```
In [5]: import numpy as np
        import matplotlib.pyplot as plt

        % matplotlib inline
```

```
In [6]: qsort_file = open('qsort_stats.txt', 'r')
        qs = qsort_file.readline()
        qs
```

```
Out[6]: '2.368365s 10000000 1000000 1\n'
```

```
In [7]: qs_time = float(qs.split()[0][:-1])
        qs_time
```

```
Out[7]: 2.368365
```

```
In [8]: open_mp = open("stats_openmp.txt", 'r')
        lines_omp = open_mp.readlines()
        times_omp = []
        threads_omp = []
        for line in lines_omp:
            times_omp.append(float(line.split()[0][:-1]))
            threads_omp.append(int(line.split()[-1]))
```

```
In [9]: print(times_omp)
```

```
[2.222133, 1.233361, 1.292751, 1.295044, 1.218215]
```

```
In [10]: file = open("stats.txt", 'r')
         lines = file.readlines()
         times = []
         threads = []
         for line in lines:
             times.append(float(line.split()[0][:-1]))
             threads.append(int(line.split()[-1]))
```
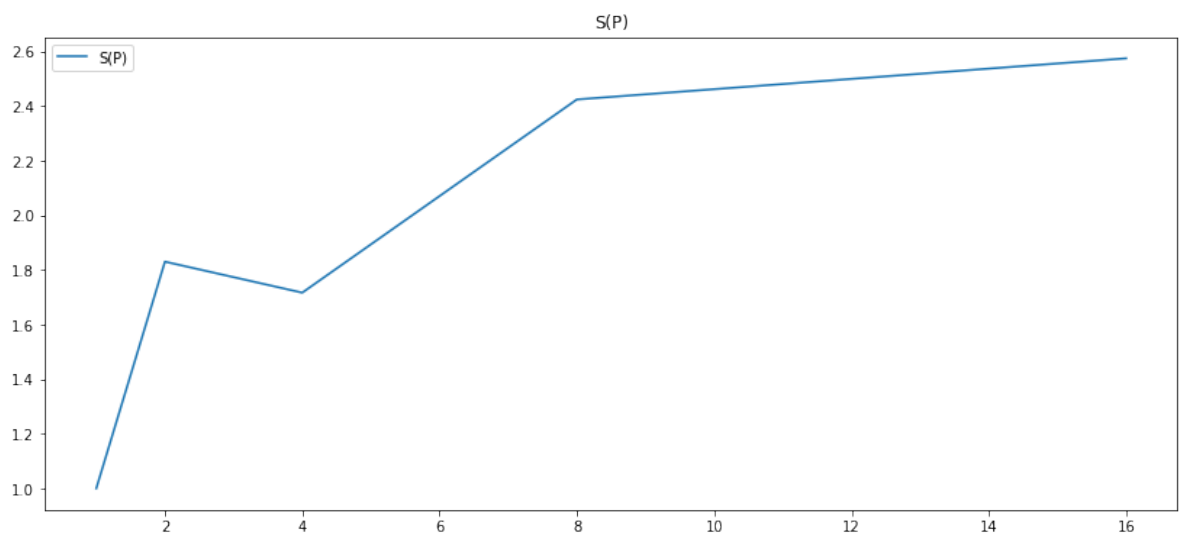
```
In [11]: times
```

```
Out[11]: [2.366152, 1.292836, 1.378357, 0.976085, 0.919011]
```

```
In [12]: plt.figure(figsize=(14, 6))
         plt.plot(threads, times, label='pthreads')
         plt.hlines(qs_time, 0, 17, label='qsort')
         plt.plot(threads, times_omp, label='OpenMP')
         plt.title("T(P)")
         plt.legend()
         plt.show()
```
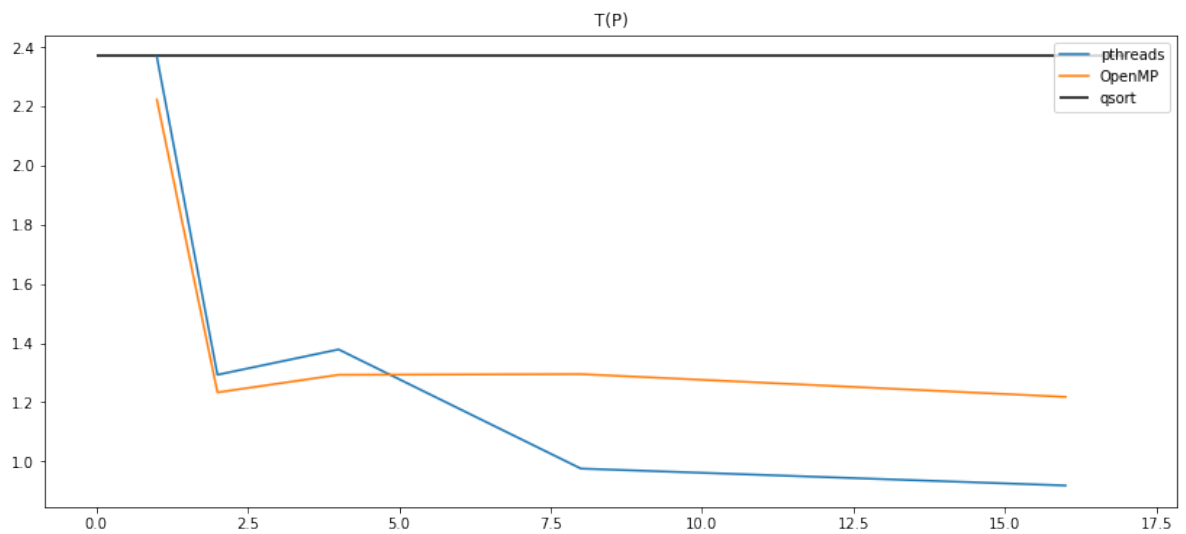


```
In [13]: plt.figure(figsize=(14, 6))
         sp = times[0] / np.array(times)
         plt.plot(threads, sp, label='S(P)')
         plt.title("S(P)")
         plt.legend()
         plt.show()
```

```
In [14]: ep = sp / np.array(threads)
         plt.figure(figsize=(14, 6))
         plt.plot(threads, ep, label='E(P)')
         plt.title("E(P)")
         plt.legend()
         plt.show()
```