```
In [4]: #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 [6]: Salary
```

```
Out[6]: 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, 4171200, 4484040, 4796880,
                 15506632, 16669630, 17832627, 18995624],
                                            0, 4822800, 5184480, 5546160,
                                  0,
                   6993708, 16402500, 17632688, 18862875],
                 [ 3031920, 3841443, 13041250, 14410581, 15779912, 14200000,
                  15691000, 17182000, 18673000, 15000000]])
 In [7]:
        Games
 Out[7]: 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 [8]: Points
 Out[8]: 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,
                 [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,
                 [2040, 1397, 1254, 2386, 2045, 1941, 1082, 1463, 1028, 1331]])
In [11]: Games[1]
Out[11]: array([82, 57, 82, 79, 76, 72, 60, 72, 79, 80])
In [12]: Games[0:6]
Out[12]: 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]])
```

```
In [14]: Games[0,6]
Out[14]: 58
In [15]: #numpy + matplotlib = visualization
         #numpy == math + linear algebra + stats + calcus + DS
In [16]:
         #matplotlib == math + numpyfeatures + stats + graphs + dsa
In [17]:
        Salary
Out[17]: 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, 4171200, 4484040, 4796880, 6053663,
                 15506632, 16669630, 17832627, 18995624],
                                  0,
                                            0, 4822800, 5184480,
                  6993708, 16402500, 17632688, 18862875],
                 [ 3031920, 3841443, 13041250, 14410581, 15779912, 14200000,
                 15691000, 17182000, 18673000, 15000000]])
In [18]: Games
Out[18]: 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 [25]: Salary/Games
        C:\Users\Affan\AppData\Local\Temp\ipykernel 12296\3709746658.py:1: RuntimeWarnin
        g: divide by zero encountered in divide
          Salary/Games
```

```
, 230113.63636364, 237690.54878049,
Out[25]: array([[ 199335.9375
                  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],
                                    72216.01538462, 169366.88311688,
                [ 46420.5
                  218342.13636364, 228694.37681159, 222717.44155844,
                  336701.34545455, 290298.50746269, 291006.15584416,
                           ],
                [ 54794.63414634, 58618.53658537, 73917.97560976,
                  174151.89873418, 185397.43902439, 213425.38461538,
                  335032.77777778, 257057.36842105, 288918.
                  522835.87804878],
                                                , 185895.52238806,
                [ 47828.57142857,
                                    61380.
                  187150.4025974 , 225427.31428571, 188311.68831169,
                  281096.49122807, 237094.59459459, 241360.75949367,
                  469190.90909091],
                [ 40310.76923077,
                                   52815.
                                                    45199.5
                   58643.44871795, 300455.5555556, 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,
                                               inf, 1763268.8
                  179325.84615385,
                  369860.29411765],
                [ 40425.6
                                  75322.41176471, 255710.78431373,
                  182412.41772152, 204933.92207792, 186842.10526316,
                  320224.48979592, 249014.49275362, 345796.2962963,
                  241935.48387097]])
```

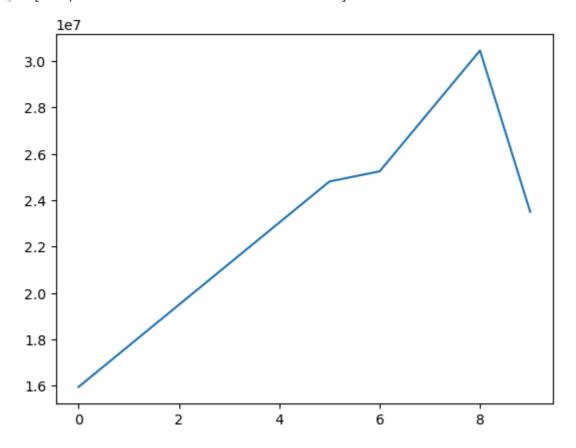
In [23]: np.round(Salary//Games)

