1. Input the following data into a data frame called titanic, and display the entire data frame: Sex, Class, Survived, Died Children, First, 6, 0 Children, Second, 24, 0 Children, Third, 27, 52 Men, First, 57, 118 Men, Second, 14, 154 Men, Third, 75, 387 Men, Crew, 192, 693 Women, First, 140, 4 Women, Second, 80, 13 Women, Third, 76, 89 Women, Crew, 20, 3

In [1]:
```
import pandas as pd
import numpy as np

#Hard-coded data for output represents the sales per 5 months for 3 types of cars
titanic = {'Sex':['Children','Children','Children','Men','Men','Men','Men','Women
                'Class' : ['First','Second','Third','First','Second','Third','Cr
                'Survived': [6,24,27,57,14,75,192,140,80,76,20],
                'Died':[0,0,52,118,154,387,693,4,13,89,3]}

#Creates a data frame with the correct order of columns
df = pd.DataFrame(titanic,columns=["Sex","Class","Survived","Died"])

#Prints out the table
print(df)
```

```
         Sex   Class  Survived  Died
0   Children   First         6     0
1   Children  Second        24     0
2   Children   Third        27    52
3        Men   First        57   118
4        Men  Second        14   154
5        Men   Third        75   387
6        Men    Crew       192   693
7      Women   First       140     4
8      Women  Second        80    13
9      Women   Third        76    89
10     Women    Crew        20     3
```

2. Now only show the data of the people in first class.

In [2]:
```
print(df[df["Class"]=="First"])
```

```
        Sex  Class  Survived  Died
0  Children  First         6     0
3       Men  First        57   118
7     Women  First       140     4
```

3. Delete the crew members from the data.

In [3]:
```
df = df[(df['Class'] != 'Crew')]
df
```

Out[3]:

	Sex	Class	Survived	Died
0	Children	First	6	0
1	Children	Second	24	0
2	Children	Third	27	52
3	Men	First	57	118
4	Men	Second	14	154
5	Men	Third	75	387
7	Women	First	140	4
8	Women	Second	80	13
9	Women	Third	76	89

4. Create a new column that is the total number of people for that group (those who survived + died).

In [4]:
```
df["Total Passenger"]= df["Survived"]+df["Died"]
df
```

Out[4]:

	Sex	Class	Survived	Died	Total Passenger
0	Children	First	6	0	6
1	Children	Second	24	0	24
2	Children	Third	27	52	79
3	Men	First	57	118	175
4	Men	Second	14	154	168
5	Men	Third	75	387	462
7	Women	First	140	4	144
8	Women	Second	80	13	93
9	Women	Third	76	89	165

5. Create a new column with the percentage of people who survived.

In [5]:
```
df["Percentage of Survived"] =round((df["Survived"]/df["Total Passenger"])*100,2
df
```

Out[5]:

	Sex	Class	Survived	Died	Total Passenger	Percentage of Survived
0	Children	First	6	0	6	100.00
1	Children	Second	24	0	24	100.00
2	Children	Third	27	52	79	34.18
3	Men	First	57	118	175	32.57
4	Men	Second	14	154	168	8.33
5	Men	Third	75	387	462	16.23
7	Women	First	140	4	144	97.22
8	Women	Second	80	13	93	86.02
9	Women	Third	76	89	165	46.06

6. Delete the column indicating the total number of people in that group.

In [6]:
```
df = df.drop("Total Passenger",axis = 1)
df
```

Out[6]:

	Sex	Class	Survived	Died	Percentage of Survived
0	Children	First	6	0	100.00
1	Children	Second	24	0	100.00
2	Children	Third	27	52	34.18
3	Men	First	57	118	32.57
4	Men	Second	14	154	8.33
5	Men	Third	75	387	16.23
7	Women	First	140	4	97.22
8	Women	Second	80	13	86.02
9	Women	Third	76	89	46.06

7. Only show the rows where more than 80% of the people survived.

In [7]:
```
print(df[df["Percentage of Survived"] > 80.0])
```

```
        Sex   Class  Survived  Died  Percentage of Survived
0  Children   First         6     0                  100.00
1  Children  Second        24     0                  100.00
7     Women   First       140     4                   97.22
8     Women  Second        80    13                   86.02
```

8. Then only show the rows where less than 40% of the people survived

In [8]:
```
print(df[df["Percentage of Survived"] < 40.0])
```

```
        Sex   Class  Survived  Died  Percentage of Survived
2  Children   Third        27    52                   34.18
3       Men   First        57   118                   32.57
4       Men  Second        14   154                    8.33
5       Men   Third        75   387                   16.23
```

9. Calculate the total number of people that survived and died for each class, then report the percentages. (Hint: Use a grouped calculation.)

In [9]:
```
##This can also be done in one line
groupedDied = df.groupby('Class')['Died'].sum()
groupedSurvived = df.groupby('Class')['Survived'].sum()
groupedTotal = groupedDied+groupedDied
PerDied = (groupedDied/groupedTotal)*100
PerSur = (groupedSurvived/groupedTotal)*100
print(PerDied)
print(PerSur)
```

```
Class
First     50.0
Second    50.0
Third     50.0
Name: Died, dtype: float64
Class
First     83.196721
Second    35.329341
Third     16.856061
dtype: float64
```

10. Save your table in CSV format (as e.g. titanic_data.csv) with the first line as headers for the columns.

In [10]:
```
df.to_csv('titanic_data.csv',encoding='utf-8', index=False)
```

11. Duplicate the CSV file on your computer since you will be editing the copied version (e.g. titanic_data2.csv). Open the new CSV file in a text editor. Note the way the data is organized. Now, in the text editor, add new lines including the data for the crew that was removed earlier. (Help: the percentage of male crew and female crew that survived was 21.69% and 86.96%.)

In [11]:
```
df.to_csv('D:\\Courses\\BigData\\titanic_data3.csv',encoding='utf-8', index=Fals
```

12. Now read that updated CSV file into a new data frame called titanic2, and display the data.

In [12]:
```
df2 = pd.read_csv('D:\\Courses\\BigData\\titanic_data3.csv')
print(df2)
```

```
        Sex   Class  Survived  Died  Percentage of Survived
0  Children   First         6     0                  100.00
1  Children  Second        24     0                  100.00
2  Children   Third        27    52                   34.18
3       Men   First        57   118                   32.57
4       Men  Second        14   154                    8.33
5       Men   Third        75   387                   16.23
6     Women   First       140     4                   97.22
7     Women  Second        80    13                   86.02
8     Women   Third        76    89                   46.06
```

1. Open the file in a text editor while you read over the column names in the data file details at the end of this assignment.

2. Read the text file in as a dataframe. And then print it to make sure it read in correctly. Keep in mind this can be a tricky, error-prone problem depending on the formatting of the data file.

In [63]:
```
h = ['age','sex','chest_pain','bp','chol','sugar','ecg','heart_rate','angina','o
df = pd.read_csv('D:\\Courses\\BigData\\heart.csv',delimiter=' ')
df.shape
```

Out[63]:
```
(269, 14)
```

In [64]:
```
df1 = pd.DataFrame(df.values ,
                   columns = h)
df1
```

Out[64]:

	age	sex	chest_pain	bp	chol	sugar	ecg	heart_rate	angina	oldpeak	slope	vessel
0	67.0	0.0	3.0	115.0	564.0	0.0	2.0	160.0	0.0	1.6	2.0	0.0
1	57.0	1.0	2.0	124.0	261.0	0.0	0.0	141.0	0.0	0.3	1.0	0.0
2	64.0	1.0	4.0	128.0	263.0	0.0	0.0	105.0	1.0	0.2	2.0	1.0
3	74.0	0.0	2.0	120.0	269.0	0.0	2.0	121.0	1.0	0.2	1.0	1.0
4	65.0	1.0	4.0	120.0	177.0	0.0	0.0	140.0	0.0	0.4	1.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...	...
264	52.0	1.0	3.0	172.0	199.0	1.0	0.0	162.0	0.0	0.5	1.0	0.0
265	44.0	1.0	2.0	120.0	263.0	0.0	0.0	173.0	0.0	0.0	1.0	0.0
266	56.0	0.0	2.0	140.0	294.0	0.0	2.0	153.0	0.0	1.3	2.0	0.0
267	57.0	1.0	4.0	140.0	192.0	0.0	0.0	148.0	0.0	0.4	2.0	0.0
268	67.0	1.0	4.0	160.0	286.0	0.0	2.0	108.0	1.0	1.5	2.0	3.0

269 rows × 14 columns

3. Now let's get a sense of the ages of the people. First print only the ages of the patients by selecting only that column. Then calculate the mean and standard deviation of the ages.

In [68]:
```
df1["age"]
```

Out[68]:
```
0      67.0
1      57.0
2      64.0
3      74.0
4      65.0
       ...
264    52.0
265    44.0
266    56.0
267    57.0
268    67.0
Name: age, Length: 269, dtype: float64
```

