

02052021 - Visualization

February 27, 2021

1 Matplotlib

Matplotlib tries to make easy things easy and hard things possible. You can generate plots, histograms, power spectra, bar charts, errorcharts, scatterplots, etc., with just a few lines of code.

1. Generally easy to get started for simple plots 2. Support for custom labels and texts 3. Great control of every element in a figure 4. High-quality output in many formats 5. Very customizable in general

```
[1]: import matplotlib.pyplot as plt
      %matplotlib inline

      # help in creating the graphs in the notebook otherwise they will pop up
```

```
[2]: avg_monthly_rain=[0,0,1,12,113,868,995,513,252,125,31,17]
      month = list(range(1,13))

      print (avg_monthly_rain)
      print ()
      print (month)
```

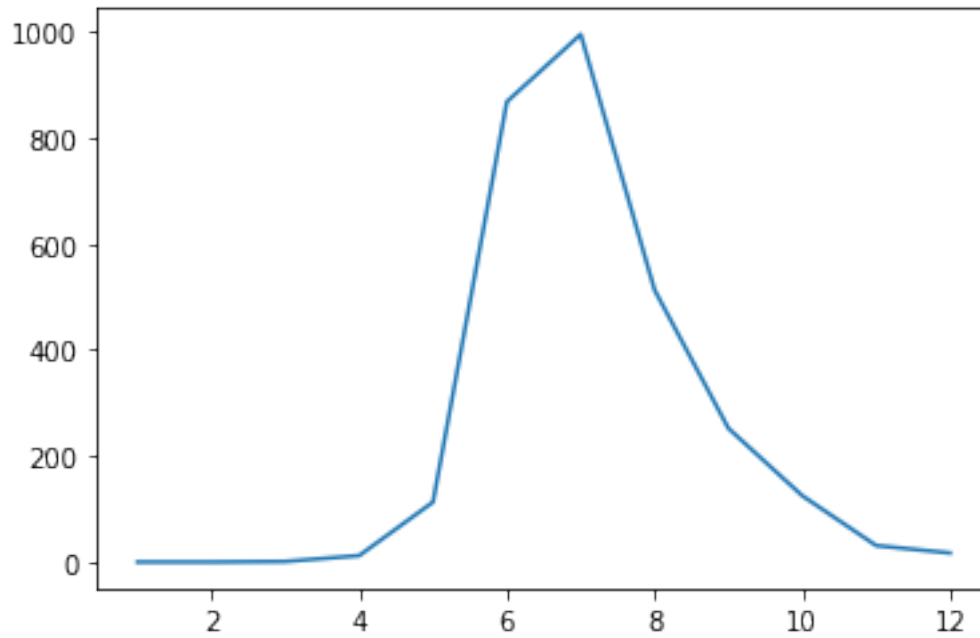
```
[0, 0, 1, 12, 113, 868, 995, 513, 252, 125, 31, 17]
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]
```

Basic Line Plot

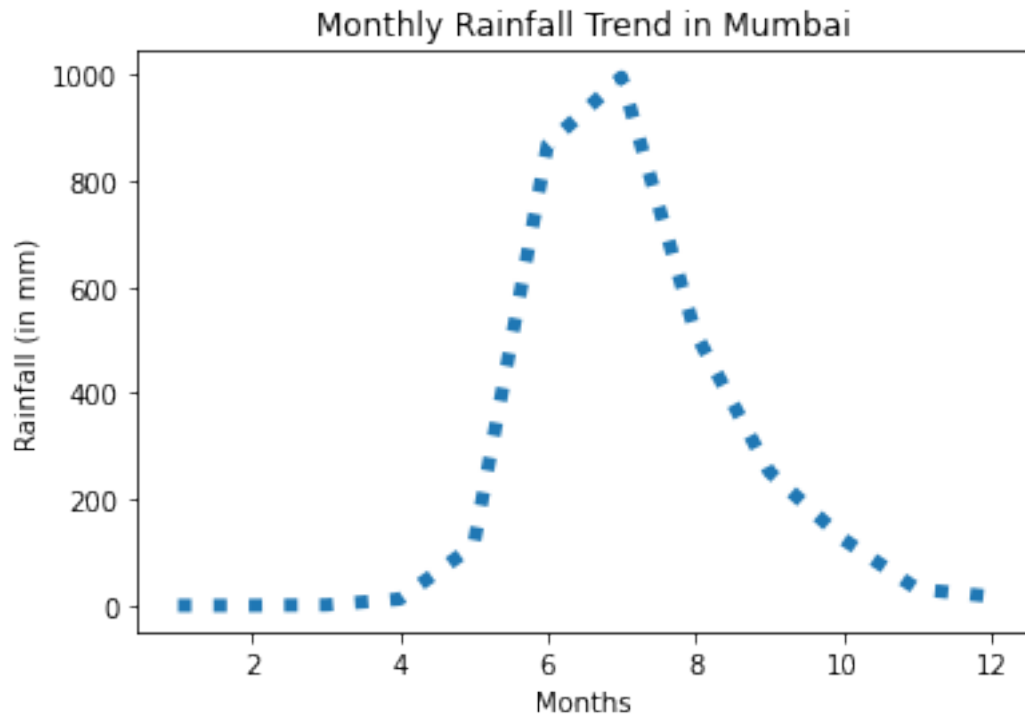
```
[3]: plt.plot(month, avg_monthly_rain);

      # plt.plot(x,y)
```



Basic Line Plot - Labels, linewidth, linestyle

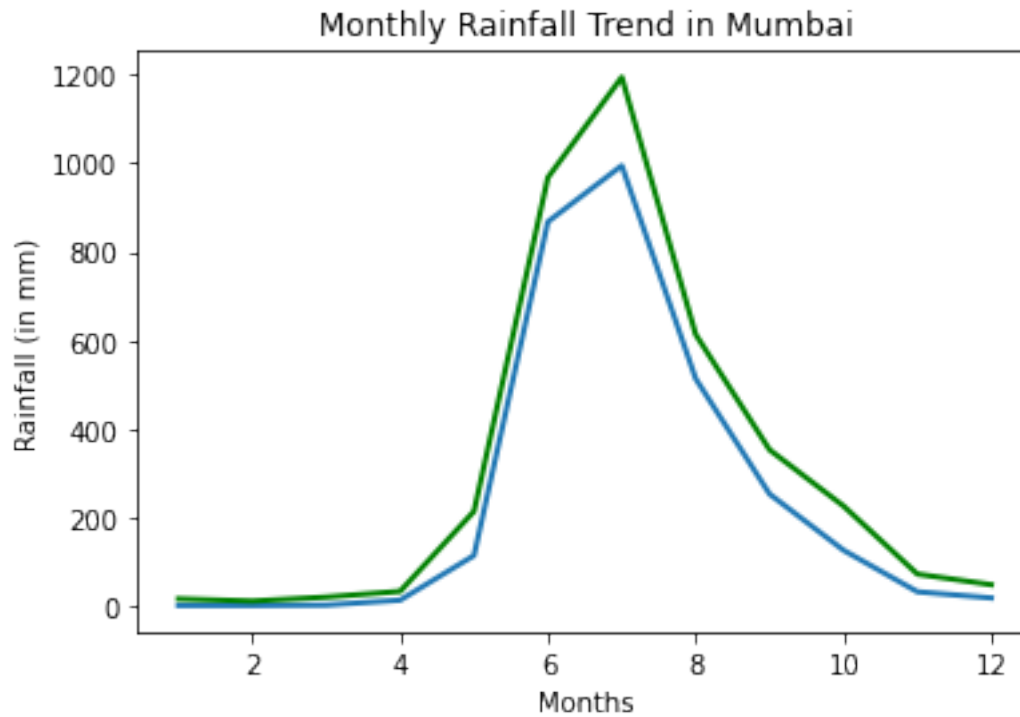
```
[5]: plt.xlabel('Months')
plt.ylabel('Rainfall (in mm)')
plt.title('Monthly Rainfall Trend in Mumbai')
plt.plot(month, avg_monthly_rain, linewidth = 5, linestyle = 'dotted');
```



Line Plot - 2 Datasets

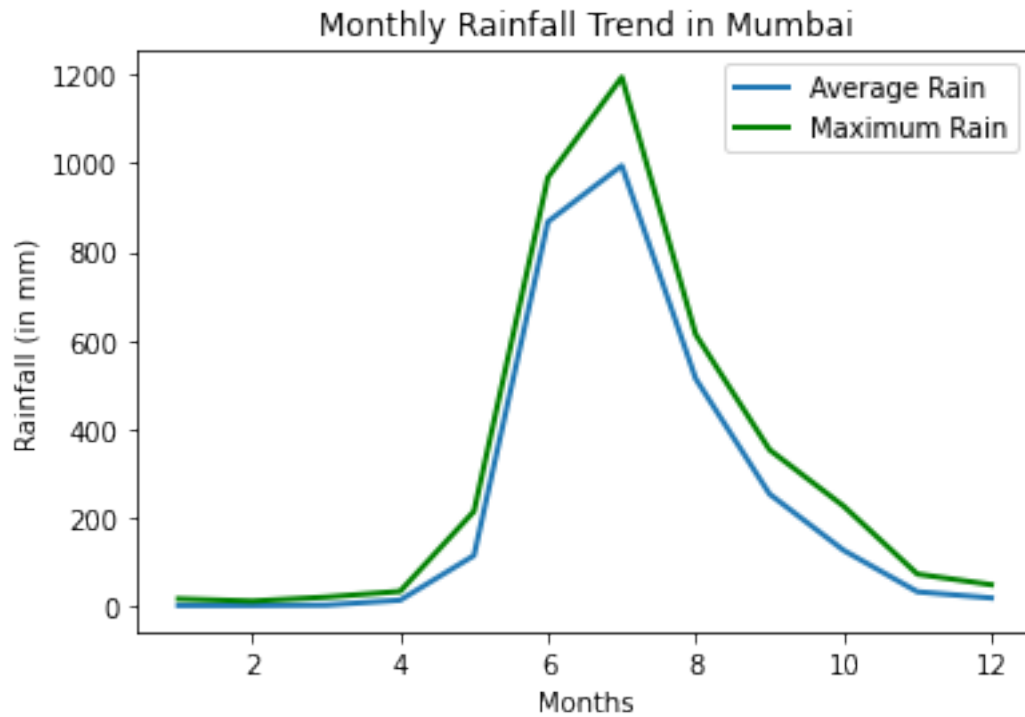
```
[6]: max_rain = [15,10,19,32,213,968,1195,613,352,225,71,47]
```

```
[7]: plt.xlabel('Months')  
plt.ylabel('Rainfall (in mm)')  
plt.title('Monthly Rainfall Trend in Mumbai')  
plt.plot(month, avg_monthly_rain, linewidth = 2);  
plt.plot(month, max_rain, linewidth = 2, color = 'green');
```

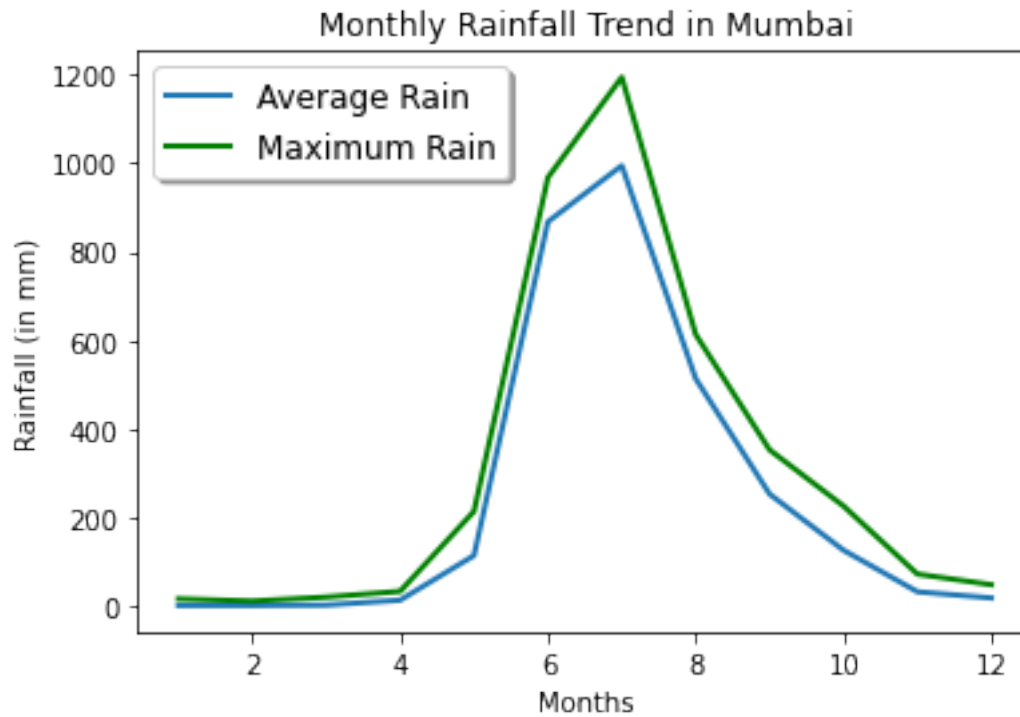


Line Plot - Legends

```
[8]: plt.xlabel('Months')
plt.ylabel('Rainfall (in mm)')
plt.title('Monthly Rainfall Trend in Mumbai')
plt.plot(month, avg_monthly_rain, linewidth = 2, label = 'Average Rain');
plt.plot(month, max_rain, linewidth = 2, color = 'green', label = 'Maximum Rain');
plt.legend();
```

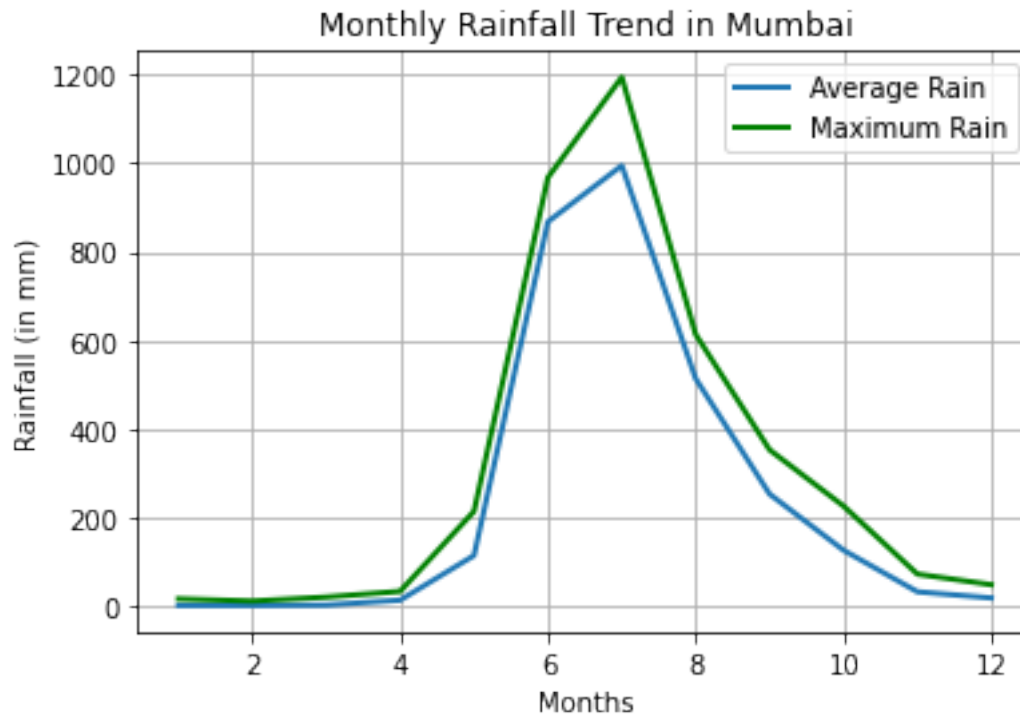


```
[11]: plt.xlabel('Months')
plt.ylabel('Rainfall (in mm)')
plt.title('Monthly Rainfall Trend in Mumbai')
plt.plot(month, avg_monthly_rain, linewidth = 2, label = 'Average Rain');
plt.plot(month, max_rain, linewidth = 2, color = 'green', label = 'Maximum Rain');
plt.legend(loc = 'upper left', fontsize = 'large', shadow = True);
```



Line Plot - Grids

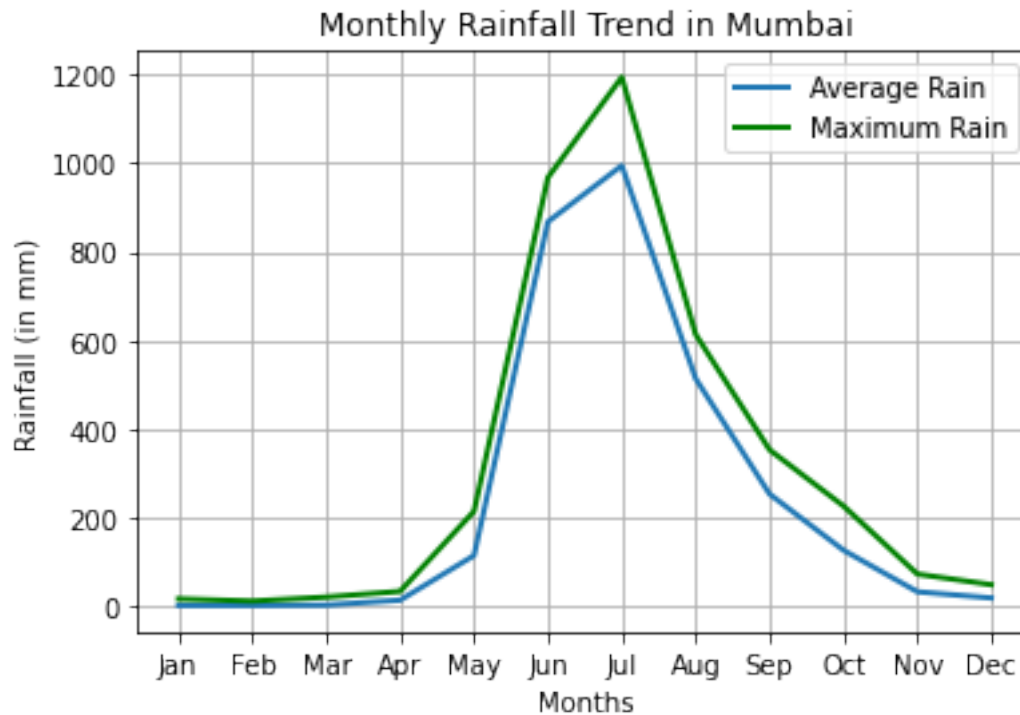
```
[12]: plt.xlabel('Months')
plt.ylabel('Rainfall (in mm)')
plt.title('Monthly Rainfall Trend in Mumbai')
plt.plot(month, avg_monthly_rain, linewidth = 2, label = 'Average Rain');
plt.plot(month, max_rain, linewidth = 2, color = 'green', label = 'Maximum Rain');
plt.legend();
plt.grid();
```



Line Plot - xticks

```
[14]: month_name = ['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec']
plt.xticks(month, month_name)

plt.xlabel('Months')
plt.ylabel('Rainfall (in mm)')
plt.title('Monthly Rainfall Trend in Mumbai')
plt.plot(month, avg_monthly_rain, linewidth = 2, label = 'Average Rain');
plt.plot(month, max_rain, linewidth = 2, color = 'green', label = 'Maximum Rain');
plt.legend();
plt.grid();
```



1.1 Bar Chart

Simple bar chart showing revenues of major Indian tech companies

```
[15]: company = ['Infosys', 'TCS', 'Wipro', 'Hcl']
      revenue = [190, 236, 189, 97]
```

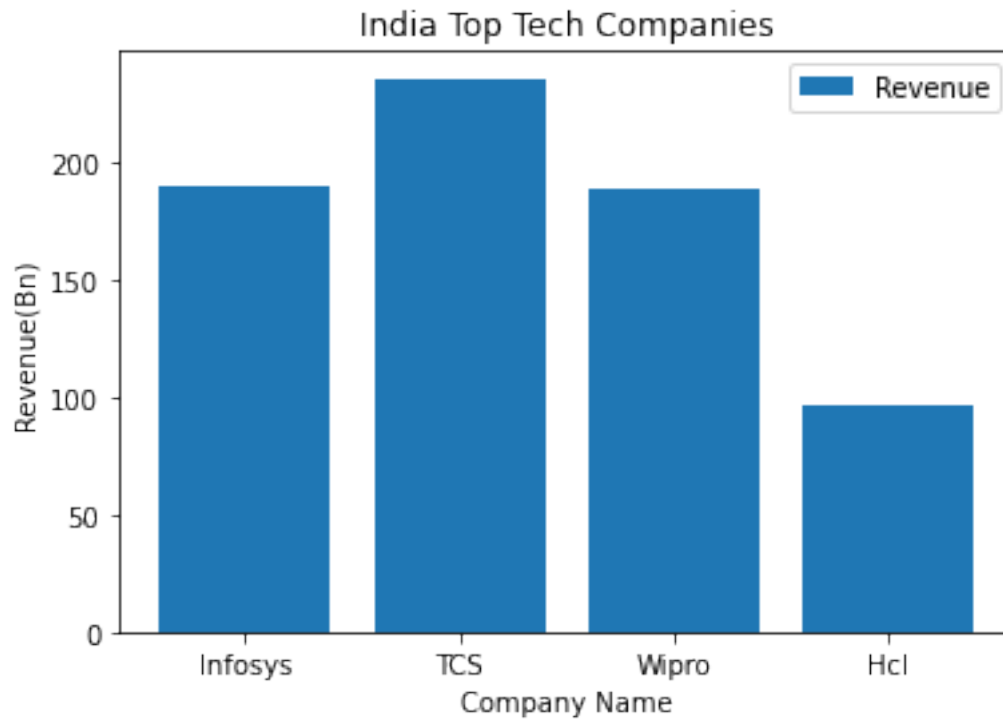
```
[16]: import numpy as np
      xpos = np.arange(len(company))
      xpos
```

```
[16]: array([0, 1, 2, 3])
```

```
[18]: np.arange(4)
```

```
[18]: array([0, 1, 2, 3])
```

```
[17]: plt.bar(xpos, revenue, label = "Revenue")
      plt.xticks(xpos, company)
      plt.ylabel('Revenue(Bn) ');
      plt.xlabel('Company Name');
      plt.title('India Top Tech Companies');
      plt.legend();
```