C:\Users\Affan\AppData\Local\Temp\ipykernel_12296\3663165759.py:1: RuntimeWarnin
g: divide by zero encountered in floor_divide
 np.round(Salary//Games)

```
Out[23]: 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],
                          72216, 169366,
                                                    228694,
                [ 46420,
                                            218342,
                                                             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],
                                             58643, 300455, 186751, 272663,
                [ 40310,
                          52815,
                                   45199,
                  253992, 301103, 244738],
                               0,
                                   52140,
                                             60595,
                                                     58498,
                                                              77611, 234948,
                      0,
                  205797, 220155, 703541],
                                             59540,
                                                     66467,
                       0,
                                                              68471, 179325,
                               0,
                                        0,
                       0, 1763268, 369860],
                  40425, 75322, 255710, 182412, 204933, 186842, 320224,
                  249014, 345796, 241935]])
In [28]: Salary // Games #same like prev o/p without round
       C:\Users\Affan\AppData\Local\Temp\ipykernel_12296\2741550898.py:1: RuntimeWarnin
        g: divide by zero encountered in floor_divide
         Salary // Games #same like prev o/p without round
Out[28]: 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],
                                   73917, 174151,
                                                             213425,
                54794,
                          58618,
                                                    185397,
                                                                      335032,
                  257057, 288918, 522835],
                           61380, 185895, 187150,
                [ 47828,
                                                    225427,
                                                             188311,
                                                                      281096,
                  237094, 241360, 469190],
                [ 40310,
                          52815,
                                  45199,
                                             58643,
                                                    300455, 186751,
                                                                      272663,
                  253992, 301103, 244738],
                      0,
                               0,
                                    52140,
                                             60595,
                                                     58498,
                                                              77611,
                                                                      234948,
                         220155,
                  205797,
                                  703541],
                       0,
                                        0,
                                             59540,
                                                     66467,
                                                              68471,
                                                                      179325,
                               0,
                       0, 1763268, 369860],
                  40425,
                          75322,
                                  255710, 182412, 204933,
                                                             186842,
                                                                      320224,
                  249014,
                          345796, 241935]])
In [30]: import warnings
         warnings.filterwarnings('ignore')
         #we are using above code to ignore unknown errors caused by OS updations
In [40]:
         import matplotlib.pyplot as plt
         import numpy as np
In [35]: | Salary[0]
Out[35]: array([15946875, 17718750, 19490625, 21262500, 23034375, 24806250,
                25244493, 27849149, 30453805, 23500000])
```

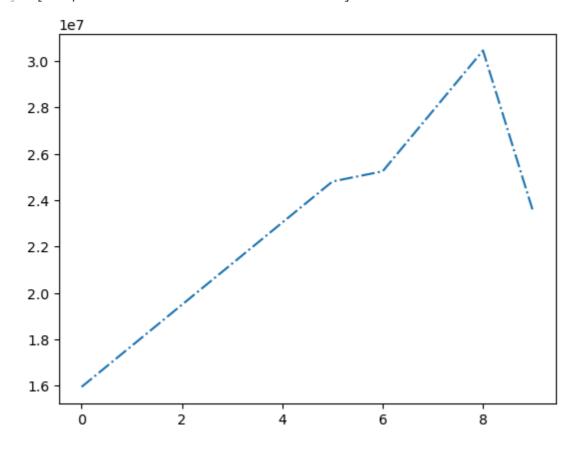
In [41]: plt.plot(Salary[0])

Out[41]: [<matplotlib.lines.Line2D at 0x23c63978710>]



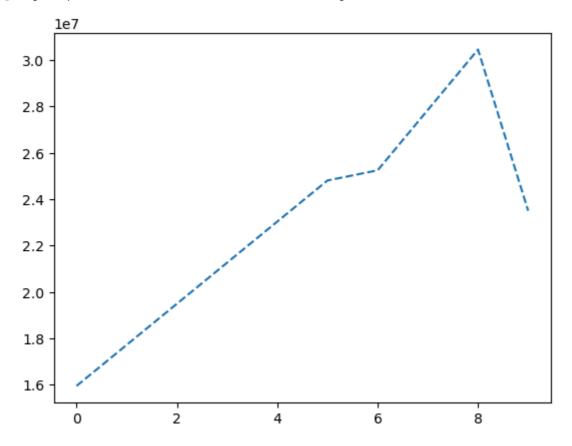
In [48]: plt.plot(Salary[0], ls = '-.')

