

```

In [1]: import numpy as np

#Seasons
Seasons = ["2010", "2011", "2012", "2013", "2014", "2015", "2016", "2017", "2018", "2019"]
Sdict = {"2010":0, "2011":1, "2012":2, "2013":3, "2014":4, "2015":5, "2016":6, "2017":7

#Players
Players = ["Sachin", "Rahul", "Smith", "Sami", "Pollard", "Morris", "Samson", "Dhoni", "
Pdct = {"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 [4]: Salary

```

```
Out[4]: 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 [5]: Games

```
Out[5]: 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 [6]: Points

```
Out[6]: 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 [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 [9]: Salary / Games

C:\Users\chamb\AppData\Local\Temp\ipykernel\_4004\1572766764.py:1: RuntimeWarning:  
divide by zero encountered in divide  
Salary / Games

```
Out[9]: array([[ 199335.9375, 230113.63636364, 237690.54878049,
 259298.7804878, 315539.38356164, 302515.24390244,
 435249.87931034, 357040.37179487, 5075634.16666667,
 671428.57142857],
 [ 146341.46341463, 223582.26315789, 164492.40243902,
 180159.07594937, 197062.55263158, 226729.16666667,
 300642.88333333, 274342.29166667, 271730.60759494,
 289759.875],
 [ 58503.79746835, 74719.1025641, 173883.33333333,
 177908.40740741, 207630.42105263, 183544.30379747,
 258427.41935484, 230855.26315789, 247629.87012987,
 299194.20289855],
 [ 46420.5, 72216.01538462, 169366.88311688,
 218342.13636364, 228694.37681159, 222717.44155844,
 336701.34545455, 290298.50746269, 291006.15584416,
 561450.],
 [ 54794.63414634, 58618.53658537, 73917.97560976,
 174151.89873418, 185397.43902439, 213425.38461538,
 335032.77777778, 257057.36842105, 288918.,
 522835.87804878],
 [ 47828.57142857, 61380., 185895.52238806,
 187150.4025974, 225427.31428571, 188311.68831169,
 281096.49122807, 237094.59459459, 241360.75949367,
 469190.90909091],
 [ 40310.76923077, 52815., 45199.5,
 58643.44871795, 300455.55555556, 186751.9125,
 272663.41666667, 253992.25714286, 301103.72580645,
 244738.57317073],
 [ 0., 0., 52140.,
 60595.13513514, 58498.53658537, 77611.06410256,
 234948.96969697, 205797.90123457, 220155.88888889,
 703541.62962963],
 [ 0., 0., 0.,
 59540.74074074, 66467.69230769, 68471.11111111,
 179325.84615385, inf, 1763268.8,
 369860.29411765],
 [ 40425.6, 75322.41176471, 255710.78431373,
 182412.41772152, 204933.92207792, 186842.10526316,
 320224.48979592, 249014.49275362, 345796.2962963,
 241935.48387097]])
```

In [10]: Salary // Games

C:\Users\chamb\AppData\Local\Temp\ipykernel\_4004\3536023082.py:1: RuntimeWarning:  
divide by zero encountered in floor\_divide  
Salary // Games

```
Out[10]: array([[ 199335,  230113,  237690,  259298,  315539,  302515,  435249,
                  357040,  5075634,  671428],
                [ 146341,  223582,  164492,  180159,  197062,  226729,  300642,
                  274342,  271730,  289759],
                [  58503,   74719,  173883,  177908,  207630,  183544,  258427,
                  230855,  247629,  299194],
                [  46420,   72216,  169366,  218342,  228694,  222717,  336701,
                  290298,  291006,  561450],
                [  54794,   58618,   73917,  174151,  185397,  213425,  335032,
                  257057,  288918,  522835],
                [  47828,   61380,  185895,  187150,  225427,  188311,  281096,
                  237094,  241360,  469190],
                [  40310,   52815,   45199,   58643,  300455,  186751,  272663,
                  253992,  301103,  244738],
                [    0,         0,   52140,   60595,   58498,   77611,  234948,
                  205797,  220155,  703541],
                [    0,         0,         0,   59540,   66467,   68471,  179325,
                   0, 1763268,  369860],
                [  40425,   75322,  255710,  182412,  204933,  186842,  320224,
                  249014,  345796,  241935]])
```

```
In [11]: np.round(Salary // Games)
```

C:\Users\chamb\AppData\Local\Temp\ipykernel\_4004\2034936389.py:1: RuntimeWarning:  
divide by zero encountered in floor\_divide  
np.round(Salary // Games)

```
Out[11]: array([[ 199335,  230113,  237690,  259298,  315539,  302515,  435249,
                  357040,  5075634,  671428],
                [ 146341,  223582,  164492,  180159,  197062,  226729,  300642,
                  274342,  271730,  289759],
                [  58503,   74719,  173883,  177908,  207630,  183544,  258427,
                  230855,  247629,  299194],
                [  46420,   72216,  169366,  218342,  228694,  222717,  336701,
                  290298,  291006,  561450],
                [  54794,   58618,   73917,  174151,  185397,  213425,  335032,
                  257057,  288918,  522835],
                [  47828,   61380,  185895,  187150,  225427,  188311,  281096,
                  237094,  241360,  469190],
                [  40310,   52815,   45199,   58643,  300455,  186751,  272663,
                  253992,  301103,  244738],
                [    0,         0,   52140,   60595,   58498,   77611,  234948,
                  205797,  220155,  703541],
                [    0,         0,         0,   59540,   66467,   68471,  179325,
                   0, 1763268,  369860],
                [  40425,   75322,  255710,  182412,  204933,  186842,  320224,
                  249014,  345796,  241935]])
```

```
In [2]: import warnings
warnings.filterwarnings('ignore')
```

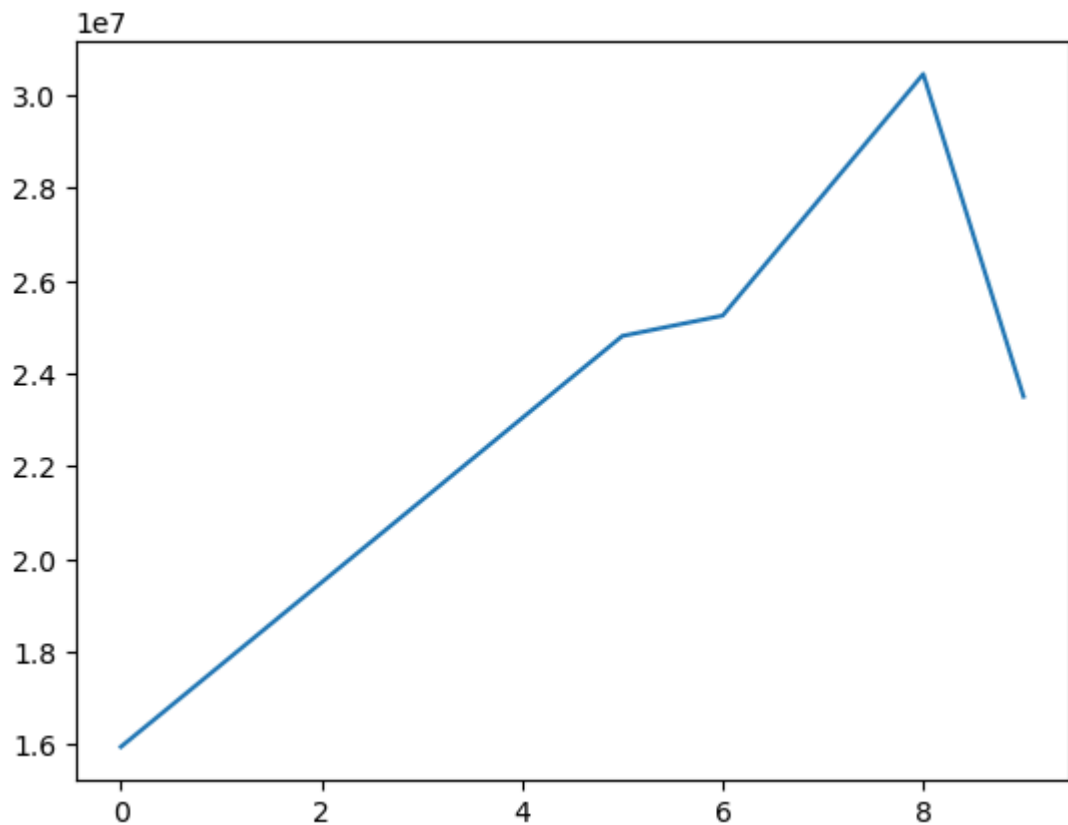
```
In [3]: import matplotlib.pyplot as plt # Library for visualization
```

```
In [14]: Salary[0]
```

```
Out[14]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
                25244493, 27849149, 30453805, 23500000])
```

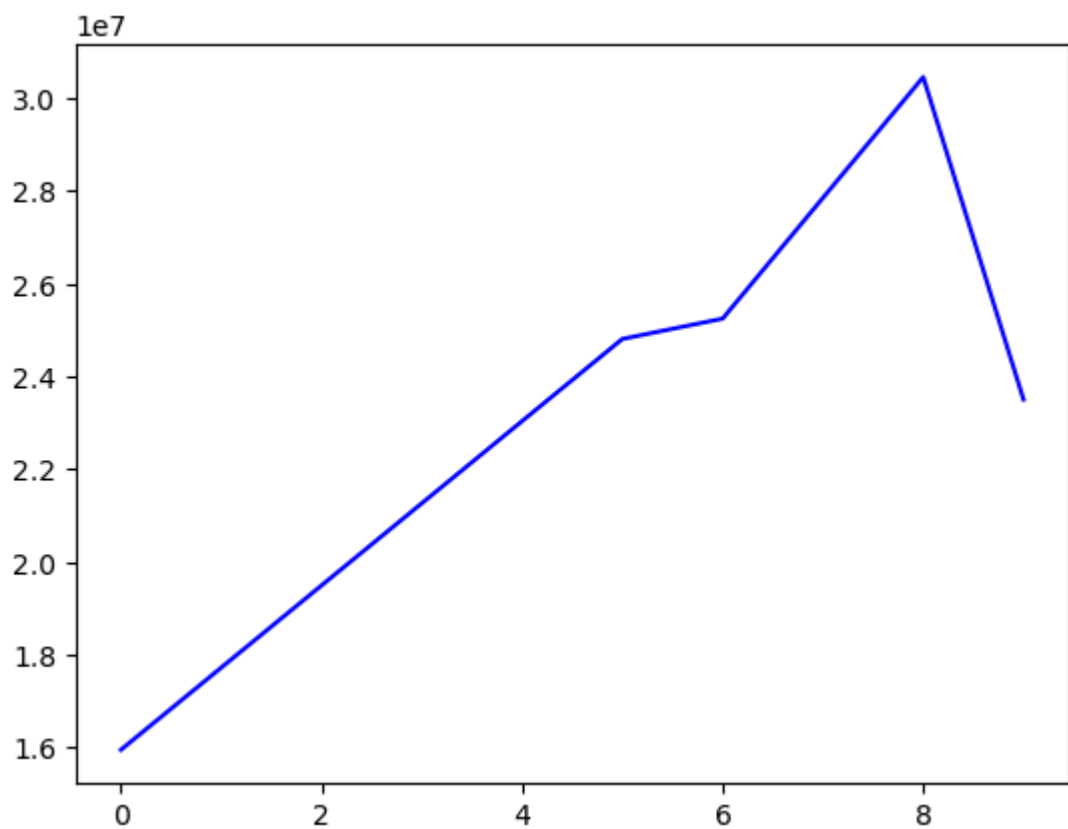
```
In [4]: plt.plot(Salary[0])
```

Out[4]: [



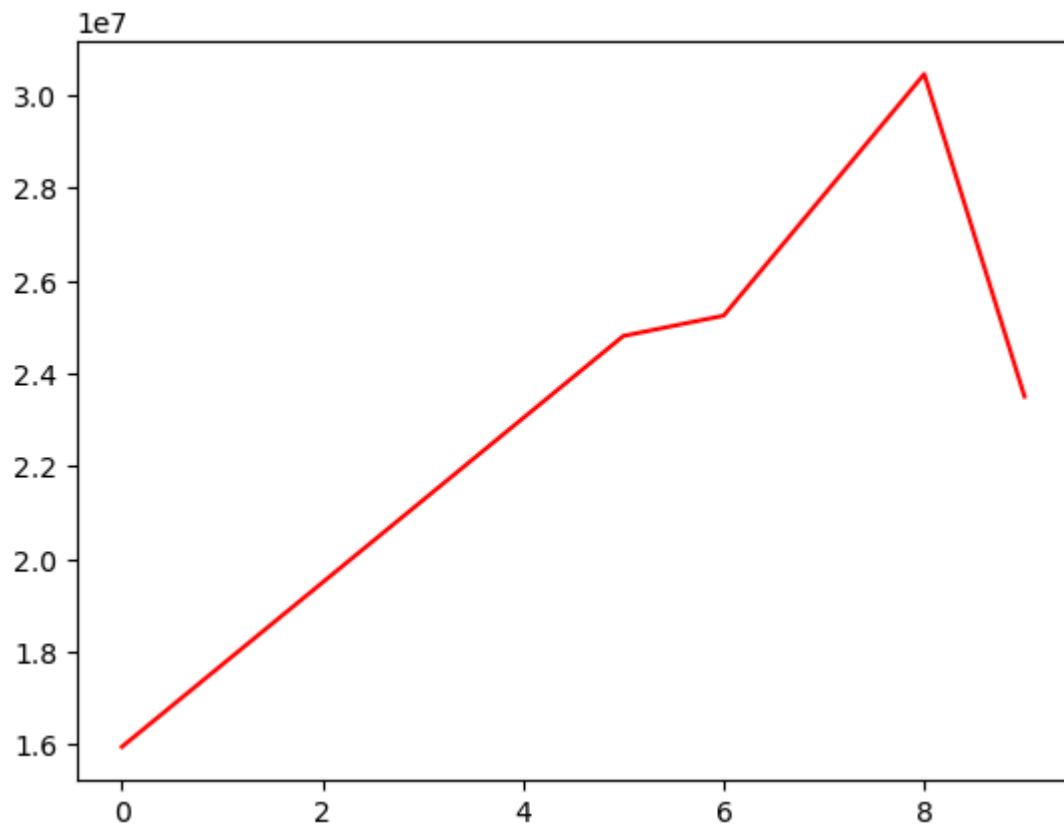
```
In [17]: plt.plot(Salary[0], c = 'b')
```

Out[17]: [



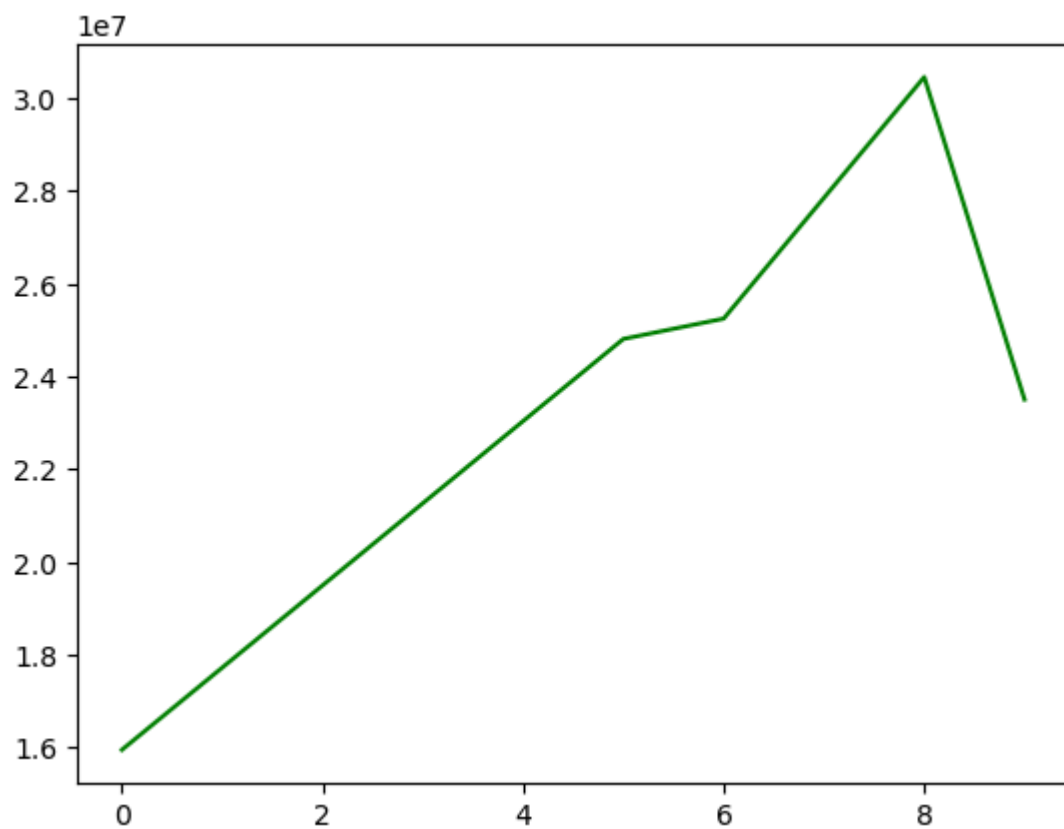
```
In [18]: plt.plot(Salary[0], c = 'r')
```

Out[18]: [



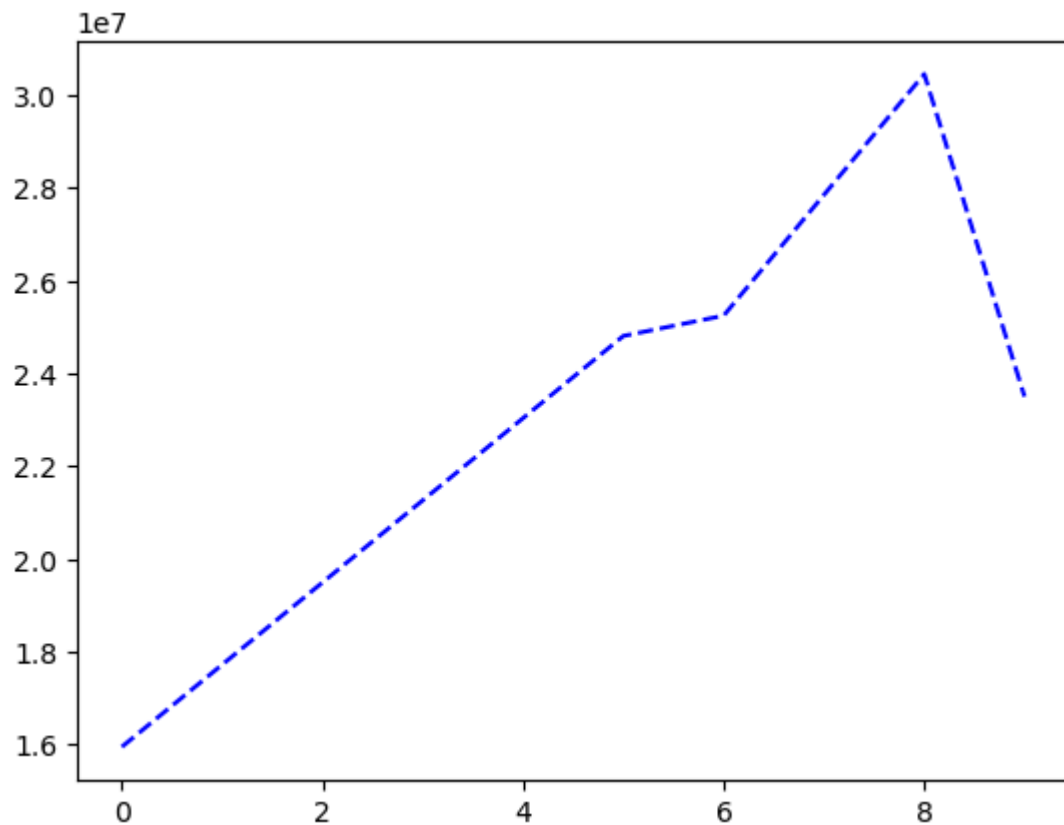
In [19]: `plt.plot(Salary[0], c = 'g')`

Out[19]: [



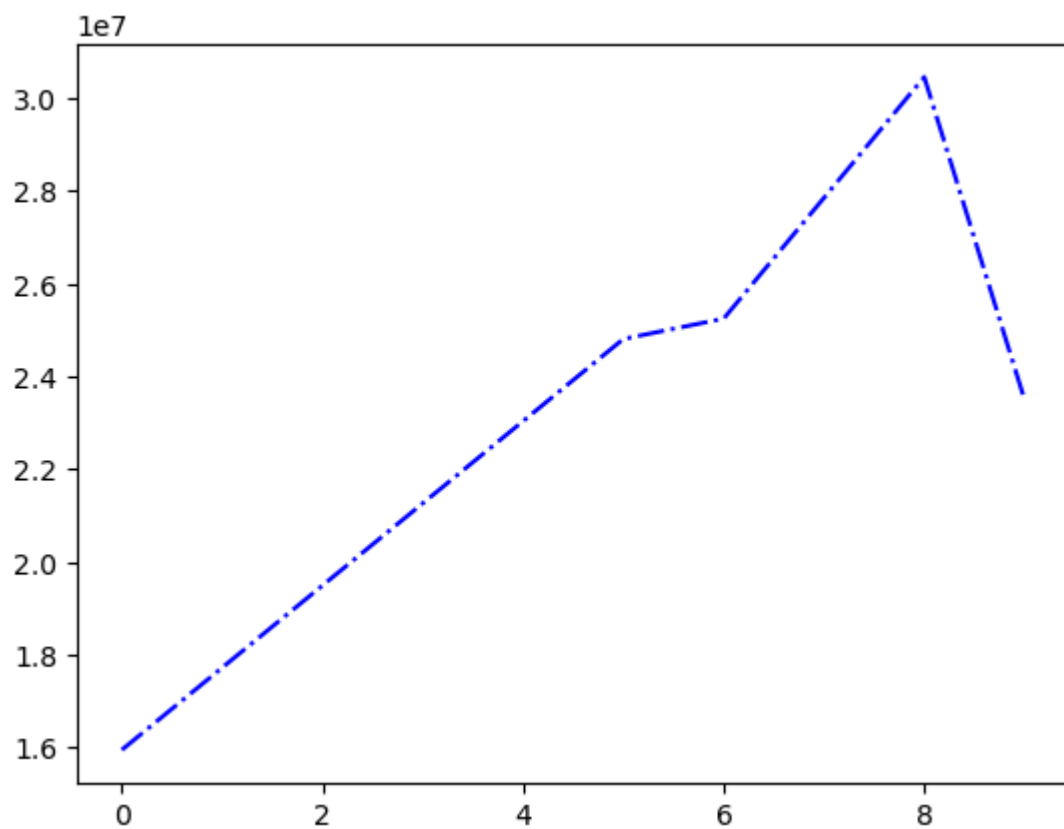
In [21]: `plt.plot(Salary[0], c = 'b', ls = '--')`

Out[21]: [



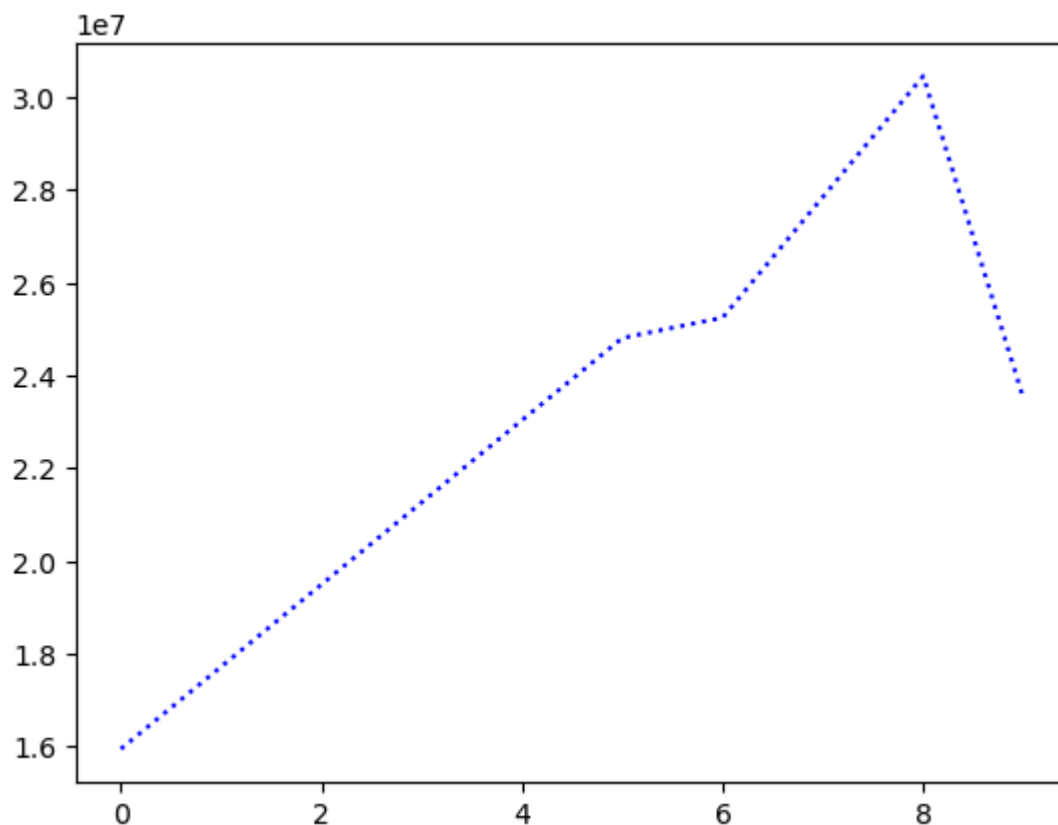
In [22]: `plt.plot(Salary[0], c = 'b', ls = '-.')`

Out[22]: [



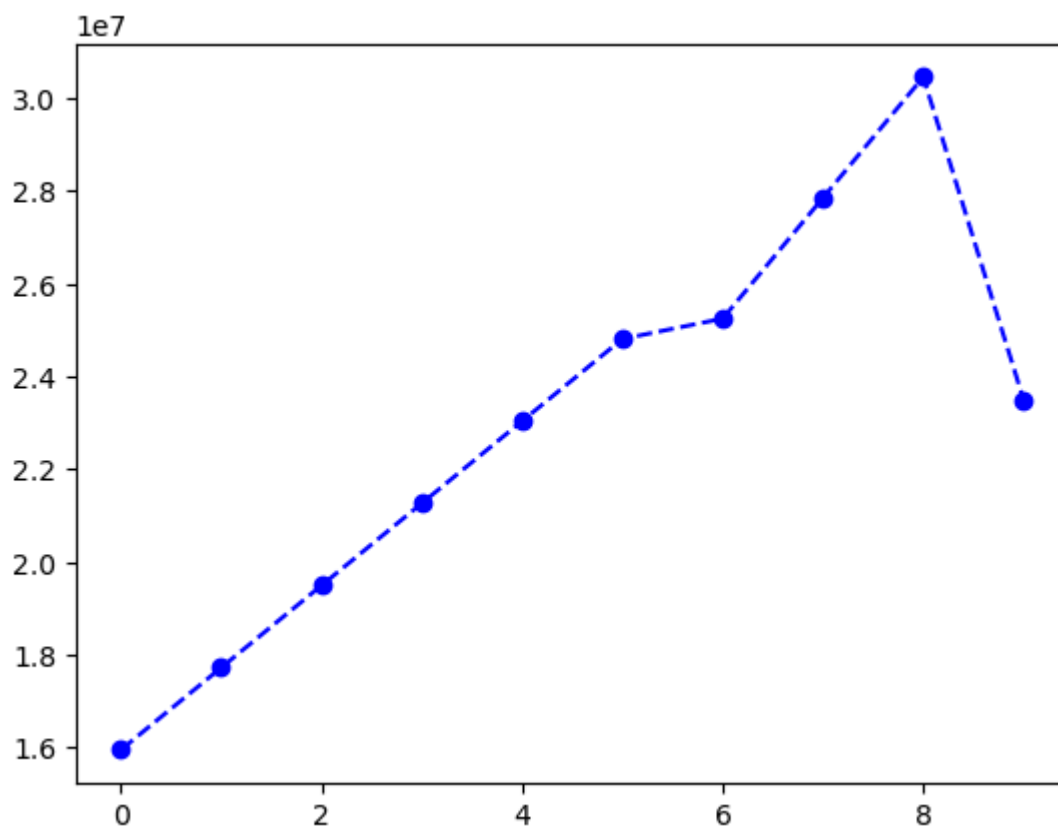
In [23]: `plt.plot(Salary[0], c = 'b', ls = ':')`

Out[23]: [



In [25]: `plt.plot(Salary[0], c = 'b', ls = '--', marker = 'o')`

Out[25]: [



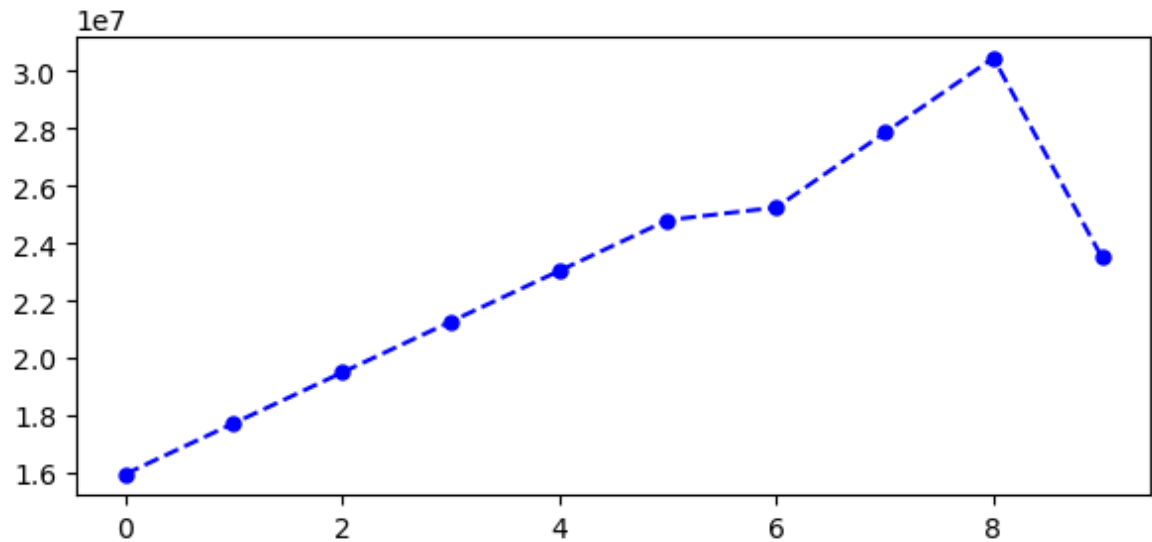
In [26]: `Games[0]`



Out[26]: array([80, 77, 82, 82, 73, 82, 58, 78, 6, 35])

In [30]: `%matplotlib inline`  
`plt.rcParams['figure.figsize'] = 7,3`

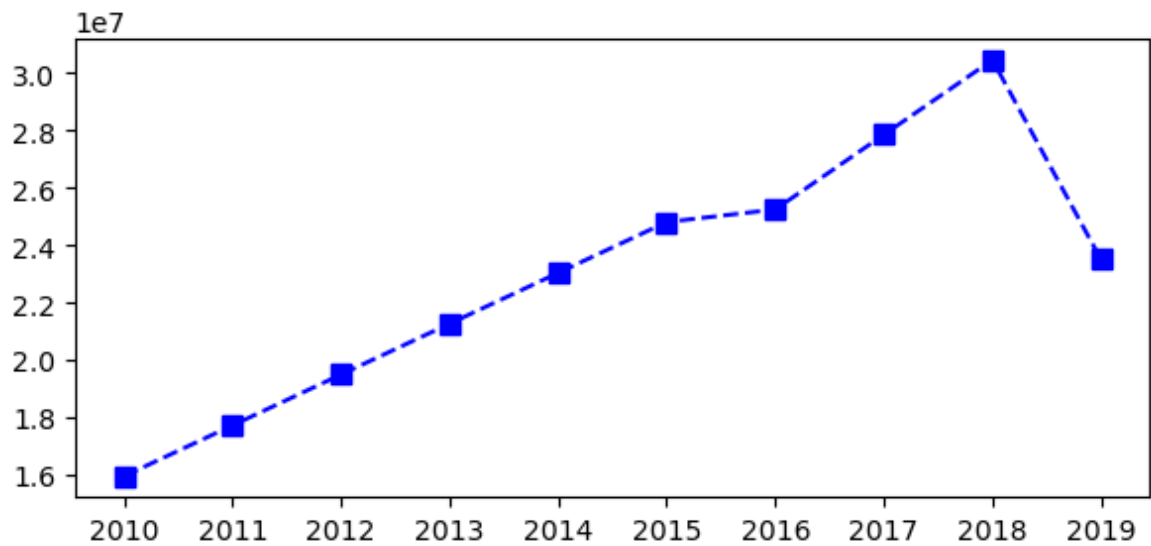
In [34]: `plt.plot(Salary[0], c = 'b', ls = '--', marker = 'o', ms = 5)`  
`plt.show()`



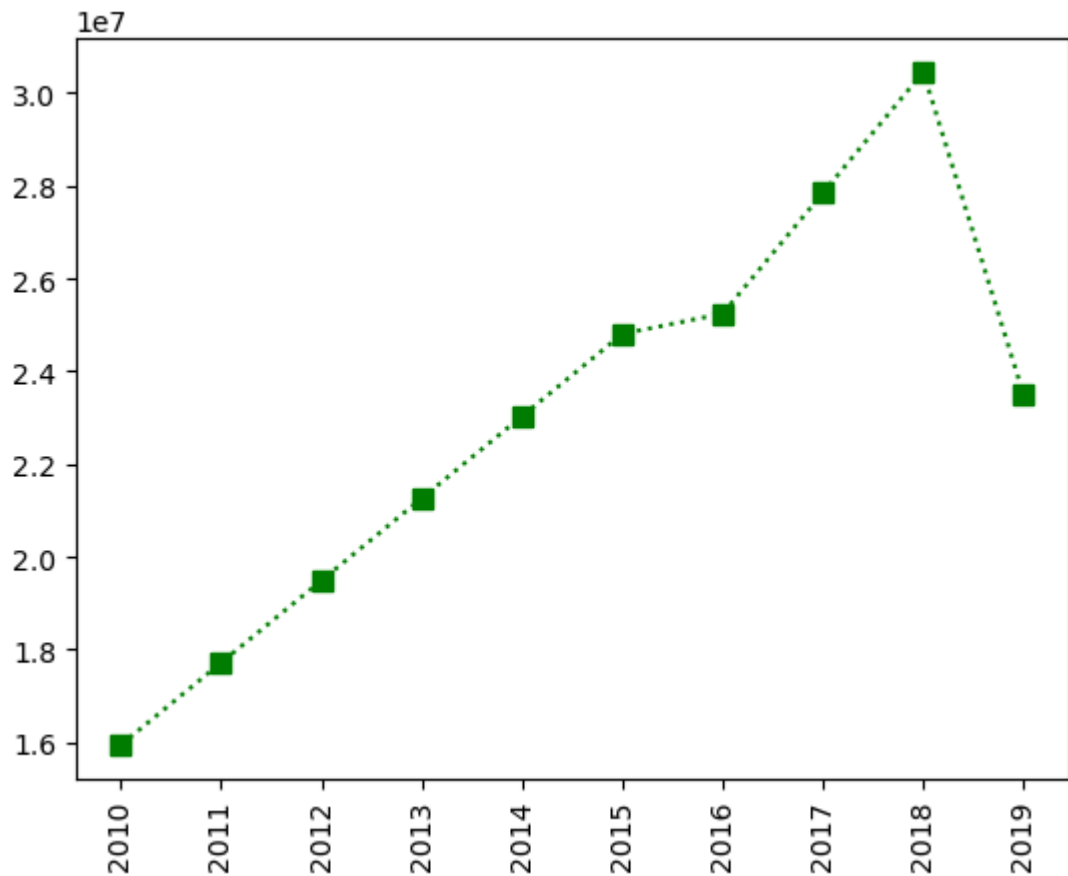
In [35]: `Sdict`

Out[35]: `{'2010': 0,`  
`'2011': 1,`  
`'2012': 2,`  
`'2013': 3,`  
`'2014': 4,`  
`'2015': 5,`  
`'2016': 6,`  
`'2017': 7,`  
`'2018': 8,`  
`'2019': 9}`

In [37]: `plt.plot(Salary[0], c = 'blue', ls = '--', marker = 's', ms = 7)`  
`plt.xticks(list(range(0,10)), Seasons)`  
`plt.show()`



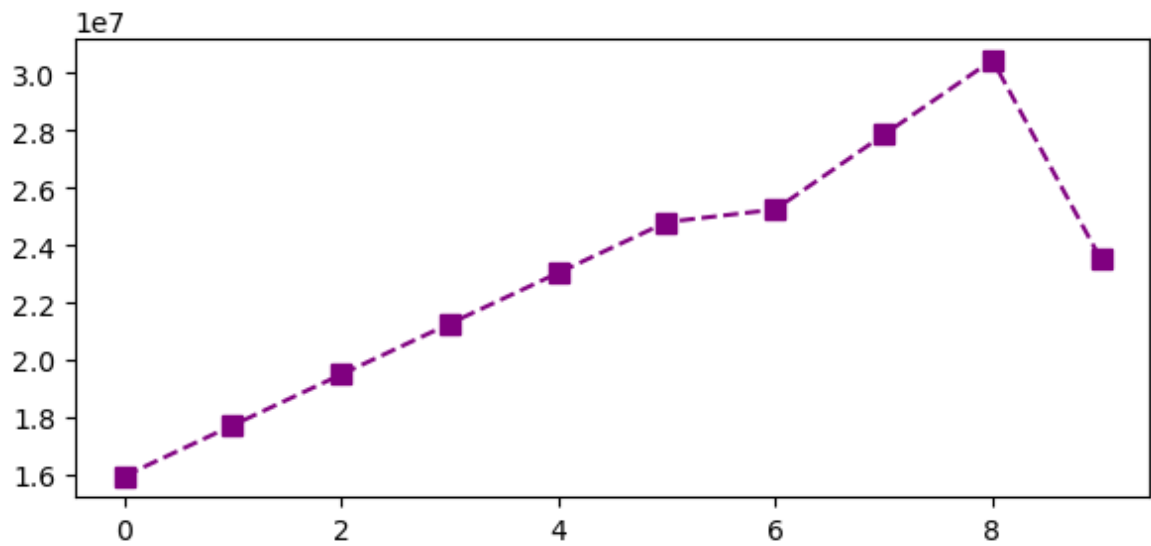
```
In [7]: plt.plot(Salary[0], c = 'Green', ls = ':', marker = 's', ms = 7)
plt.xticks(list(range(0,10)), Seasons, rotation = 'vertical')
plt.show()
```



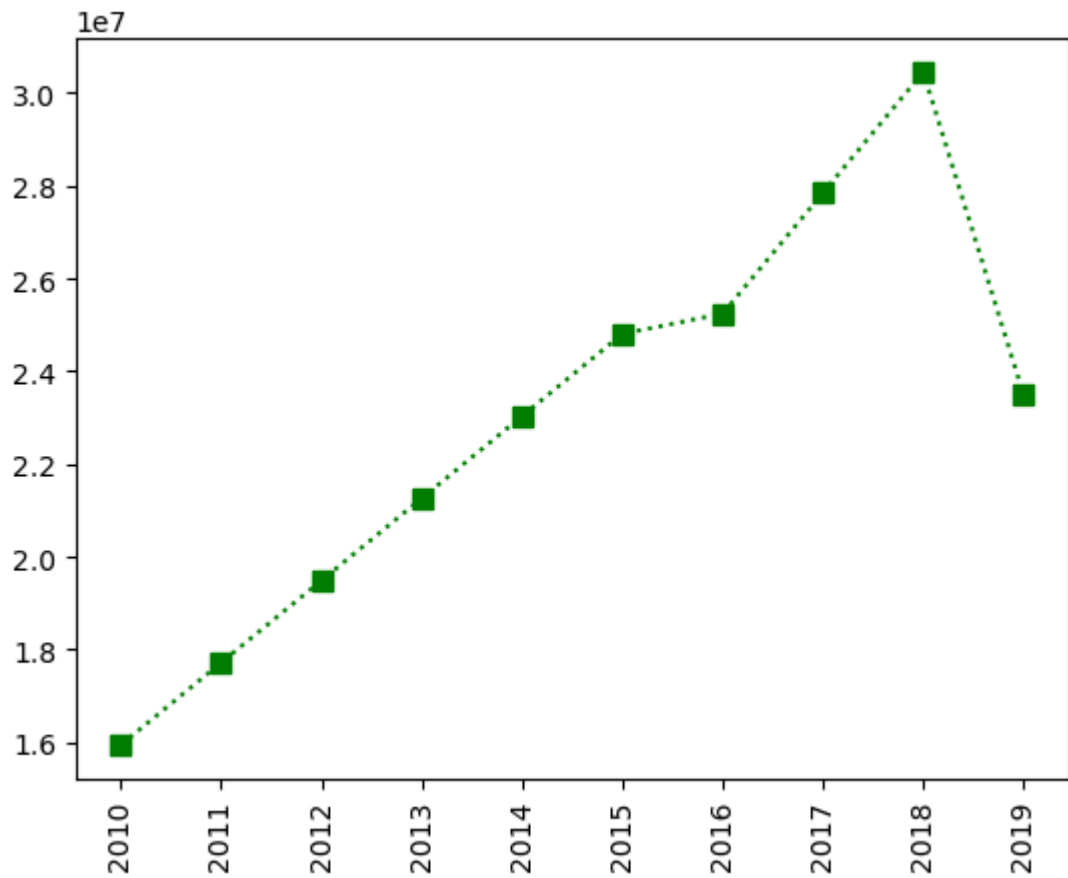
```
In [39]: Salary[1]
```

```
Out[39]: array([12000000, 12744189, 13488377, 14232567, 14976754, 16324500,
18038573, 19752645, 21466718, 23180790])
```

```
In [42]: plt.plot(Salary[0], c = 'purple', ls = '--', marker = 's', ms = 7)
plt.show()
```



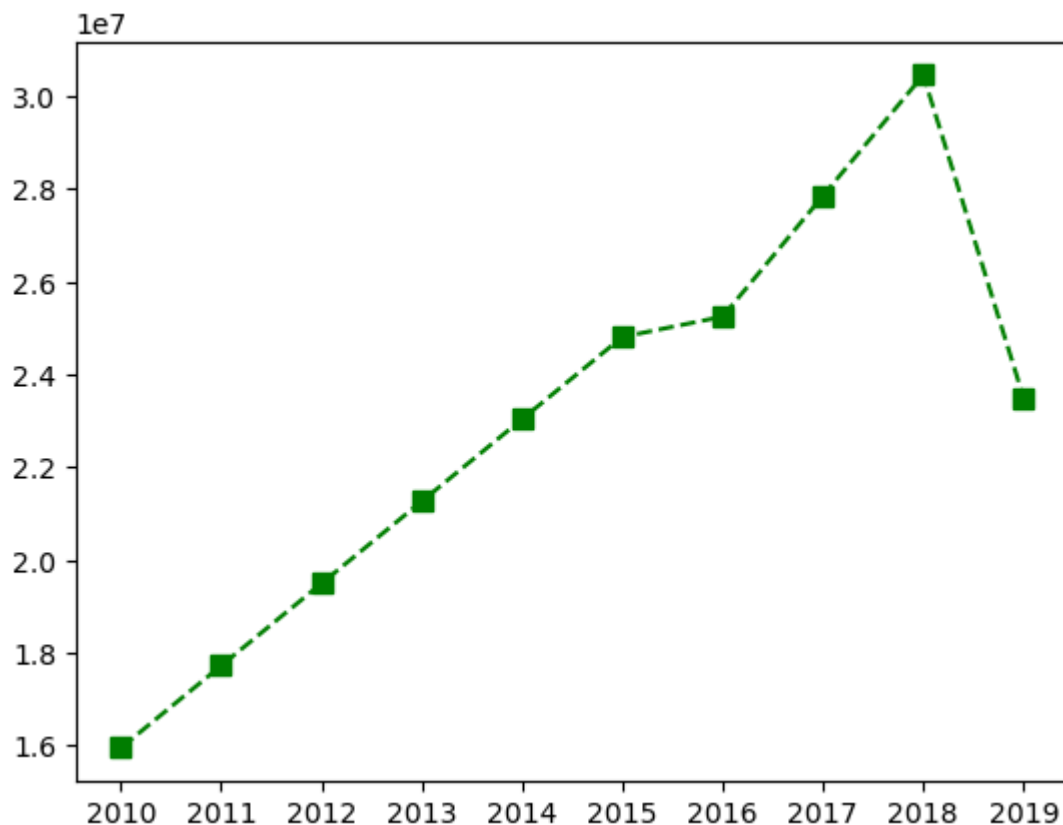
```
In [8]: plt.plot(Salary[0], c='Green', ls=':', marker='s', ms=7, label=Players[0])
plt.xticks(list(range(0,10)), Seasons, rotation='vertical')
plt.show()
```



```
In [9]: Games
```

```
Out[9]: 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 [10]: 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 [11]: Salary[0]
```

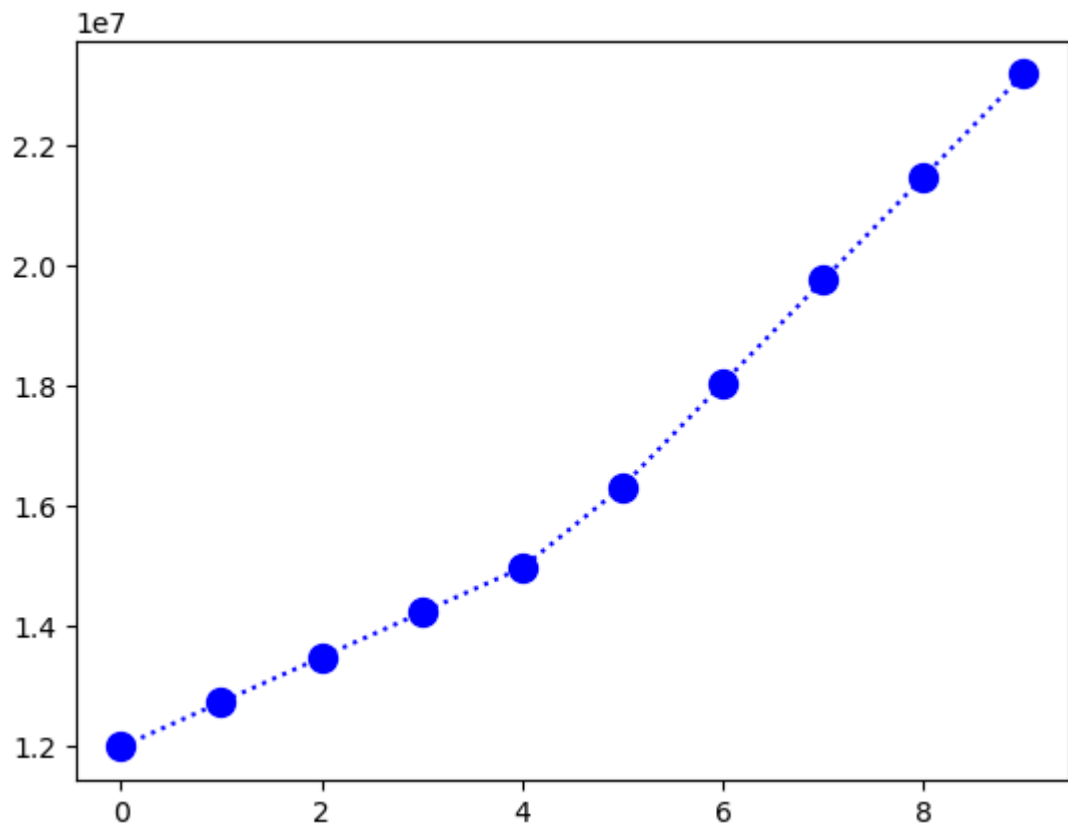
```
Out[11]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
                25244493, 27849149, 30453805, 23500000])
```

```
In [12]: Salary[1]
```

```
Out[12]: array([12000000, 12744189, 13488377, 14232567, 14976754, 16324500,
                18038573, 19752645, 21466718, 23180790])
```

```
In [15]: plt.plot(Salary[1], c = 'Blue', ls = ':', marker = 'o', ms = 10, label = Players[1])
```

```
Out[15]: [<matplotlib.lines.Line2D at 0x2810ab0a490>]
```

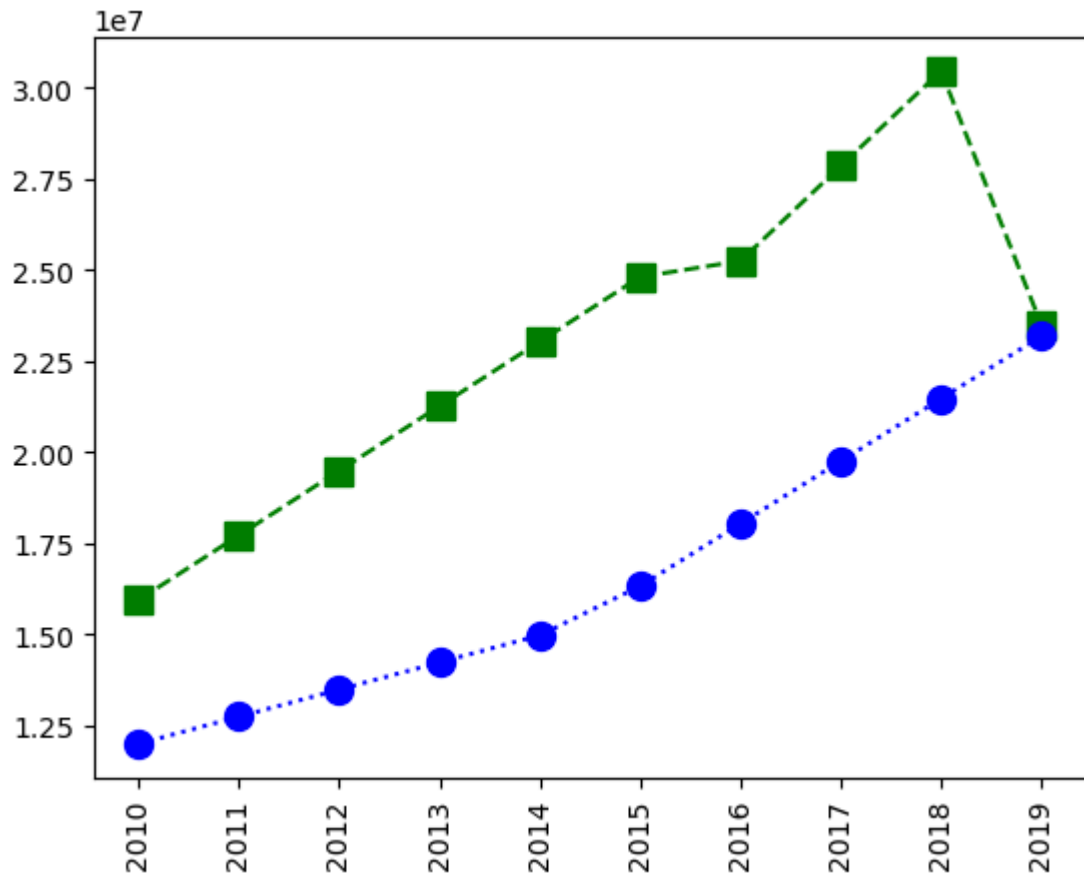


In [16]: *# More visualization*

```
In [17]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 10, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = ':', marker = 'o', ms = 10, label = Players[1])

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

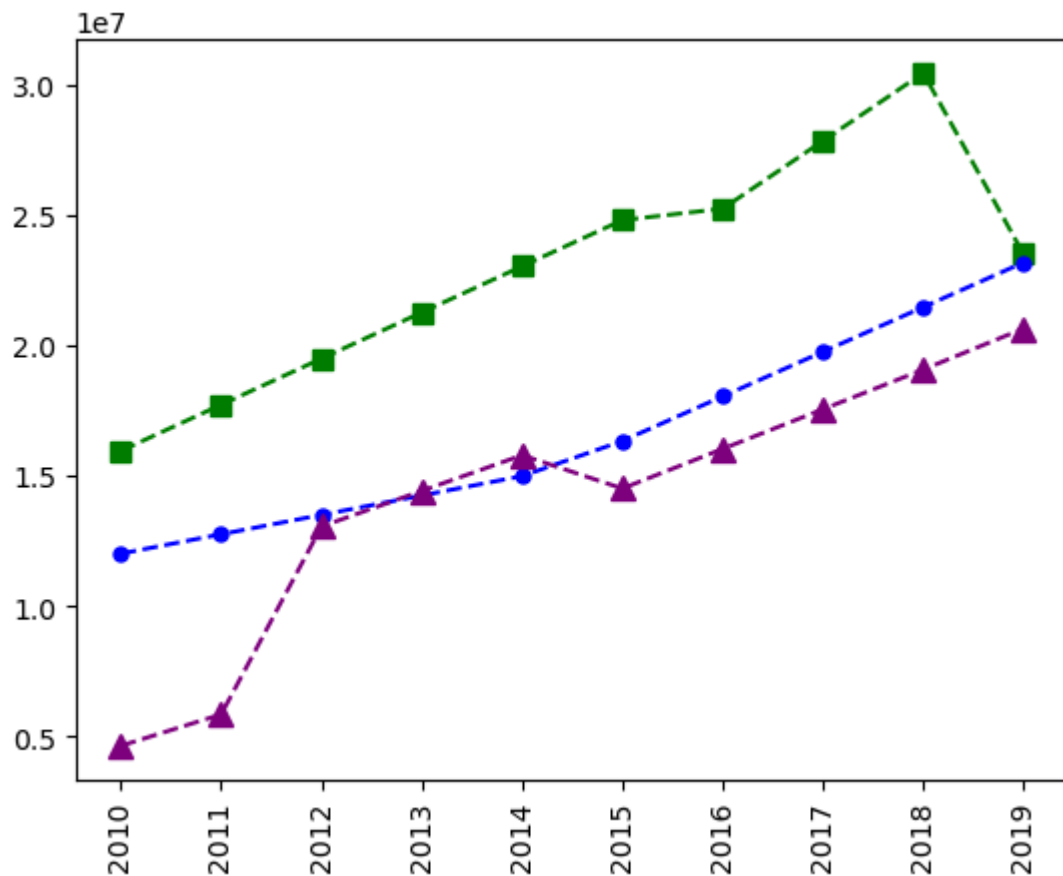
plt.show()
```



```
In [18]: 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.xticks(list(range(0,10)), Seasons,rotation='vertical')

