plots

October 6, 2016

```
In [2]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        %matplotlib inline
```

```
In [15]: data = pd.read_csv('times.txt', names=['size','num_threads','load_t',\
                                                  'calc_t'], header=None)
```

```
In [37]: data
```

```
Out[37]:     size  num_threads  load_t  calc_t
         0      3            1      57     109
         1      3            1      62     101
         2      3            1      46      76
         3      3            1      47      75
         4      3            1      59      71
         5      3            1      43      77
         6      3            1      54      68
         7      3            1      44      79
         8      3            1      62      79
         9      3            1      47      76
         10     3            2      67     111
         11     3            2      47     123
         12     3            2      61     110
         13     3            2      43     116
         14     3            2      67     167
         15     3            2      48     118
         16     3            2      64     118
         17     3            2      50     118
         18     3            2      67     116
         19     3            2      49     114
         20     3            3      72     125
         21     3            3      43     143
         22     3            3      74     117
         23     3            3      46     133
         24     3            3      69     117
         25     3            3      46     121
         26     3            3      76     118
```

```
27       3            3       48     118
28       3            3       69     119
29       3            3       45     125
..     ...          ...      ...     ...
690  10000           16  2586175  549647
691  10000           16  2567133  554986
692  10000           16  2576410  561138
693  10000           16  2571335  554345
694  10000           16  2586150  556283
695  10000           16  2587923  555074
696  10000           16  2591619  555477
697  10000           16  2582523  556372
698  10000           16  2589251  554702
699  10000           16  2603057  556121
700  10000           24  2558474  566978
701  10000           24  2584939  559805
702  10000           24  2591775  570429
703  10000           24  2584773  565708
704  10000           24  2583579  580031
705  10000           24  2602621  558144
706  10000           24  2584417  566434
707  10000           24  2593800  558992
708  10000           24  2582762  562789
709  10000           24  2566838  559545
710  10000           32  2590355  571449
711  10000           32  2566649  580405
712  10000           32  2569428  578074
713  10000           32  2576233  570299
714  10000           32  2665336  590600
715  10000           32  2540435  577829
716  10000           32  2659087  554522
717  10000           32  2576910  574532
718  10000           32  2574372  554015
719  10000           32  2576174  576029

[720 rows x 4 columns]
```

```
In [140]: mean_data = data.groupby(['size','num_threads']).mean().reset_index()
          mean_data.to_csv('mean_data.csv')
          mean_data
```

```
Out[140]:     size  num_threads     load_t    calc_t
           0     3            1       52.1      81.1
           1     3            2       56.3     121.1
           2     3            3       58.8     123.6
           3     3            4       57.8     183.4
           4     3            6       57.7     311.1
           5     3            8       56.7     406.0
```

```
6       3           16       46.8     157.7
7       3           24       45.4     157.2
8       3           32       46.4     164.5
9      10            1       63.5      77.4
10     10            2       61.5     122.6
11     10            3       63.6     135.0
12     10            4       60.6     183.9
13     10            6       60.1     297.5
14     10            8       59.6     389.1
15     10           16       62.8     679.7
16     10           24       61.2    1000.6
17     10           32       61.7    1359.5
18    100            1      336.9     194.1
19    100            2      280.7     210.6
20    100            3      284.0     235.9
21    100            4      279.1     260.6
22    100            6      283.5     393.5
23    100            8      280.6     452.5
24    100           16      277.1     778.6
25    100           24      277.0    1136.1
26    100           32      280.3    1485.9
27    500            1     6372.1    2641.4
28    500            2     6819.8    1869.6
29    500            3     7654.1    1811.9
..    ...          ...        ...       ...
42   1000           16    27841.4    6129.1
43   1000           24    28570.7    6710.3
44   1000           32    28243.9    7208.8
45   3000            1   243106.2   75665.3
46   3000            2   241495.3   58532.1
47   3000            3   235505.6   54430.0
48   3000            4   235397.6   51763.2
49   3000            6   235225.5   53232.0
50   3000            8   235291.3   51863.8
51   3000           16   235185.5   52943.9
52   3000           24   235893.1   53754.9
53   3000           32   236643.0   54115.6
54   5000            1   651204.1  209701.0
55   5000            2   656570.4  159318.3
56   5000            3   648315.7  148626.9
57   5000            4   651089.7  138866.2
58   5000            6   648384.7  142579.4
59   5000            8   645762.6  142423.7
60   5000           16   652317.3  147216.6
61   5000           24   668271.1  150112.2
62   5000           32   648044.0  148588.1
63  10000            1  2578999.2  838504.5
64  10000            2  2656718.8  630979.6
```

