MATRICES / NUMPY------

- Matrix is the tabular representation of the data
- Lot of datas are stored in table format,that is why Matrices is very very important topic in python
- as we working on dataframe so matrices are played a major rule
- List is one dimension & matrix is multidimension
- indexation is very important to plot the datapoints
- we will see tht & we gonna analyze the NBA players
- hear i have taken top 10 highest paid player in 2015-2016 season
- we will analyze how 10 players have been playing over the past 10 years & we had the data for past 10yrs yrs
- our main goal is to find trends,patterns & their performance for the past 10 yrs
- ultimately they haven't always been top 10 player & lets see how they improving, what actually secreates or patterns
- dont worry guys if you dont know anything about basket ball NBA
- I will explain indepth of everything
- lets analyze the statistics of the basket ball player
- gp - total games played,mpg - minutes per game,field goal(accuracy), ppg (points per game) -- this is no of point player has scores in that season
- guys slowly i am bringing you into data analytics, jump into datavisualization using python
- i will give you the this code can everybody copy and paste your jupyter notebook
- Now i will explain with matrices

In [127…

```
#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, Samsc

#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 [9]:
```
# building your first matrix
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 [11]:
```
Salary
```

Out[11]:
```
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 [129…
```
Points
```

Out[129…
```
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 [131…
```
mydata =np.arange(0,20)
print(mydata)
```

```
[ 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19]
```

In [133…
```
np.reshape(mydata,(4,5))
```

Out[133…
```
array([[ 0,  1,  2,  3,  4],
       [ 5,  6,  7,  8,  9],
       [10, 11, 12, 13, 14],
       [15, 16, 17, 18, 19]])
```

In [135…
```
mydata
```

Out[135…
```
array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
       17, 18, 19])
```

In [137…
```
MATR1 =np.reshape(mydata,(5,4),order ='c')
MATR1
```

Out[137…
```
array([[ 0,  1,  2,  3],
       [ 4,  5,  6,  7],
       [ 8,  9, 10, 11],
       [12, 13, 14, 15],
       [16, 17, 18, 19]])
```

In [139…
```
MATR1[4,3]
```
Out[139…
```
19
```

In [141…
```
MATR1[3,3]
```
Out[141…
```
15
```

In [143…
```
MATR1[-3,-1]
```
Out[143…
```
11
```

In [147…
```
MATR1[-4,-2]
```
Out[147…
```
6
```

In [149…
```
MATR1[0:2]
```
Out[149…
```
array([[0, 1, 2, 3],
       [4, 5, 6, 7]])
```

In [151…
```
MATR1[1:2]
```
Out[151…
```
array([[4, 5, 6, 7]])
```

In [155…
```
a1=['welcome','to','datascience']
a2=['required','hard','work']
a3=[1,2,3]
```

In [157…
```
[a1,a2,a3] # list same datatype
```
Out[157…
```
[['welcome', 'to', 'datascience'], ['required', 'hard', 'work'], [1, 2, 3]]
```

In [159…
```
np.array([a1,a2,a3])
```
Out[159…
```
array([['welcome', 'to', 'datascience'],
       ['required', 'hard', 'work'],
       ['1', '2', '3']], dtype='<U11')
```

In [161…
```
Games
```
Out[161…
```
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 [163…
```
Games[0]
```
Out[163…
```
array([80, 77, 82, 82, 73, 82, 58, 78,  6, 35])
```

In [165…
```
Games[5]
```

Out[165… array([70, 69, 67, 77, 70, 77, 57, 74, 79, 44])

In [167…
```
Games[0:5]
```

Out[167…
```
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]])
```

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

```
C:\Users\krishna\AppData\Local\Temp\ipykernel_19548\3709746658.py:1: RuntimeWarni
ng: divide by zero encountered in divide
  Salary/Games
```

Out[13]:
```
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 [15]:
```
Points
```

Out[15]:
```
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 [175…
```
# DICTIONARY
# dict does not maintain the order
dict1 = {'key1':'val1', 'key2':'val2', 'key3':'val3'}
```

In [177…
```
dict1
```

Out[177…
```
{'key1': 'val1', 'key2': 'val2', 'key3': 'val3'}
```

In [179…
```
dict1['key2']
```

Out[179…
```
'val2'
```

In [181…
```
dict2 = {'bang':2,'hyd':'we are hear', 'pune':True}
dict2
```

Out[181…
```
{'bang': 2, 'hyd': 'we are hear', 'pune': True}
```

In [185…
```
dict3 = {'Germany':'I have been here', 'France':2, 'Spain': True}
dict3
```

Out[185…
```
{'Germany': 'I have been here', 'France': 2, 'Spain': True}
```

In [189…
```
dict3['Germany']
```

Out[189…
```
'I have been here'
```

In [17]:
```
np.round(Salary//Games)
```

```
C:\Users\krishna\AppData\Local\Temp\ipykernel_19548\3663165759.py:1: RuntimeWarni
ng: divide by zero encountered in floor_divide
  np.round(Salary//Games)
```

Out[17]:
```
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 [19]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [21]:
```
import matplotlib.pyplot as plt
```

