Python Assignment

In [2]:

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

In [3]:

```
data = pd.read_excel("Ass-Data.xlsx")
```

Sample Data

In [4]:

```
data.head()
```

Out[4]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

1.What is the overall average tip?

In [5]:

```
data['tip'].mean()
```

Out[5]:

```
2.9982786885245902
```

2.Get a numerical summary for 'tip' - are the median and mean very different? What does this tell you about the field?

In [6]:

```
data['tip'].median()
```

Out[6]:

```
2.9
```

Hence, Median & mean are almost same.

If the distribution is symmetric then the mean is equal to the median and the distribution will have zero skewness

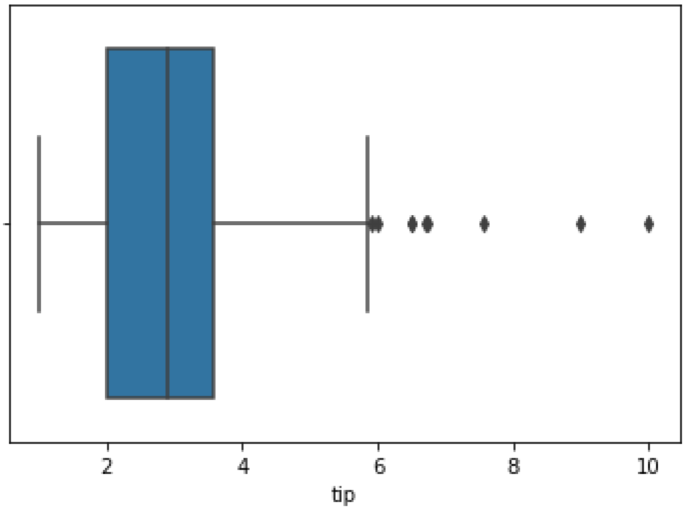
3.Prepare a boxplot for 'tip', are there any outliers?

In [7]:

```
sns.boxplot(x="tip", data=data)
```

Out[7]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x134256dc5c0>
```



In [8]:

```
q3, q1 = np.percentile(data.tip, [75,25])

iqr = q3 - q1
iqr = round(iqr,2)

print ("Lower Quatile:- ", q1 )
print ("Lower Quatile:- ", q3 )
print ("IQR:- ", iqr )
l = q1 - (1.5*iqr)
u = q1 + (1.5*iqr)
l = round(l,2)
u = round(u,2)
print("Lower range in boxplot is {}, & the upper range is, {}".format(l,u))
```

```
Lower Quatile:-  2.0
Lower Quatile:-  3.5624999999999996
IQR:-  1.56
Lower range in boxplot is -0.34, & the upper range is, 4.34
```

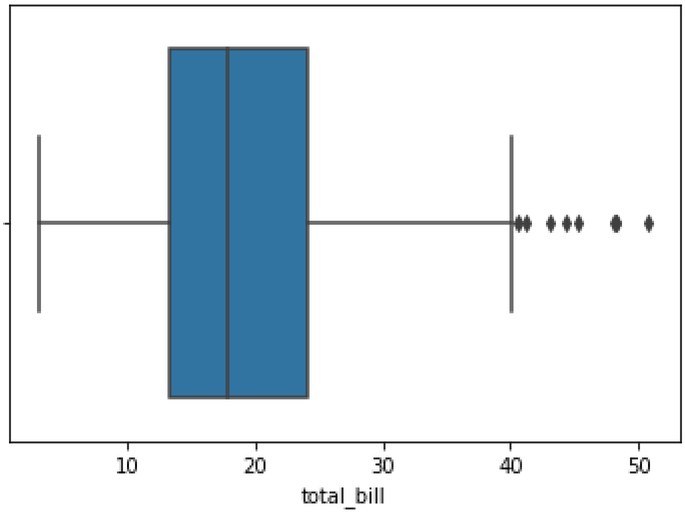
4.Prepare a boxplot for 'total_bill', are there any outliers?

In [9]:

```
sns.boxplot(x="total_bill", data = data)
```

Out[9]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x1342572d710>
```



