In [1]:
```
import matplotlib.pyplot as plt
%matplotlib inline
#plt.show for others
import numpy as np
```

In [2]:
```
x=np.linspace(0,5,11)
y=x**2
```

In [7]:
```
x
```

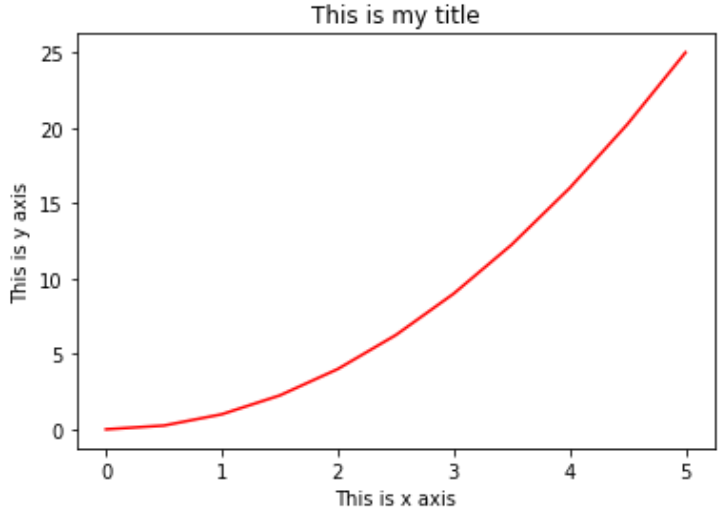
Out[7]:
```
array([0. , 0.5, 1. , 1.5, 2. , 2.5, 3. , 3.5, 4. , 4.5, 5. ])
```

In [8]:
```
y
```

Out[8]:
```
array([ 0.  ,  0.25,  1.  ,  2.25,  4.  ,  6.25,  9.  , 12.25, 16.  ,
       20.25, 25.  ])
```

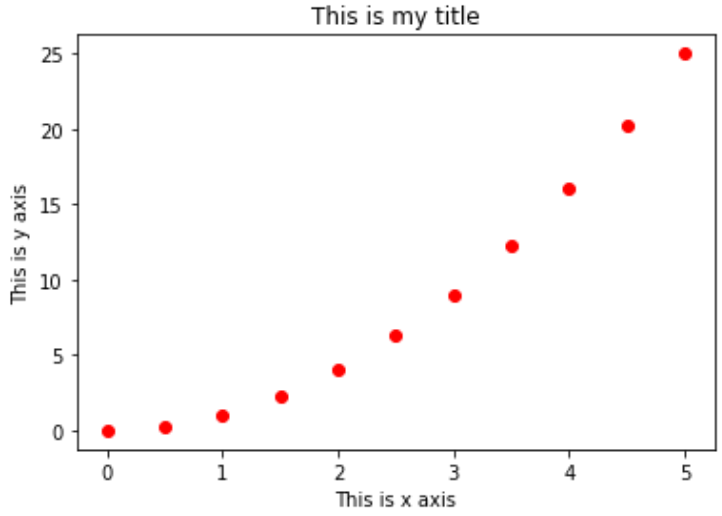
In [9]:
```
plt.plot(x,y,'r') # r g b or pink orange
plt.xlabel('This is x axis')
plt.ylabel('This is y axis')
plt.title('This is my title')
```

Out[9]:
```
Text(0.5, 1.0, 'This is my title')
```



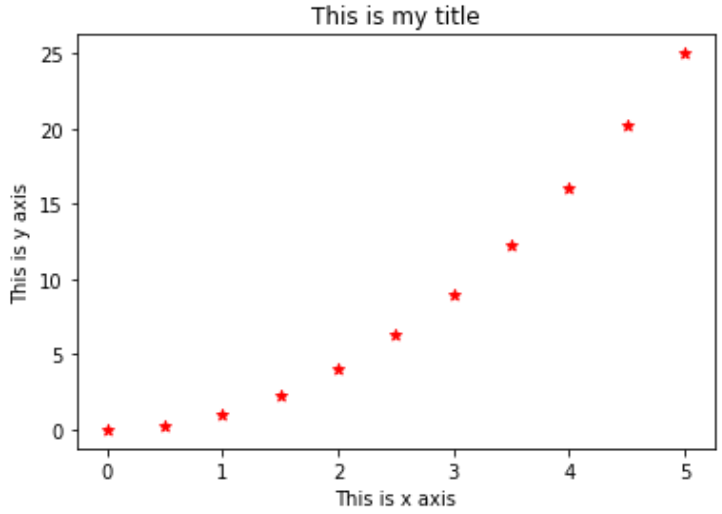
In [10]:
```
plt.scatter(x,y,color='red')
plt.xlabel('This is x axis')
plt.ylabel('This is y axis')
plt.title('This is my title')
```

Out[10]: Text(0.5, 1.0, 'This is my title')



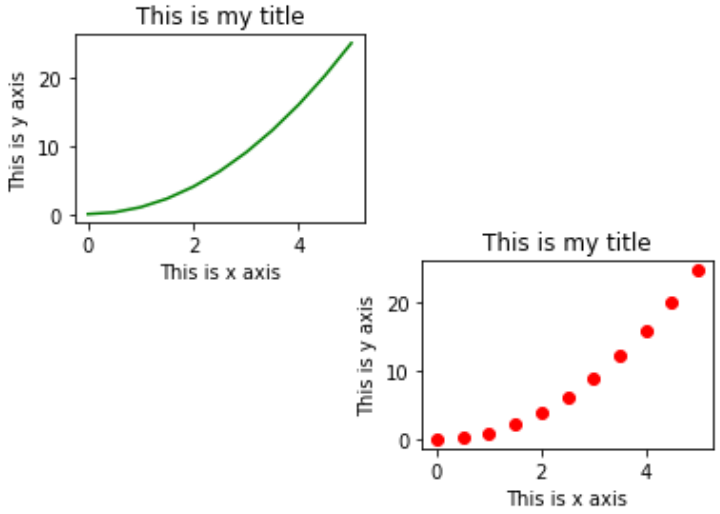
In [11]:
```
plt.scatter(x,y,color='red',marker='*')
plt.xlabel('This is x axis')
plt.ylabel('This is y axis')
plt.title('This is my title')
```