In [22]:
```
Salary
```

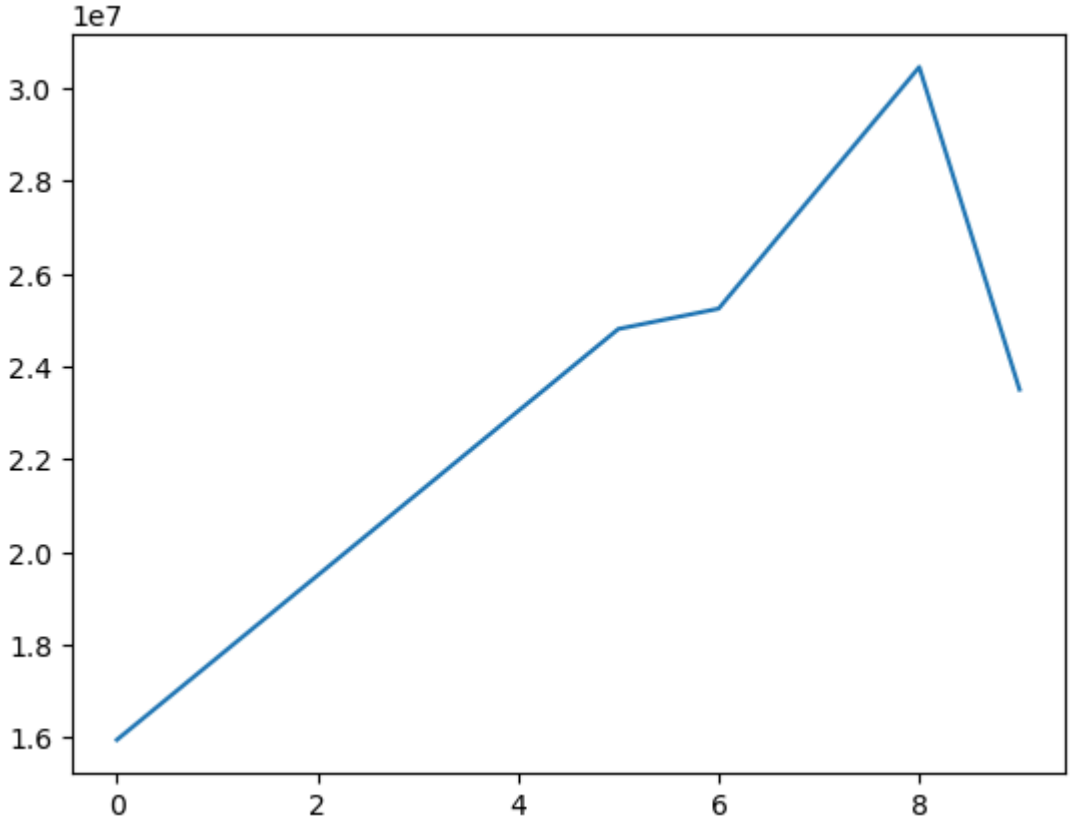
Out[22]:
```
array([[15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
        25244493, 27849149, 30453805, 23500000],
       [12000000, 12744189, 13488377, 14232567, 14976754, 16324500,
        18038573, 19752645, 21466718, 23180790],
       [ 4621800,  5828090, 13041250, 14410581, 15779912, 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 [23]:
```
Salary[0]
```

Out[23]:
```
array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
       25244493, 27849149, 30453805, 23500000])
```

In [24]:
```
plt.plot(Salary[0])
```

Out[24]:
```
[<matplotlib.lines.Line2D at 0x207eafc6ff0>]
```



In [25]:
```
Insight1: based on above graph sachin salary increases till 2023 & then it decre
```