Out[48]: [<matplotlib.lines.Line2D at 0x23c68ecb500>]



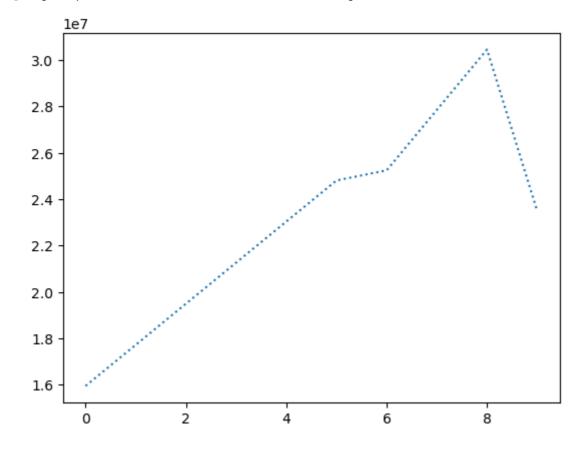
```
In [49]: plt.plot(Salary[0], ls = '--')
```

Out[49]: [<matplotlib.lines.Line2D at 0x23c68f83ce0>]



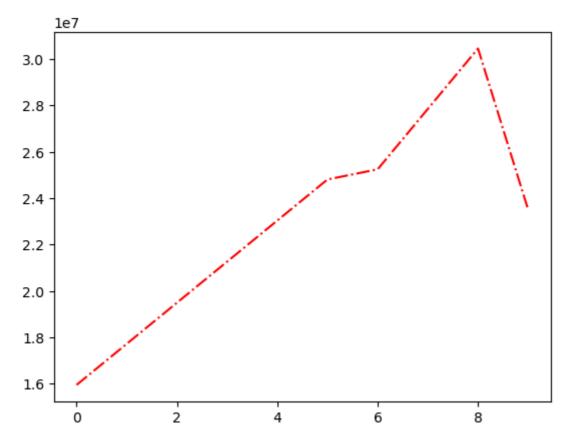
In [50]: plt.plot(Salary[0], ls = ':')

Out[50]: [<matplotlib.lines.Line2D at 0x23c69149010>]



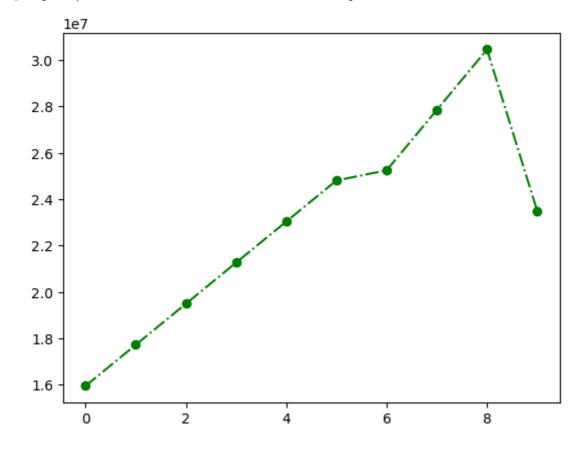
```
In [53]: plt.plot(Salary[0], ls = '-.',color = 'red')
```

Out[53]: [<matplotlib.lines.Line2D at 0x23c6a8728a0>]



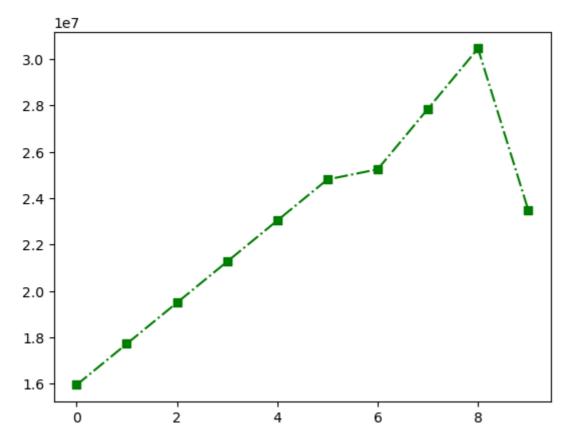
In [56]: plt.plot(Salary[0], ls = '-.', color = 'green', marker = 'o')