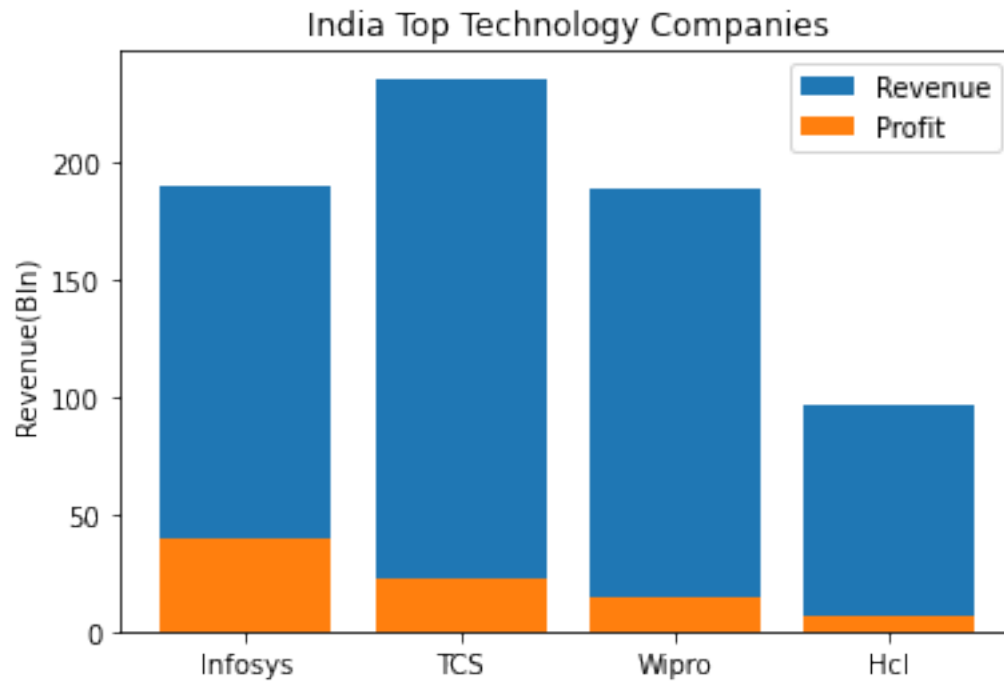



1.1.1 Multiple Bars showing revenue and profit of Top Indian tech companies

```
[19]: profit=[40,22,15,7]
```

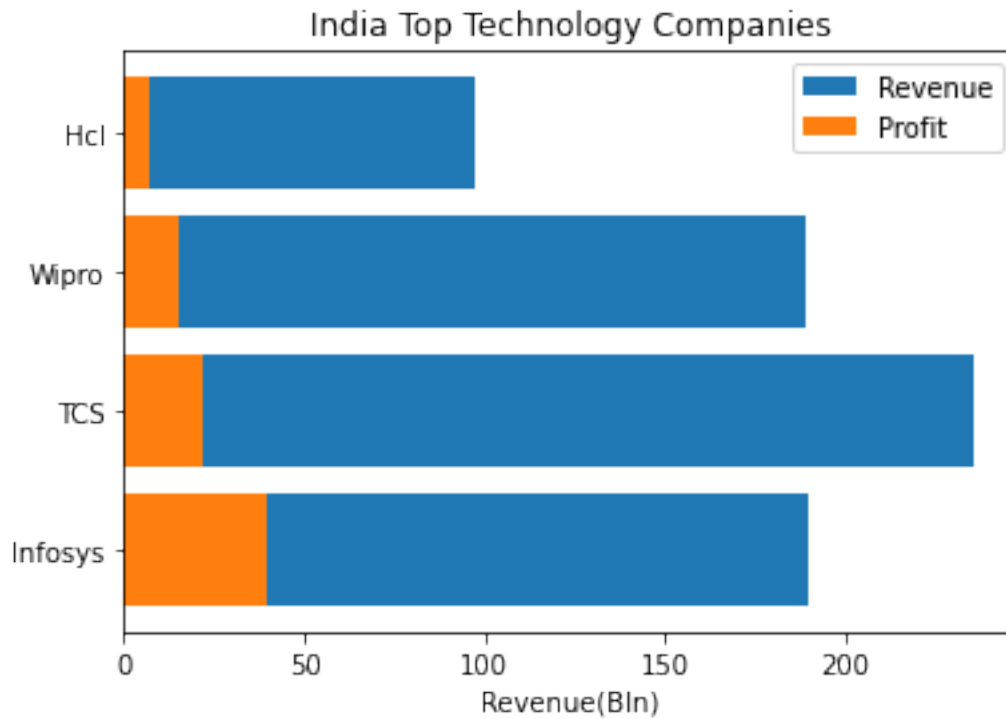
```
[20]: plt.bar(xpos,revenue, label="Revenue")
plt.bar(xpos,profit,label="Profit")

plt.xticks(xpos,company)
plt.ylabel("Revenue(Bln)");
plt.title('India Top Technology Companies');
plt.legend();
```



```
[22]: plt.barh(xpos,revenue, label="Revenue")
      plt.barh(xpos,profit,label="Profit")

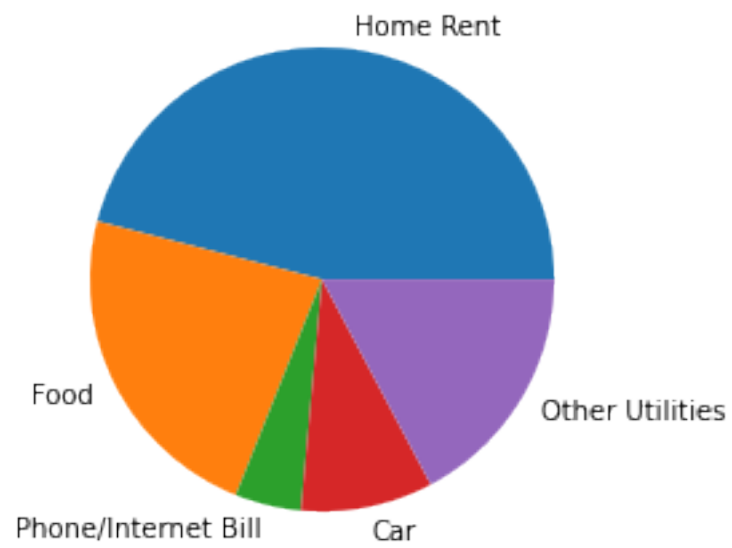
      plt.yticks(xpos,company)
      plt.xlabel("Revenue(Bln)");
      plt.title('India Top Technology Companies');
      plt.legend();
```



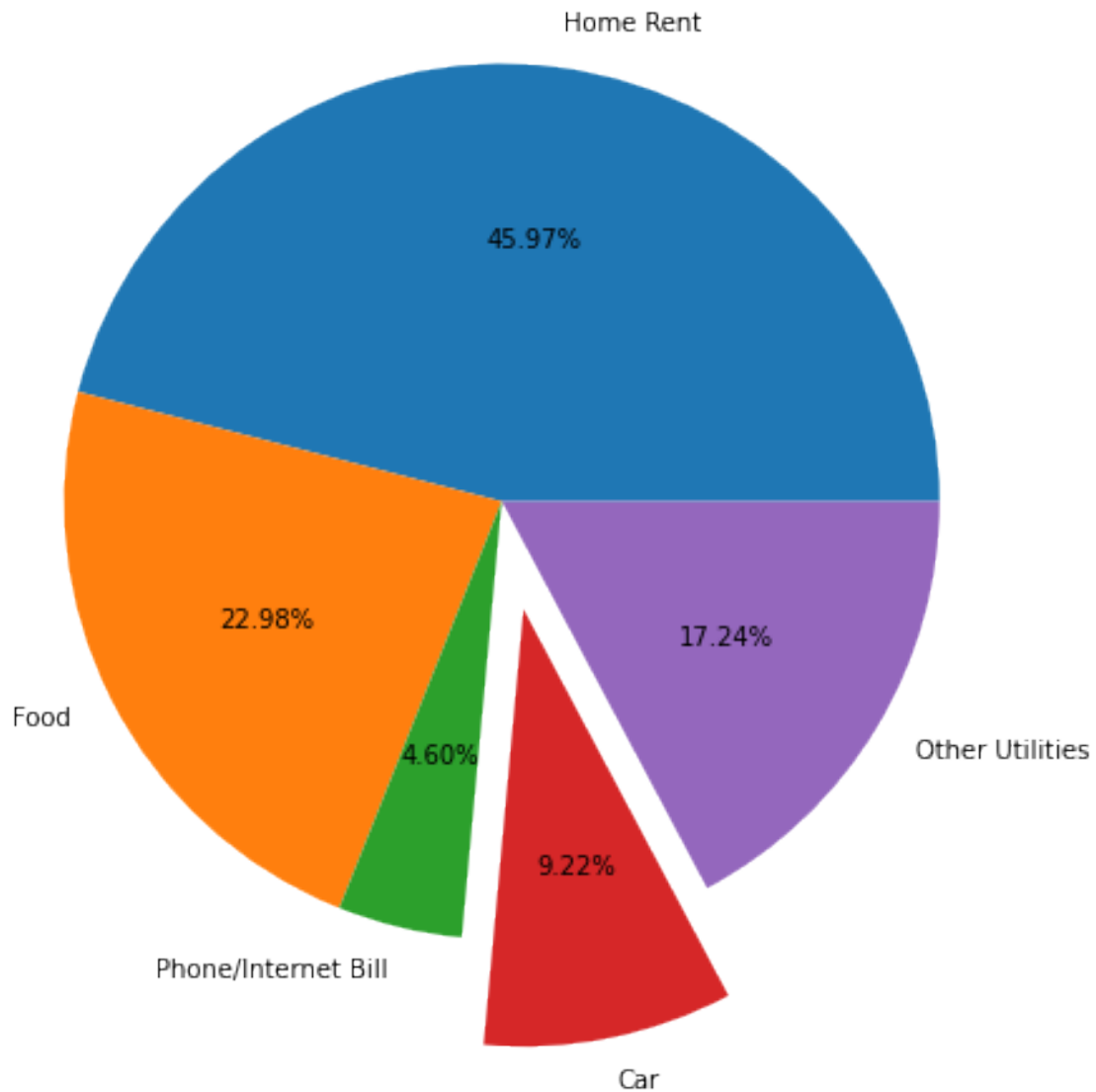
1.2 Pie Chart

Use Pie chart to analyze monthly home expenditure

```
[23]: exp_vals = [20000,10000,2000,4010,7500]
      exp_labels = ["Home Rent","Food","Phone/Internet Bill","Car","Other Utilities"]
      plt.pie(exp_vals,labels=exp_labels);
```

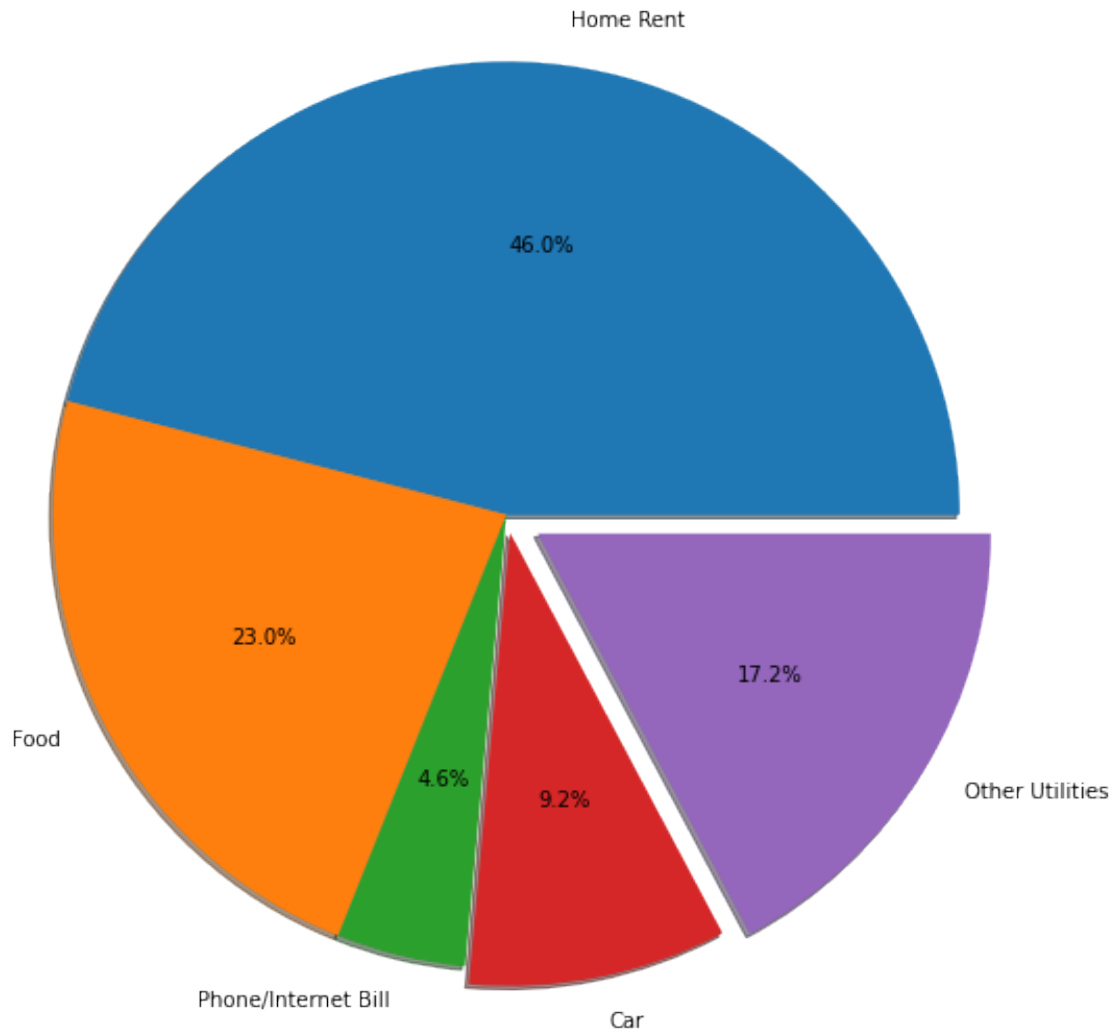


```
[24]: # Explode, percentage
plt.axis("equal")
plt.pie(exp_vals, labels=exp_labels, autopct='%1.2f%%', radius=2,
    ↪ explode=[0,0,0,0.5,0])
plt.show()
```



1.2.1 Exporting the Plot as an image file

```
[28]: # Explode, percentage
plt.axis("equal");
plt.pie(exp_vals, labels=exp_labels, shadow=True, autopct='%1.1f%%', radius=2.5,
    explode=[0,0,0,0.1,0.2]);
plt.savefig("myfirstplot2.jpeg", bbox_inches='tight');
```



API -> https://matplotlib.org/api/_as_gen/matplotlib.pyplot.plot.html#matplotlib.pyplot.plot

28 Jupyter Notebook tips, tricks, and shortcuts <https://www.dataquest.io/blog/jupyter-notebook-tips-tricks-shortcuts/>

[]: