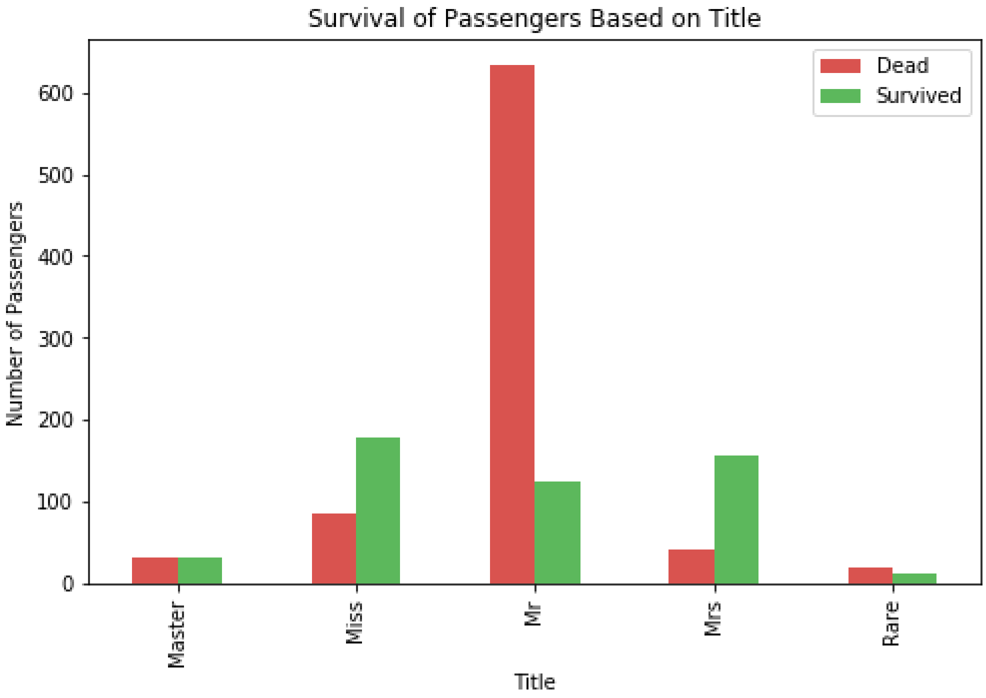
```
# Viewing the survival of each title
titanic[['title', 'survived']].groupby(['title'], as_index=False).mean()
```

Out[73]:

	title	survived
0	Master	0.508197
1	Miss	0.678030
2	Mr	0.162483
3	Mrs	0.787879
4	Rare	0.379310

In [74]:

```
# Visualizing survival based on title
titanic_title = titanic.groupby(['title', 'survived'])['survived'].count().unstack()
titanic_title.plot.bar(color=['#d9534f', '#5cb85c'], title = "Survival of Passengers Based on Title", figsize=(8,5))
plt.legend(['Dead', 'Survived'])
plt.xlabel('Title')
plt.ylabel('Number of Passengers')
#plt.savefig('12.png')
plt.show()
```


Survival of Passengers Based on Title
🟥 Dead
🟩 Survived
Number of Passengers
Master
Miss
Mr
Mrs
Rare
Title