

```
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", "Kohli"]
Pdict = {"Sachin":0, "Rahul":1, "Smith":2, "Sami":3, "Pollard":4, "Morris":5, "Samson":6, "Dhoni":7, "Kohli":8}

#Salaries
Sachin_Salary = [15946875, 17718750, 19490625, 21262500, 23034375, 24806250, 25244493, 26000000, 27744189, 29488377, 31232567, 32976754, 34324500, 36038573, 3751800, 3828090, 39041250, 40410581, 41779912, 43500000, 45022500, 4751840, 4864041, 49041250, 50410581, 51779912, 53149243, 54518574, 561945, 57493160, 5806720, 59061274, 60758000, 6202590, 63647180, 65091770, 6719, 6848000, 6935220, 70455000, 71410581, 72779912, 74500000, 76022500, 775144240, 78380160, 79615960, 80574189, 813520500, 824940153, 836359805, 84777, 8561200, 86484040, 8796880, 89053663, 90506632, 916669630, 927832627, 931, 94222800, 95184480, 96546160, 976993708, 9816402500, 9917632688, 10018862875, 101Sky_Salary = [103031920, 1043841443, 1053041250, 10614410581, 10715779912, 10814200000, 10915691000, 11017182, #Matrix
Salary = np.array([Sachin_Salary, Rahul_Salary, Smith_Salary, Sami_Salary, Pollard_Salary, Morris_Salary, Samson_Salary, Dhoni_Salary, Kohli_Salary, Sky_Salary])

#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, Samson_G, Dhoni_G, Kohli_G, Sky_G])

#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, Morris_PTS, Samson_PTS, Dhoni_PTS, Kohli_PTS, Sky_PTS])
```

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, 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]
```

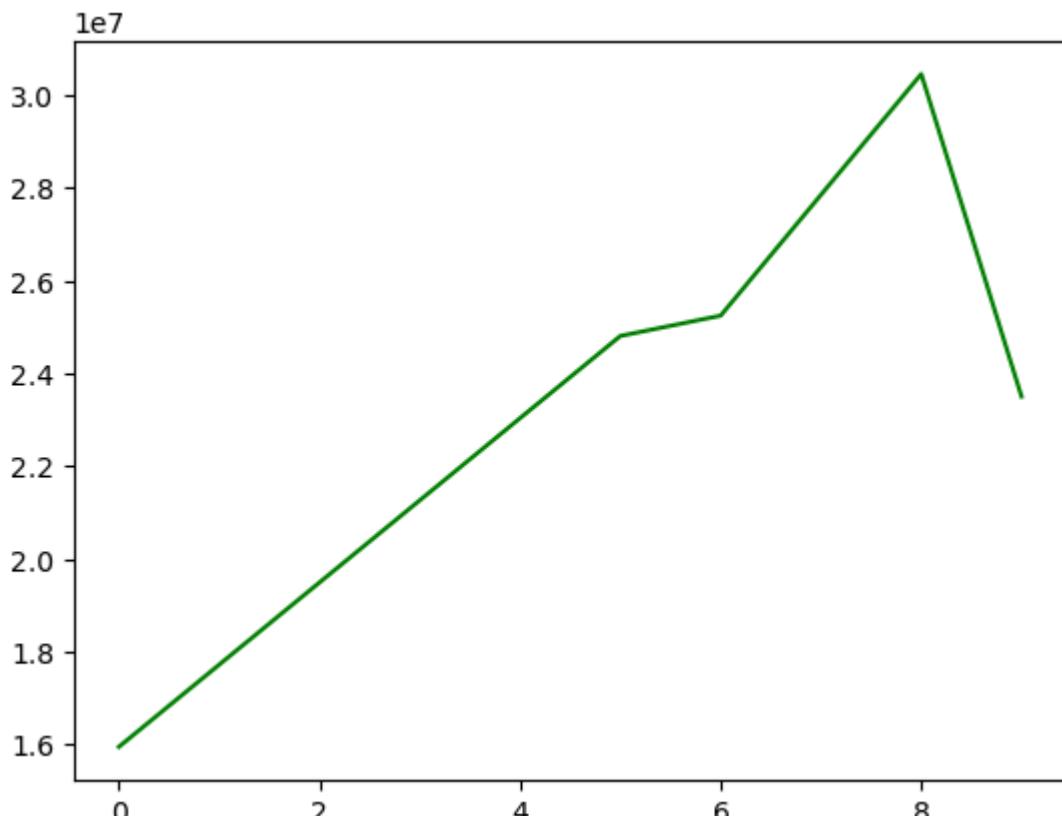
```
Out[16]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
   25244493, 27849149, 30453805, 23500000])
```

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

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

```
Out[18]: [

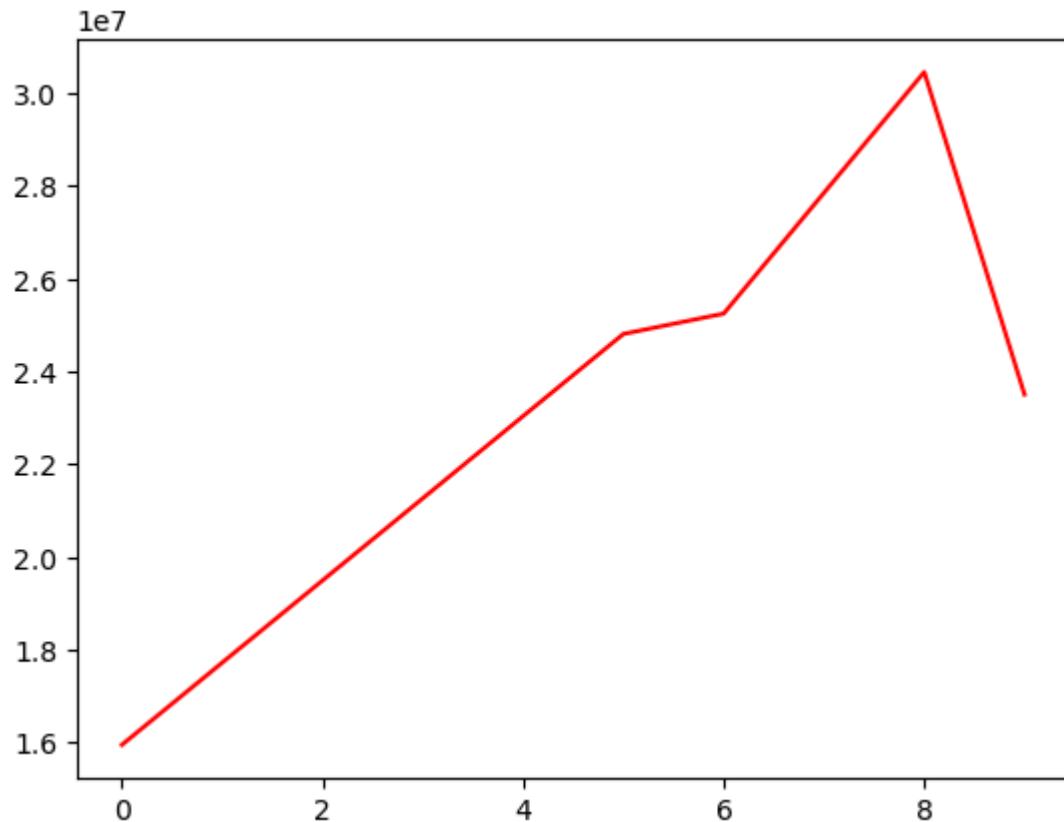
```



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

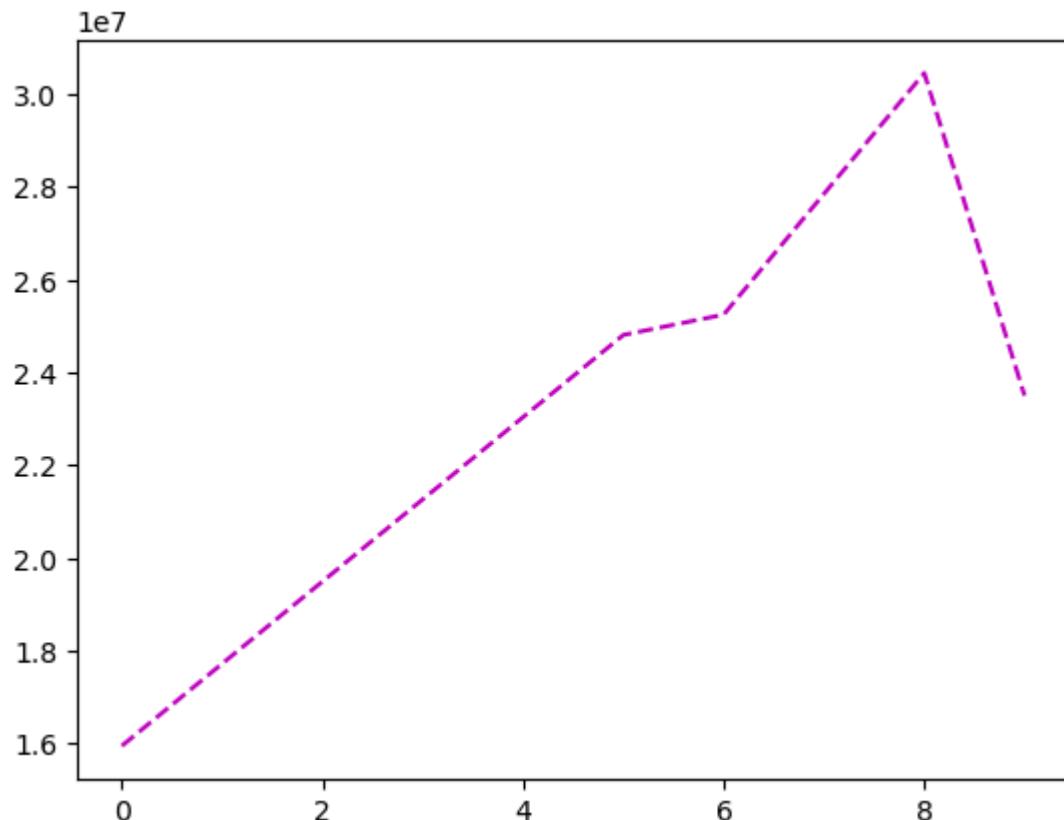
```
Out[19]: [

```



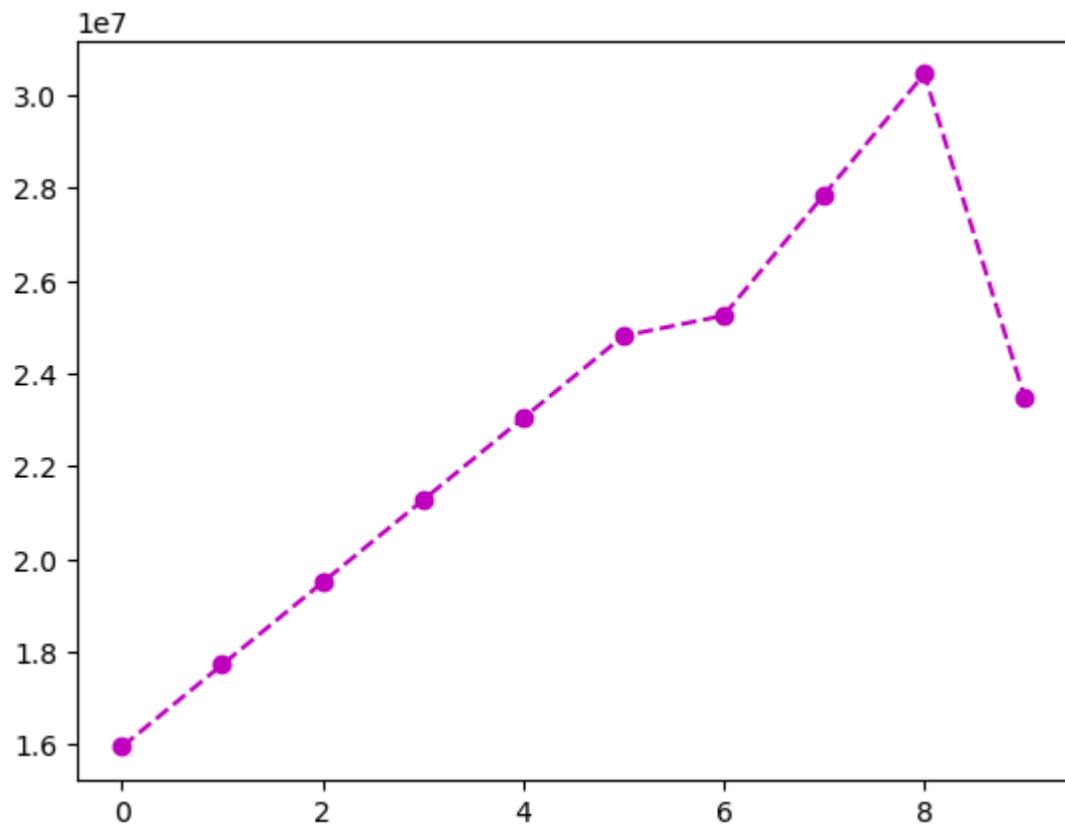
```
In [20]: plt.plot(Salary[0],c = 'm',ls = '--')
```

```
Out[20]: [
```



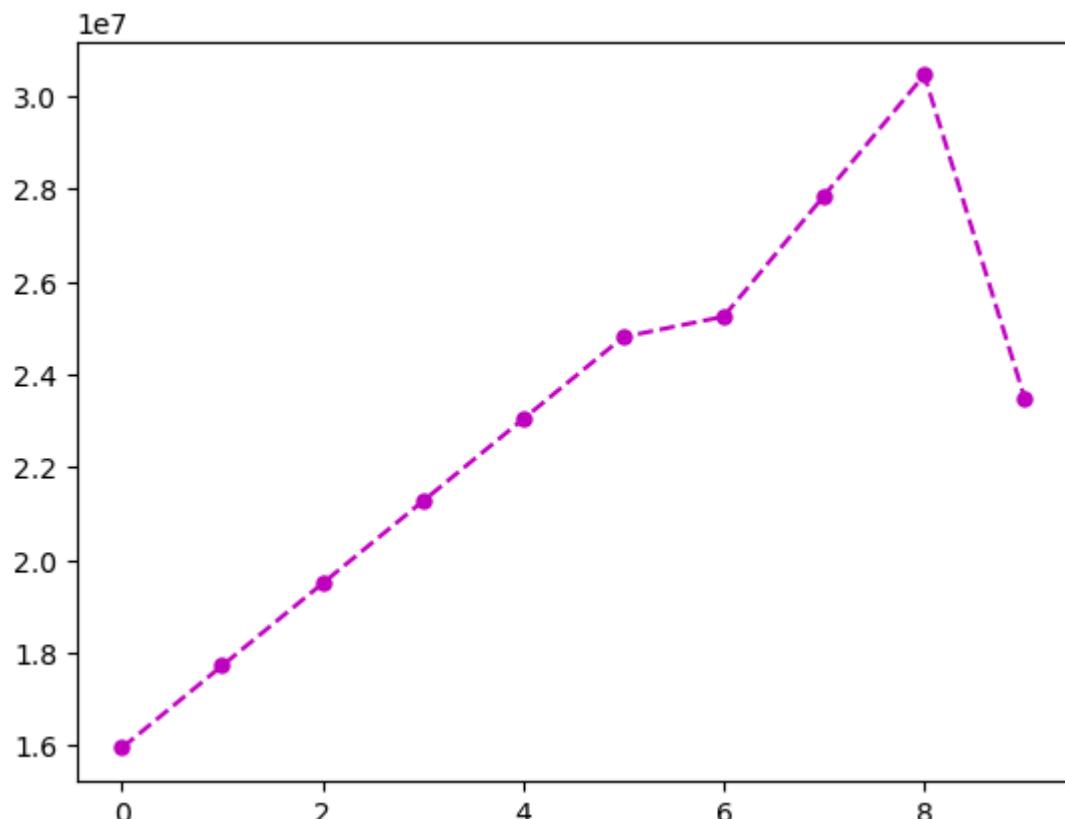
```
In [21]: plt.plot(Salary[0],c = 'm',ls = '--',marker = 'o')
```

```
Out[21]: [
```



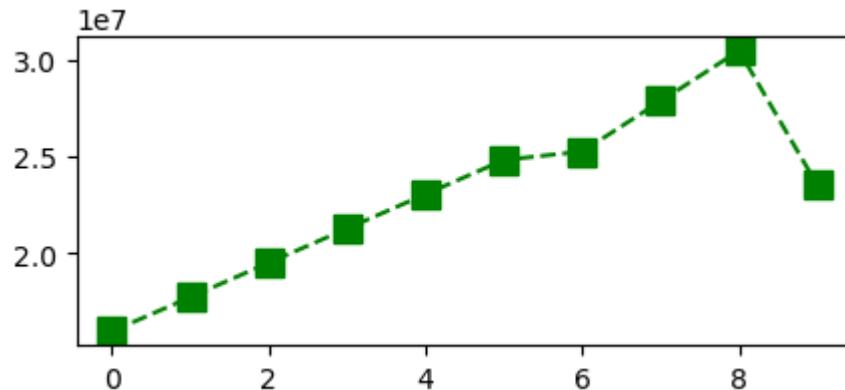
```
In [22]: plt.plot(Salary[0],c = 'm',ls = '--',marker = 'o',ms = 5)
```

```
Out[22]: [
```



```
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]
```

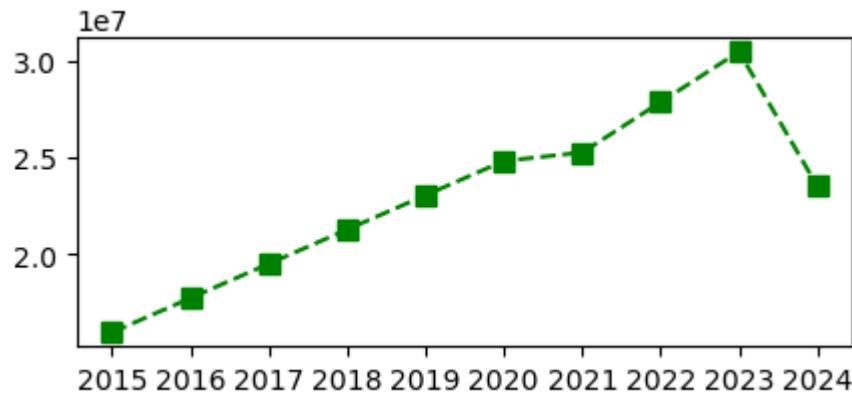
```
In [26]: Sdict
```

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

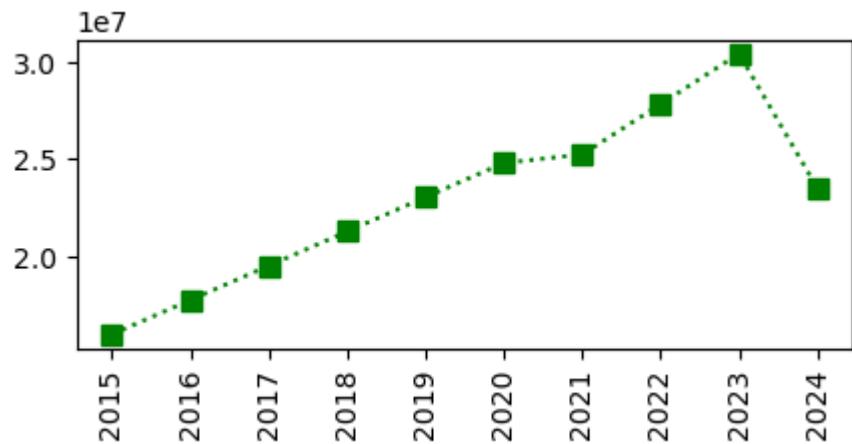
```
In [27]: Pdict
```

```
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()
```



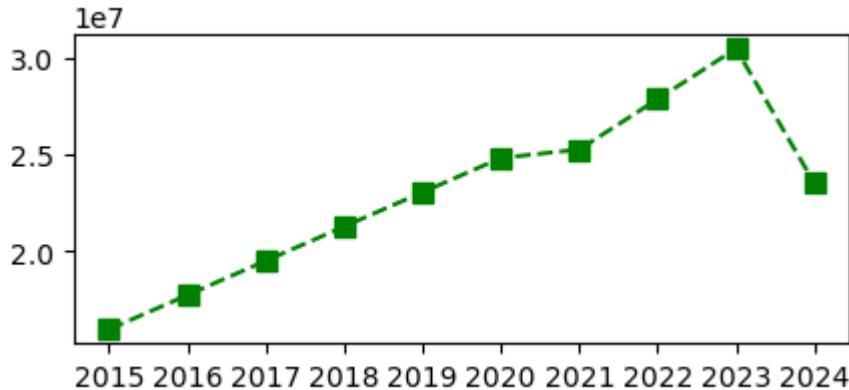
```
In [29]: plt.plot(Salary[0], c='Green', ls = ':', marker = 's', ms = 7, label = Players[0])
plt.xticks(list(range(0,10)), Seasons, rotation='vertical')
plt.show()
```



```
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])`

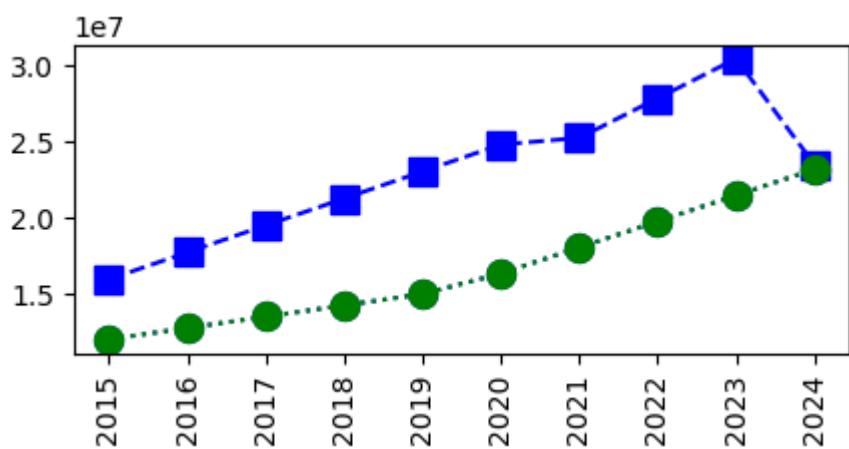
In [34]: `plt.plot(Salary[1], c='Blue', ls = ':', marker = 'o', ms = 10, label = Players[1])`

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')

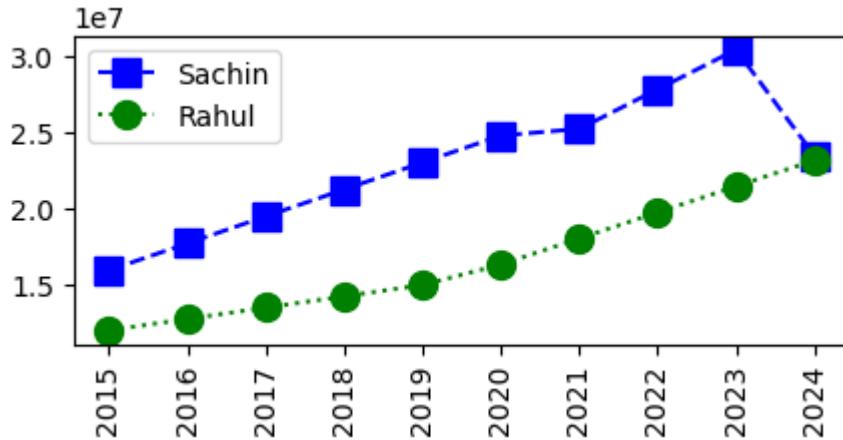
plt.show()`



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])

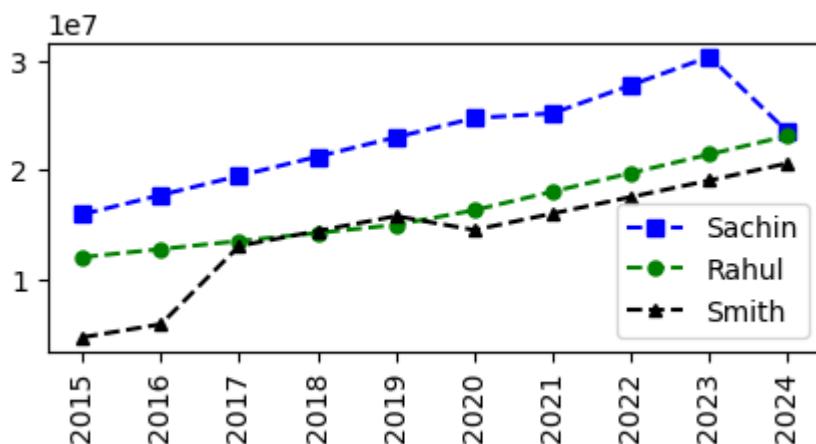
plt.xticks(list(range(0,10)), Seasons, rotation='vertical')
plt.legend()

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])

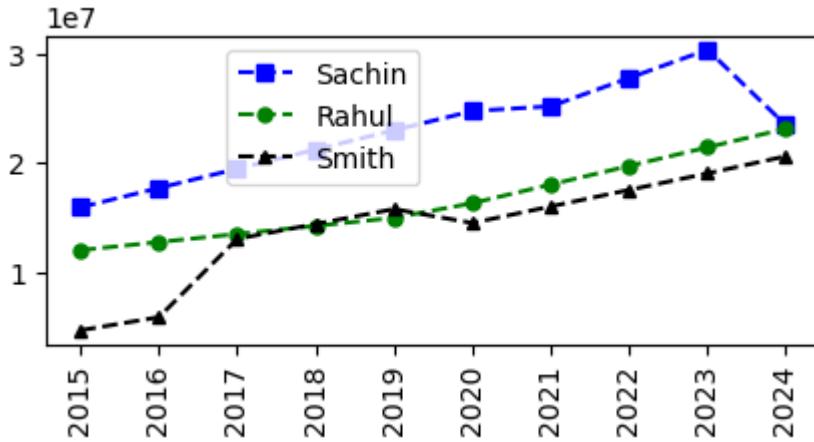
plt.xticks(list(range(0,10)), Seasons, rotation='vertical')
plt.legend()
plt.show()
```



```
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')

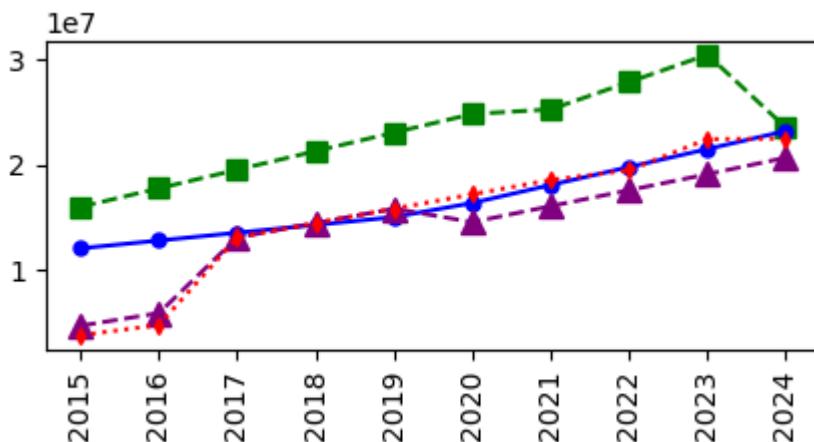
plt.legend(loc = 'upper right', bbox_to_anchor=(0.5,1))
plt.show()
```



```
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])

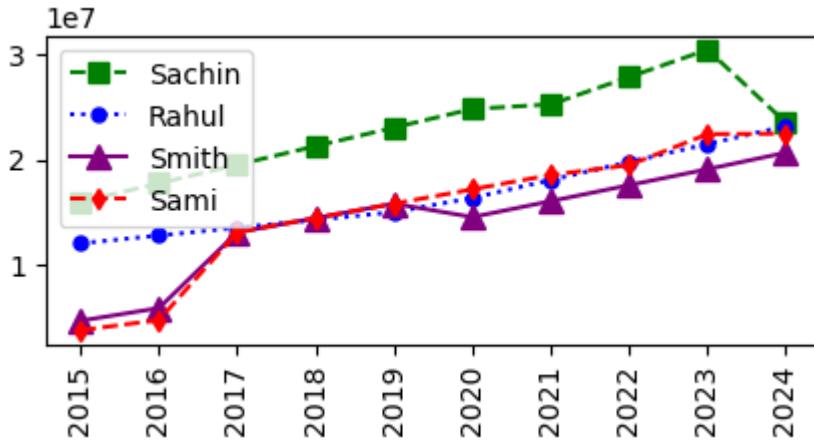
plt.xticks(list(range(0,10)), Seasons, rotation='vertical')

plt.show()
```



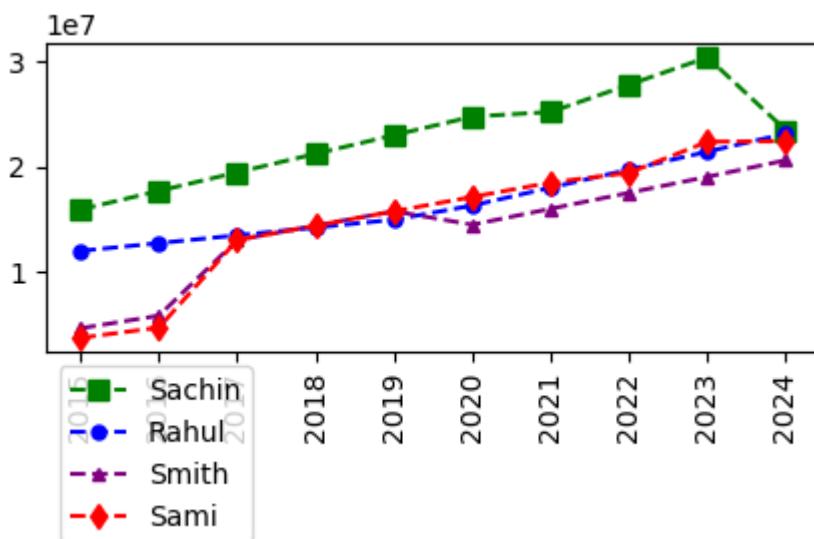
```
In [41]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = ':', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='purple', ls = '-.', marker = '^', ms = 8, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--',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

plt.show()
```



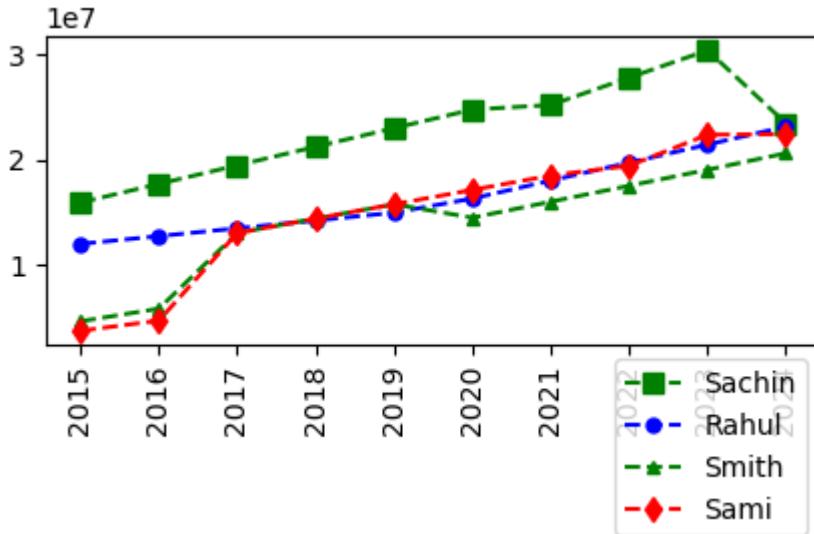
```
In [42]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 5, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', 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()
```



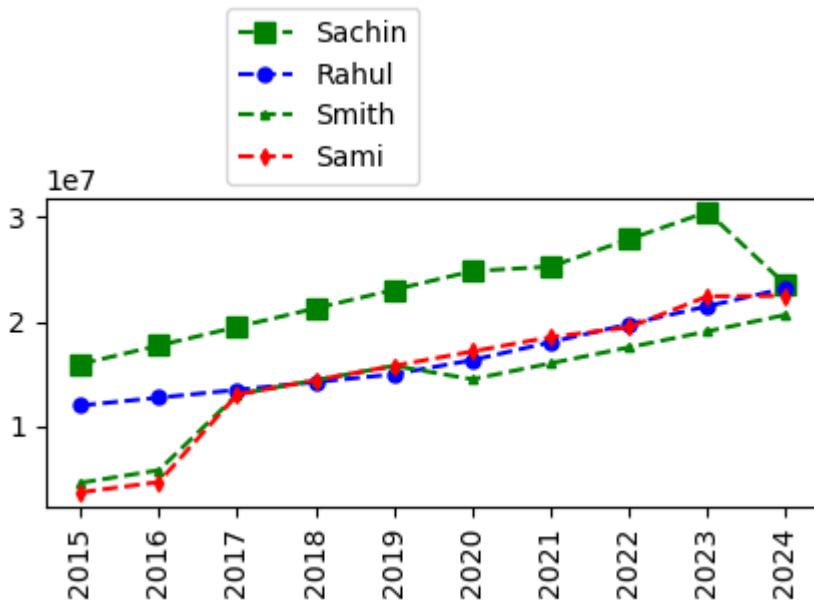
```
In [43]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='Green', ls = '--', marker = '^', ms = 5, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', 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')

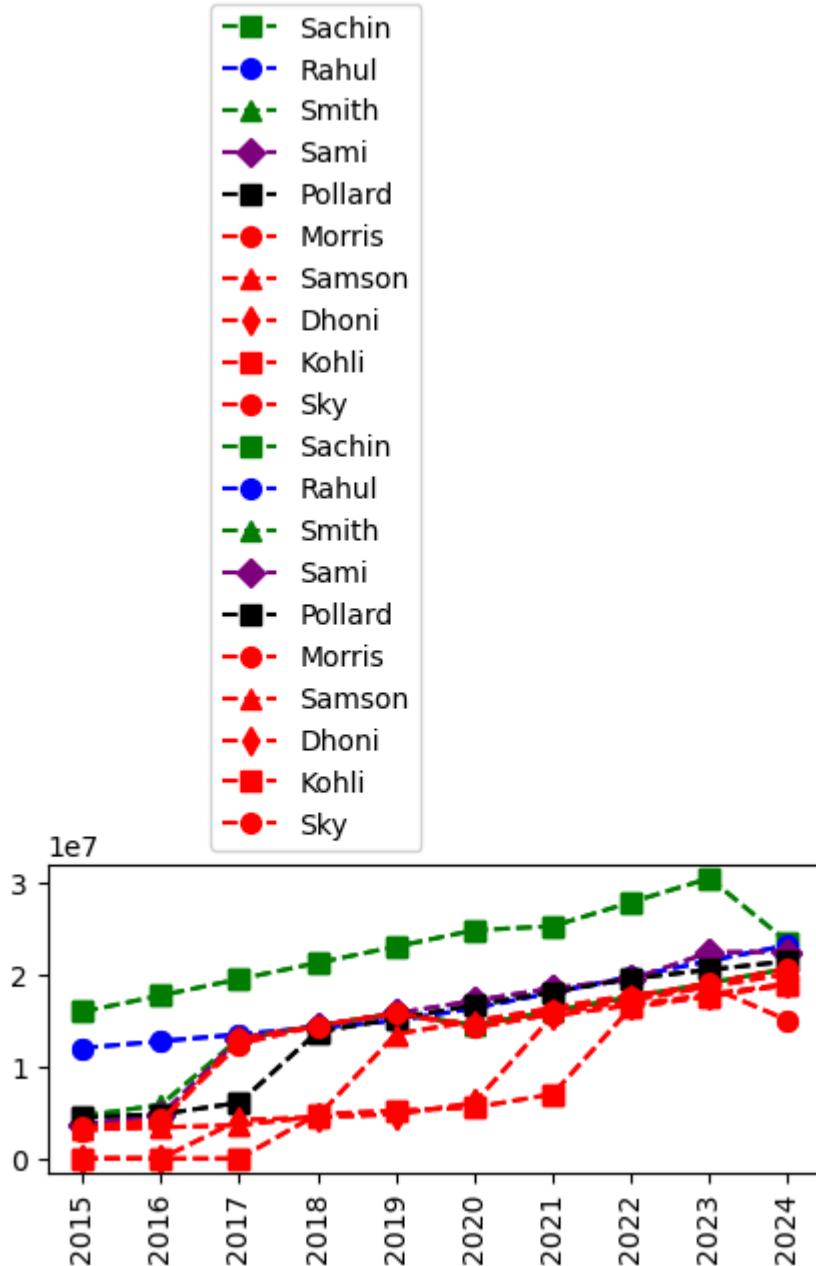
plt.show()
```



```
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()
```

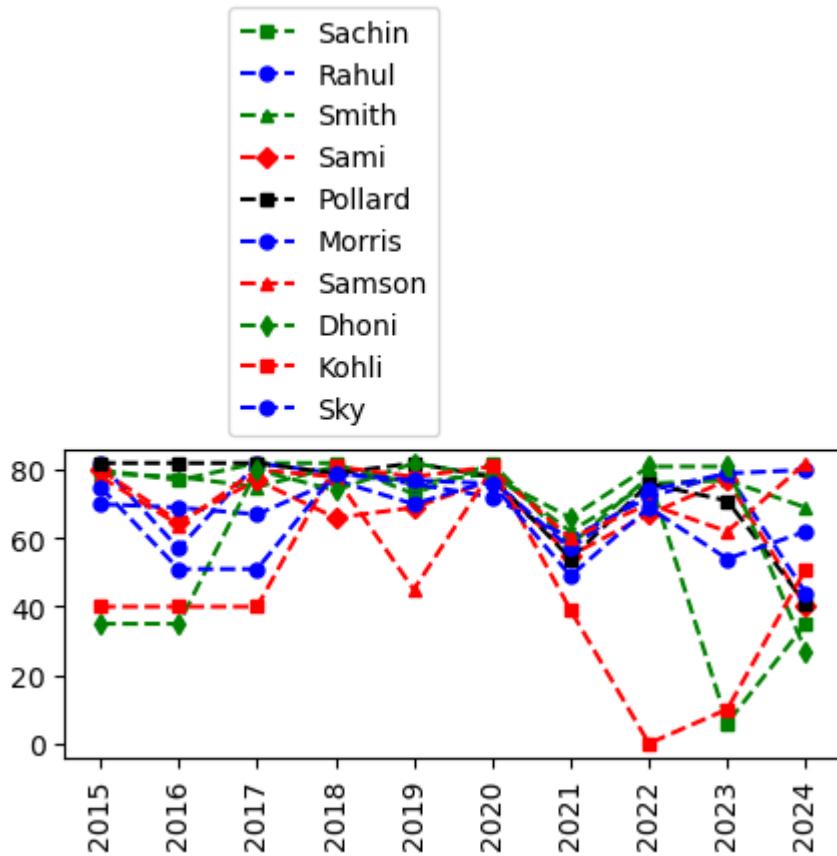


```
In [48]: # we can visualize the how many games played by a player
```

```
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>Dictionaried in python (order doesnot mater) (keys & values)
4>visualizaing using pyplot
5>Basket ball analysis
```