Out[56]: [<matplotlib.lines.Line2D at 0x23c6a8d95b0>]



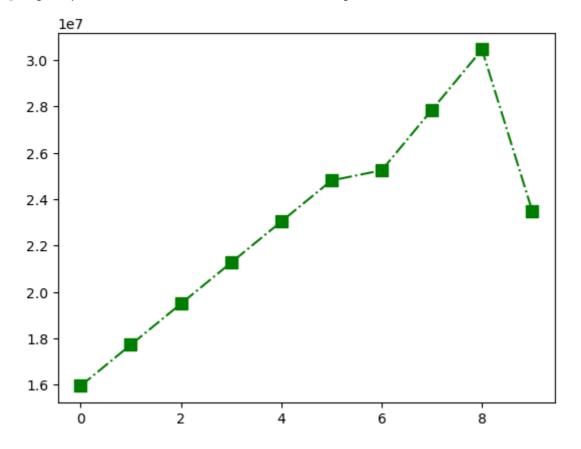
```
In [59]: plt.plot(Salary[0], ls = '-.', color = 'green', marker = 's')
```

Out[59]: [<matplotlib.lines.Line2D at 0x23c68f0a8a0>]

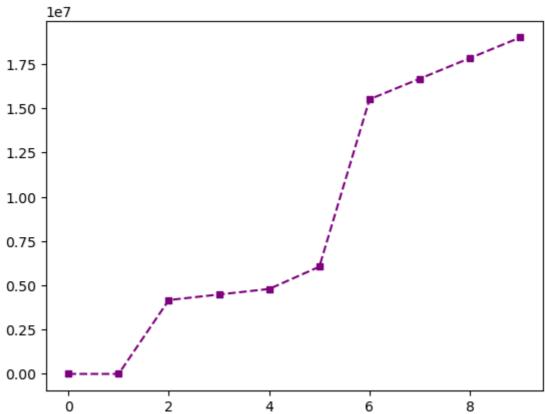


In [61]: plt.plot(Salary[0], ls = '-.', color = 'green', marker = 's', ms = 8)

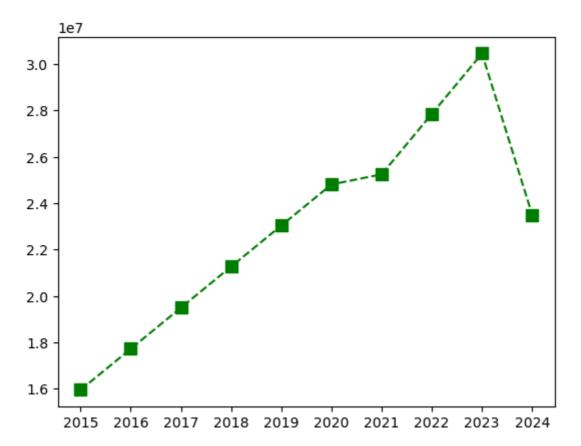
Out[61]: [<matplotlib.lines.Line2D at 0x23c6ad48a70>]



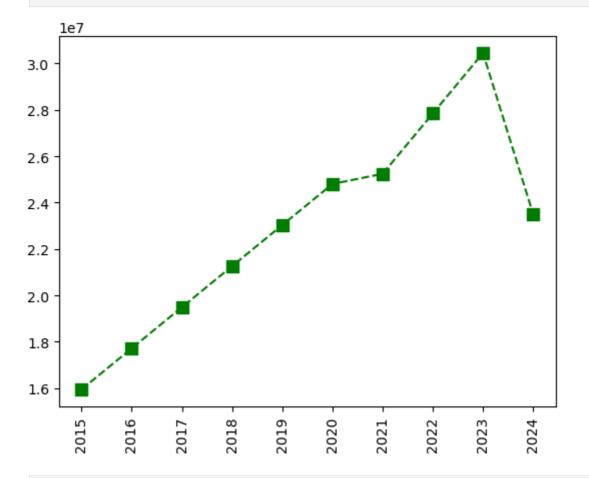
```
In [ ]:
In [4]: #Import numpy
        import numpy as np
        #Seasons
        Seasons = ["2015","2016","2017","2018","2019","2020","2021","2022","2023","2024"
        Sdict = {"2015":0,"2016":1,"2017":2,"2018":3,"2019":4,"2020":5,"2021":6,"2022":7
        #Players
        Players = ["Sachin", "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
        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
        plt.plot(Salary[7],ls='--',color='purple',marker='s',ms=4)
In [7]:
        plt.show()
```



