```
In [22]:  import numpy as np
          import matplotlib.pyplot as plt
```

```
In [23]:  n = 10000000
          m = 3000000
```

```
In [24]:  qsort_time = 0.74724
```

```
In [25]:  T0 = np.average([0.80923, 0.78221, 0.76649])
          T0
```

Out[25]: 0.78597666666666666

```
In [26]:  P = np.array([1, 2, 4, 8, 16])
```

```
In [27]:  T1 = np.average([0.85253, 0.84885, 0.74314])
          T1
          T2 = np.average([0.39404, 0.40663, 0.51121])
          T2
          T4 = np.average([0.43430, 0.43085, 0.46480])
          T4
          T8 = np.average([0.43061, 0.41554, 0.40612])
          T8
          T16 = np.average([0.40391, 0.41607, 0.50594])
          T16
```

Out[27]: 0.44197333333333333

```
In [28]:  T = np.array([T1, T2, T4, T8, T16])
          T
```

Out[28]: array([0.81484   , 0.43729333, 0.44331667, 0.41742333, 0.4419
          7333])
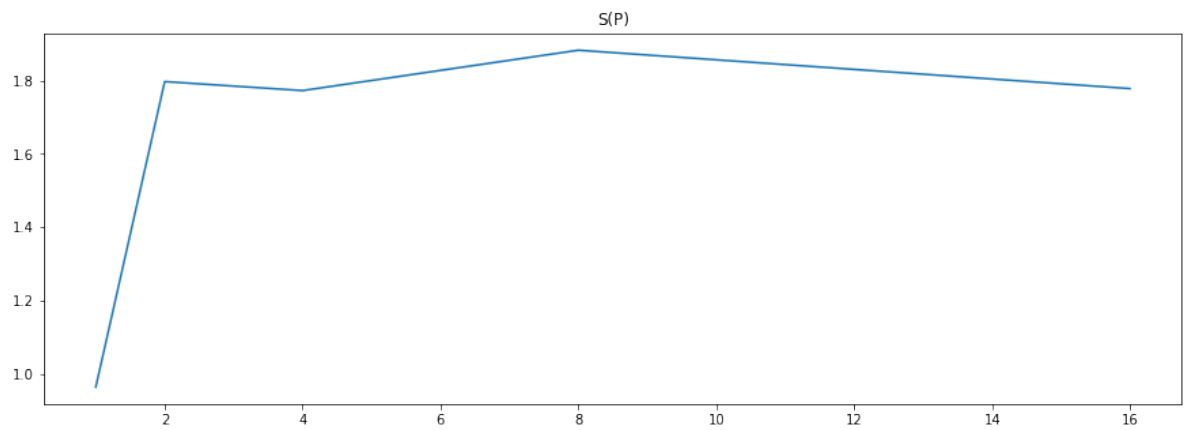
```
In [37]:  plt.figure(figsize=(15,5))
          plt.plot(P, T)
          plt.title("T(P)")
          plt.hlines(qsort_time, 0.9, 16, colors='green')
          plt.show()
```
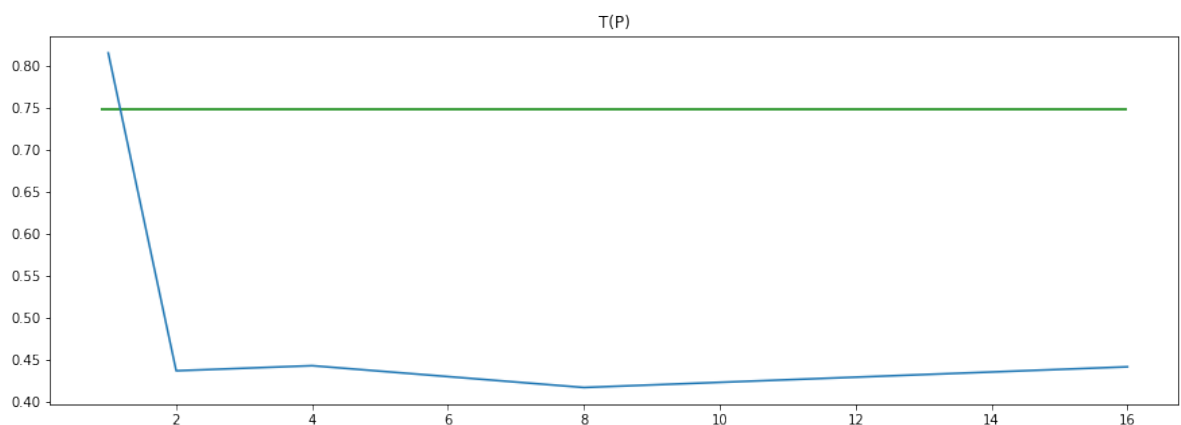
```
In [30]: S = T0 / T
         S
```

Out[30]: array([0.96457791, 1.79736714, 1.77294635, 1.88292461, 1.7783
         3504])

```
In [31]: plt.figure(figsize=(15,5))
         plt.plot(P, S)
         plt.title("S(P)")
         plt.show()
```



```
In [32]: E = S / P
         E
```

Out[32]: array([0.96457791, 0.89868357, 0.44323659, 0.23536558, 0.1111
         4594])

```
In [33]: plt.figure(figsize=(15,5))
         plt.plot(P, E)
         plt.title("E(P)")
         plt.show()
```