In [1]:

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
import seaborn as sns
```

In [2]:

```
#load csv files
```

In [3]:

```
ride = pd.read_csv('Resources/ride_data.csv')
ride.head()
```

Out[3]:

	city	date	fare	ride_id
0	Sarabury	2016-01-16 13:49:27	38.35	5403689035038
1	South Roy	2016-01-02 18:42:34	17.49	4036272335942
2	Wiseborough	2016-01-21 17:35:29	44.18	3645042422587
3	Spencertown	2016-07-31 14:53:22	6.87	2242596575892
4	Nguyenbury	2016-07-09 04:42:44	6.28	1543057793673

In [4]:

```
city = pd.read_csv('Resources/city_data.csv')
city.head()
```

Out[4]:

	city	driver_count	type
0	Kelseyland	63	Urban
1	Nguyenbury	8	Urban
2	East Douglas	12	Urban
3	West Dawnfurt	34	Urban
4	Rodriguezburgh	52	Urban

In [5]:

```
#merge two csv files
```

In [6]:

```
pyber_df = pd.merge(ride, city, how='outer', on='city', sort=True)
pyber_df.head()
```

Out[6]:

	city	date	fare	ride_id	driver_count	type
0	Alvarezhaven	2016-04-18 20:51:29	31.93	4267015736324	21	Urban
1	Alvarezhaven	2016-08-01 00:39:48	6.42	8394540350728	21	Urban
2	Alvarezhaven	2016-09-01 22:57:12	18.09	1197329964911	21	Urban
3	Alvarezhaven	2016-08-18 07:12:06	20.74	357421158941	21	Urban
4	Alvarezhaven	2016-04-04 23:45:50	14.25	6431434271355	21	Urban

In [7]:

```
# * Average Fare ($) Per City
# * Total Number of Rides Per City
# * Total Number of Drivers Per City
# * City Type (Urban, Suburban, Rural)
```

In [8]:

```
#separate the df by city types
urban_df=pyber_df.loc[pyber_df['type'] == 'Urban']
suburban_df=pyber_df.loc[pyber_df['type'] == 'Suburban']
rural_df=pyber_df.loc[pyber_df['type'] == 'Rural']
```

In [9]:

```
#sum,count, and mean for each city type
urban_city_sum=urban_df.groupby('city').sum()
urban_city_ct=urban_df.groupby('city').count()
urban_city_avg=urban_df.groupby('city').mean()
```

In [10]:

```
#mean=avg fare, ct=total rides, sum/ct=driver counts
urban_x_axis=list(urban_city_ct['ride_id'])
urban_y_axis=list(urban_city_avg['fare'])
urban_s=list((urban_city_sum/urban_city_ct)['driver_count'])
```

In [11]:

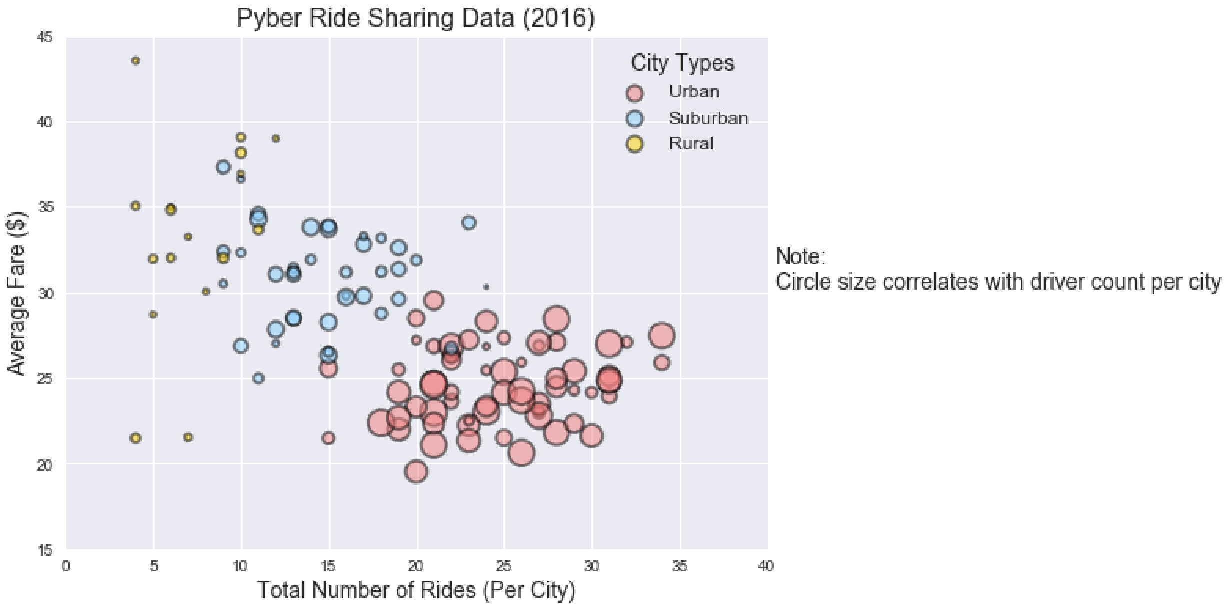
```
sub_city_sum=suburban_df.groupby('city').sum()
sub_city_ct=suburban_df.groupby('city').count()
sub_city_avg=suburban_df.groupby('city').mean()
sub_x_axis=list(sub_city_ct['ride_id'])
sub_y_axis=list(sub_city_avg['fare'])
sub_s=list((sub_city_sum/sub_city_ct)['driver_count'])
```

In [12]:

```
rural_city_sum=rural_df.groupby('city').sum()
rural_city_ct=rural_df.groupby('city').count()
rural_city_avg=rural_df.groupby('city').mean()
rural_x_axis=list(rural_city_ct['ride_id'])
rural_y_axis=list(rural_city_avg['fare'])
rural_s=list((rural_city_sum/rural_city_ct)['driver_count'])
```

In [13]:

```
plt.figure(figsize=(8,6))
sns.set(color_codes=True)

#urban plot
plt.scatter(urban_x_axis, urban_y_axis, marker='o', facecolors='lightcoral',
#suburban plot
plt.scatter(sub_x_axis, sub_y_axis, marker='o', facecolors='lightskyblue', e
#rural plot
plt.scatter(rural_x_axis, rural_y_axis, marker='o', facecolors='gold', edgec

#set xlim and ylim
plt.xlim(0, 40)
plt.ylim(15,45)

plt.title('Pyber Ride Sharing Data (2016)', fontsize=16)
plt.xlabel('Total Number of Rides (Per City)', fontsize=14)
plt.ylabel('Average Fare ($)', fontsize=14)


plt.annotate('Note:\nCircle size correlates with driver count per city',
            xy=(1, 0.5),  xytext=(5, 10), xycoords=('axes fraction', 'figure
            textcoords='offset points', size=14)
lgnd = plt.legend(fontsize=12, markerscale=1, frameon=False, title='City Typ
plt.setp(lgnd.get_title(),fontsize=14)
lgnd.legendHandles[0]._sizes = [100]
lgnd.legendHandles[1]._sizes = [100]
lgnd.legendHandles[2]._sizes = [100]

plt.grid(True)
plt.show()
```



In [14]:

```
# In addition, you will be expected to produce the following three pie chart

# % of Total Fares by City Type
# % of Total Rides by City Type
# % of Total Drivers by City Type
```

In [15]:

```
total_fare=pyber_df.sum()['fare']
```

In [16]:

```
urban_fare = urban_df.groupby('type').sum()['fare']
urban_fare_percent=urban_fare/total_fare
urban_fare_percent
```

Out[16]:

```
type
Urban    0.619745
Name: fare, dtype: float64
```

In [17]:

```
suburban_fare = suburban_df.groupby('type').sum()['fare']
suburban_fare_percent=suburban_fare/total_fare
suburban_fare_percent
```

Out[17]:

```
type
Suburban    0.314458
Name: fare, dtype: float64
```

In [18]:

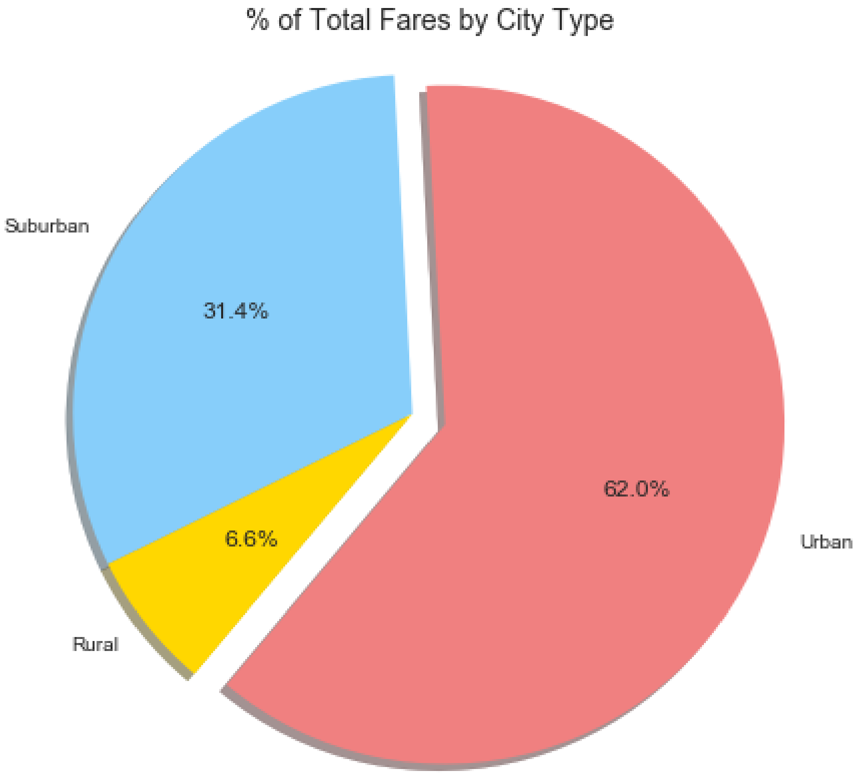
```
rural_fare = rural_df.groupby('type').sum()['fare']
rural_fare_percent=rural_fare/total_fare
rural_fare_percent
```

Out[18]:

```
type
Rural    0.065798
Name: fare, dtype: float64
```

In [19]:

```
plt.figure(figsize=(7,7))
faresize=list(zip(urban_fare_percent, suburban_fare_percent, rural_fare_perc
labels = ['Urban', 'Suburban', 'Rural']
colors = ['lightcoral', 'lightskyblue', 'gold']
explode = (0.1,0,0)

plt.pie(faresize[0], explode=explode, labels=labels, colors=colors,
        autopct="%1.1f%%", shadow=True, startangle=230)
plt.title('% of Total Fares by City Type',fontsize=14)
plt.axis('equal')
plt.show()
```



In [20]:

```
total_rides=len(pyber_df)
urban_rides=urban_df.groupby('type').count()['ride_id']
```

In [21]:

```
suburban_rides=suburban_df.groupby('type').count()['ride_id']
suburban_rides
```

Out[21]:

```
type
Suburban    657
Name: ride_id, dtype: int64
```

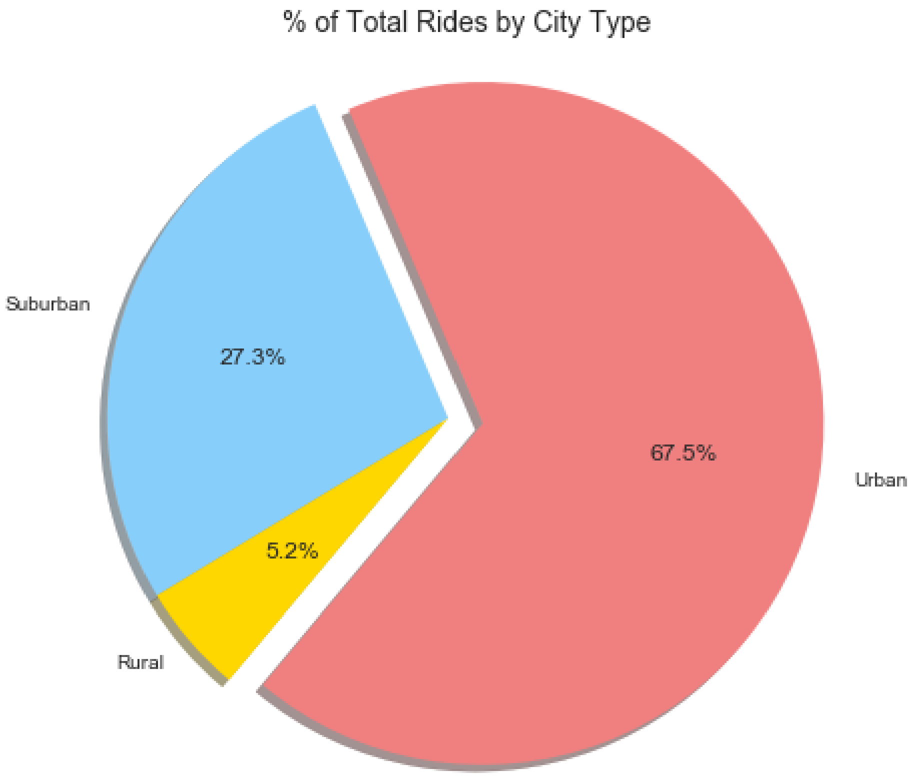
In [22]:

```
rural_rides=rural_df.groupby('type').count()['ride_id']
rural_rides
```

Out[22]:

```
type
Rural    125
Name: ride_id, dtype: int64
```

In [23]:
```
plt.figure(figsize=(7,7))
ridesize=list(zip(urban_rides, suburban_rides, rural_rides))
labels = ['Urban', 'Suburban', 'Rural']
colors = ['lightcoral', 'lightskyblue', 'gold']
explode = (0.1,0,0)

plt.pie(ridesize[0], explode=explode, labels=labels, colors=colors,
        autopct="%1.1f%%", shadow=True, startangle=230)
plt.title('% of Total Rides by City Type',fontsize=14)
plt.axis('equal')
plt.show()
```

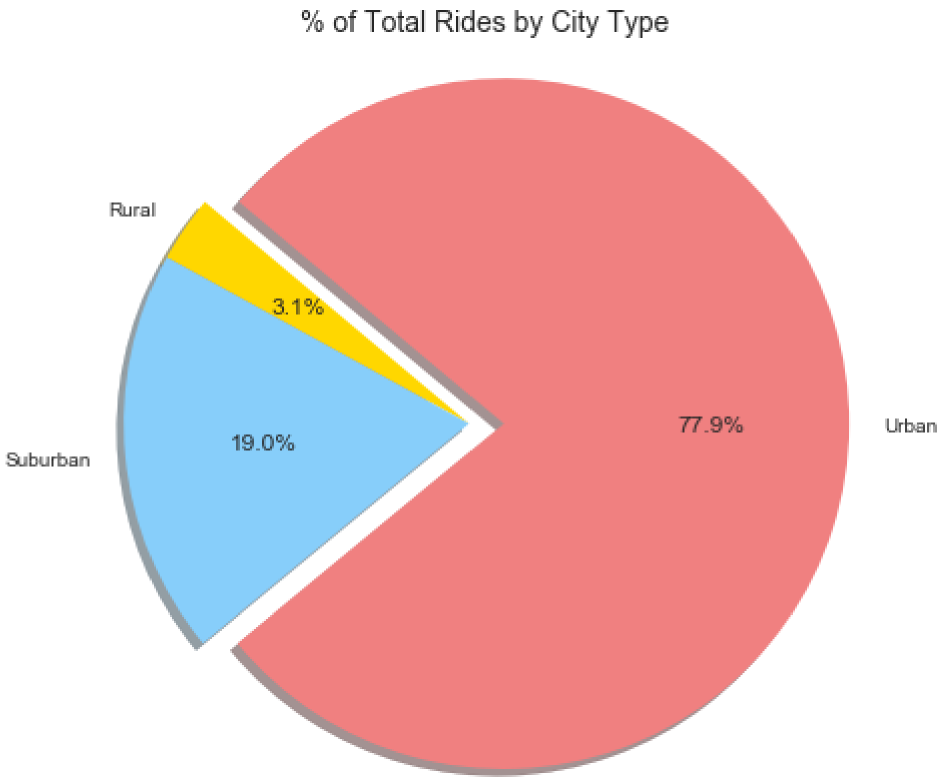


In [24]:
```
driver_df = pyber_df.drop_duplicates(['city'],keep='first')
driver_type=driver_df.groupby('type').sum()
driver_type
```

Out[24]:

	fare	ride_id	driver_count
type			
Rural	575.86	80908776277624	104
Suburban	1184.07	170431128985342	635
Urban	1567.85	319081797791091	2607

In [25]:
```
plt.figure(figsize=(7,7))
driversize=list(driver_type['driver_count'])
labels = ['Rural', 'Suburban', 'Urban']
colors = ['gold', 'lightskyblue', 'lightcoral']
explode = (0,0,0.1)

plt.pie(driversize, explode=explode, labels=labels, colors=colors,
        autopct="%1.1f%%", shadow=True, startangle=140)
plt.title('% of Total Rides by City Type',fontsize=14)
plt.axis('equal')
plt.show()
```


% of Total Rides by City Type
Rural
Suburban
Urban