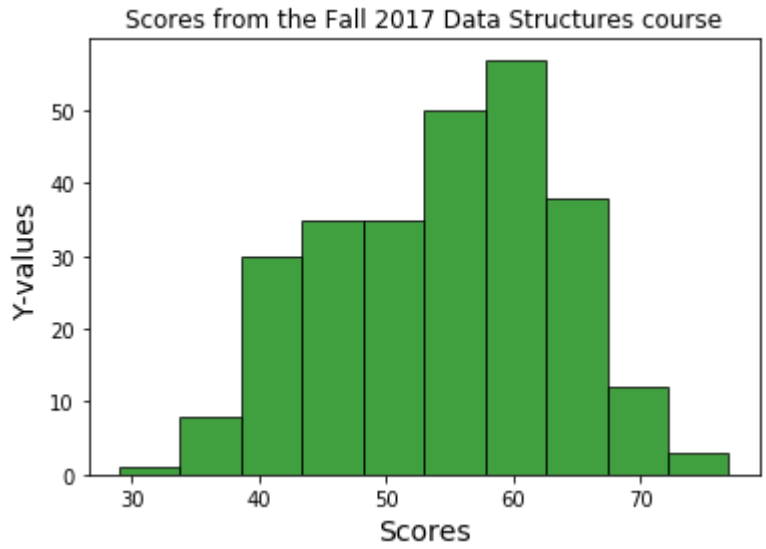
In [69]:
```
df1["age"].mean()
```

Out[69]:
```
54.37546468401487
```

In [87]:
```
import numpy as np
import matplotlib.pyplot as plt
x = df1['age']
num_bins =10
n, bins, patches = plt.hist(x, num_bins, facecolor='green', alpha=0.75, edgecolo

plt.title('Scores from the Fall 2017 Data Structures course')
plt.xlabel('Scores',fontsize=14)
plt.ylabel('Y-values',fontsize=14)
plt.savefig("D:\Courses\BigData\histogram.pdf",bbox_inches='tight')
plt.savefig("D:\Courses\BigData\histogram.png",bbox_inches='tight')
plt.show()
```

```
0      67.0
1      57.0
2      64.0
3      74.0
4      65.0
       ...
264    52.0
265    44.0
266    56.0
267    57.0
268    67.0
Name: age, Length: 269, dtype: float64
```



In [70]:
```
df1["age"].std()
```

Out[70]:
```
9.076186256688375
```

4. Create a data frame called young_df with all the people below 55 years old. Similarly, create a data frame called old_df with everyone at or above 55 years old. Now calculate the mean age, blood pressure, cholesterol, and heart rate for both groups and note the trend as people age.

In [73]:
```
young_df = df1[df1["age"] < 55]
old_df = df1[df1["age"] >= 55]
young_df
```

Out[73]:

	age	sex	chest_pain	bp	chol	sugar	ecg	heart_rate	angina	oldpeak	slope	vessel
10	53.0	1.0	4.0	142.0	226.0	0.0	2.0	111.0	1.0	0.0	1.0	0.0
11	44.0	1.0	3.0	140.0	235.0	0.0	2.0	180.0	0.0	0.0	1.0	0.0
15	46.0	1.0	4.0	140.0	311.0	0.0	0.0	120.0	1.0	1.8	2.0	2.0
16	53.0	1.0	4.0	140.0	203.0	1.0	2.0	155.0	1.0	3.1	3.0	0.0
18	40.0	1.0	1.0	140.0	199.0	0.0	0.0	178.0	1.0	1.4	1.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...	...
258	43.0	1.0	4.0	150.0	247.0	0.0	0.0	171.0	0.0	1.5	1.0	0.0
262	49.0	1.0	2.0	130.0	266.0	0.0	0.0	171.0	0.0	0.6	1.0	0.0
263	48.0	1.0	2.0	110.0	229.0	0.0	0.0	168.0	0.0	1.0	3.0	0.0
264	52.0	1.0	3.0	172.0	199.0	1.0	0.0	162.0	0.0	0.5	1.0	0.0
265	44.0	1.0	2.0	120.0	263.0	0.0	0.0	173.0	0.0	0.0	1.0	0.0

132 rows × 14 columns

5. Using all the data, let's try to see if there tend to be overall differences between people with heart disease and people without it. Find the mean age, blood pressure, cholesterol, and max heart rate for people with heart disease, and separately for the people without heart disease. This can be done easily using a grouping method for your data frame. Note the trend in each of these between people with heart disease and those without.

In [79]:
```
without_disease = df1[df1["disease"] == 1]
print('Age mean ',without_disease['age'].mean())
print('Bp mean ',without_disease['bp'].mean())
print('Chol mean ',without_disease['chol'].mean())
print('heart rate ',without_disease['heart_rate'].mean())
```

```
Age mean  52.70666666666666
Bp mean  128.86666666666667
Chol mean  244.21333333333334
heart rate  158.33333333333334
```

In [80]:
```
with_disease = df1[df1["disease"] == 2]
print('Age mean ',with_disease['age'].mean())
print('Bp mean ',with_disease['bp'].mean())
print('Chol mean ',with_disease['chol'].mean())
print('heart rate ',with_disease['heart_rate'].mean())
```

```
Age mean  56.47899159663866
Bp mean  134.47899159663865
Chol mean  255.91596638655463
heart rate  139.109243697479
```