

A Comparison between A B C

```
import matplotlib.pyplot as plt
import numpy as np
```

```
inputs = [5, 10, 50, 100, 500, 10**3, 5 * 10**3, 10**4, 5 * 10**4,
10**5, 5 * 10**5, 10**6]
```

```
times = [[8.58306884765625e-06, 8.344650268554688e-06,
0.0001227855682373047, 0.00045990943908691406, 0.01203608512878418,
0.05643773078918457, 1.5574758052825928, 5.795194864273071,
147.73878645896912, 595.1502323150635, 595.1502323150635*4,
595.1502323150635*16], [1.2874603271484375e-05, 9.5367431640625e-06,
5.221366882324219e-05, 0.00012230873107910156, 0.0009887218475341797,
0.002524852752685547, 0.02401137351989746, 0.06473803520202637,
0.7862980365753174, 2.0648396015167236, 26.445839405059814,
72.89753484725952], [8.106231689453125e-06, 6.9141387939453125e-06,
2.5272369384765625e-05, 5.030632019042969e-05, 0.0002853870391845703,
0.0006022453308105469, 0.0033957958221435547, 0.008321762084960938,
0.04799675941467285, 0.08408665657043457, 0.47100043296813965,
1.0639145374298096], [4.76837158203125e-06, 5.4836273193359375e-06,
1.5974044799804688e-05, 2.8371810913085938e-05,
0.00014400482177734375, 0.0002930164337158203, 0.0015158653259277344,
0.0030672550201416016, 0.015823841094970703, 0.03692960739135742,
0.17017102241516113, 0.360424280166626]]]
times.append([[1.71661376953125e-05, 1.7642974853515625e-05,
0.0002193450927734375, 0.0007827281951904297, 0.017605304718017578,
0.05678439140319824, 1.64115309715271, 6.2975544929504395,
153.90738463401794, 612.1382052898407, 4*612.1382052898407,
16*612.1382052898407], [1.6927719116210938e-05, 1.7881393432617188e-
05, 0.00010609626770019531, 0.0002925395965576172,
0.00153350830078125, 0.002889394760131836, 0.031970977783203125,
0.06746912002563477, 0.6907429695129395, 1.9548075199127197,
25.54882311820984, 74.59105324745178], [1.5974044799804688e-05,
1.4543533325195312e-05, 6.103515625e-05, 0.0001220703125,
0.0006418228149414062, 0.0009315013885498047, 0.005592823028564453,
0.009818553924560547, 0.05376315116882324, 0.1100320816040039,
0.6264150142669678, 1.376746654510498], [1.0728836059570312e-05,
1.2636184692382812e-05, 4.601478576660156e-05, 8.606910705566406e-05,
0.0003707408905029297, 0.0010349750518798828, 0.004034519195556641,
0.00587916374206543, 0.02996516227722168, 0.059784889221191406,
0.30876660346984863, 0.6495921611785889]])
times.append([[8.106231689453125e-06, 8.344650268554688e-06,
0.00012636184692382812, 0.0004737377166748047, 0.012262821197509766,
0.0542604923248291, 1.4507133960723877, 6.291901350021362,
148.18718767166138, 591.2566955089569, 4.5*591.2566955089569,
4.5*4.5*591.2566955089569], [9.059906005859375e-06,
8.821487426757812e-06, 5.245208740234375e-05, 0.0001227855682373047,
0.0010223388671875, 0.002592325210571289, 0.02563929557800293,
```

```
0.07202458381652832, 0.6946070194244385, 1.9673988819122314,
25.00427770614624, 73.84481120109558], [7.867813110351562e-06,
7.3909759521484375e-06, 2.8848648071289062e-05, 6.079673767089844e-05,
0.0003972053527832031, 0.0008769035339355469, 0.005219936370849609,
0.012183427810668945, 0.05977797508239746, 0.12654423713684082,
0.7922322750091553, 1.867142915725708], [5.245208740234375e-06,
5.7220458984375e-06, 1.6450881958007812e-05, 2.8133392333984375e-05,
0.00014829635620117188, 0.0003020763397216797, 0.0015347003936767578,
0.0031065940856933594, 0.015790224075317383, 0.03180360794067383,
0.17420434951782227, 0.36737847328186035]])
```

```
for i in range(len(times)):
    for j in range(len(times[i])):
        for k in range(len(times[i][j])):
            times[i][j][k] = float("{:.5f}".format(times[i][j][k]))
```

```
def drawGraph(x, y):
    plt.plot(x,y)
    plt.show()
```

```
def drawSummaryGraphs():
    parts = ['A', 'B', 'C']
    for j in range(4):
        plt.title("Solution {}".format(j+1))
        for i in range(3):
            plt.plot(inputs, times[i][j], label =
"{}".format(parts[i]))
        plt.legend()
        plt.show()
```

```
def drawTable(rows, columns, data, title):
    fig, ax = plt.subplots()
    ax.set_axis_off()
    rcolors = plt.cm.BuPu(np.full(len(rows), 0.1))
    ccolors = plt.cm.BuPu(np.full(len(columns), 0.1))
    table = ax.table(
        cellText = data,
        rowLabels = rows,
        colLabels = columns,
        rowColours = rcolors,
        colColours = ccolors,
        cellLoc = 'center',
        loc = 'upper left')
```

```
#     table.auto_set_font_size(False)
table.set_fontsize(30)
table.scale(2, 5)
ax.set_title(title,
              fontweight = "bold", fontdict={'fontsize': 30})
```

```

plt.show()

def drawStuff():
    for i in range(4):
        temp = []
        for j in range(3):
            temp.append(times[j][i])
            drawTable([" A ", " B ", " C "], inputs, temp, 'Solution
{}'.format(i+1))
        drawSummaryGraphs()

```

drawStuff()

Solution 1

	5	10	50	100	500	1000	5000	10000	50000	100000	500000	1000000
A	1e-05	1e-05	0.00012	0.00046	0.01204	0.05644	1.55748	5.79519	147.73879	595.15023	2380.60093	9522.40372
B	2e-05	2e-05	0.00022	0.00078	0.01761	0.05678	1.64115	6.29755	153.90738	612.13821	2448.55282	9794.21128
C	1e-05	1e-05	0.00013	0.00047	0.01226	0.05426	1.45071	6.2919	148.18719	591.2567	2660.65513	11972.94808

Solution 2

	5	10	50	100	500	1000	5000	10000	50000	100000	500000	1000000
A	1e-05	1e-05	5e-05	0.00012	0.00099	0.00252	0.02401	0.06474	0.7863	2.06484	26.44584	72.89753
B	2e-05	2e-05	0.00011	0.00029	0.00153	0.00289	0.03197	0.06747	0.69074	1.95481	25.54882	74.59105
C	1e-05	1e-05	5e-05	0.00012	0.00102	0.00259	0.02564	0.07202	0.69461	1.9674	25.00428	73.84481

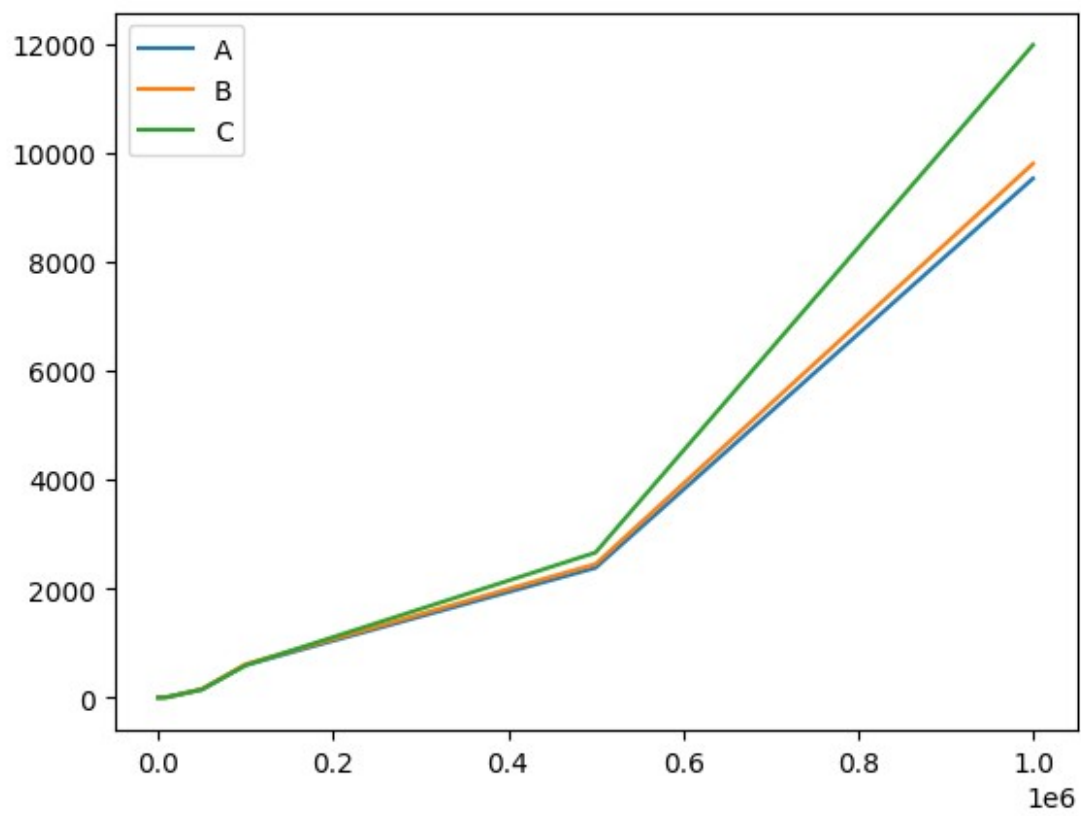
Solution 3

	5	10	50	100	500	1000	5000	10000	50000	100000	500000	1000000
A	1e-05	1e-05	3e-05	5e-05	0.00029	0.0006	0.0034	0.00832	0.048	0.08409	0.471	1.06391
B	2e-05	1e-05	6e-05	0.00012	0.00064	0.00093	0.00559	0.00982	0.05376	0.11003	0.62642	1.37675
C	1e-05	1e-05	3e-05	6e-05	0.0004	0.00088	0.00522	0.01218	0.05978	0.12654	0.79223	1.86714

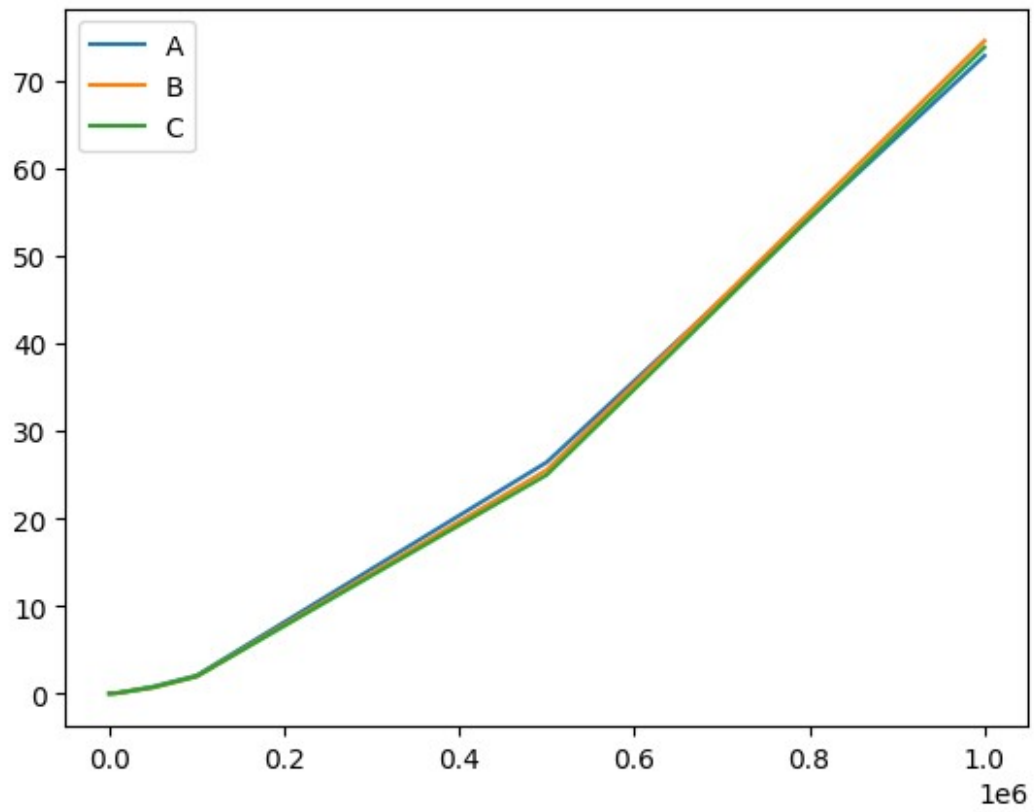
Solution 4

	5	10	50	100	500	1000	5000	10000	50000	100000	500000	1000000
A	0.0	1e-05	2e-05	3e-05	0.00014	0.00029	0.00152	0.00307	0.01582	0.03693	0.17017	0.36042
B	1e-05	1e-05	5e-05	9e-05	0.00037	0.00103	0.00403	0.00588	0.02997	0.05978	0.30877	0.64959
C	1e-05	1e-05	2e-05	3e-05	0.00015	0.0003	0.00153	0.00311	0.01579	0.0318	0.1742	0.36738

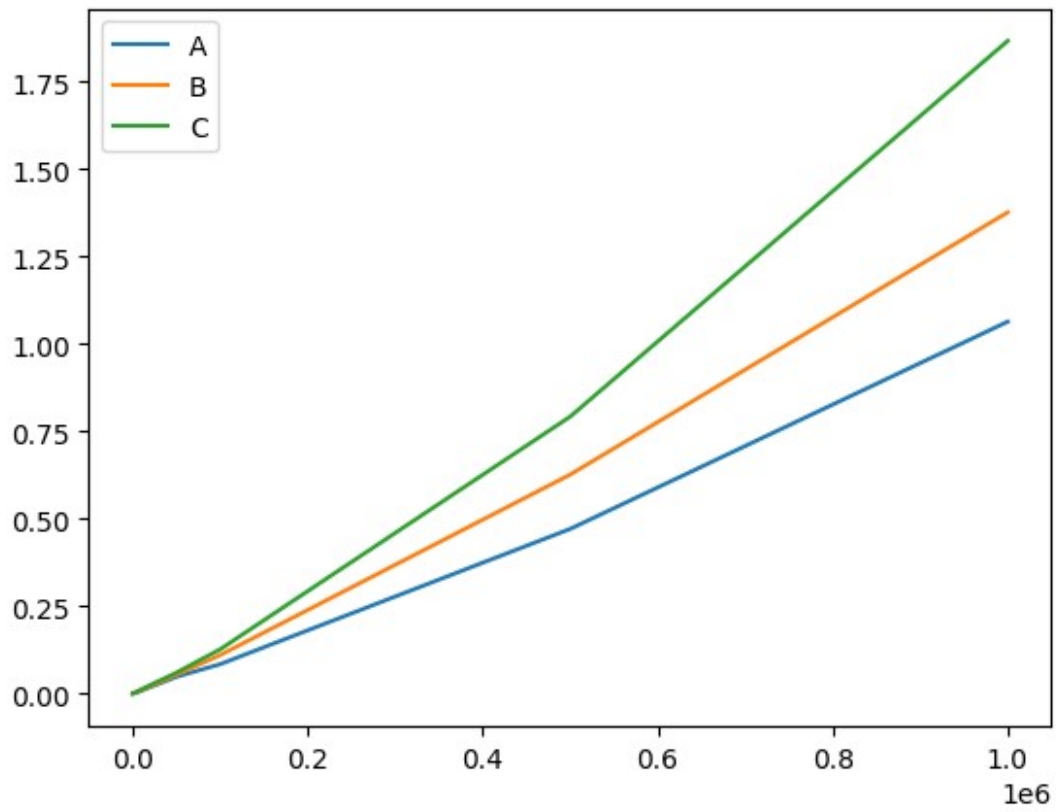
Solution 1



Solution 2



Solution 3



Solution 4