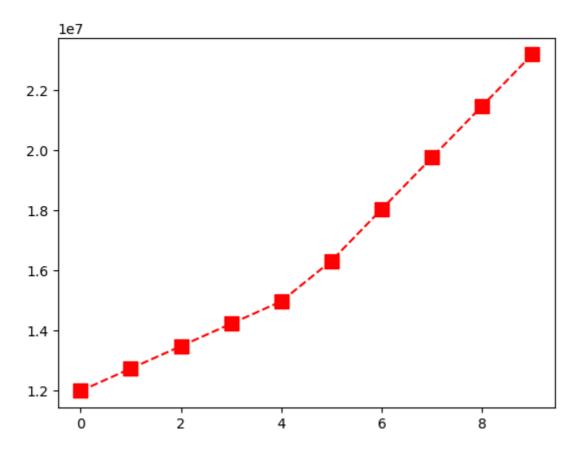
```
In [11]: Sdict #season dictionary
Out[11]: {'2015': 0,
           '2016': 1,
           '2017': 2,
           '2018': 3,
           '2019': 4,
           '2020': 5,
           '2021': 6,
           '2022': 7,
           '2023': 8,
           '2024': 9}
In [10]: Pdict #player dictionary
Out[10]:
          {'Sachin': 0,
           'Rahul': 1,
           'Smith': 2,
           'Sami': 3,
           'Pollard': 4,
           'Morris': 5,
           'Samson': 6,
           'Dhoni': 7,
           'Kohli': 8,
           'Sky': 9}
         plt.plot(Salary[0], ls = '--',color='green',marker='s',ms=8)
In [21]:
         plt.xticks(list(range(0,10)),Seasons) #(range to select seasons, it prints the y
         plt.show()
```



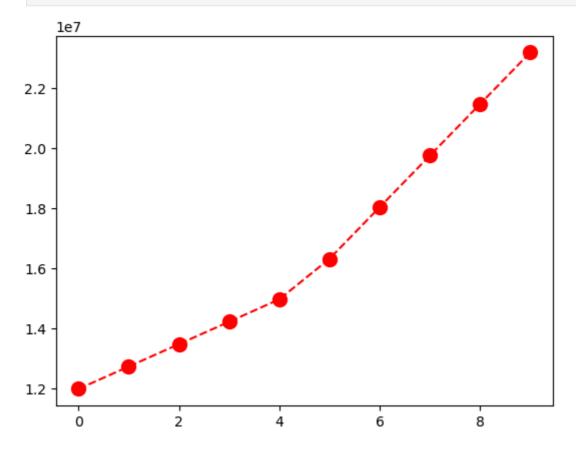
In [25]: plt.plot(Salary[0], ls = '--',color='green',marker='s',ms=8)
 plt.xticks(list(range(0,10)),Seasons,rotation='vertical')
 plt.show()



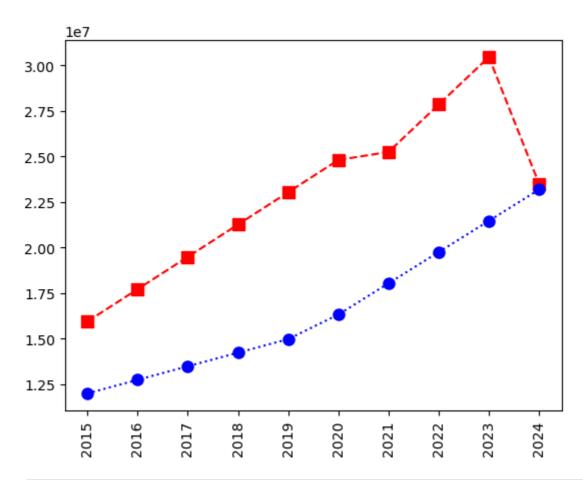
In [28]: plt.plot(Salary[1], ls = '--',color='red',marker='s',ms=10,label=Players[1])
 plt.show()