In [10]:

```
q3, q1 = np.percentile(data.total_bill, [75,25])

iqr = q3 - q1
iqr = round(iqr,2)

print ("Lower Quatile:- ", q1 )
print ("Lower Quatile:- ", q3 )
print ("IQR:- ", iqr )
l = q1 - (1.5*iqr)
u = q1 + (1.5*iqr)
l = round(l,2)
u = round(u,2)
print("Lower range in boxplot is {}, & the upper range is, {}".format(l,u))
```

```
Lower Quatile:-  13.3475
Lower Quatile:-  24.127499999999998
IQR:-  10.78
Lower range in boxplot is -2.82, & the upper range is, 29.52
```

5. Gender: what is the percent of females in the data?

In [11]:

```
data.groupby('sex').size()
```

Out[11]:

```
sex
Female     87
Male      157
dtype: int64
```

In [12]:

```
x = data.groupby("sex").size()
t = data["sex"].count()
p = x/t * 100
p
```

Out[12]:

```
sex
Female    35.655738
Male      64.344262
dtype: float64
```

6.Prepare a bar plot with the bars representing the percentage of records for each gender.

In [64]:

```
cnt['count_perc'] = (cnt['total_bill']/ len(data)) *100
cnt
```

Out[64]:

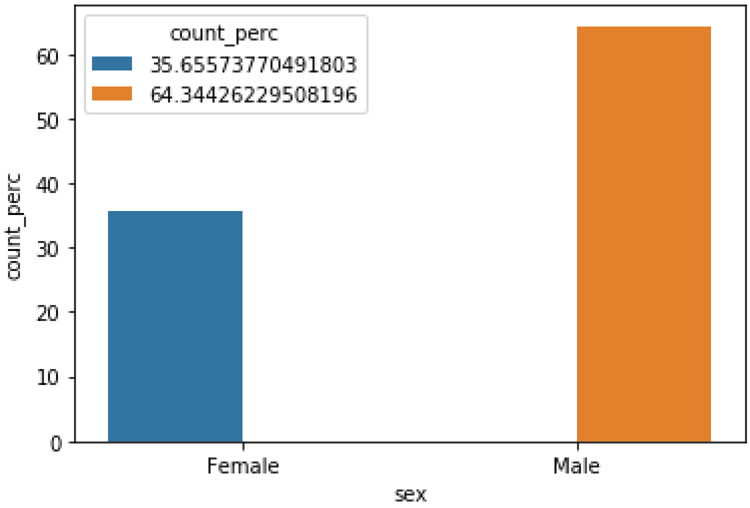
	sex	total_bill	tip	smoker	day	time	size	pct_tip	count_perc
0	Female	87	87	87	87	87	87	87	35.655738
1	Male	157	157	157	157	157	157	157	64.344262

In [68]:

```
sns.barplot(x="sex",y='count_perc',
            hue = 'count_perc'
            ,data = cnt)
```

Out[68]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x13426608f60>
```



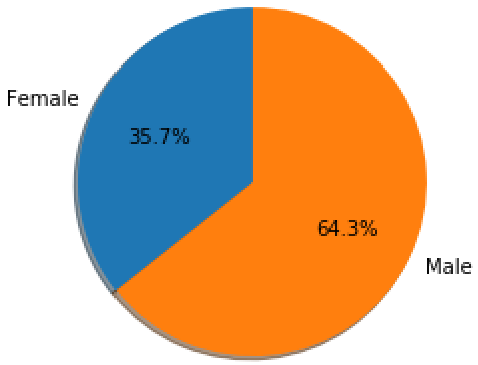
In [57]:

```
cnt = data.groupby(['sex']).count().reset_index()
cnt
cnt['count_perc'] = (cnt['total_bill']/ len(data)) *100

plt.pie(x='count_perc',data=cnt,labels=['Female', 'Male'], autopct='%1.1f%%',
       shadow=True, startangle=90)
```

Out[57]:

```
([<matplotlib.patches.Wedge at 0x1342652d908>,
  <matplotlib.patches.Wedge at 0x1342653b2b0>],
 [Text(-0.9901862461361194, 0.47909414311057974, 'Female'),
  Text(0.990186290992146, -0.47909405040265074, 'Male')],
 [Text(-0.5401015888015196, 0.2613240780603162, '35.7%'),
  Text(0.5401016132684432, -0.2613240274923549, '64.3%')])
```



7.Does the average tip differ by gender? Does one gender tip more than the other?

In [18]:

```
data.groupby(["sex"]).mean()['tip']
```

Out[18]:

```
sex
Female    2.833448
Male      3.089618
Name: tip, dtype: float64
```

yes, the avg value of male tip is greater than female tip

8. Does the average tip differ by the time of day?

In [19]:

```
data.groupby(["day","time"]).mean()['tip']
```

Out[19]:

```
day   time
Fri   Dinner    2.940000
      Lunch     2.382857
Sat   Dinner    2.993103
Sun   Dinner    3.255132
Thur  Dinner    3.000000
      Lunch     2.767705
Name: tip, dtype: float64
```

In [20]:

```
data.groupby(["day"]).mean()['tip']
```

Out[20]:

```
day
Fri     2.734737
Sat     2.993103
Sun     3.255132
Thur    2.771452
Name: tip, dtype: float64
```

In [21]:

```
data.groupby(["time"]).mean()['tip']
```

Out[21]:

```
time
Dinner    3.102670
Lunch     2.728088
Name: tip, dtype: float64
```

9. Does the average tip differ by size (number of people at the table)?

In [22]:

```
data.groupby('size').mean()['tip']
```

Out[22]:

```
size
1    1.437500
2    2.582308
3    3.393158
4    4.135405
5    4.028000
6    5.225000
Name: tip, dtype: float64
```

10. Do smokers tip more than non-smokers?

In [23]:

```
data.groupby('smoker').sum()['tip']
```

Out[23]:

```
smoker
No     451.77
Yes    279.81
Name: tip, dtype: float64
```

11. Gender vs. smoker/non-smoker and tip size - create a 2 by 2 and get the average tip size. Which group tips the most?

In [24]:

```
data.groupby(['sex','smoker']).mean()['tip']
```

Out[24]:

```
sex     smoker
Female  No        2.773519
        Yes       2.931515
Male    No        3.113402
        Yes       3.051167
Name: tip, dtype: float64
```

12.Create a new metric called 'pct_tip' = tip/ total_bill - this would be percent tip give, and should be a better measure of the tipping behaviour.

In [25]:

```
data['pct_tip'] = data['tip']/data['total_bill']
```

13. Does pct_tip differ by gender? Does one gender tip more than the other?

In [26]:

```
data.groupby(["sex"]).sum()['pct_tip']
```

Out[26]:

```
sex
Female    14.484694
Male      24.751136
Name: pct_tip, dtype: float64
```

14. Does pct_tip differ by size (number of people at the table)?

In [27]:

```
data.groupby(["size"]).sum()['pct_tip']
```

Out[27]:

```
size
1     0.869168
2    25.852194
3     5.781960
4     5.400113
5     0.707477
6     0.624917
Name: pct_tip, dtype: float64
```

15. Make the gender vs. smoker view using pct_tip - does your inference change?

In [131]:

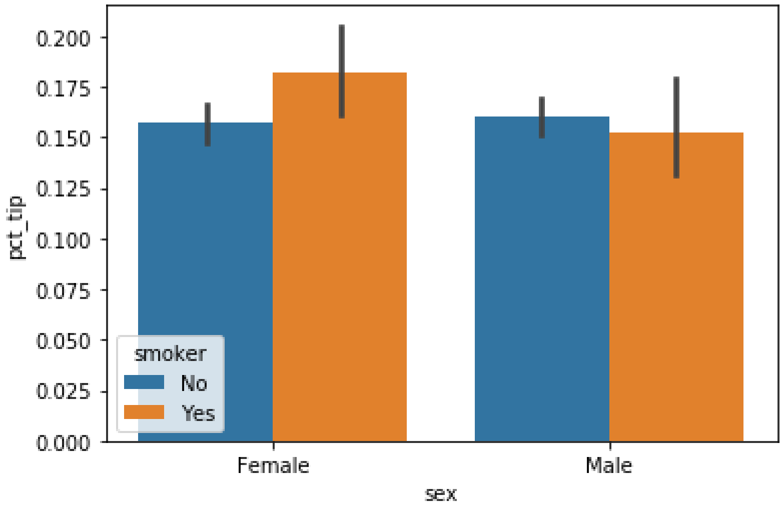
```
data['sex'].groupby(data["smoker"]).value_counts(normalize=True).rename('pct_tip').reset_index()