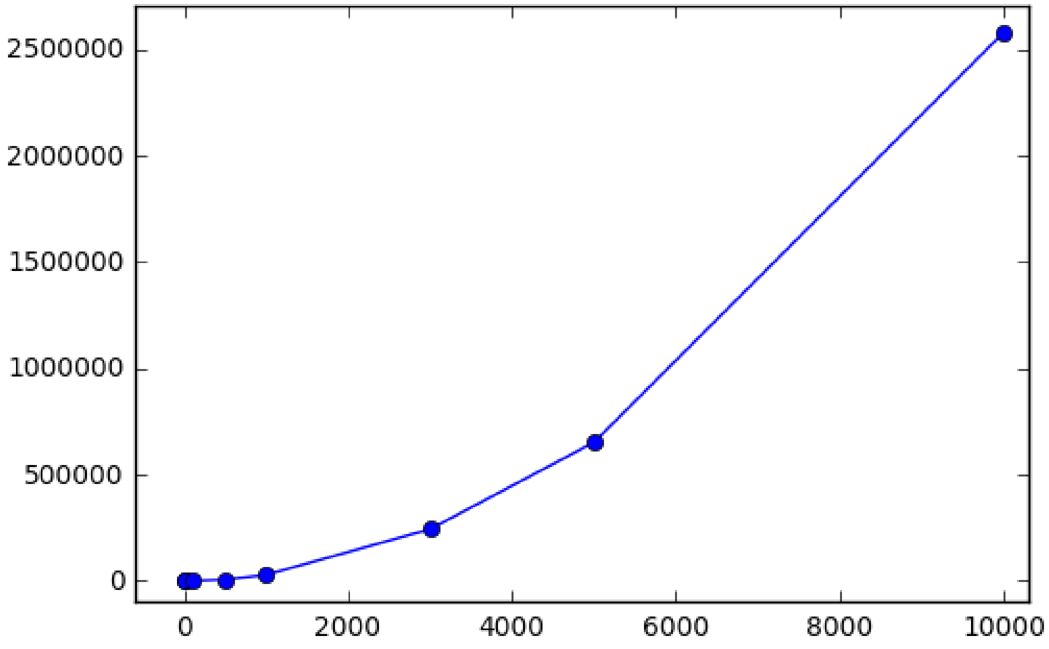
```
65  10000           3  2642527.8  592991.7
66  10000           4  2592539.9  551745.5
67  10000           6  2585486.1  555175.2
68  10000           8  2575978.5  549713.8
69  10000          16  2584157.6  555414.5
70  10000          24  2583397.8  564885.5
71  10000          32  2589497.9  572775.4

[72 rows x 4 columns]
```

```
In [139]: sizes = [3,10,100,500,1000,3000,5000,10000]
          num_threads = [1,2,3,4,6,8,16,24,32]

          print '       '

          calc_time = mean_data.ix[mean_data['num_threads'] == 1][['size',\
                                                                   'load_t']]
          plt.figure()
          plt.plot(calc_time['size'], calc_time['load_t'],'bo-')
          plt.xlim((-600,10300))
          plt.ylim((-100000,2700000))
          plt.show()
```

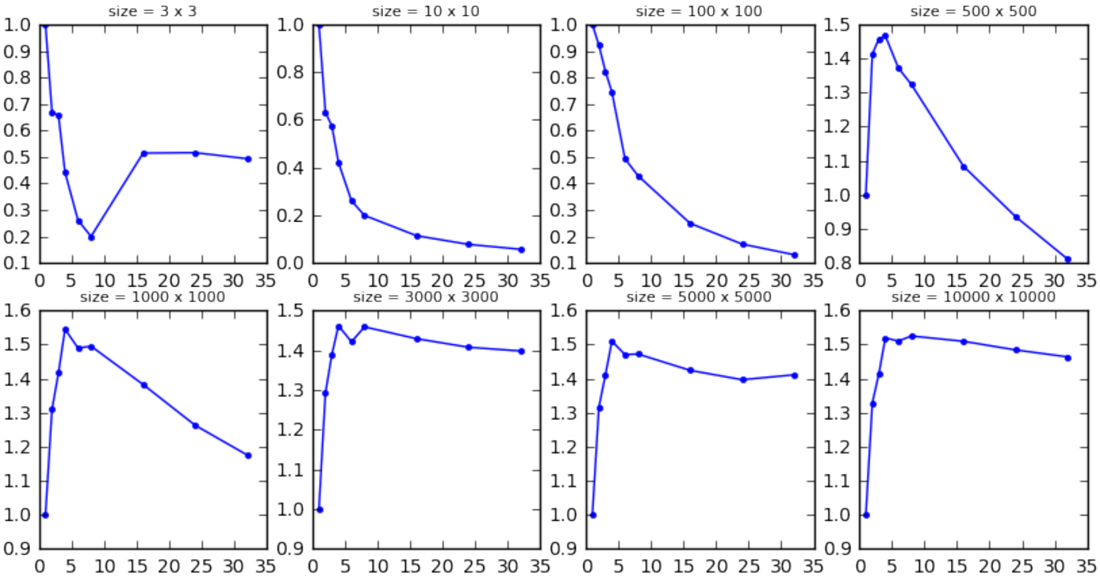


```
In [122]: print ' '

          plt.figure(figsize=(10,5))

          for s,i in zip(sizes,range(241,249)):
              calc_time = mean_data.ix[mean_data['size'] == s][['num_threads',\
                                                                 'calc_t']]
              plt.subplot(i)
              plt.title('size = {0} x {0}'.format(s), fontsize=8)
              plt.plot(calc_time['num_threads'], \
                           calc_time['calc_t'].values[0] * 1.0 / \
                                                np.array(calc_time['calc_t']), 'b.-')

          plt.show()
```


size = 3 x 3
size = 10 x 10
size = 100 x 100
size = 500 x 500
size = 1000 x 1000
size = 3000 x 3000
size = 5000 x 5000
size = 10000 x 10000