```
  Cell In[25], line 1
    Insight1: based on above graph sachin salary increases till 2023 & then it de
creases
                      ^
SyntaxError: invalid syntax
```

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

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

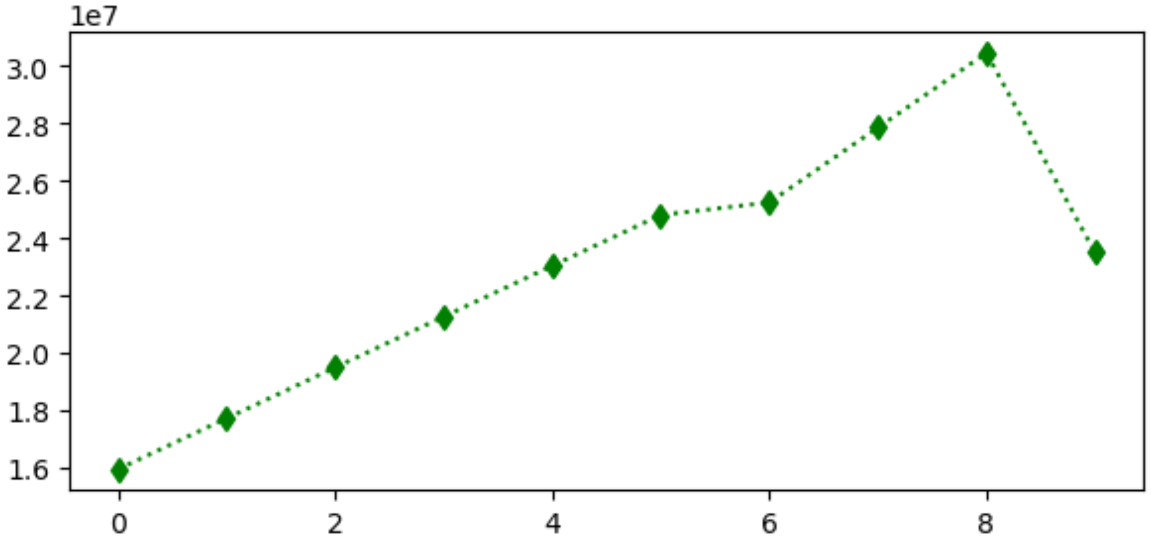
In [ ]:
```
plt.plot(Salary[0],c='k',marker='o')
```

In [ ]:
```
plt.plot(Salary[0],c='k',marker='d')
```

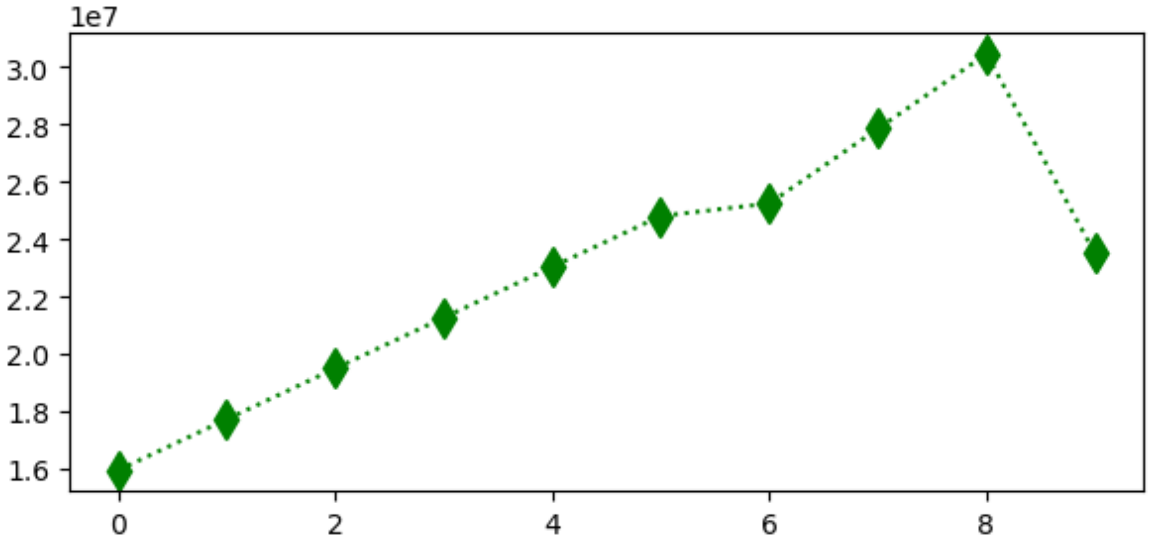
In [ ]:
```
plt.plot(Salary[0],c='g',marker='d',ls=':')
```

In [33]:
```
%matplotlib inline
plt.rcParams['figure.figsize'] = 7,3 #7 means width 3 means height
```

In [35]:
```
plt.plot(Salary[0],c='g',marker='d',ls=':')
plt.show()
```



In [36]:
```
plt.plot(Salary[0],c='g',marker='d',ls=':',ms=10)
plt.show()
```



In [38]:
```
list(range(0,10))
```

Out[38]:
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

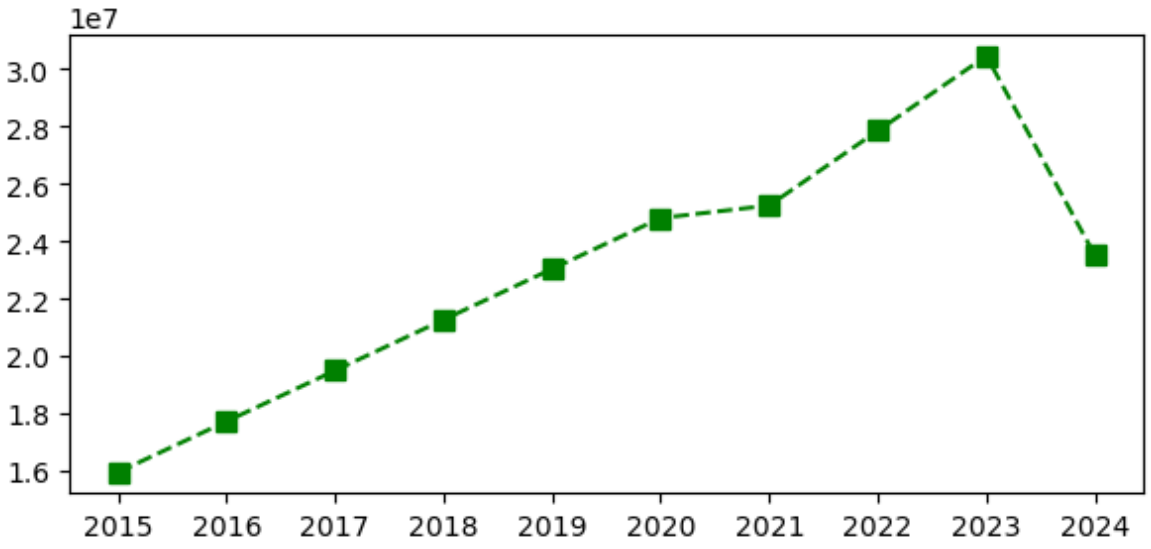
In [41]:
```
Sdict
```

Out[41]:
```
{'2015': 0,
 '2016': 1,
 '2017': 2,
 '2018': 3,
 '2019': 4,
 '2020': 5,
 '2021': 6,
 '2022': 7,
 '2023': 8,
 '2024': 9}
```

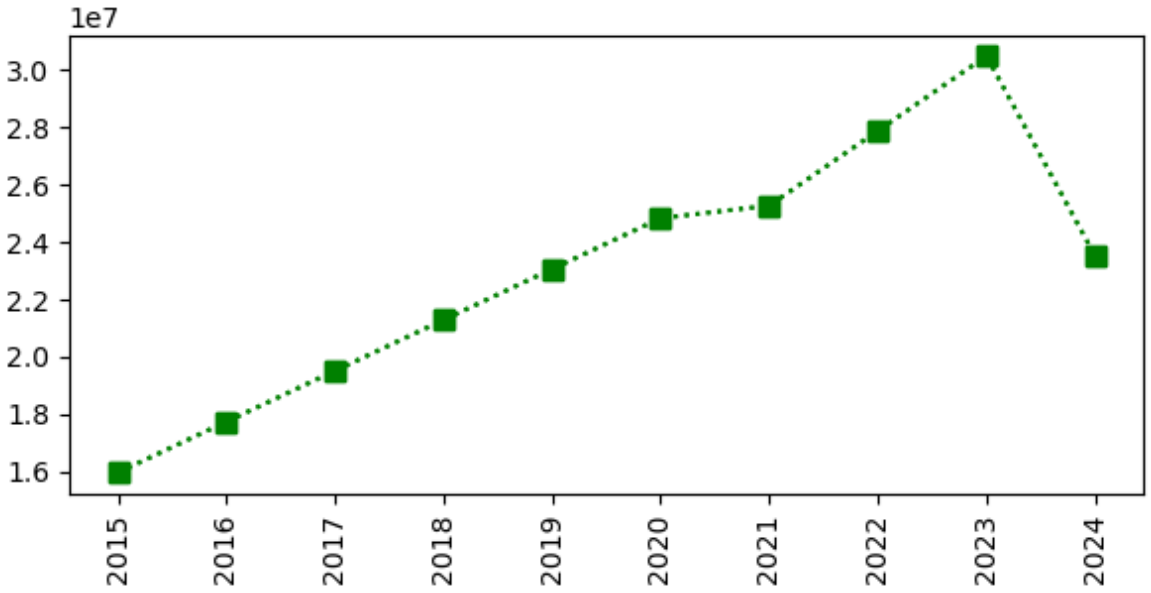
In [43]:
```
Pdict
```

Out[43]:
```
{'Sachin': 0,
 'Rahul': 1,
 'Smith': 2,
 'Sami': 3,
 'Pollard': 4,
 'Morris': 5,
 'Samson': 6,
 'Dhoni': 7,
 'Kohli': 8,
 'Sky': 9}
```

In [45]:
```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7)
plt.xticks(list(range(0,10)), Seasons)
plt.show()
```



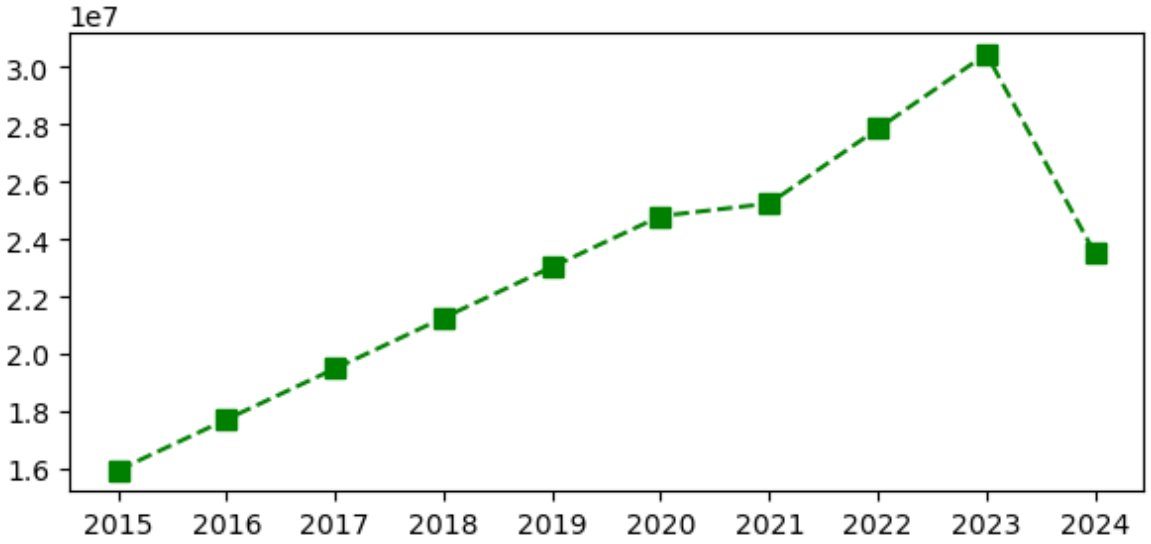
In [55]:
```
plt.plot(Salary[0], c='Green', ls =':', marker = 's' ,ms =7,label =Players[0])
plt.xticks(list(range(0,10)),Seasons,rotation ='vertical')
plt.show()
```



In [57]:
```
Games
```

Out[57]:
```
