**Report:**

Figure1: speedup and efficiency plot

Figure2: Time difference between parallel linear and binary search

We can see that from the figure 2 that, the parallel execution time compare to the execution time of the binary search function is decreasing gradually.

Table: speedup and efficiency plot

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Number of THREADS** | **CPU time[s] linear search** | **Speedup** | **Efficiency** | **CPU time[s] binary search  ( without parallel execution)** | **Time difference between  linear and binary search** |
| **1** | 3.94E-02 | 1 | 1 | 3.00E-06 | 3.94E-02 |
| **2** | 2.17E-02 | 1.81531264 | 0.907656322 | 3.00E-06 | 2.17E-02 |
| **4** | 1.18E-02 | 3.33298385 | 0.833245962 | 3.00E-06 | 1.18E-02 |
| **8** | 6.58E-03 | 5.98782917 | 0.748478647 | 3.00E-06 | 6.58E-03 |
| **16** | 3.45E-03 | 11.4137955 | 0.713362218 | 3.00E-06 | 3.45E-03 |

**Program Output:**

Running with 1 threads:

Index computed with linear search: 6

CPU time for linear search: 3.941202163696289E-002

Index computed with linear search: 9999999

was the value found?: T

Running with 2 threads:

Index computed with linear search: 6

CPU time for linear search: 2.171087265014648E-002

Index computed with linear search: 9999999

was the value found?: T

Running with 4 threads:

Index computed with linear search: 6

CPU time for linear search: 1.182484626770020E-002

Index computed with linear search: 9999999

was the value found?: T

Running with 8 threads:

Index computed with linear search: 6

CPU time for linear search: 6.582021713256836E-003

Index computed with linear search: 9999999

was the value found?: T

Running with 16 threads:

Index computed with linear search: 6

CPU time for linear search: 3.453016281127930E-003

Index computed with linear search: 9999999

was the value found?: T