Out[11]:
```
Text(0.5, 1.0, 'This is my title')
```



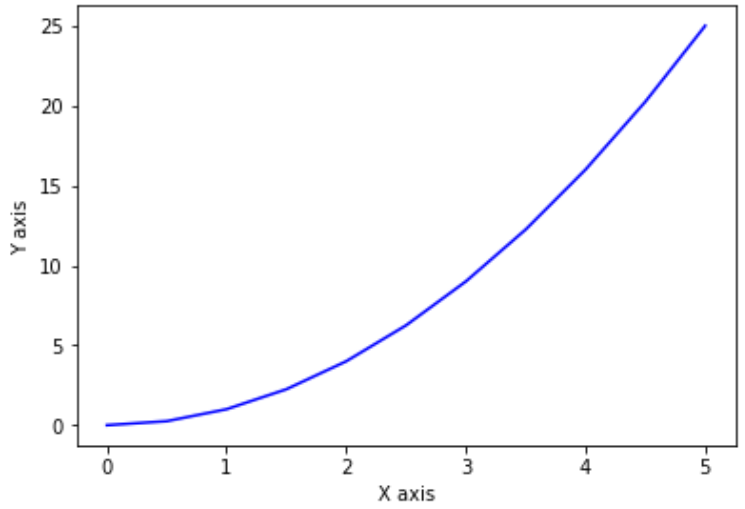
In [12]:
```
# plotting 2 grafs in same plot
#plt.subplot(no of rows,no of cols, which division(1,2,3,4) for 2 rows,2 cols and for 3,3, division(1,2...9) and so on)

plt.subplot(2,2,1)
plt.plot(x,y,'g')
plt.xlabel('This is x axis')
plt.ylabel('This is y axis')
plt.title('This is my title')
plt.subplot(2,2,4)
plt.scatter(x,y,color='red')
plt.xlabel('This is x axis')
plt.ylabel('This is y axis')
plt.title('This is my title')
```

Out[12]: Text(0.5, 1.0, 'This is my title')



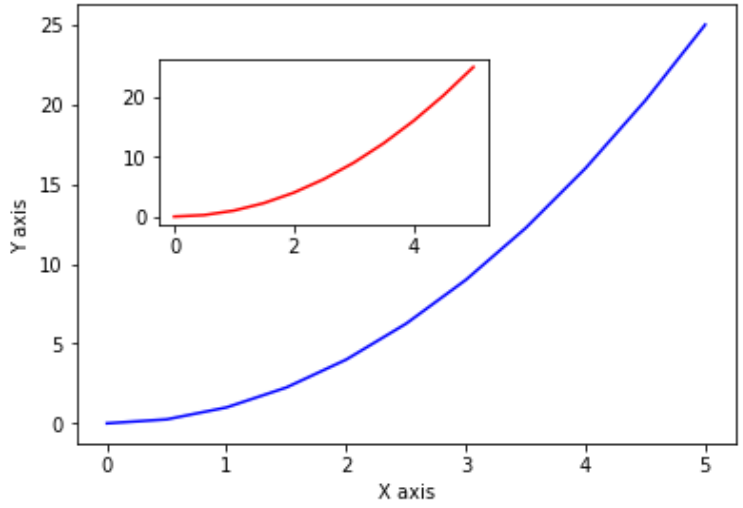
In [13]:
```
#creating fig and ploting axes
fig=plt.figure()
axes=fig.add_axes([0.1,0.1,0.8,0.8])#[(0.1,0.1) graph start,hight,width]
axes.plot(x,y,'b')
axes.set_xlabel('X axis')
axes.set_ylabel('Y axis')
```

Out[13]:
```
Text(0, 0.5, 'Y axis')
```



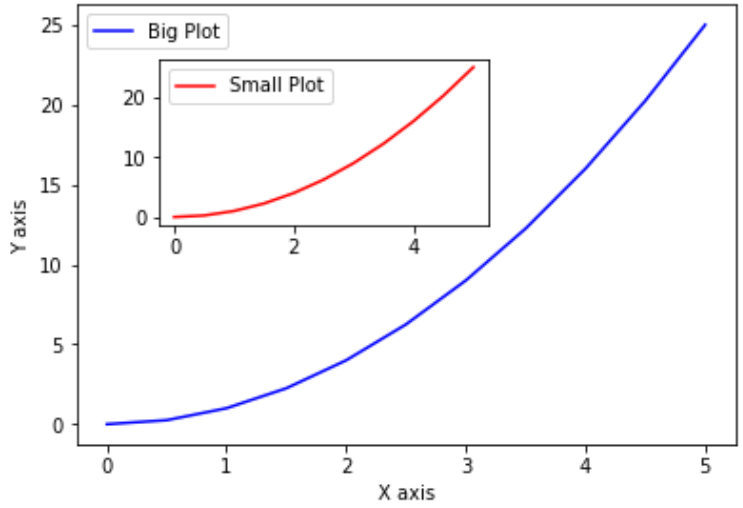
In [14]:
```
#creating 2 fig and ploting axes
fig=plt.figure()
axes=fig.add_axes([0.1,0.1,0.8,0.8])#[(0.1,0.1) graph start,hight,width]
axes2=fig.add_axes([0.2,0.5,0.4,0.3])
axes.plot(x,y,'b')
axes.set_xlabel('X axis')
axes.set_ylabel('Y axis')
axes2.plot(x,y,'r')
```

Out[14]:
```
[<matplotlib.lines.Line2D at 0x29def6902b0>]
```



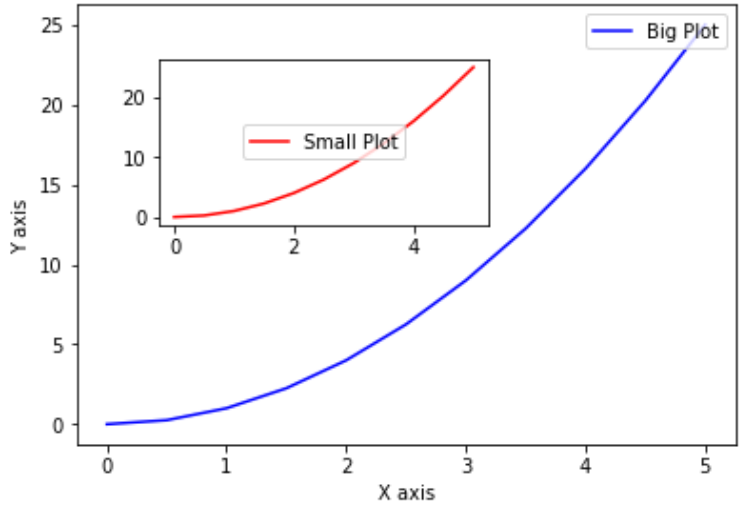
In [15]:
```
# adding title plot into graph
fig=plt.figure()
axes=fig.add_axes([0.1,0.1,0.8,0.8])#[(0.1,0.1) graph start,hight,width]
axes2=fig.add_axes([0.2,0.5,0.4,0.3])
axes.plot(x,y,'b',label='Big Plot')#naming title
axes.legend() #showing title
axes.set_xlabel('X axis')
axes.set_ylabel('Y axis')
axes2.plot(x,y,'r',label='Small Plot')#naming title
axes2.legend()#showing title
```

Out[15]:
```
<matplotlib.legend.Legend at 0x29def72cda0>
```



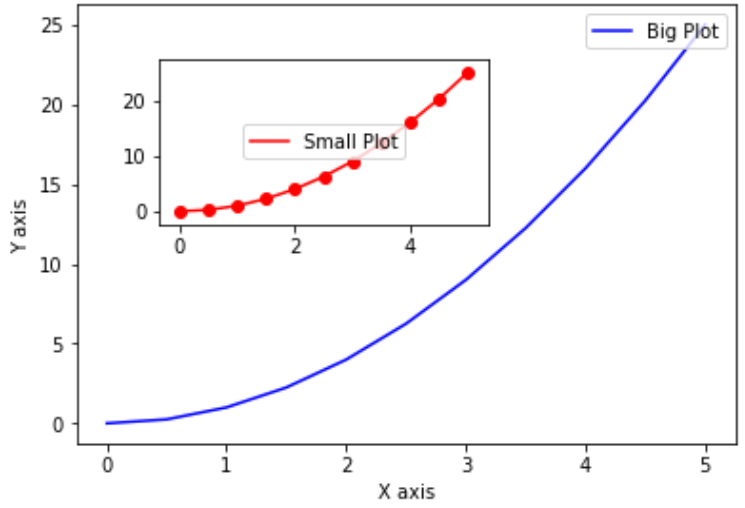
In [16]:
```
#changing position of title
fig=plt.figure()
axes=fig.add_axes([0.1,0.1,0.8,0.8])#[(0.1,0.1) graph start,hight,width]
axes2=fig.add_axes([0.2,0.5,0.4,0.3])
axes.plot(x,y,'b',label='Big Plot')#naming title
axes.legend(loc='upper right') #showing title in upper right
axes.set_xlabel('X axis')
axes.set_ylabel('Y axis')
axes2.plot(x,y,'r',label='Small Plot')#naming title
axes2.legend(loc='center')#showing title in center
```

Out[16]:
```
<matplotlib.legend.Legend at 0x29def7dffd0>
```



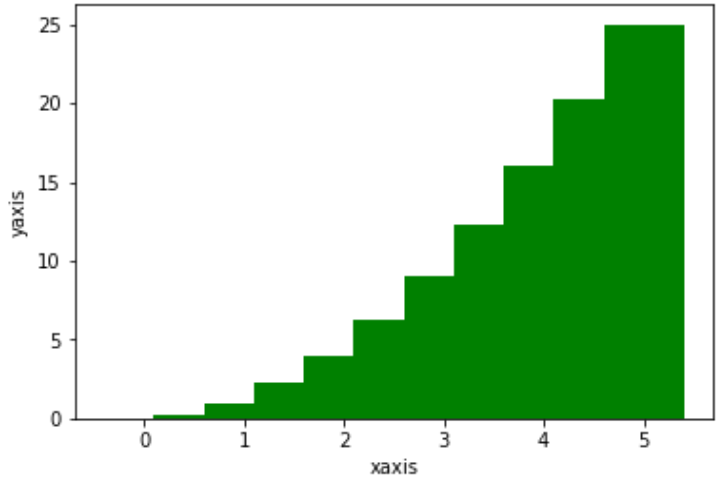
In [17]:
```
#using scatter
fig=plt.figure()
axes=fig.add_axes([0.1,0.1,0.8,0.8])#[(0.1,0.1) graph start,hight,width]
axes2=fig.add_axes([0.2,0.5,0.4,0.3])
axes.plot(x,y,'b',label='Big Plot')#naming title
axes.legend(loc='upper right') #showing title in upper right
axes.set_xlabel('X axis')
axes.set_ylabel('Y axis')
axes2.plot(x,y,'r',label='Small Plot')#naming title
axes2.scatter(x,y,color='red') # scatter can be user too
axes2.legend(loc='center')#showing title in center
```

Out[17]: <matplotlib.legend.Legend at 0x29def890668>



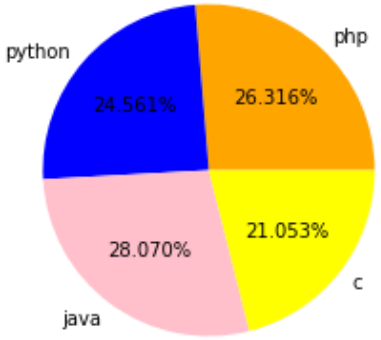
In [19]:
```
#bar plot

plt.bar(x,y,color='green')
plt.xlabel('xaxis')
plt.ylabel('yaxis')
```

Out[19]: Text(0, 0.5, 'yaxis')



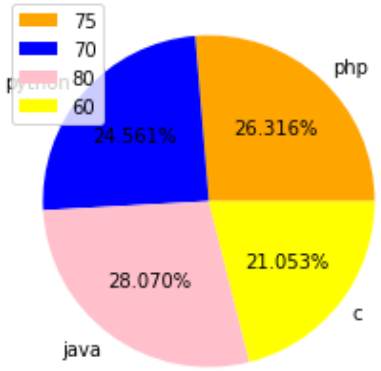
In [28]:
```
# pie graph

labels=['php','python','java','c']
number=[75,70,80,60]
fig,ax1=plt.subplots()
ax1.pie(number,labels=labels,autopct='%0.3f%%',colors=['orange','blue','pink','yellow']) # with percent and colour
```

Out[28]:
```
([<matplotlib.patches.Wedge at 0x29df0aab1d0>,
  <matplotlib.patches.Wedge at 0x29df0aab8d0>,
  <matplotlib.patches.Wedge at 0x29df0aabf60>,
  <matplotlib.patches.Wedge at 0x29df0ab46a0>],
 [Text(0.7450097048603818, 0.8092963237676587, 'php'),
  Text(-0.8295173176268907, 0.7224271726320158, 'python'),
  Text(-0.6514587095050077, -0.8863416665203493, 'java'),
  Text(0.8680546202641105, -0.6756339069630322, 'c')],
 [Text(0.4063689299238446, 0.44143435841872286, '26.316%'),
  Text(-0.45246399143284943, 0.3940511850720086, '24.561%'),
  Text(-0.3553411142754587, -0.4834590908292814, '28.070%'),
  Text(0.4734843383258784, -0.36852758561619936, '21.053%')])
```



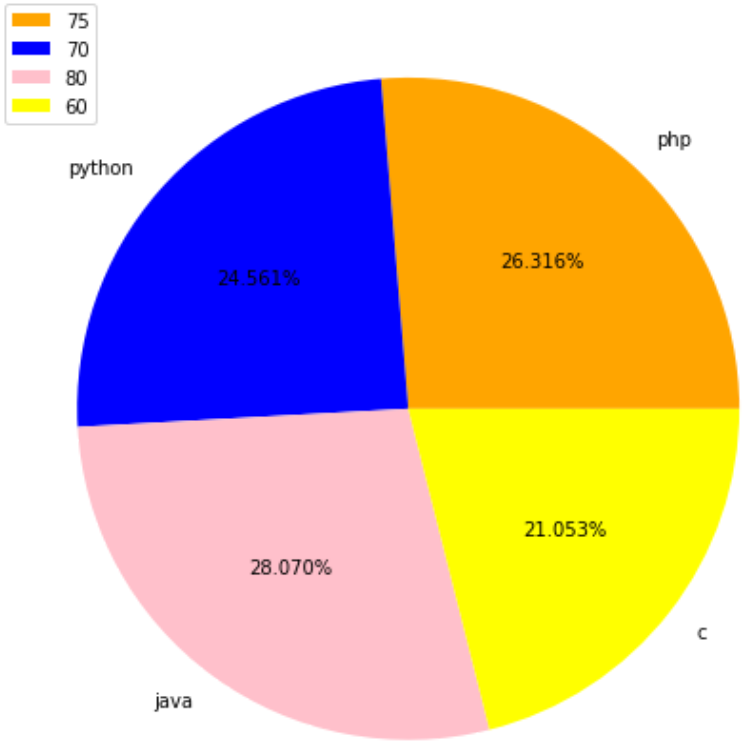
In [41]:
```
labels=['php','python','java','c']
number=[75,70,80,60]
fig,ax1=plt.subplots()
ax1.pie(number,labels=labels,autopct='%0.3f%%',colors=['orange','blue','pink','yellow'])
ax1.legend(number,loc='upper left')
```

Out[41]: <matplotlib.legend.Legend at 0x29df11aeb70>



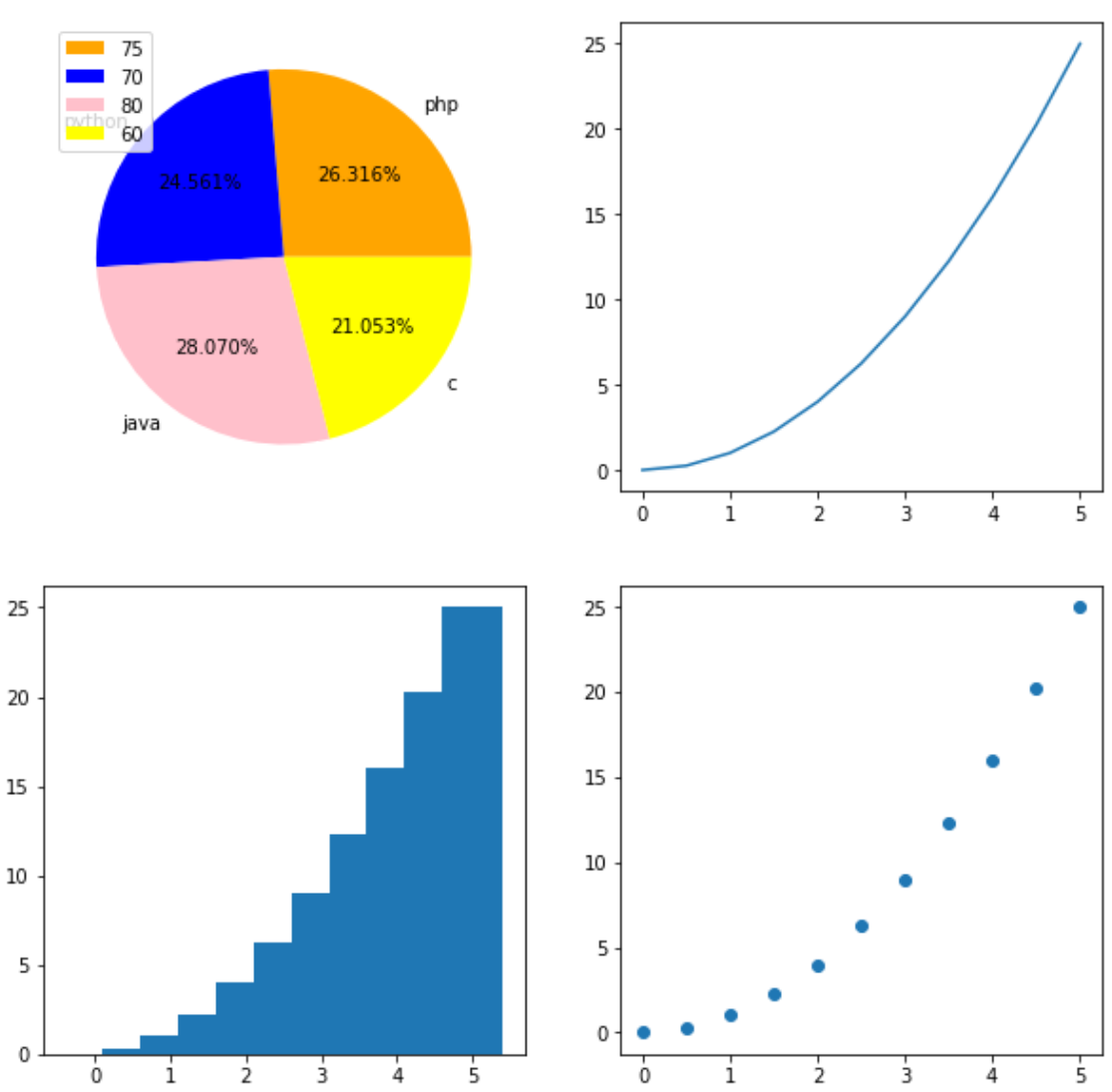
In [44]:
```
labels=['php','python','java','c']
number=[75,70,80,60]
fig,ax1=plt.subplots(figsize=(8,8)) #increasing fig size
ax1.pie(number,labels=labels,autopct='%0.3f%%',colors=['orange','blue','pink','yellow'])
ax1.legend(number,loc='upper left')
```

Out[44]: <matplotlib.legend.Legend at 0x29df1259cc0>



In [49]:
```
#showing all in one
labels = ["php","python","java","c"]
number = [75,70,80,60]
fig = plt.figure(figsize = (10,10))
ax = fig.add_subplot(2,2,1)
ax1 = fig.add_subplot(2,2,2)
ax2 = fig.add_subplot(2,2,3)
ax3 = fig.add_subplot(2,2,4)
ax.pie(number,labels =labels, autopct = '%0.3f%%',colors = ["orange","blue","pink","yellow"])
ax1.plot(x,y)
ax2.bar(x,y)
ax3.scatter(x,y)

ax.legend(number,loc = "upper left")
```

Out[49]:
```
<matplotlib.legend.Legend at 0x29df1bd30f0>
```



Seaborn

scatterplot is used when visualization is need better scatter can used in matplot and seaborn both

In [50]:
```
import seaborn as sns
```

In [51]:
```
tips=sns.load_dataset('tips')# this dataset is observation of tip providers in resturent
```

In [53]:
```
tips
```

Out[53]:

	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
5	25.29	4.71	Male	No	Sun	Dinner	4
6	8.77	2.00	Male	No	Sun	Dinner	2
7	26.88	3.12	Male	No	Sun	Dinner	4
8	15.04	1.96	Male	No	Sun	Dinner	2
9	14.78	3.23	Male	No	Sun	Dinner	2
10	10.27	1.71	Male	No	Sun	Dinner	2
11	35.26	5.00	Female	No	Sun	Dinner	4
12	15.42	1.57	Male	No	Sun	Dinner	2
13	18.43	3.00	Male	No	Sun	Dinner	4
14	14.83	3.02	Female	No	Sun	Dinner	2
15	21.58	3.92	Male	No	Sun	Dinner	2
16	10.33	1.67	Female	No	Sun	Dinner	3
17	16.29	3.71	Male	No	Sun	Dinner	3
18	16.97	3.50	Female	No	Sun	Dinner	3
19	20.65	3.35	Male	No	Sat	Dinner	3
20	17.92	4.08	Male	No	Sat	Dinner	2
21	20.29	2.75	Female	No	Sat	Dinner	2
22	15.77	2.23	Female	No	Sat	Dinner	2
23	39.42	7.58	Male	No	Sat	Dinner	4
24	19.82	3.18	Male	No	Sat	Dinner	2

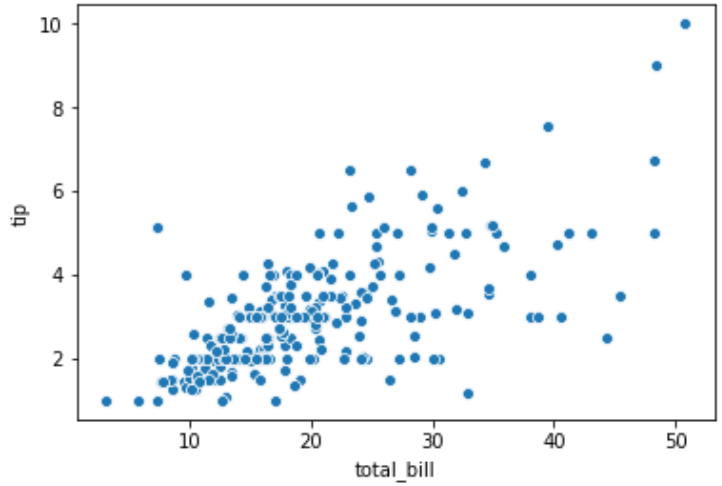
	total_bill	tip	sex	smoker	day	time	size
25	17.81	2.34	Male	No	Sat	Dinner	4
26	13.37	2.00	Male	No	Sat	Dinner	2
27	12.69	2.00	Male	No	Sat	Dinner	2
28	21.70	4.30	Male	No	Sat	Dinner	2
29	19.65	3.00	Female	No	Sat	Dinner	2
...	...	...	...	...	...	...	...
214	28.17	6.50	Female	Yes	Sat	Dinner	3
215	12.90	1.10	Female	Yes	Sat	Dinner	2
216	28.15	3.00	Male	Yes	Sat	Dinner	5
217	11.59	1.50	Male	Yes	Sat	Dinner	2
218	7.74	1.44	Male	Yes	Sat	Dinner	2
219	30.14	3.09	Female	Yes	Sat	Dinner	4
220	12.16	2.20	Male	Yes	Fri	Lunch	2
221	13.42	3.48	Female	Yes	Fri	Lunch	2
222	8.58	1.92	Male	Yes	Fri	Lunch	1
223	15.98	3.00	Female	No	Fri	Lunch	3
224	13.42	1.58	Male	Yes	Fri	Lunch	2
225	16.27	2.50	Female	Yes	Fri	Lunch	2
226	10.09	2.00	Female	Yes	Fri	Lunch	2
227	20.45	3.00	Male	No	Sat	Dinner	4
228	13.28	2.72	Male	No	Sat	Dinner	2
229	22.12	2.88	Female	Yes	Sat	Dinner	2
230	24.01	2.00	Male	Yes	Sat	Dinner	4
231	15.69	3.00	Male	Yes	Sat	Dinner	3
232	11.61	3.39	Male	No	Sat	Dinner	2
233	10.77	1.47	Male	No	Sat	Dinner	2
234	15.53	3.00	Male	Yes	Sat	Dinner	2
235	10.07	1.25	Male	No	Sat	Dinner	2

	total_bill	tip	sex	smoker	day	time	size
236	12.60	1.00	Male	Yes	Sat	Dinner	2
237	32.83	1.17	Male	Yes	Sat	Dinner	2
238	35.83	4.67	Female	No	Sat	Dinner	3
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

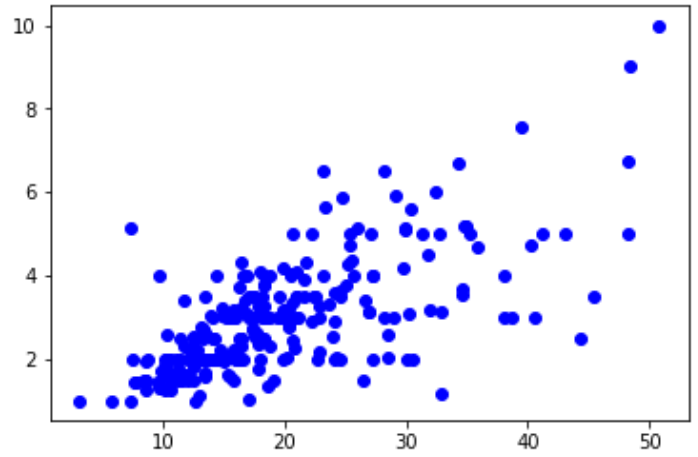
In [56]:
```
#visualization between bill and tip

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

Out[56]: <matplotlib.axes._subplots.AxesSubplot at 0x29df50cbac8>



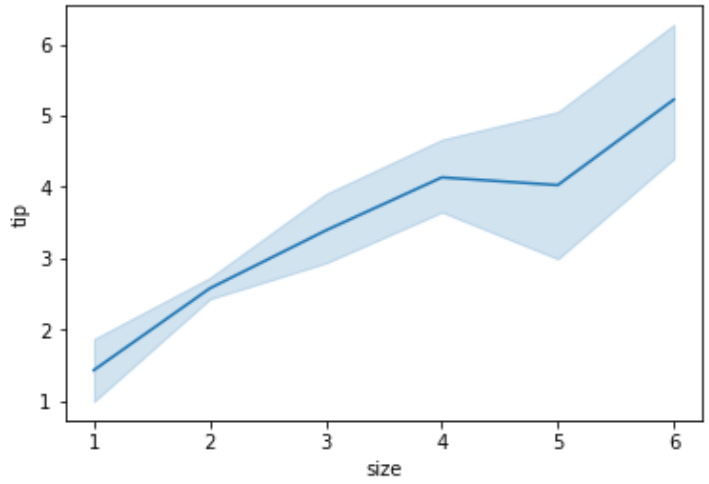
In [57]:
```
plt.scatter(tips['total_bill'],tips['tip'],color='blue')
```

Out[57]:
```
<matplotlib.collections.PathCollection at 0x29df14f6fd0>
```



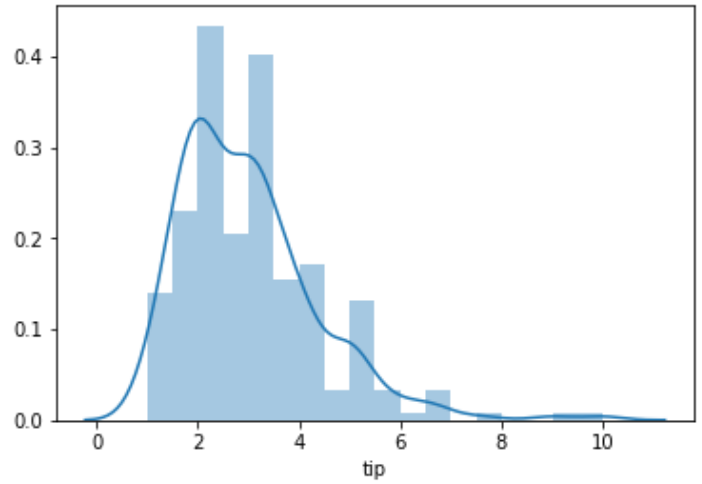
In [60]:
```
sns.lineplot(x="size",y="tip",data=tips)
```

Out[60]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x29df138cfd0>
```



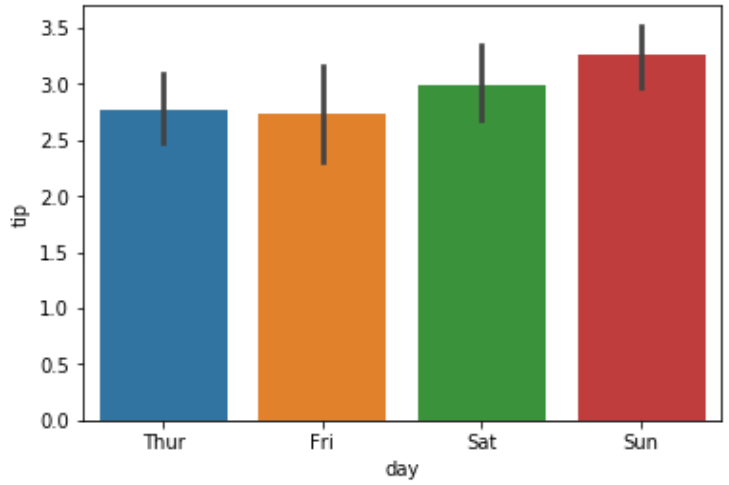
In [62]:
```
#distribution plot that will give density of the occurance

sns.distplot(tips["tip"])
```

Out[62]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x29df5a2a048>
```



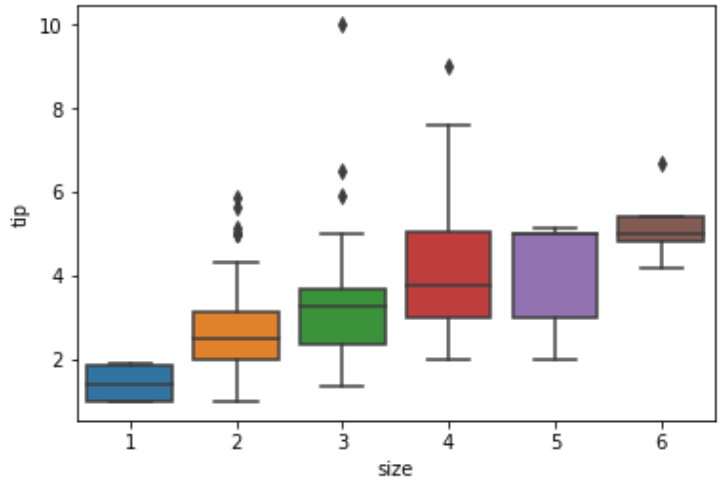
In [64]:
```
#bar plot

sns.barplot(x="day",y="tip",data=tips)
```

Out[64]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x29df59dec50>
```



In [65]:
```
#box plot
#quartile(2nd quatile is median) and rombos are outlayers when a balue is way differ than rest

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

Out[65]: <matplotlib.axes._subplots.AxesSubplot at 0x29df5b53400>



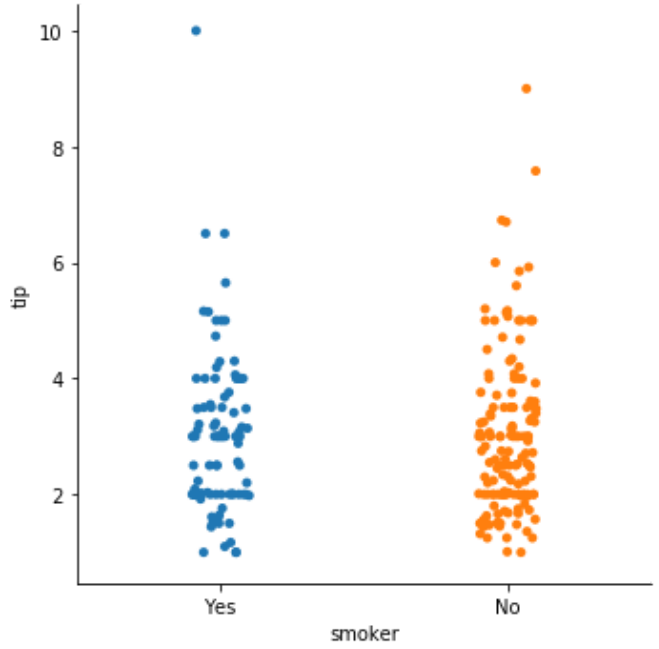
In [66]:
```
tips.describe()
```

Out[66]:

	total_bill	tip	size
count	244.000000	244.000000	244.000000
mean	19.785943	2.998279	2.569672
std	8.902412	1.383638	0.951100
min	3.070000	1.000000	1.000000
25%	13.347500	2.000000	2.000000
50%	17.795000	2.900000	2.000000
75%	24.127500	3.562500	3.000000
max	50.810000	10.000000	6.000000

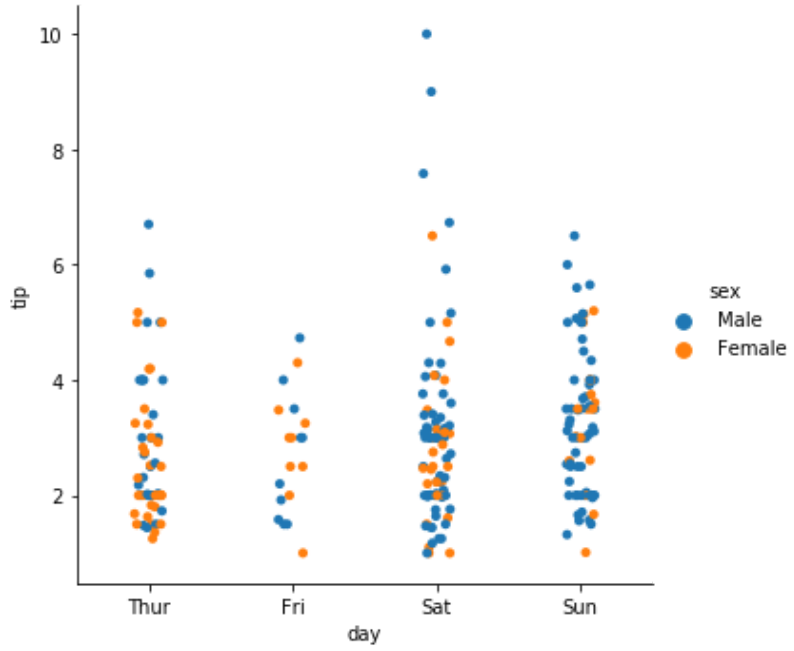
In [68]:
```
#catagorical plot ->relation between numerical and one or more catagorical variable

sns.catplot(x="smoker",y="tip",data=tips)
```

Out[68]: <seaborn.axisgrid.FacetGrid at 0x29df56ba3c8>



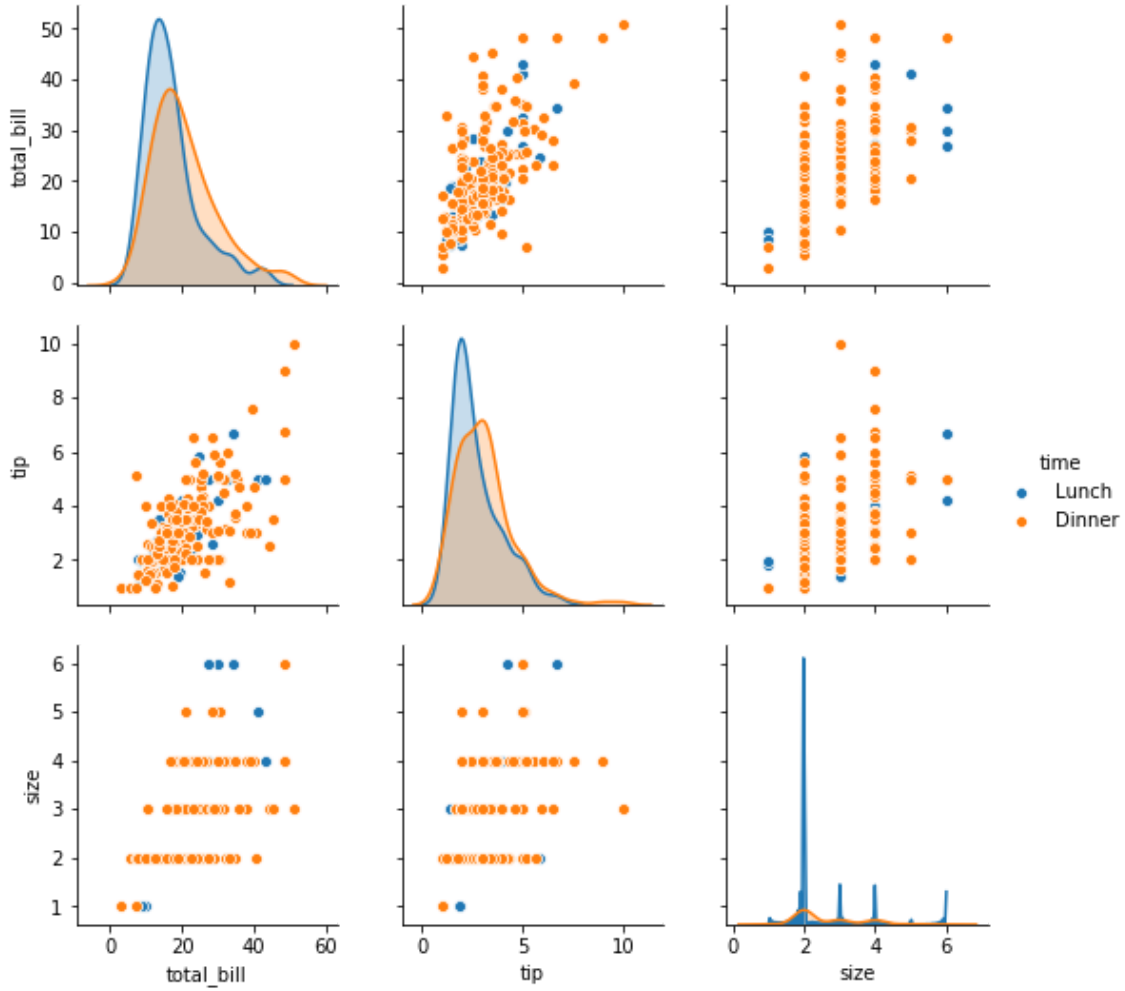
In [69]:
```
# heu parameter determines which column in the data frame should be used for colour encoding
sns.catplot(x="day",y="tip",hue="sex",data=tips)
```

Out[69]: <seaborn.axisgrid.FacetGrid at 0x29df5679b38>



In [73]:
```
#pairplot -> relation between one coloumn to other

sns.pairplot(tips,hue="time")
```

Out[73]: <seaborn.axisgrid.PairGrid at 0x29df75629e8>



In [71]:
```
tips.corr() #pairwise correlation of all columns in the dataframe
```

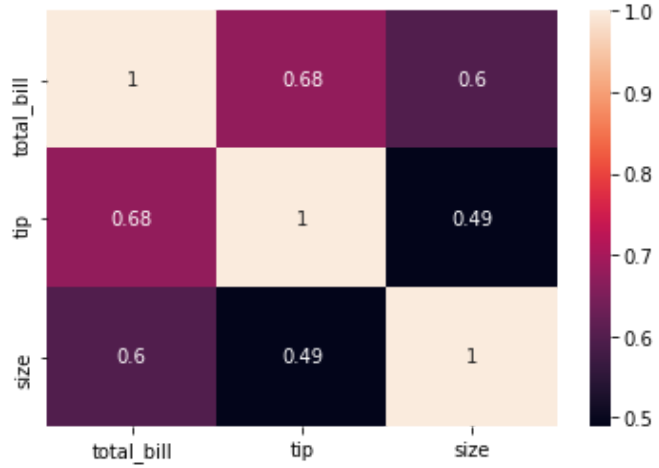
Out[71]:

	total_bill	tip	size
total_bill	1.000000	0.675734	0.598315
tip	0.675734	1.000000	0.489299
size	0.598315	0.489299	1.000000

-1 to 1 thresold is 0.5 value > 0.5 it is highly positively corelated - direct proportionately value < 0.5 it is partially corelated value > -0.5 it is partially negatively corelated value < -0.5 it is negatively highly corelated - inverse proportionately

In [76]:
```
#heat map generate
#higher color means high corelates lower means lower corelated

sns.heatmap(tips.corr(),annot=True)#annot=true values will show (annotate)
```

Out[76]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x29df892a550>
```



In [77]:
```
tips=sns.load_dataset('iris')
```

In [78]:
```
tips
```

Out[78]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa
5	5.4	3.9	1.7	0.4	setosa
6	4.6	3.4	1.4	0.3	setosa
7	5.0	3.4	1.5	0.2	setosa
8	4.4	2.9	1.4	0.2	setosa
9	4.9	3.1	1.5	0.1	setosa
10	5.4	3.7	1.5	0.2	setosa
11	4.8	3.4	1.6	0.2	setosa
12	4.8	3.0	1.4	0.1	setosa
13	4.3	3.0	1.1	0.1	setosa
14	5.8	4.0	1.2	0.2	setosa
15	5.7	4.4	1.5	0.4	setosa
16	5.4	3.9	1.3	0.4	setosa
17	5.1	3.5	1.4	0.3	setosa
18	5.7	3.8	1.7	0.3	setosa
19	5.1	3.8	1.5	0.3	setosa
20	5.4	3.4	1.7	0.2	setosa
21	5.1	3.7	1.5	0.4	setosa
22	4.6	3.6	1.0	0.2	setosa
23	5.1	3.3	1.7	0.5	setosa
24	4.8	3.4	1.9	0.2	setosa

	sepal_length	sepal_width	petal_length	petal_width	species
25	5.0	3.0	1.6	0.2	setosa
26	5.0	3.4	1.6	0.4	setosa
27	5.2	3.5	1.5	0.2	setosa
28	5.2	3.4	1.4	0.2	setosa
29	4.7	3.2	1.6	0.2	setosa
...	...	...	...	...	...
120	6.9	3.2	5.7	2.3	virginica
121	5.6	2.8	4.9	2.0	virginica
122	7.7	2.8	6.7	2.0	virginica
123	6.3	2.7	4.9	1.8	virginica
124	6.7	3.3	5.7	2.1	virginica
125	7.2	3.2	6.0	1.8	virginica
126	6.2	2.8	4.8	1.8	virginica
127	6.1	3.0	4.9	1.8	virginica
128	6.4	2.8	5.6	2.1	virginica
129	7.2	3.0	5.8	1.6	virginica
130	7.4	2.8	6.1	1.9	virginica
131	7.9	3.8	6.4	2.0	virginica
132	6.4	2.8	5.6	2.2	virginica
133	6.3	2.8	5.1	1.5	virginica
134	6.1	2.6	5.6	1.4	virginica
135	7.7	3.0	6.1	2.3	virginica
136	6.3	3.4	5.6	2.4	virginica
137	6.4	3.1	5.5	1.8	virginica
138	6.0	3.0	4.8	1.8	virginica
139	6.9	3.1	5.4	2.1	virginica
140	6.7	3.1	5.6	2.4	virginica
141	6.9	3.1	5.1	2.3	virginica

	sepal_length	sepal_width	petal_length	petal_width	species
142	5.8	2.7	5.1	1.9	virginica
143	6.8	3.2	5.9	2.3	virginica
144	6.7	3.3	5.7	2.5	virginica
145	6.7	3.0	5.2	2.3	virginica
146	6.3	2.5	5.0	1.9	virginica
147	6.5	3.0	5.2	2.0	virginica
148	6.2	3.4	5.4	2.3	virginica
149	5.9	3.0	5.1	1.8	virginica

150 rows × 5 columns

In [82]:
```
#convert data set into excel format

tips.to_csv("tips.csv")
```

In [ ]:
```

```