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

data = pd.read_csv('filtered_final_dataset.csv')
data
```

Out[1]:

	Unnamed: 0	Unnamed: 0.1	Name	Rank	Race	Year	CaseID	TypeOfMisconduct	
0	0	0	joseph abasciano	Police Officer	White	2011.0	IAD2011-0182	Citizen complaint	Neg.I
1	1	1	joseph abasciano	Police Officer	White	2011.0	IAD2011-0182	Citizen complaint	Neg.I
2	2	2	joseph abasciano	Police Officer	White	2011.0	IAD2011-0182	Citizen complaint	
3	3	3	joseph abasciano	Police Officer	White	2011.0	IAD2011-0182	Citizen complaint	
4	4	4	joseph abasciano	Police Officer	White	2013.0	IAD2013-0019	Citizen complaint	Neg.I
...	...	...	...	...	...	...	...	...	
3966	8816	1	vladimir xavier	Police Officer	Black	2012.0	IAD2012-0009	Citizen complaint	
3967	8817	2	vladimir xavier	Police Officer	Black	2014.0	IAD2014-0255	Citizen complaint	Re
3968	8818	0	anthony d ierardi	Sergeant	White	2017.0	IAD2017-0154	Internal investigation	
3969	8819	0	robert m zingg	Detective	White	2011.0	IAD2011-0553	Internal investigation	Co
3970	8820	1	robert m zingg	Detective	White	2012.0	IAD2012-0039	Citizen complaint	Co

3971 rows × 46 columns

Initial Exploration -- See Look at Race, Rank, and Misconducts of Officers

Types of Misconduct

In [4]:
```
data['TypeOfMisconduct'].value_counts()
```

Out[4]:
```
Citizen complaint         3059
Internal investigation     912
Name: TypeOfMisconduct, dtype: int64
```

There are two types of misconduct - citizen complaint, and internal investigation. Now, we want to see whether or not race, ranking, and type of misconduct have an effect on the amount of contributions an officer makes.

In [5]:
```
# Sum of the total amounts for each officer WITHOUT duplicate dates
sum = {}
total_sum = 0
for n in data['Name'].unique():
    dates = []
    sum[n] = 0
    for d in data.loc[data['Name'] == n, 'Date']:
        if d not in dates:
            dates.append(d)
            s = ((data.loc[(data['Date'] == d )& (data['Name'] == n), 'Amount'].v
            sum[n] += s
    total_sum += sum[n]
sum
```

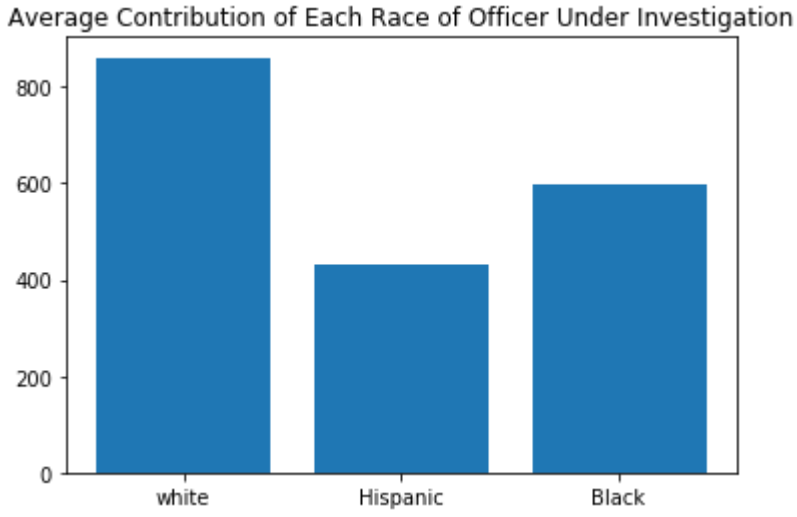
Out[5]:
```
{'joseph abasciano': 1549.06,
 'cesar abreu': 350.0,
 'luis m anjos': 800.0,
 'christopher adams': 500.0,
 'christopher p adams': 500.0,
 'john a adduci': 850.0,
 'jason m albanese': 825.0,
 'anthony m alexis': 100.0,
 'lamont anderson': 900.0,
 'alfredo andres': 275.0,
 'diamantino e araujo': 825.0,
 'mark l assad': 1250.0,
 'gerard w bailey': 1180.0,
 'dana s barrett': 6500.0,
 'harry bazile': 100.0,
 'manuel blas': 350.0,
 'michael john boulger': 2200.0,
 'john p boyle': 450.0,
 'john t boyle': 450.0,
```

In [6]:
```
# Adding correct total contributions to dataset
data = data.drop_duplicates(subset = ["Name"])
data['Total Amount']= data['Name'].map(sum)
df = data[['Name', 'Race','TypeOfMisconduct','Allegation', 'Date', 'Rank', 'Tota
df
```

100	christopher adams	White	Citizen complaint	Neg.Duty/Unreasonable Judge	3/15/2018	Police Officer	50
102	christopher p adams	White	Citizen complaint	Neg.Duty/Unreasonable Judge	3/15/2018	Police Officer	50
...	...	...	...	...	...	...	
3954	dante b williams	Hispanic	Citizen complaint	Neg.Duty/Unreasonable Judge	8/30/2017	Detective	30
3962	fred r williams	White	Internal investigation	Respectful Treatment	4/24/2013	Lieutenant	70
3965	vladimir xavier	Black	Citizen complaint	Respectful Treatment	8/28/2013	Police Officer	2
3968	anthony d ierardi	White	Internal investigation	Details	9/11/2013	Sergeant	50
3969	robert m zingg	White	Internal investigation	Conduct Unbecoming	3/27/2018	Detective	50

In [7]:
```
# Plot to see Demographic of Officers and the Average Contributions
race1 = []
for race in df.Race:
    for amount in df.loc[data['Race'] == race, 'Total Amount']:
        if race == 'White':
            race1.append(amount)

