

```

In [2]: #Import numpy
import numpy as np

#Seasons
Seasons = ["2015", "2016", "2017", "2018", "2019", "2020", "2021", "2022", "2023", "2024"]
Sdict = {"2015":0, "2016":1, "2017":2, "2018":3, "2019":4, "2020":5, "2021":6, "2022":7

#Players
Players = ["Sachin", "Rahul", "Smith", "Sami", "Pollard", "Morris", "Samson", "Dhoni", "
Pdict = {"Sachin":0, "Rahul":1, "Smith":2, "Sami":3, "Pollard":4, "Morris":5, "Samson"

#Salaries
Sachin_Salary = [15946875, 17718750, 19490625, 21262500, 23034375, 24806250, 25244493,
Rahul_Salary = [12000000, 12744189, 13488377, 14232567, 14976754, 16324500, 18038573, 1
Smith_Salary = [4621800, 5828090, 13041250, 14410581, 15779912, 14500000, 16022500, 175
Sami_Salary = [3713640, 4694041, 13041250, 14410581, 15779912, 17149243, 18518574, 1945
Pollard_Salary = [4493160, 4806720, 6061274, 13758000, 15202590, 16647180, 18091770, 19
Morris_Salary = [3348000, 4235220, 12455000, 14410581, 15779912, 14500000, 16022500, 17
Samson_Salary = [3144240, 3380160, 3615960, 4574189, 13520500, 14940153, 16359805, 1777
Dhoni_Salary = [0, 0, 4171200, 4484040, 4796880, 6053663, 15506632, 16669630, 17832627, 1
Kohli_Salary = [0, 0, 0, 4822800, 5184480, 5546160, 6993708, 16402500, 17632688, 18862875
Sky_Salary = [3031920, 3841443, 13041250, 14410581, 15779912, 14200000, 15691000, 17182

#Matrix
Salary = np.array([Sachin_Salary, Rahul_Salary, Smith_Salary, Sami_Salary, Polla

#Games
Sachin_G = [80, 77, 82, 82, 73, 82, 58, 78, 6, 35]
Rahul_G = [82, 57, 82, 79, 76, 72, 60, 72, 79, 80]
Smith_G = [79, 78, 75, 81, 76, 79, 62, 76, 77, 69]
Sami_G = [80, 65, 77, 66, 69, 77, 55, 67, 77, 40]
Pollard_G = [82, 82, 82, 79, 82, 78, 54, 76, 71, 41]
Morris_G = [70, 69, 67, 77, 70, 77, 57, 74, 79, 44]
Samson_G = [78, 64, 80, 78, 45, 80, 60, 70, 62, 82]
Dhoni_G = [35, 35, 80, 74, 82, 78, 66, 81, 81, 27]
Kohli_G = [40, 40, 40, 81, 78, 81, 39, 0, 10, 51]
Sky_G = [75, 51, 51, 79, 77, 76, 49, 69, 54, 62]

#Matrix
Games = np.array([Sachin_G, Rahul_G, Smith_G, Sami_G, Pollard_G, Morris_G, Samso

#Points
Sachin_PTS = [2832, 2430, 2323, 2201, 1970, 2078, 1616, 2133, 83, 782]
Rahul_PTS = [1653, 1426, 1779, 1688, 1619, 1312, 1129, 1170, 1245, 1154]
Smith_PTS = [2478, 2132, 2250, 2304, 2258, 2111, 1683, 2036, 2089, 1743]
Sami_PTS = [2122, 1881, 1978, 1504, 1943, 1970, 1245, 1920, 2112, 966]
Pollard_PTS = [1292, 1443, 1695, 1624, 1503, 1784, 1113, 1296, 1297, 646]
Morris_PTS = [1572, 1561, 1496, 1746, 1678, 1438, 1025, 1232, 1281, 928]
Samson_PTS = [1258, 1104, 1684, 1781, 841, 1268, 1189, 1186, 1185, 1564]
Dhoni_PTS = [903, 903, 1624, 1871, 2472, 2161, 1850, 2280, 2593, 686]
Kohli_PTS = [597, 597, 597, 1361, 1619, 2026, 852, 0, 159, 904]
Sky_PTS = [2040, 1397, 1254, 2386, 2045, 1941, 1082, 1463, 1028, 1331]

#Matrix
Points = np.array([Sachin_PTS, Rahul_PTS, Smith_PTS, Sami_PTS, Pollard_PTS, Morr

```

```

In [3]: Salary

```

```
Out[3]: array([[15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
                25244493, 27849149, 30453805, 23500000],
               [12000000, 12744189, 13488377, 14232567, 14976754, 16324500,
                18038573, 19752645, 21466718, 23180790],
               [ 4621800,  5828090, 13041250, 14410581, 15779912, 14500000,
                16022500, 17545000, 19067500, 20644400],
               [ 3713640,  4694041, 13041250, 14410581, 15779912, 17149243,
                18518574, 19450000, 22407474, 22458000],
               [ 4493160,  4806720,  6061274, 13758000, 15202590, 16647180,
                18091770, 19536360, 20513178, 21436271],
               [ 3348000,  4235220, 12455000, 14410581, 15779912, 14500000,
                16022500, 17545000, 19067500, 20644400],
               [ 3144240,  3380160,  3615960,  4574189, 13520500, 14940153,
                16359805, 17779458, 18668431, 20068563],
               [      0,      0,  4171200,  4484040,  4796880,  6053663,
                15506632, 16669630, 17832627, 18995624],
               [      0,      0,      0,  4822800,  5184480,  5546160,
                6993708, 16402500, 17632688, 18862875],
               [ 3031920,  3841443, 13041250, 14410581, 15779912, 14200000,
                15691000, 17182000, 18673000, 15000000]])
```

In [4]: Games

```
Out[4]: array([[80, 77, 82, 82, 73, 82, 58, 78,  6, 35],
               [82, 57, 82, 79, 76, 72, 60, 72, 79, 80],
               [79, 78, 75, 81, 76, 79, 62, 76, 77, 69],
               [80, 65, 77, 66, 69, 77, 55, 67, 77, 40],
               [82, 82, 82, 79, 82, 78, 54, 76, 71, 41],
               [70, 69, 67, 77, 70, 77, 57, 74, 79, 44],
               [78, 64, 80, 78, 45, 80, 60, 70, 62, 82],
               [35, 35, 80, 74, 82, 78, 66, 81, 81, 27],
               [40, 40, 40, 81, 78, 81, 39,  0, 10, 51],
               [75, 51, 51, 79, 77, 76, 49, 69, 54, 62]])
```

In [5]: Points

```
Out[5]: array([[2832, 2430, 2323, 2201, 1970, 2078, 1616, 2133,  83, 782],
               [1653, 1426, 1779, 1688, 1619, 1312, 1129, 1170, 1245, 1154],
               [2478, 2132, 2250, 2304, 2258, 2111, 1683, 2036, 2089, 1743],
               [2122, 1881, 1978, 1504, 1943, 1970, 1245, 1920, 2112, 966],
               [1292, 1443, 1695, 1624, 1503, 1784, 1113, 1296, 1297, 646],
               [1572, 1561, 1496, 1746, 1678, 1438, 1025, 1232, 1281, 928],
               [1258, 1104, 1684, 1781,  841, 1268, 1189, 1186, 1185, 1564],
               [ 903,  903, 1624, 1871, 2472, 2161, 1850, 2280, 2593, 686],
               [ 597,  597,  597, 1361, 1619, 2026,  852,  0, 159, 904],
               [2040, 1397, 1254, 2386, 2045, 1941, 1082, 1463, 1028, 1331]])
```

In [6]: Sdict

```
Out[6]: {'2015': 0,
          '2016': 1,
          '2017': 2,
          '2018': 3,
          '2019': 4,
          '2020': 5,
          '2021': 6,
          '2022': 7,
          '2023': 8,
          '2024': 9}
```

```
In [7]: Pdict
```

```
Out[7]: {'Sachin': 0,  
        'Rahul': 1,  
        'Smith': 2,  
        'Sami': 3,  
        'Pollard': 4,  
        'Morris': 5,  
        'Samson': 6,  
        'Dhoni': 7,  
        'Kohli': 8,  
        'Sky': 9}
```

```
In [8]: Games[5]
```

```
Out[8]: array([70, 69, 67, 77, 70, 77, 57, 74, 79, 44])
```

```
In [9]: Games[5,3]
```

```
Out[9]: np.int64(77)
```

```
In [10]: Salary
```

```
Out[10]: array([[15946875, 17718750, 19490625, 21262500, 23034375, 24806250,  
                25244493, 27849149, 30453805, 23500000],  
               [12000000, 12744189, 13488377, 14232567, 14976754, 16324500,  
                18038573, 19752645, 21466718, 23180790],  
               [ 4621800,  5828090, 13041250, 14410581, 15779912, 14500000,  
                16022500, 17545000, 19067500, 20644400],  
               [ 3713640,  4694041, 13041250, 14410581, 15779912, 17149243,  
                18518574, 19450000, 22407474, 22458000],  
               [ 4493160,  4806720,  6061274, 13758000, 15202590, 16647180,  
                18091770, 19536360, 20513178, 21436271],  
               [ 3348000,  4235220, 12455000, 14410581, 15779912, 14500000,  
                16022500, 17545000, 19067500, 20644400],  
               [ 3144240,  3380160,  3615960,  4574189, 13520500, 14940153,  
                16359805, 17779458, 18668431, 20068563],  
               [      0,      0,  4171200,  4484040,  4796880,  6053663,  
                15506632, 16669630, 17832627, 18995624],  
               [      0,      0,      0,  4822800,  5184480,  5546160,  
                6993708, 16402500, 17632688, 18862875],  
               [ 3031920,  3841443, 13041250, 14410581, 15779912, 14200000,  
                15691000, 17182000, 18673000, 15000000]])
```

```
In [11]: Salary[0]
```

```
Out[11]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,  
                25244493, 27849149, 30453805, 23500000])
```

```
In [12]: Games[0]
```

```
Out[12]: array([80, 77, 82, 82, 73, 82, 58, 78,  6, 35])
```

```
In [13]: Salary[0] / Games[0]
```

```
Out[13]: array([ 199335.9375    , 230113.63636364, 237690.54878049,
                259298.7804878 , 315539.38356164, 302515.24390244,
                435249.87931034, 357040.37179487, 5075634.16666667,
                671428.57142857])
```

```
In [14]: np.round(Salary[0] / Games[0])
```

```
Out[14]: array([ 199336., 230114., 237691., 259299., 315539., 302515.,
                435250., 357040., 5075634., 671429.])
```

#Lets visualise the data

```
In [15]: import warnings
warnings.filterwarnings('ignore')

#to ignore as unwanted error we need to write the code as ignore all
```

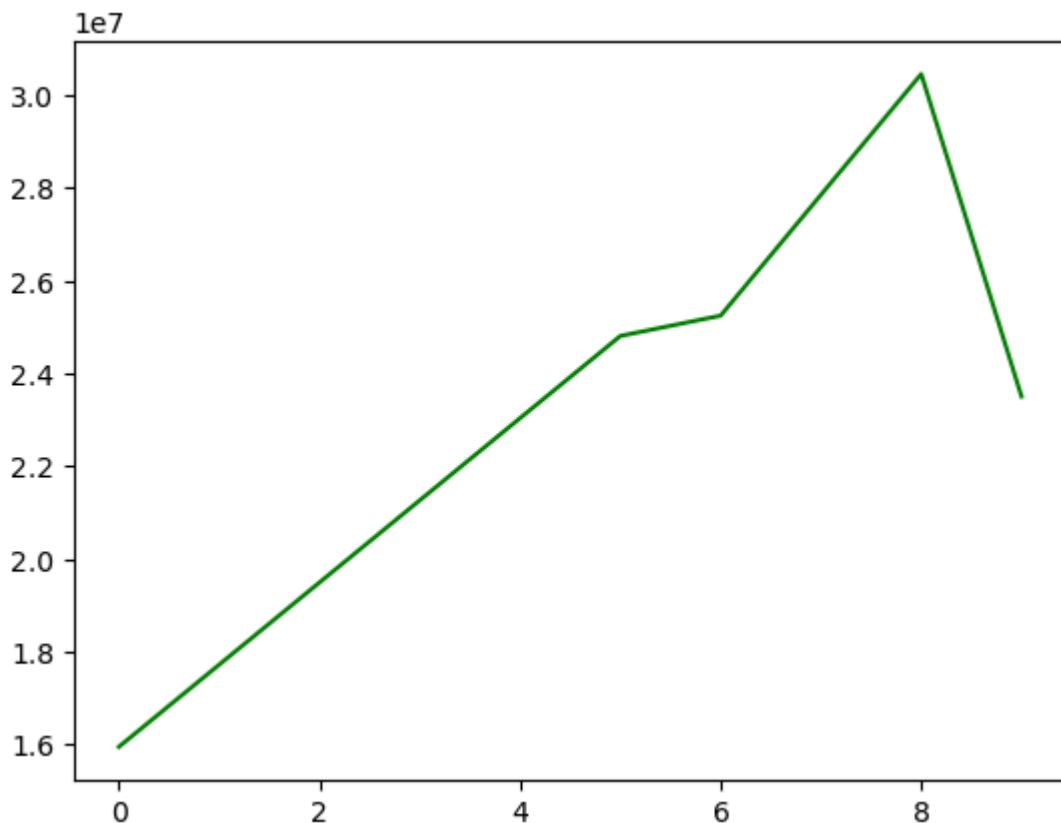
```
In [16]: Salary[0]
```

```
Out[16]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
                25244493, 27849149, 30453805, 23500000])
```

```
In [17]: import matplotlib.pyplot as plt
```

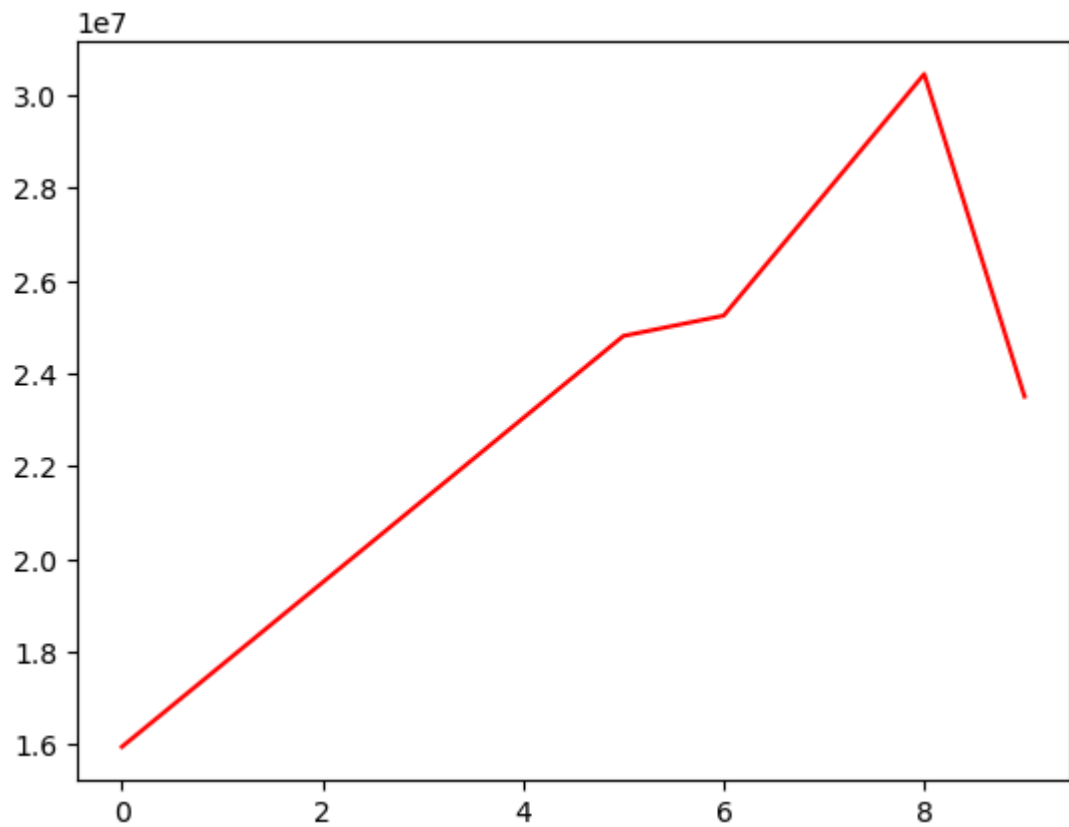
```
In [18]: plt.plot(Salary[0],color = 'green')
```

```
Out[18]: [<matplotlib.lines.Line2D at 0x1aa2aa23890>]
```



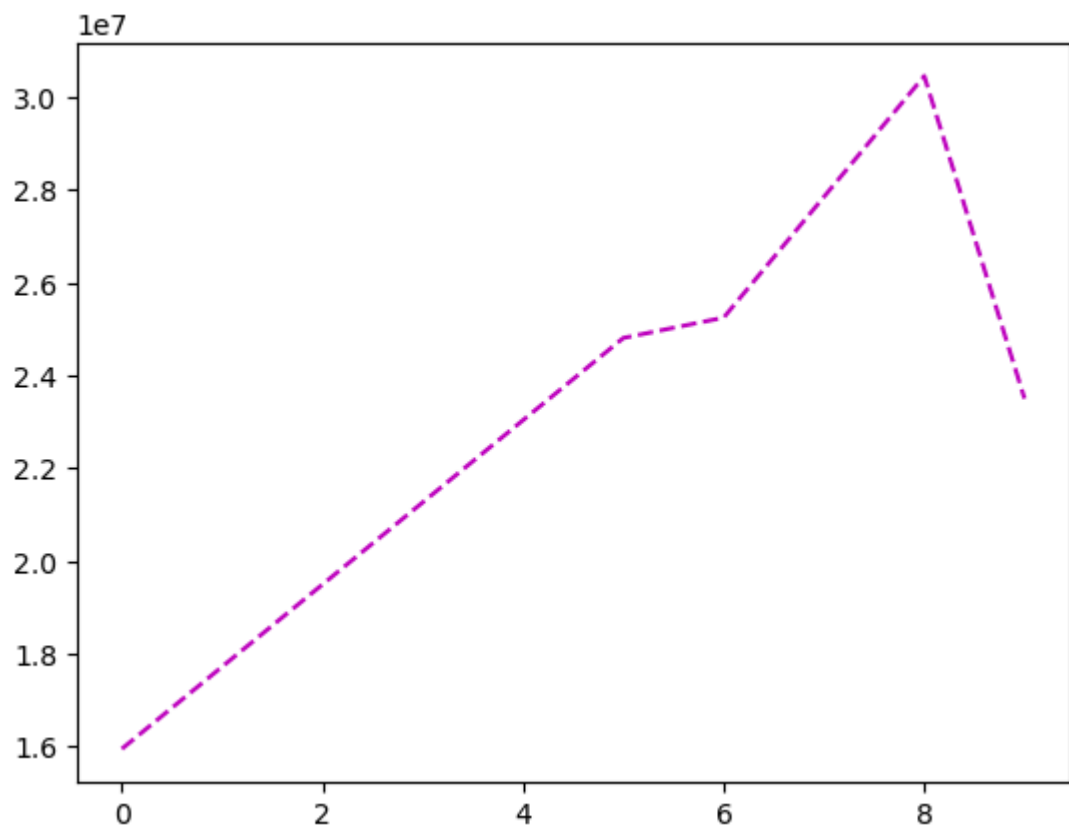
```
In [19]: plt.plot(Salary[0],c = 'r')
```

```
Out[19]: [<matplotlib.lines.Line2D at 0x1aa2b36bed0>]
```



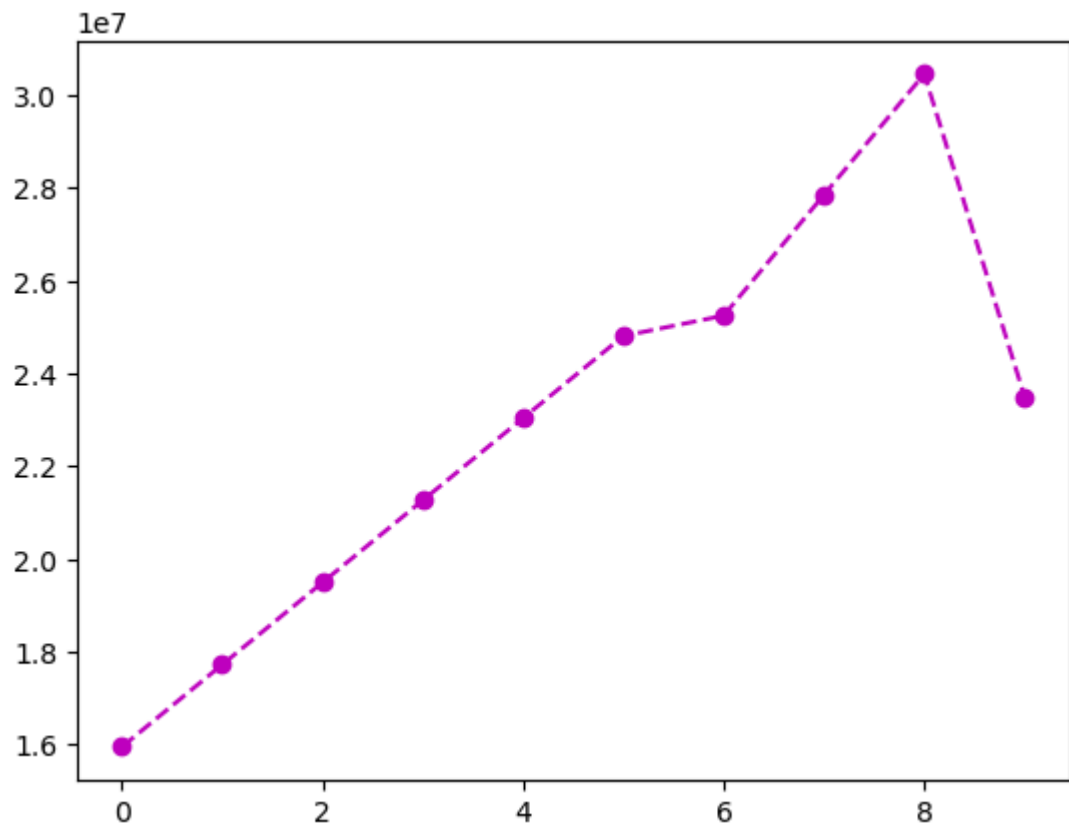
```
In [20]: plt.plot(Salary[0],c = 'm',ls = '--')
```

```
Out[20]: [<matplotlib.lines.Line2D at 0x1aa2b37ae90>]
```



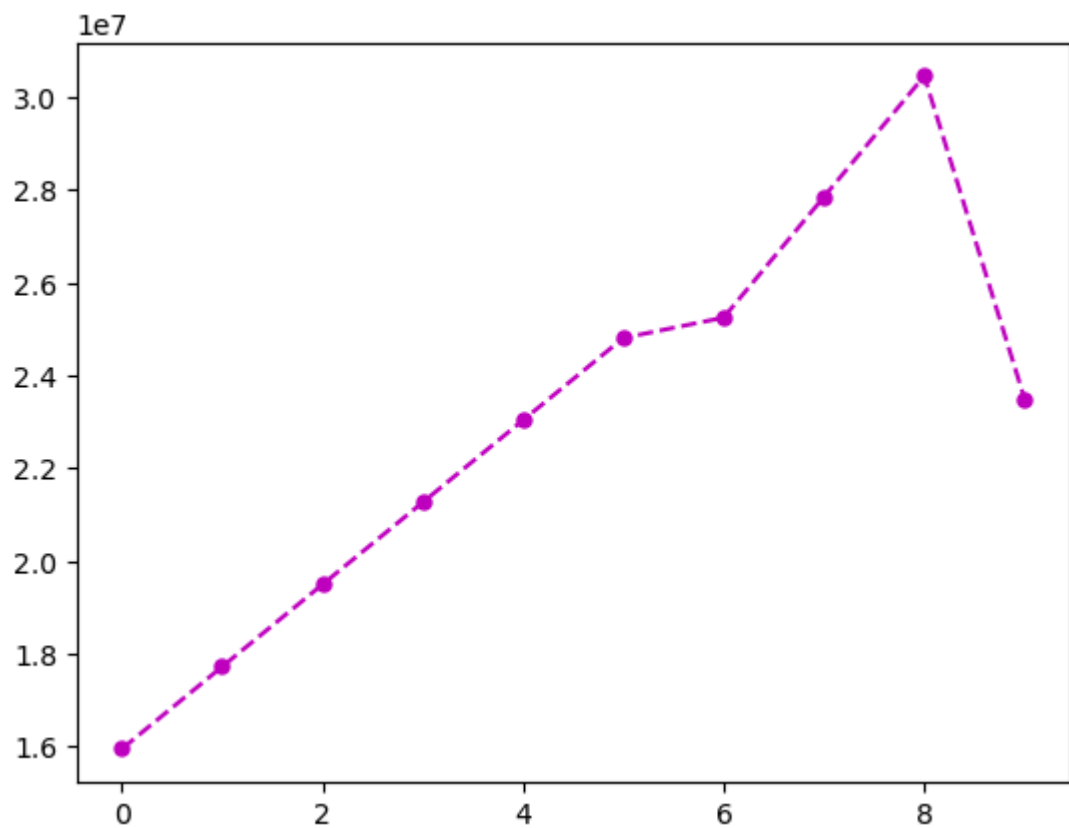
```
In [21]: plt.plot(Salary[0],c = 'm',ls = '--',marker = 'o')
```

```
Out[21]: [<matplotlib.lines.Line2D at 0x1aa2ac05450>]
```



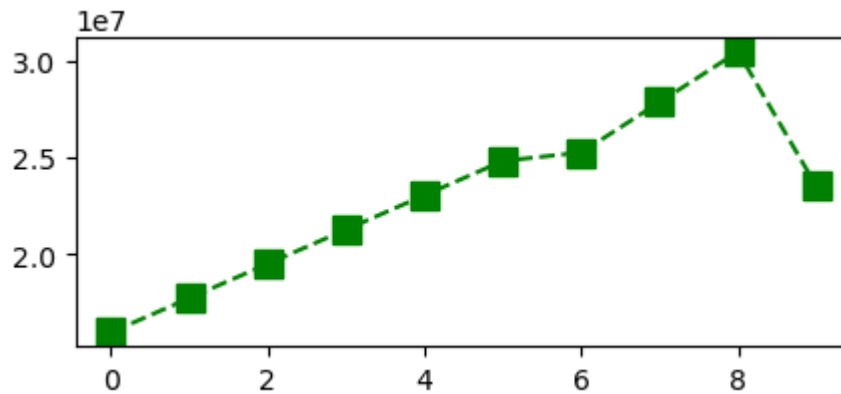
```
In [22]: plt.plot(Salary[0],c = 'm',ls = '--',marker = 'o',ms = 5)
```

```
Out[22]: [<matplotlib.lines.Line2D at 0x1aa2ac4f9d0>]
```



```
In [23]: %matplotlib inline
plt.rcParams['figure.figsize'] = 5,2
```

```
In [24]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 10)
plt.show()
```



```
In [25]: list(range(0,10))
```

```
Out[25]: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

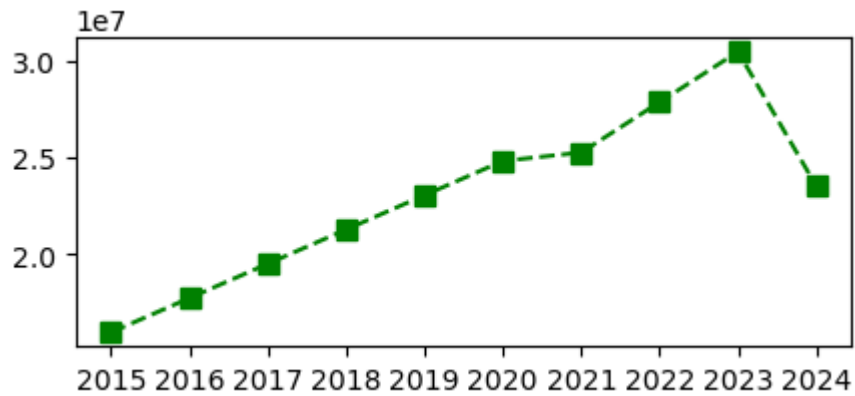
```
In [26]: Sdict
```

```
Out[26]: {'2015': 0,
          '2016': 1,
          '2017': 2,
          '2018': 3,
          '2019': 4,
          '2020': 5,
          '2021': 6,
          '2022': 7,
          '2023': 8,
          '2024': 9}
```

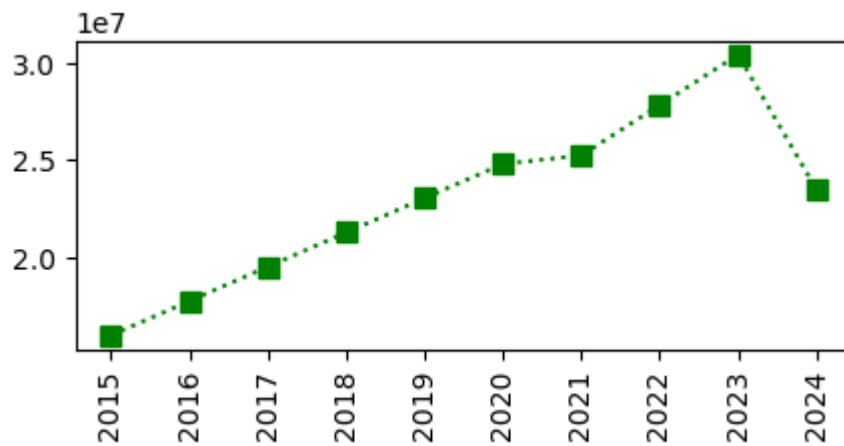
```
In [27]: Pdict
```

```
Out[27]: {'Sachin': 0,
          'Rahul': 1,
          'Smith': 2,
          'Sami': 3,
          'Pollard': 4,
          'Morris': 5,
          'Samson': 6,
          'Dhoni': 7,
          'Kohli': 8,
          'Sky': 9}
```

```
In [28]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7)
plt.xticks(list(range(0,10)), Seasons)
plt.show()
```



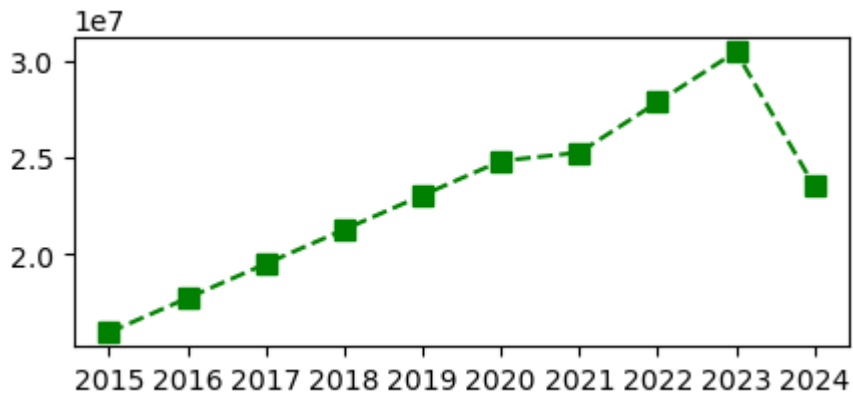
```
In [29]: plt.plot(Salary[0], c='Green', ls = ':', marker = 's', ms = 7, label = Players[0])
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')
plt.show()
```



```
In [30]: Games
```

```
Out[30]: array([[80, 77, 82, 82, 73, 82, 58, 78, 6, 35],
                [82, 57, 82, 79, 76, 72, 60, 72, 79, 80],
                [79, 78, 75, 81, 76, 79, 62, 76, 77, 69],
                [80, 65, 77, 66, 69, 77, 55, 67, 77, 40],
                [82, 82, 82, 79, 82, 78, 54, 76, 71, 41],
                [70, 69, 67, 77, 70, 77, 57, 74, 79, 44],
                [78, 64, 80, 78, 45, 80, 60, 70, 62, 82],
                [35, 35, 80, 74, 82, 78, 66, 81, 81, 27],
                [40, 40, 40, 81, 78, 81, 39, 0, 10, 51],
                [75, 51, 51, 79, 77, 76, 49, 69, 54, 62]])
```

```
In [31]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.xticks(list(range(0,10)), Seasons,rotation='horizontal')
plt.show()
```

In [32]: Salary[0]

Out[32]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250, 25244493, 27849149, 30453805, 23500000])

In [33]: Salary[1]

Out[33]: array([12000000, 12744189, 13488377, 14232567, 14976754, 16324500, 18038573, 19752645, 21466718, 23180790])

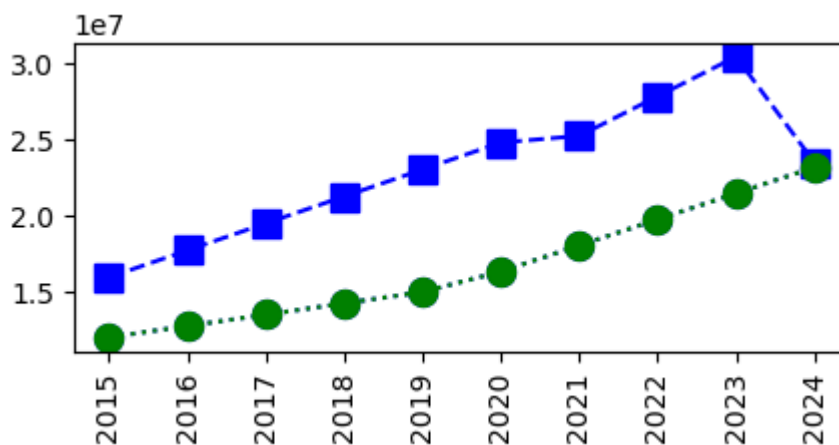
In [34]: plt.plot(Salary[1], c='Blue', ls = ':', marker = 'o', ms = 10, label = Players[1])

Out[34]: [<matplotlib.lines.Line2D at 0x1aa2c62ec10>]

```
In [35]: plt.plot(Salary[0], c='b', ls = '--', marker = 's', ms = 10, label = Players[0])
plt.plot(Salary[1], c='g', ls = ':', marker = 'o', ms = 10, label = Players[1])

plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

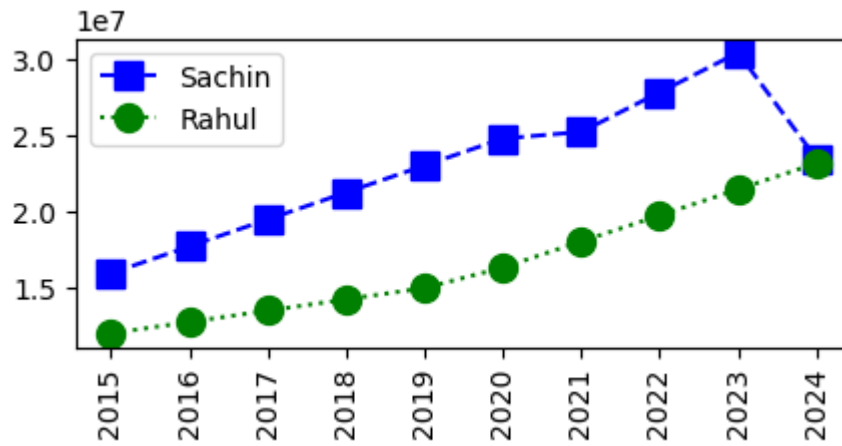
plt.show()
```



```
In [36]: plt.plot(Salary[0], c='b', ls = '--', marker = 's', ms = 10, label = Players[0])
plt.plot(Salary[1], c='g', ls = ':', marker = 'o', ms = 10, label = Players[1])

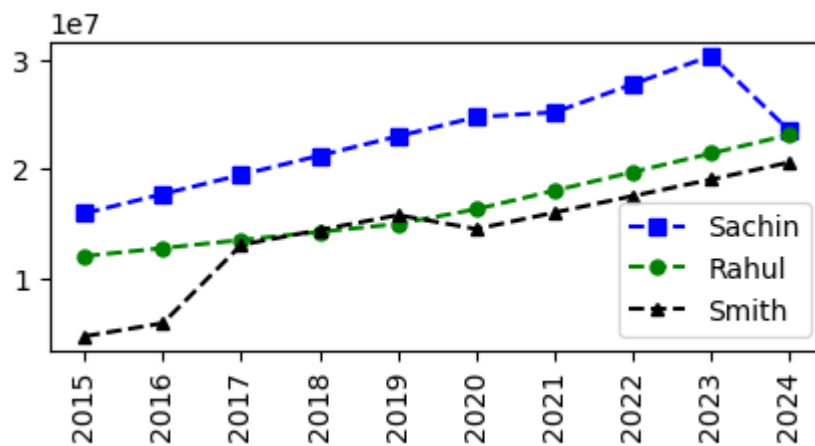
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')
plt.legend()

plt.show()
```



```
In [37]: plt.plot(Salary[0], c='b', ls = '--', marker = 's', ms = 6, label = Players[0])
plt.plot(Salary[1], c='g', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='k', ls = '--', marker = '^', ms = 4, label = Players[2])

plt.xticks(list(range(0,10)), Seasons,rotation='vertical')
plt.legend()
plt.show()
```

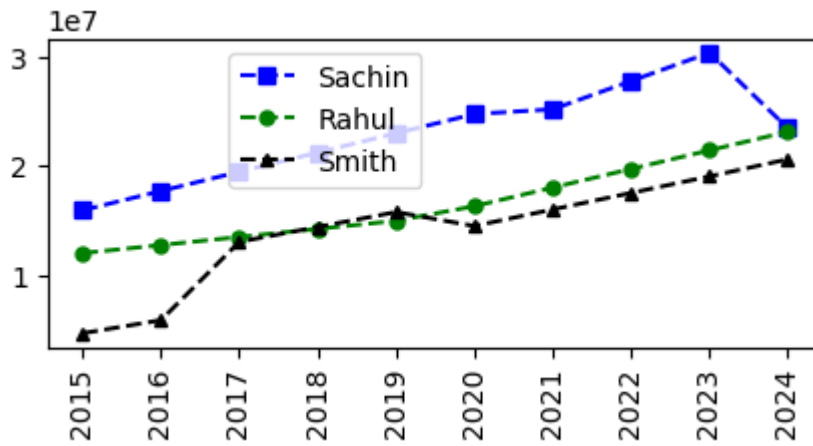


```
In [38]: plt.plot(Salary[0], c='b', ls = '--', marker = 's', ms = 6, label = Players[0])
plt.plot(Salary[1], c='g', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='k', ls = '--', marker = '^', ms = 4, label = Players[2])

plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

plt.legend(loc = 'upper right',bbox_to_anchor=(0.5,1))

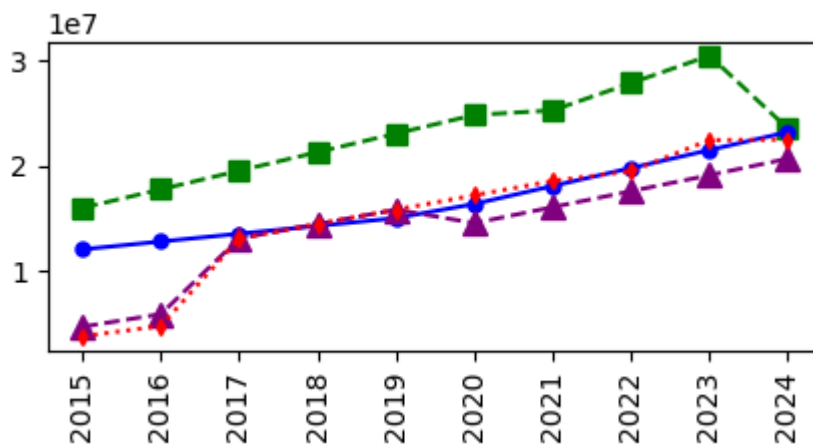
plt.show()
```



```
In [40]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '-', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players[2])
plt.plot(Salary[3], c='Red', ls = ':', marker = 'd', ms = 4, label = Players[3])

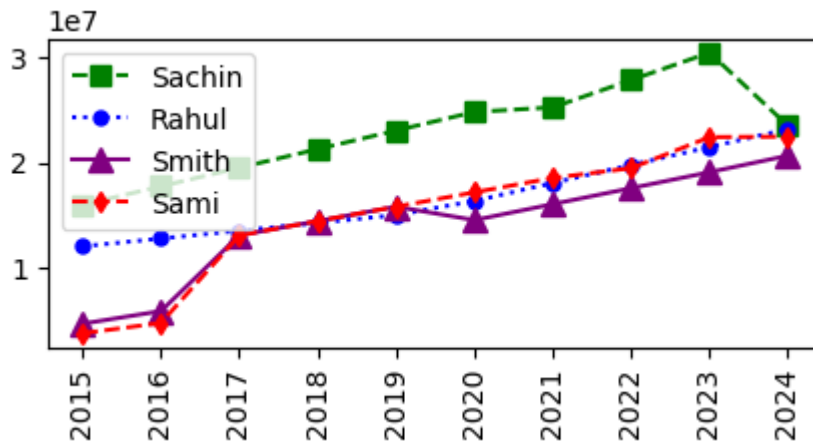
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

plt.show()
```



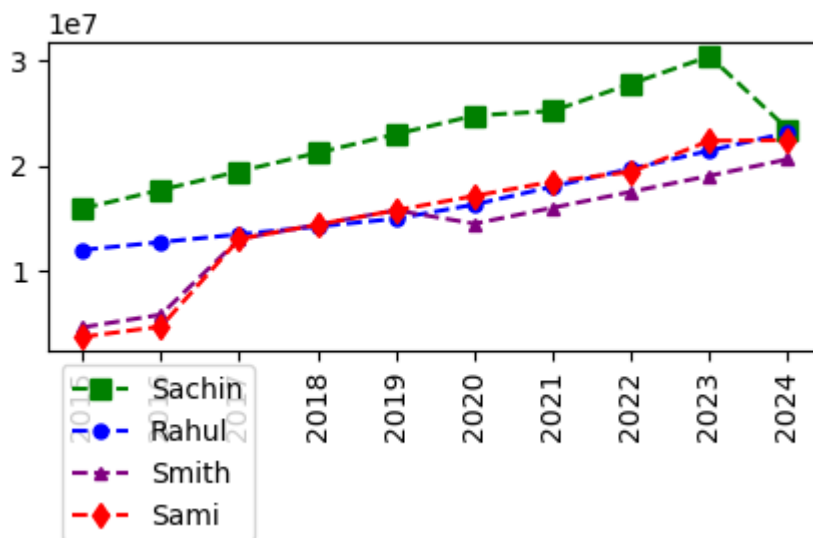
```
In [41]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = ':', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='purple', ls = '-', marker = '^', ms = 8, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', marker = 'd', ms = 5, label = Players[3])
plt.legend()
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

plt.show()
```



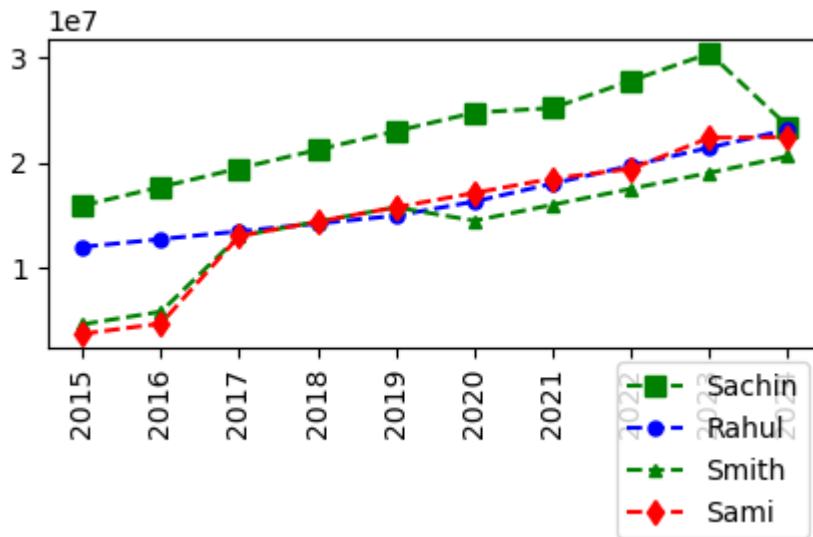
```
In [42]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 5, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', marker = 'd', ms = 6, label = Players[3])
plt.legend(loc = 'upper left',bbox_to_anchor=(0,0) )
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

plt.show()
```



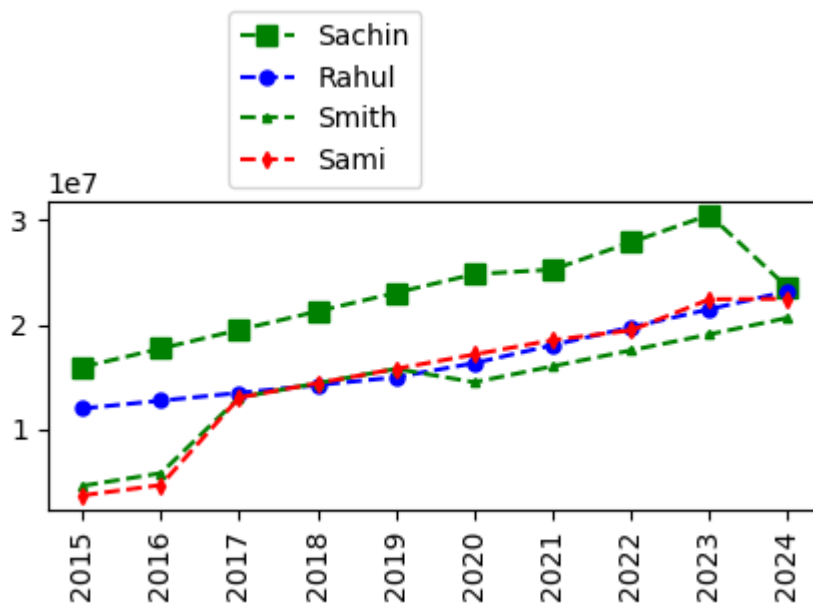
```
In [43]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='Green', ls = '--', marker = '^', ms = 5, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', marker = 'd', ms = 6, label = Players[3])
plt.legend(loc = 'upper right',bbox_to_anchor=(1,0) )
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

plt.show()
```



```
In [44]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='Green', ls = '--', marker = '^', ms = 3, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', marker = 'd', ms = 4, label = Players[3])
plt.legend(loc = 'lower right',bbox_to_anchor=(0.5,1) )
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

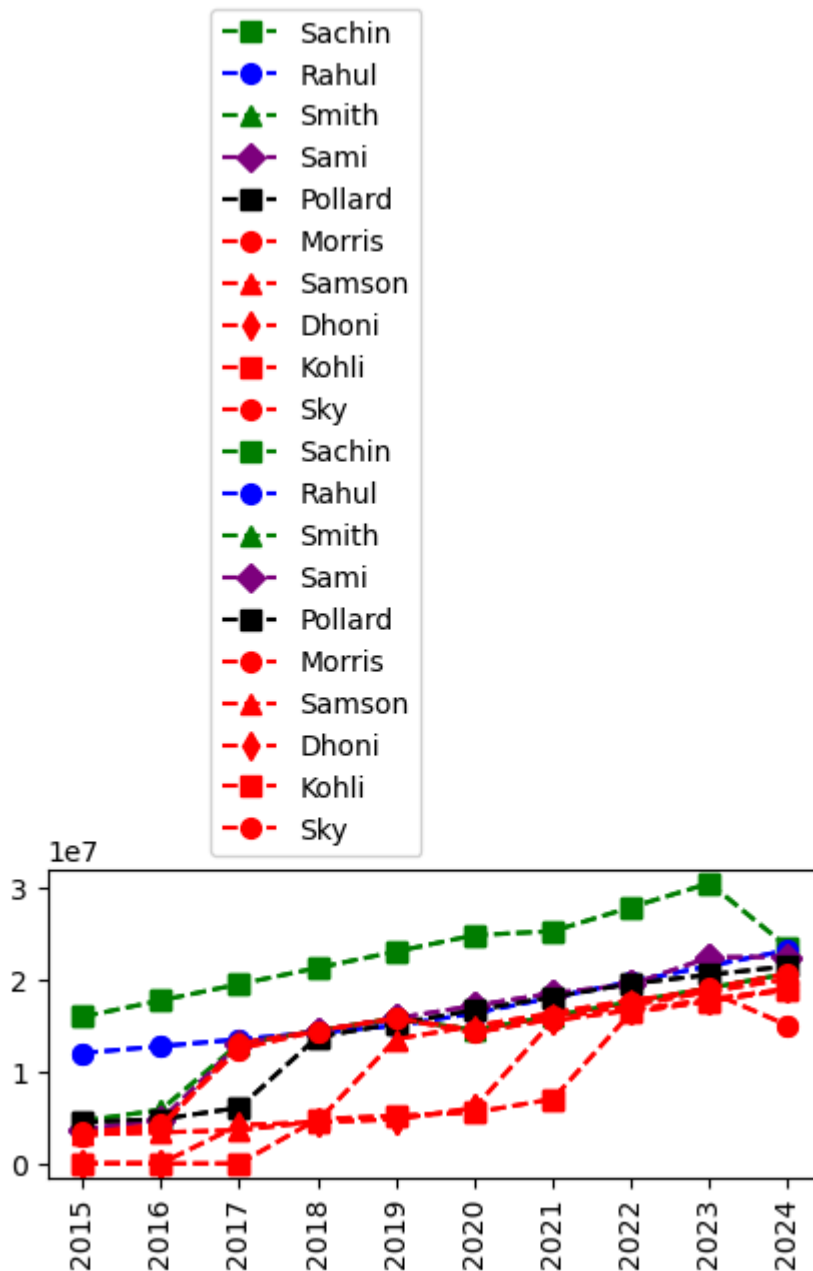
plt.show()
```



```
In [46]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 7, label = Players[1])
plt.plot(Salary[2], c='Green', ls = '--', marker = '^', ms = 7, label = Players[2])
plt.plot(Salary[3], c='Purple', ls = '--', marker = 'D', ms = 7, label = Players[3])
plt.plot(Salary[4], c='Black', ls = '--', marker = 's', ms = 7, label = Players[4])
plt.plot(Salary[5], c='Red', ls = '--', marker = 'o', ms = 7, label = Players[5])
plt.plot(Salary[6], c='Red', ls = '--', marker = '^', ms = 7, label = Players[6])
plt.plot(Salary[7], c='Red', ls = '--', marker = 'd', ms = 7, label = Players[7])
plt.plot(Salary[8], c='Red', ls = '--', marker = 's', ms = 7, label = Players[8])
plt.plot(Salary[9], c='Red', ls = '--', marker = 'o', ms = 7, label = Players[9])

plt.legend(loc = 'lower right',bbox_to_anchor=(0.5,1) )
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')
```

```
plt.show()
```

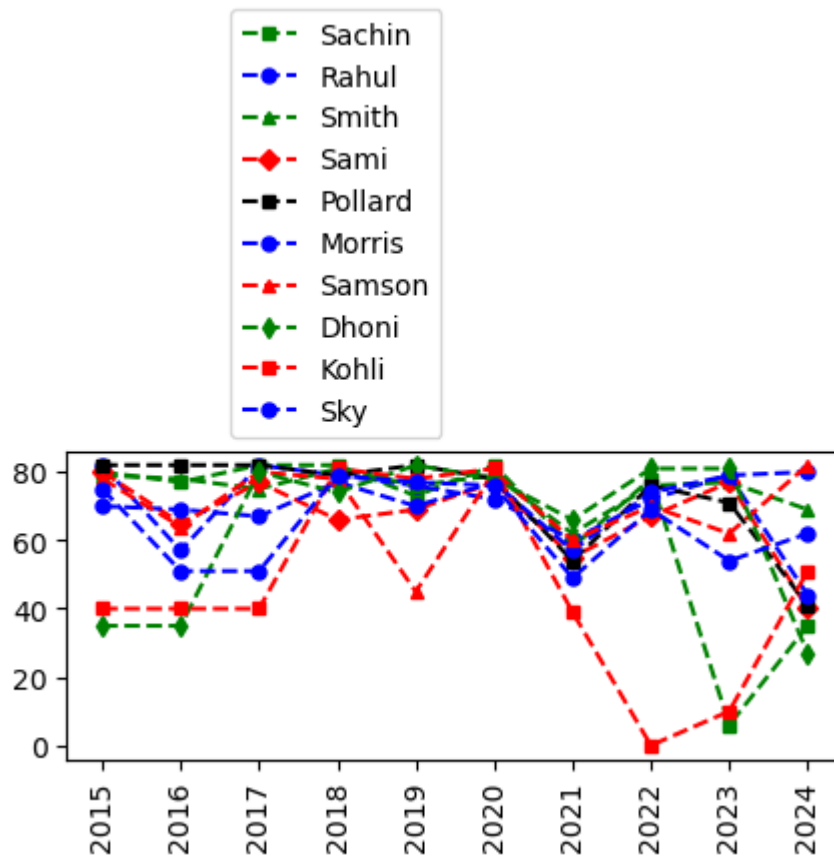


In [48]: *# we can visualize the how many games played by a player*

```
plt.plot(Games[0], c='Green', ls = '--', marker = 's', ms = 5, label = Players[0])
plt.plot(Games[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Games[2], c='Green', ls = '--', marker = '^', ms = 5, label = Players[2])
plt.plot(Games[3], c='Red', ls = '--', marker = 'D', ms = 5, label = Players[3])
plt.plot(Games[4], c='Black', ls = '--', marker = 's', ms = 5, label = Players[4])
plt.plot(Games[5], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[5])
plt.plot(Games[6], c='red', ls = '--', marker = '^', ms = 5, label = Players[6])
plt.plot(Games[7], c='Green', ls = '--', marker = 'd', ms = 5, label = Players[7])
plt.plot(Games[8], c='Red', ls = '--', marker = 's', ms = 5, label = Players[8])
plt.plot(Games[9], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[9])

plt.legend(loc = 'lower right', bbox_to_anchor=(0.5,1) )
plt.xticks(list(range(0,10)), Seasons, rotation='vertical')

plt.show()
```



```
In [ ]: * In this section we learned -
1>Matrices
2>Building matrices - np.reshape
3>Dictionaryed in python (order doesnot mater) (keys & values)
4>visualizaing using pyplot
5>Basket ball analysis
```