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]])
```

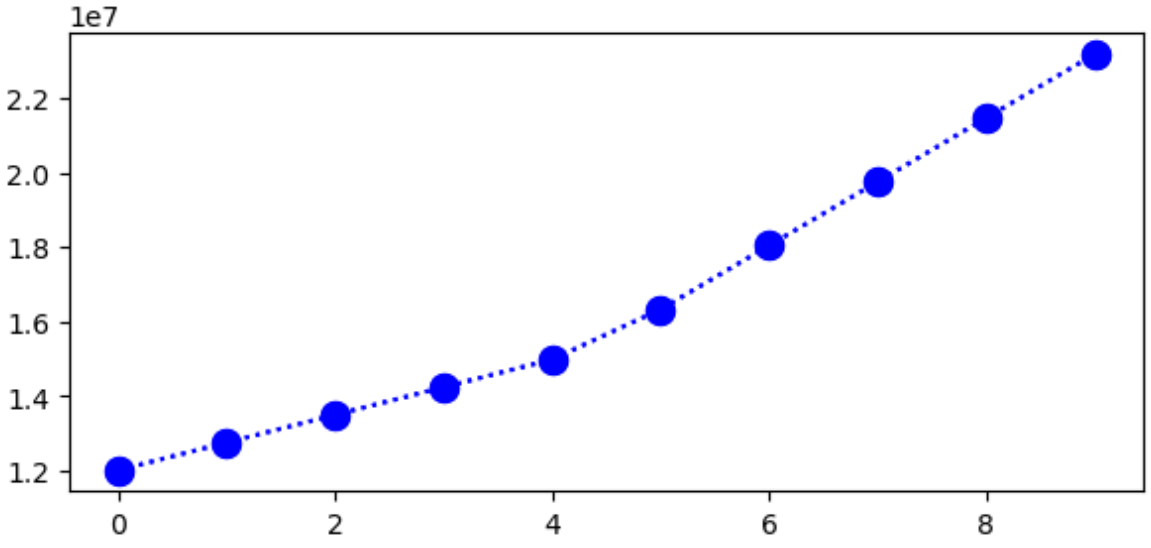
In [59]:
```
plt.plot(Salary[0], c='Green', ls ='--', marker = 's' ,ms =7,label =Players[0])
plt.xticks(list(range(0,10)),Seasons,rotation ='horizontal')
plt.show()
```



In [63]:
```
Salary[0]
```

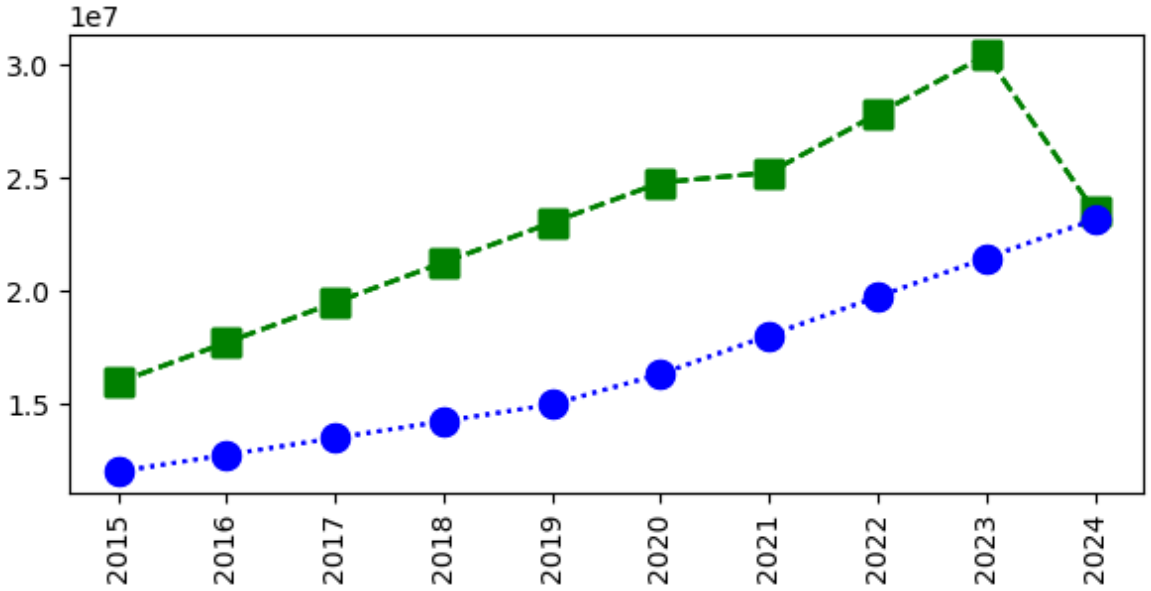
Out[63]:
```
array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
       25244493, 27849149, 30453805, 23500000])
```

In [69]:
```
plt.plot(Salary[1],c='Blue',ls =':',marker = 'o',ms =10,label =Players[1])
plt.show()
```

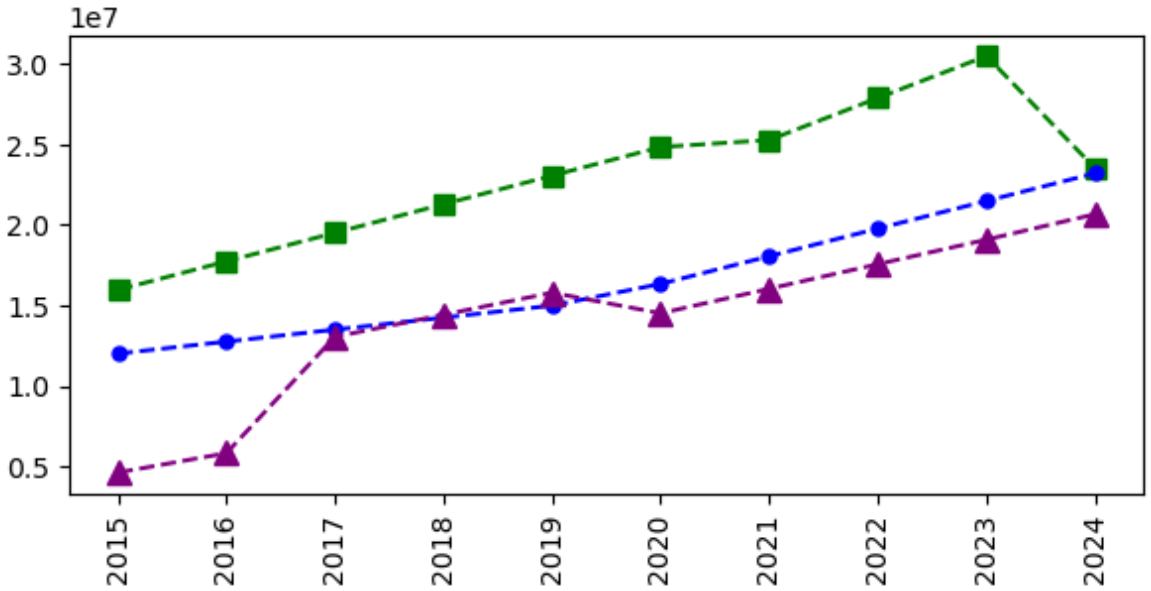


In [71]:
```
# more visualization
```

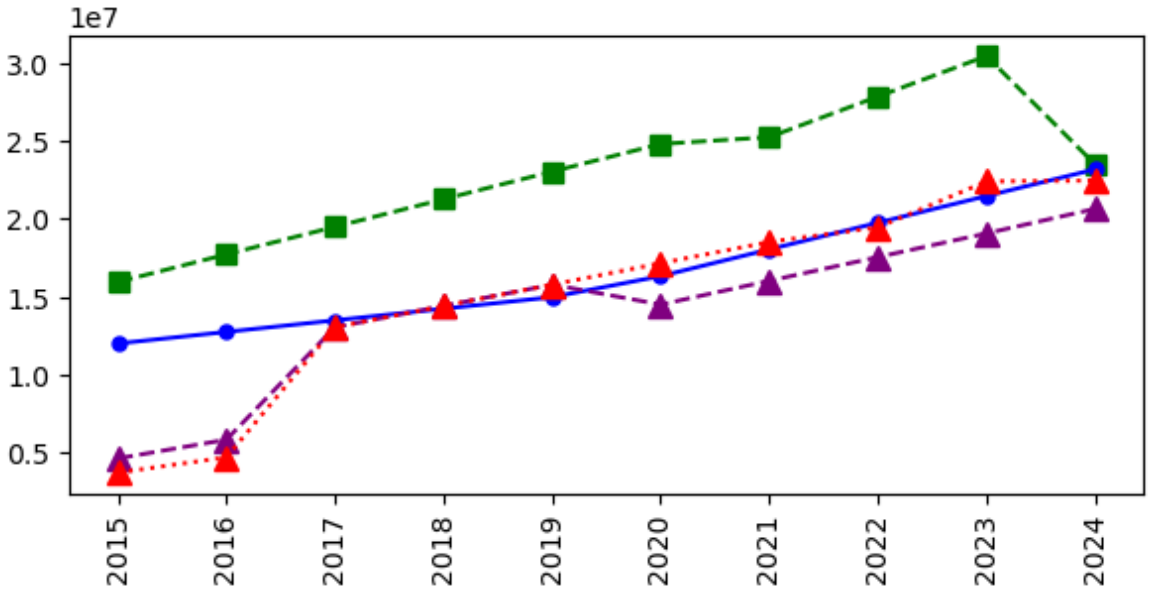
In [77]:
```
plt.plot(Salary[0],c='Green',ls ='--',marker ='s', ms=10,label =Players[0])
plt.plot(Salary[1],c='Blue',ls =':',marker='o',ms =10,label =Players[1])