race2 = []
for race in df.Race:
    for amount in df.loc[data['Race'] == race, 'Total Amount']:
        if race == 'Hispanic':
            race2.append(amount)

race3 = []
for race in df.Race[0:20]:
    for amount in df.loc[data['Race'] == race, 'Total Amount']:
        if race == 'Black':
            race3.append(amount)

avg1 = np.mean(race1)
avg2 = np.mean(race2)
avg3 = np.mean(race3)

print("Average Amount of Contribution For Officers who are White: ", avg1)
print("Average Amount of Contribution For Officers that are Hispanic: ", avg2)
print("Average Amount of Contribution For Officers that are Black: ", avg3)

fig = plt.figure()
race = ['white', 'Hispanic', 'Black']
amount = [avg1, avg2, avg3]
plt.bar(race, amount)
plt.title("Average Contribution of Each Race of Officer Under Investigation")
plt.show()
```

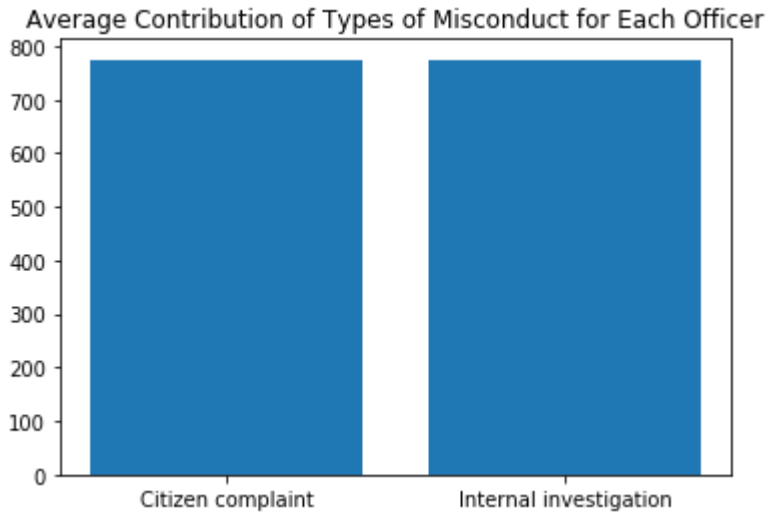
```
Average Amount of Contribution For Officers who are White:  860.7099342105263
Average Amount of Contribution For Officers that are Hispanic:  429.86666666666
66
Average Amount of Contribution For Officers that are Black:  599.5087719298245
```



From the three races represented on the graph, white officers made the most contributions. Now, we want to see if the ranking and the type of misconduct are related to race, and contribution amount. It is interesting to point out that there are more Hispanic officers than Black ones, even though Black officers contributed more.

In [8]:
```
# Plot types of misconducts and the average contribution made by officer

complaint = []
for m in df.TypeOfMisconduct:
    for amount in df.loc[data['TypeOfMisconduct'] == m, 'Total Amount']:
        if m == 'Citizen complaint':
            complaint.append(amount)
investigation = []
for i in df.TypeOfMisconduct:
    for amount in df.loc[data['TypeOfMisconduct'] == i, 'Total Amount']:
        if m == 'Internal investigation':
            investigation.append(amount)

avg1 = np.mean(complaint)
avg2 = np.mean(investigation)

print("Average Amount of Contribution For Officers who's Misconduct is Citizen Co
print("Average Amount of Contribution For Officers who's Misconduct is Internal I

fig = plt.figure()
conduct = ['Citizen complaint', 'Internal investigation']
amount = [avg1, avg2]
plt.bar(conduct, amount)
plt.title("Average Contribution of Types of Misconduct for Each Officer")
plt.show()
# do we even need the plot?
```

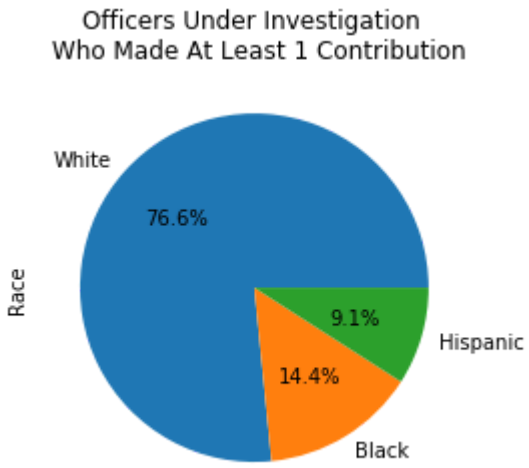
```
Average Amount of Contribution For Officers who's Misconduct is Citizen Complai
nt:  772.1757357357359
Average Amount of Contribution For Officers who's Misconduct is Internal Invest
igation:  774.8191430186547
```



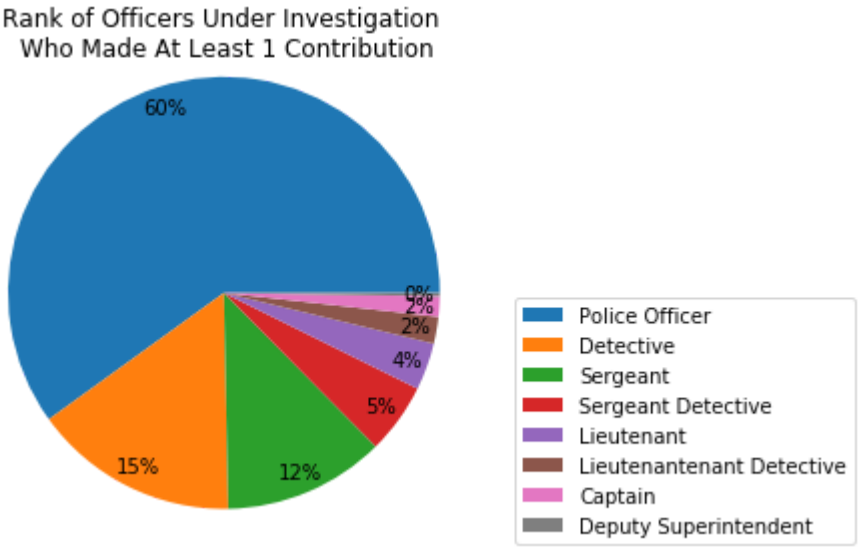
We can see that amount that the average amount of contributions by officers who's type of misconduct is internal investigation is higher than the ones who got citizen's complaints only by 2

dollars. We conclude that he type of misconduct had no affect on the amount the officer contributed.

In [9]:
```
# Plot of Race of Officers Under Investigation

data['Race'].value_counts().plot(kind='pie',autopct='%1.1f%%',)
plt.title("Officers Under Investigation \n Who Made At Least 1 Contribution")
plt.show()
```



In [13]:
```
# Plot of Officer Rank
vals_rank = data['Rank'].value_counts()
x = vals_rank.tolist()
labels = vals_rank.index.tolist()
plt.figure()

plt.gca().axis("equal")
pie = plt.pie(x, startangle=0, autopct='%1.0f%%', pctdistance=0.9, radius=1.2)
plt.title('Rank of Officers Under Investigation \n Who Made At Least 1 Contributi
plt.legend(pie[0],labels, bbox_to_anchor=(0.75,0.5), loc="best",
           bbox_transform=plt.gcf().transFigure)
plt.subplots_adjust(left=0.0, bottom=0.1, right=0.85)

plt.show()
plt.clf()
plt.close()
```



In [ ]:

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