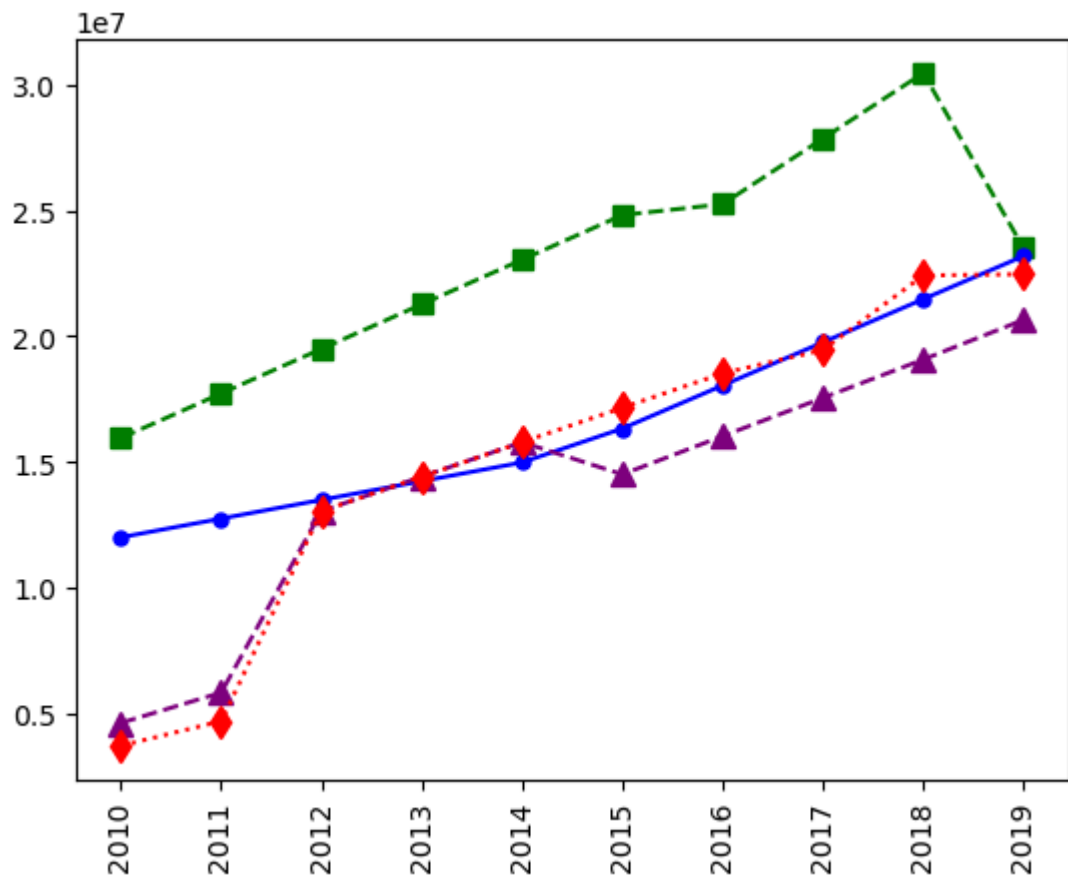
plt.show()
```



```
In [19]: 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 = 8, label = Players[3])

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

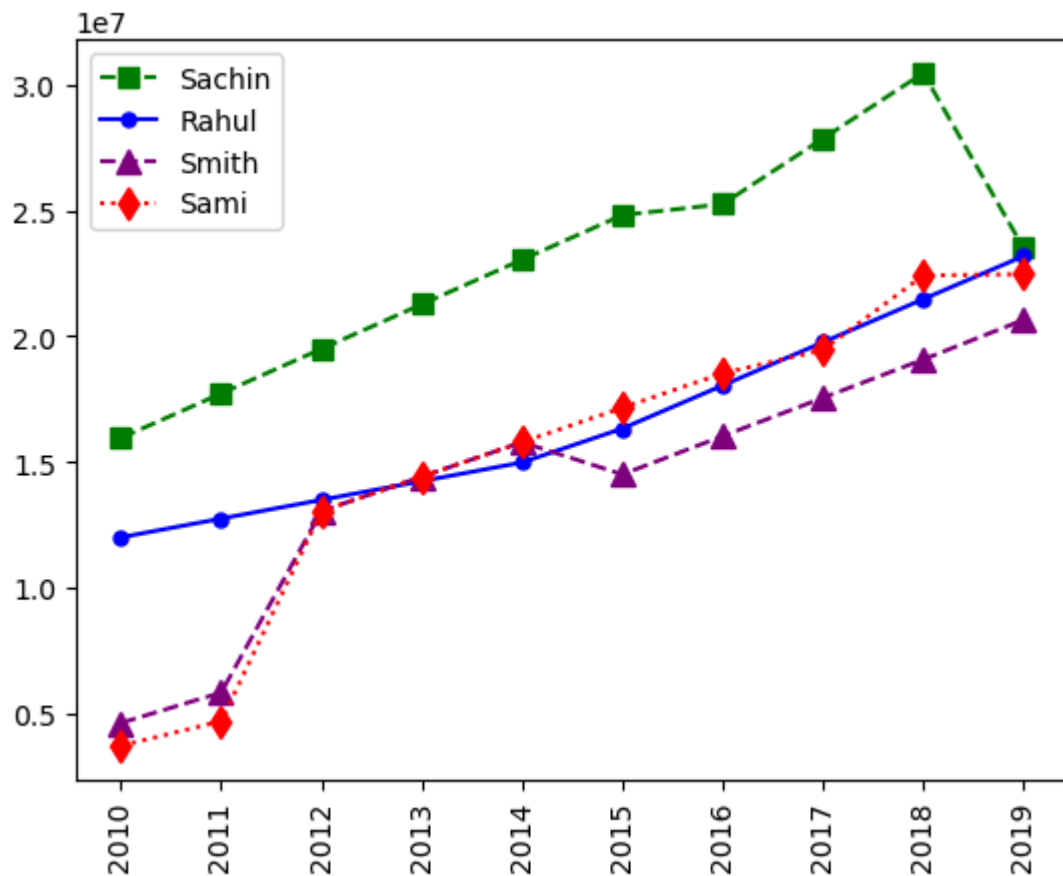
plt.show()
```



```
In [20]: # how to add legend in visualisation
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 = 8, label = Players[3])
plt.legend()
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

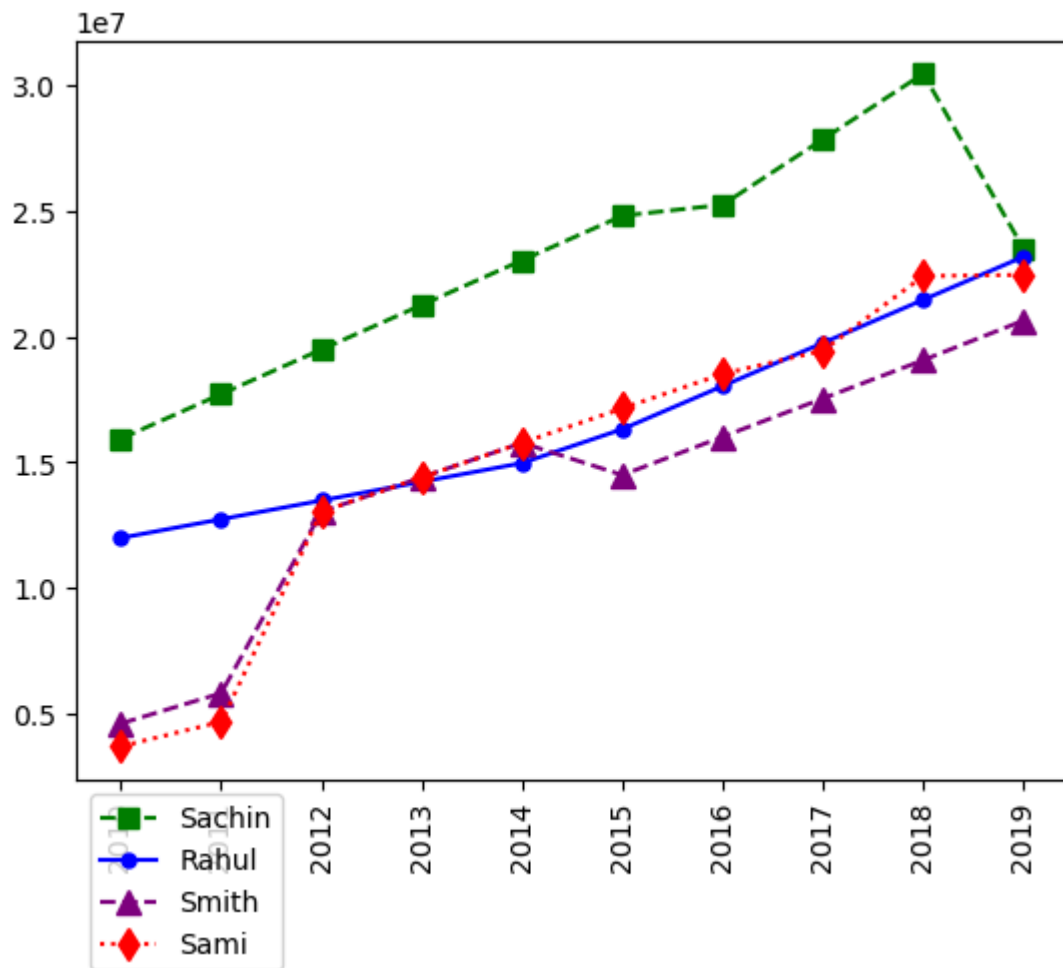
plt.show()
```





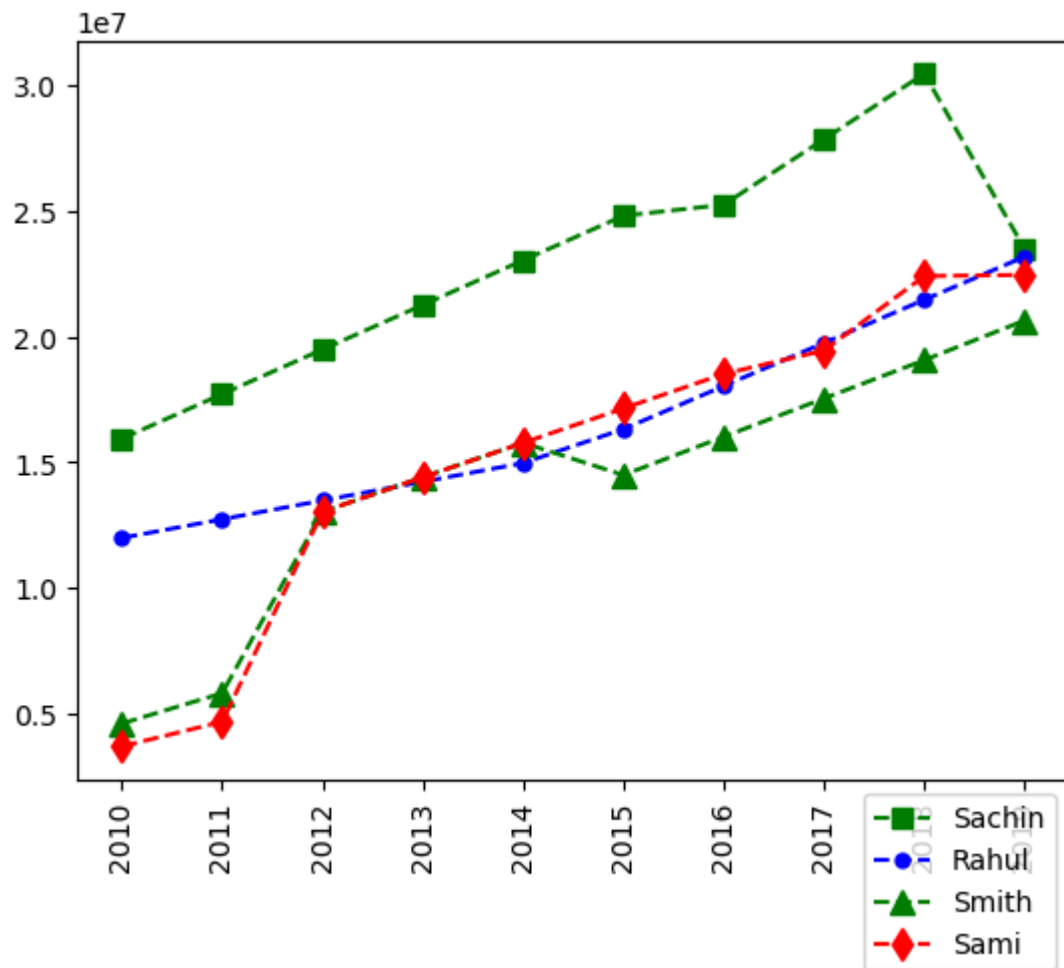
```
In [22]: # how to add legend in visualisation
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '-', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players[2])
plt.plot(Salary[3], c='Red', ls = ':', marker = 'd', ms = 8, label = Players[3])
plt.legend(loc = 'upper left', bbox_to_anchor = (0,0))
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

plt.show()
```



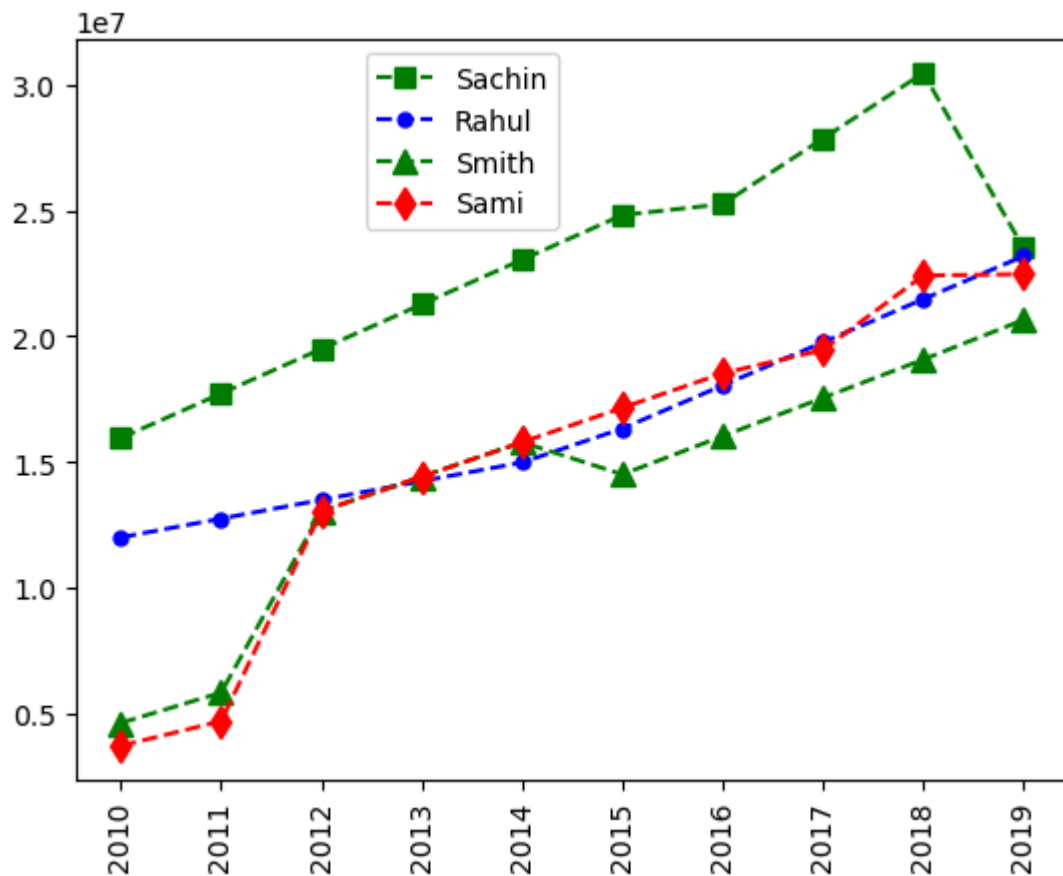
```
In [23]: plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[0])
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1])
plt.plot(Salary[2], c='Green', ls = '--', marker = '^', ms = 8, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', marker = 'd', ms = 8, 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 [24]: 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 = 8, label = Players[2])
plt.plot(Salary[3], c='Red', ls = '--', marker = 'd', ms = 8, label = Players[3])
plt.legend(loc = 'upper right',bbox_to_anchor=(0.5,1) )
plt.xticks(list(range(0,10)), Seasons,rotation='vertical')

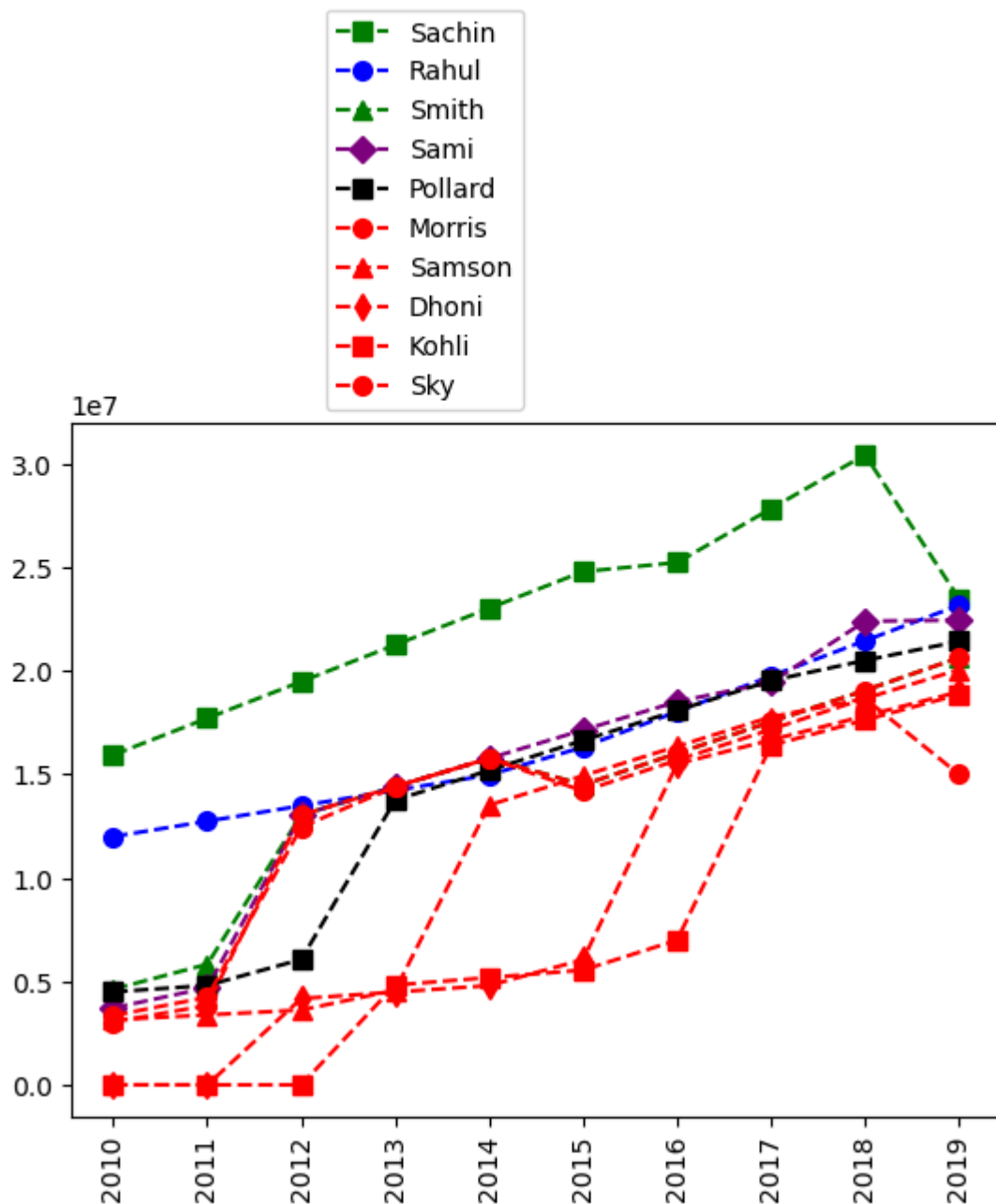
plt.show()
```



```
In [6]: 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 [7]: *# we can visualize the how many games played by a player*

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