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



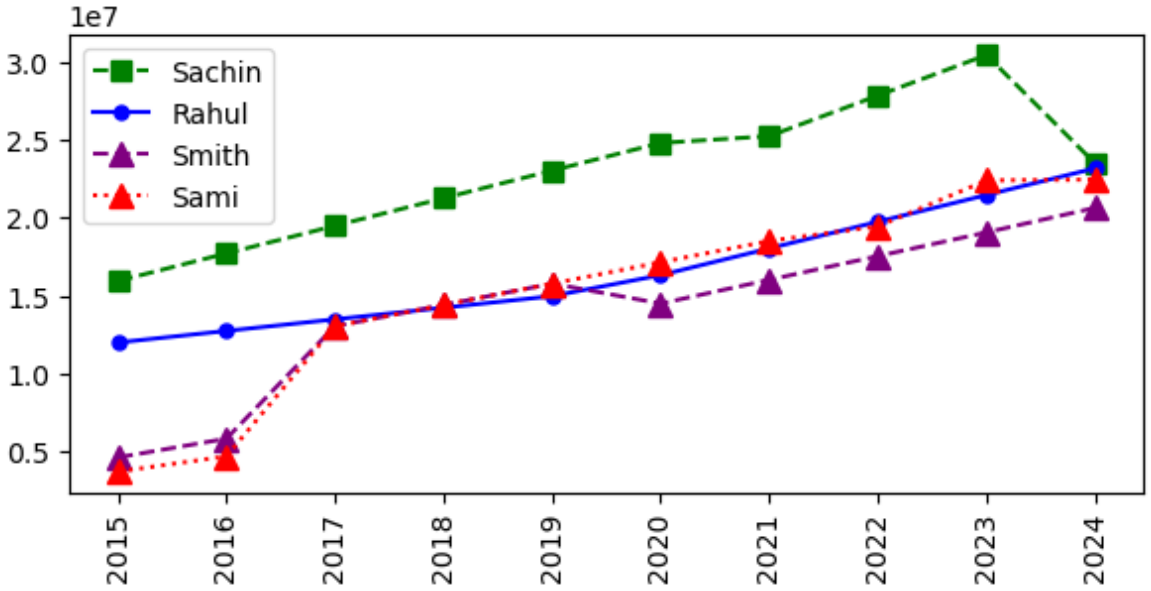
In [85]:
```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
plt.plot(Salary[1], c='Blue', ls = '--', marker = 'o', ms = 5, label = Players[1
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players
plt.xticks(list(range(0,10)),Seasons,rotation='vertical')
plt.show()
```



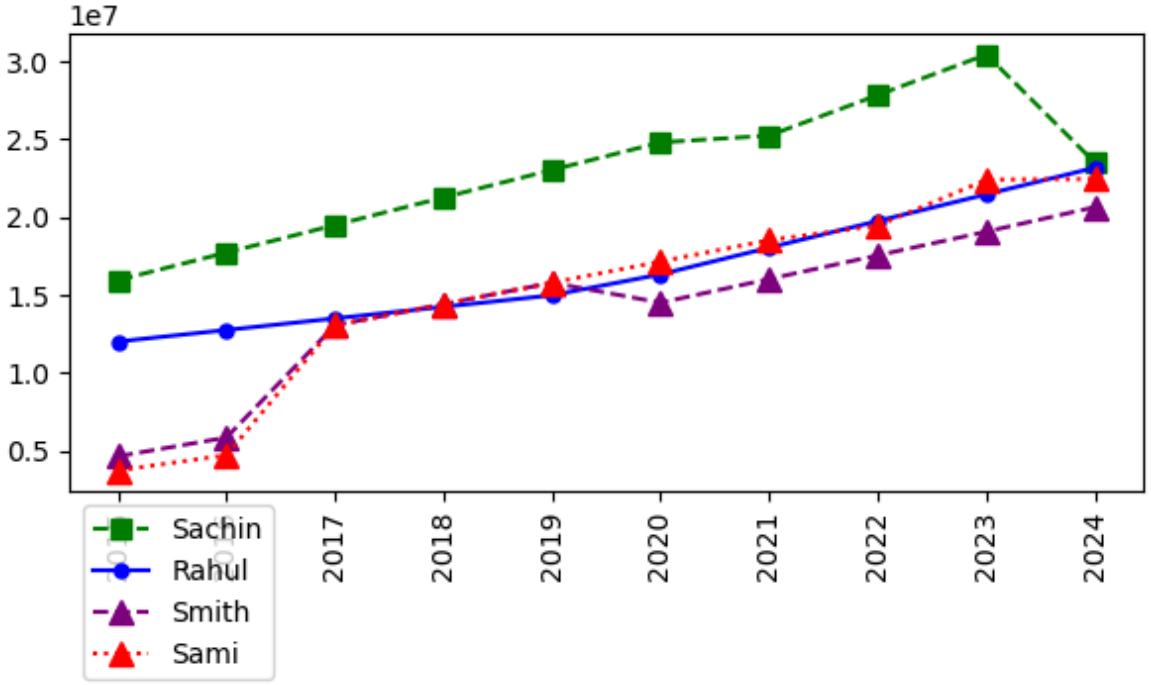
In [91]:
```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
plt.plot(Salary[1], c='Blue', ls = '-', marker = 'o', ms = 5, label = Players[1]
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players
plt.plot(Salary[3], c='Red', ls = ':', marker = '^', ms = 8, label = Players[3])

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

plt.show()
```



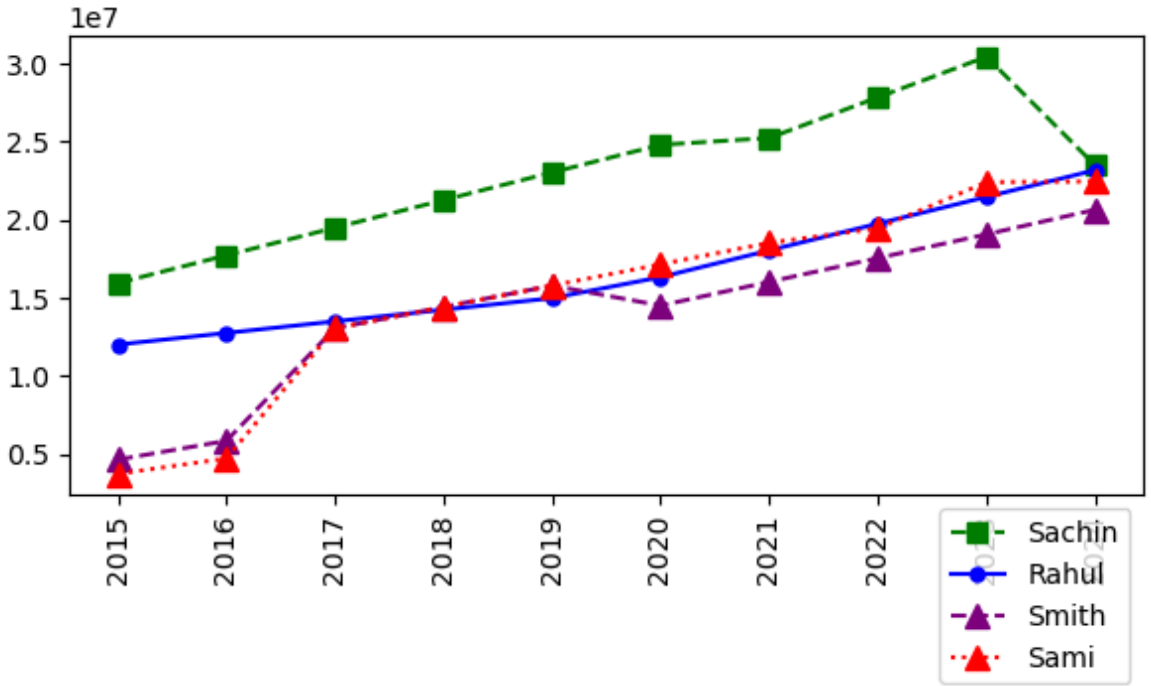
In [93]:
```
# how to add legend in visualization
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
plt.plot(Salary[1], c='Blue', ls = '-', marker = 'o', ms = 5, label = Players[1]
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players
plt.plot(Salary[3], c='Red', ls = ':', marker = '^', ms = 8, label = Players[3])

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

plt.show()
```