In [31]: plt.plot(Salary[1], ls = '--',color='red',marker='o',ms=10) #without Label
plt.show()

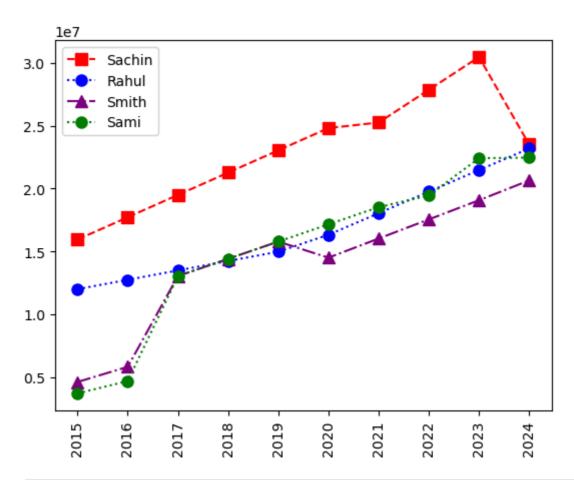


```
In [33]: plt.plot(Salary[0], ls = '--',color='red',marker='s',ms=8,label=Players[0])
   plt.plot(Salary[1], ls = ':',color='blue',marker='o',ms=8,label=Players[1])
   plt.xticks(list(range(0,10)),Seasons,rotation='vertical')
   plt.show()
```



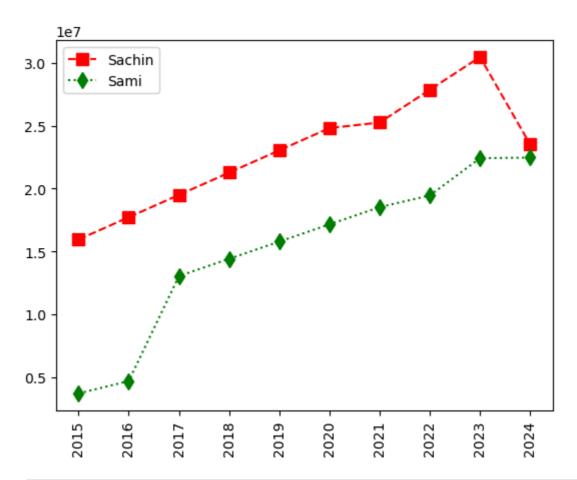
```
In [41]: #comparing 4 players salary
plt.plot(Salary[0], ls = '--',color='red',marker='s',ms=8,label=Players[0])
plt.plot(Salary[1], ls = ':',color='blue',marker='o',ms=8,label=Players[1])
plt.plot(Salary[2], ls = '--',color='purple',marker='^',ms=8,label=Players[2])
plt.plot(Salary[3], ls = ':',color='green',marker='o',ms=8,label=Players[3])

plt.legend() #graph has more meaning
plt.xticks(list(range(0,10)),Seasons,rotation='vertical')
plt.show()
```



```
In [49]: plt.plot(Salary[0], ls = '--',color='red',marker='s',ms=8,label=Players[0])
plt.plot(Salary[3], ls = ':',color='green',marker='d',ms=8,label=Players[3])

plt.legend() #graph has more meaning
plt.xticks(list(range(0,10)),Seasons,rotation='vertical')
plt.show()
```



```
In [51]: #to move Legend out of the graph
    plt.plot(Salary[0], ls = '--',color='red',marker='s',ms=8,label=Players[0])
    plt.plot(Salary[3], ls = ':',color='green',marker='d',ms=8,label=Players[3])

plt.legend(loc = 'lower left', bbox_to_anchor=(0.5,1) ) #graph has more meaning
    plt.xticks(list(range(0,10)),Seasons,rotation='vertical')
    plt.show()
```