x,y,hue = 'sex','pct_tip','smoker'

sns.barplot(x,y,hue,data=data)
```

Out[131]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x13427a4ccc0>
```



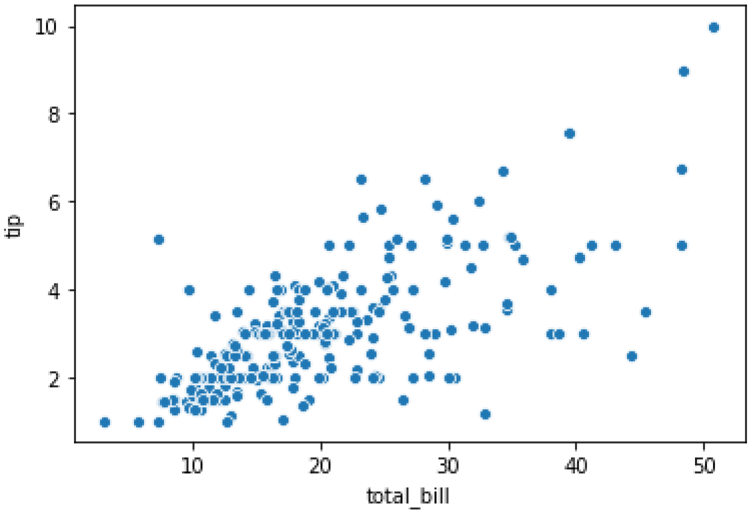
16. Make a scatter plot of total_bill vs. tip.

In [30]:

```
sns.scatterplot(x="total_bill", y = "tip",
                data = data)
```

Out[30]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x13425c4be48>
```



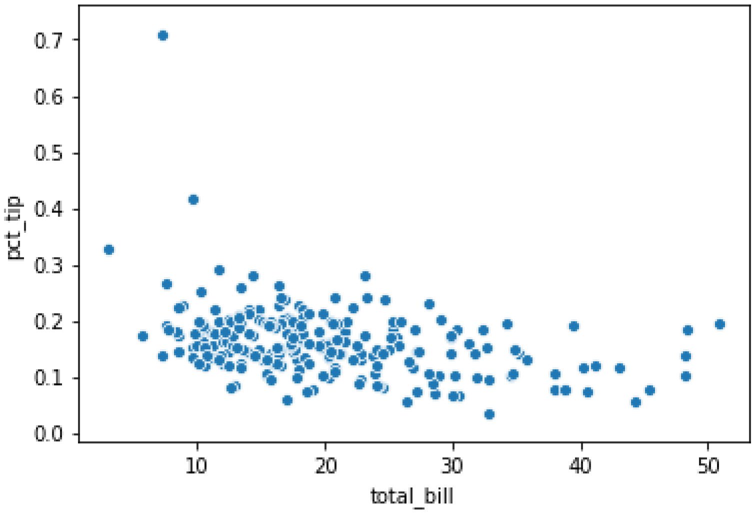
17. Make a scatter plot of total_bill vs. pct_tip.

In [31]:

```
sns.scatterplot(x="total_bill", y = "pct_tip",
                data = data)
```

Out[31]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x13425cc8518>
```



In [32]:

```
data["smoker"].count()
```

Out[32]:

```
244
```