In [95]:
```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
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
plt.plot(Salary[3], c='Red', ls = ':', marker = '^', 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()
```

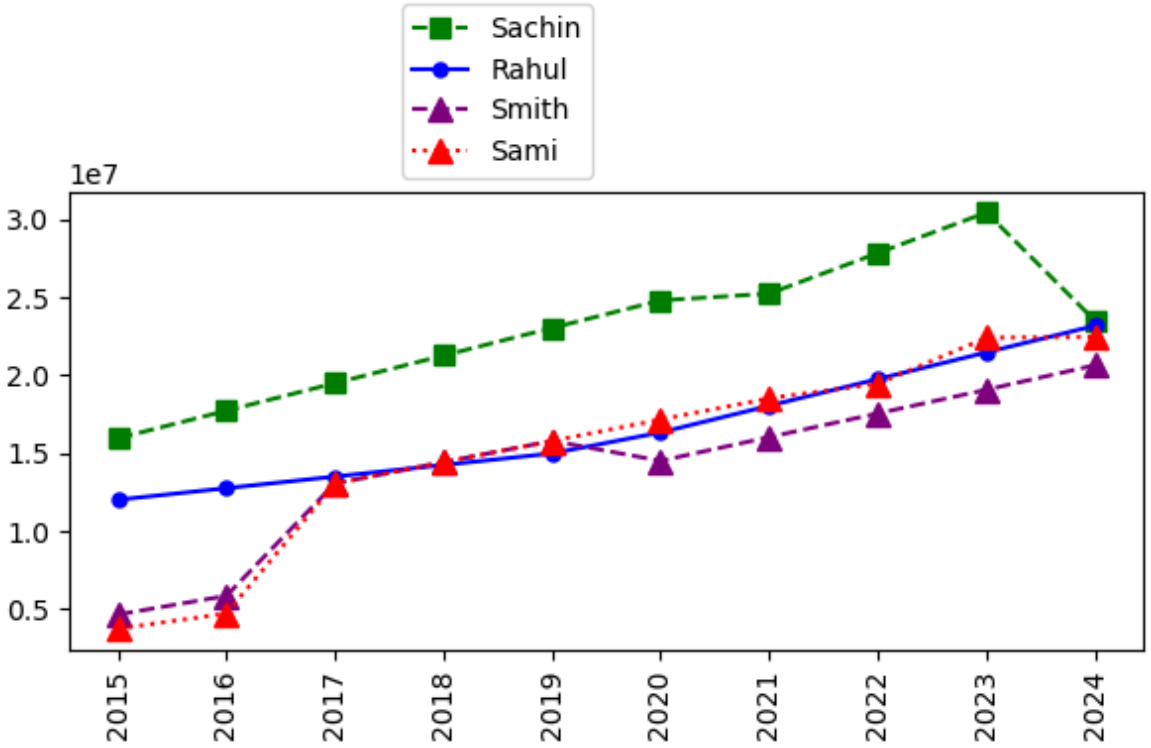


In [99]:
```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
plt.plot(Salary[1], c='Blue', ls = '-', marker = 'o', ms = 5, label = Players[1]
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players
plt.plot(Salary[3], c='Red', ls = ':', marker = '^', 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()
```



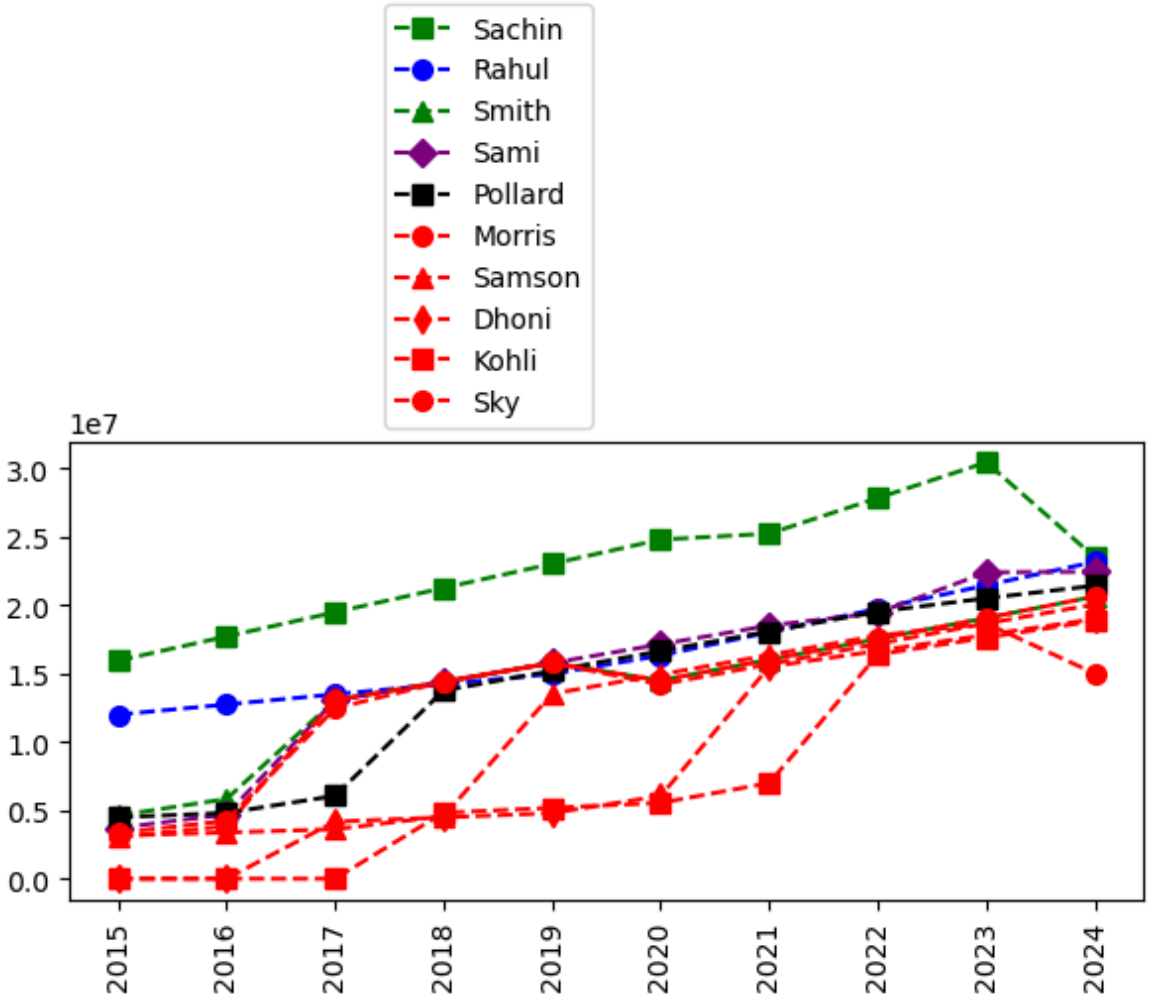
In [109…
```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
plt.plot(Salary[1], c='Blue', ls = '-', marker = 'o', ms = 5, label = Players[1]
plt.plot(Salary[2], c='purple', ls = '--', marker = '^', ms = 8, label = Players
plt.plot(Salary[3], c='Red', ls = ':', marker = '^', ms = 8, 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()
```



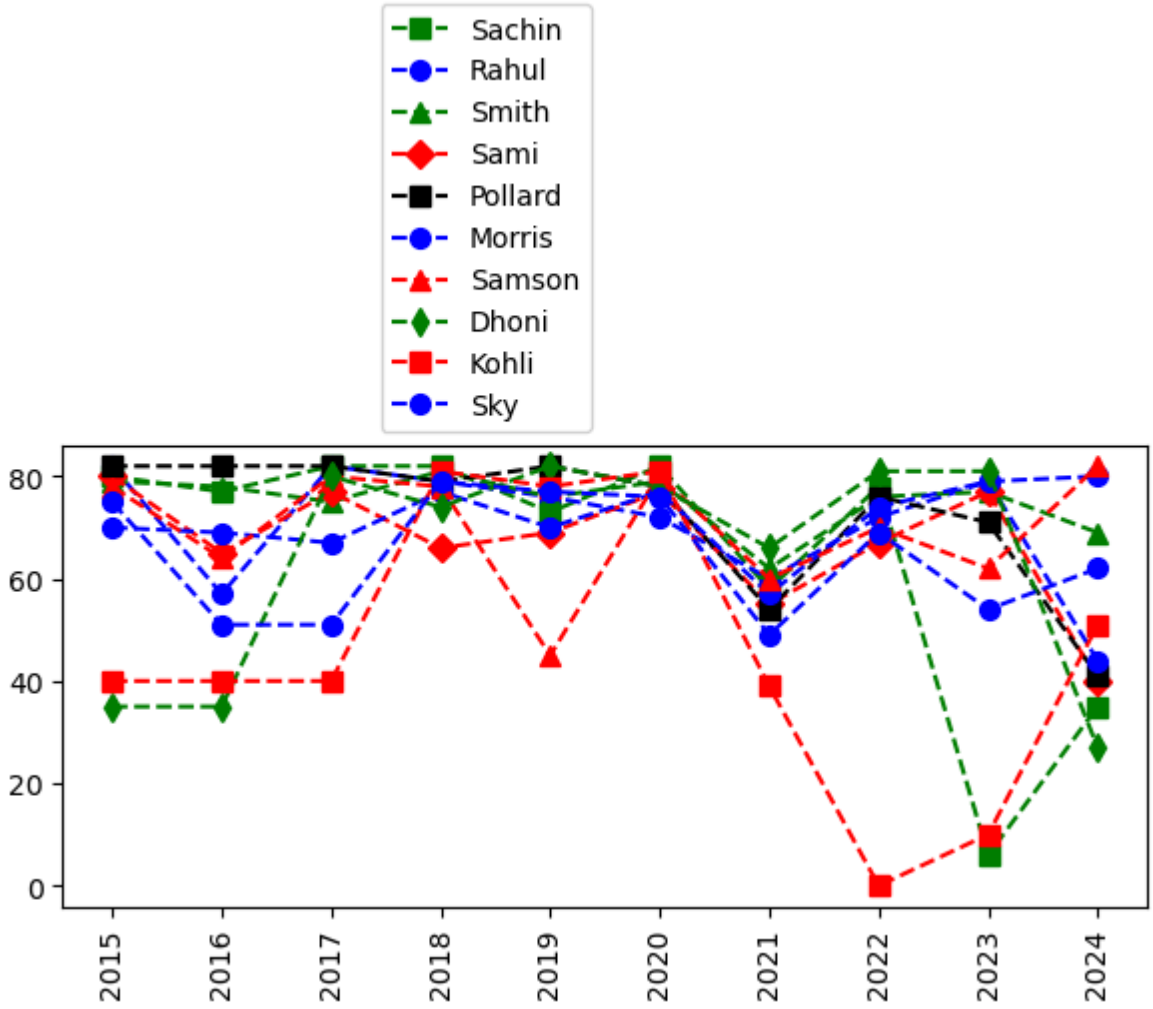
In [117…

```
plt.plot(Salary[0], c='Green', ls = '--', marker = 's', ms = 7, label = Players[
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[
plt.plot(Salary[3], c='Purple', ls = '--', marker = 'D', ms = 7, label = Players
plt.plot(Salary[4], c='Black', ls = '--', marker = 's', ms = 7, label = Players[
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 [121…

```
# 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()
```



- In this we learned -1>Matrices 2>building matrices -np.reshape 3>Dictionaried in python(order doesnot mater)(keys & values)4>visualizing using pyplot 5>basket ball analysis

In [ ]: