CS 575 - Parallel Programing

Project 0

Simple OpenMP Experiment

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1. Tell what machine you ran this on?

   I used rabbit server to compile and run this program. The array size I took is 16525.

2. What performance results did you get?

Number of rounds	1 Thread Peak performance	4 Thread Peak Performance
Round 1	169.81	557.67
Round 2	171.62	560.21
Round 3	172.21	537.03
Round 4	171.57	551.31
Round 5	182.99	571.33
Round 6	183.86	545.74
Average	175.3433333	553.8816667

   Average of Single Thread Peak Performance = 175.34 MegaMults/Sec

   Average of 4 Thread Peak Performance = 553.88 MegaMults/Sec

3. What was your 1-thread-to-4-thread speedup?

   S = (Execution time with one thread) / (Execution time with four threads) = (Performance with four threads) / (Performance with one thread)

   S = 553.88 / 175.34 = **3.15**

4. Your 1-thread-to-4-thread speedup should be less than 4.0. Why do you think it is this way?

   This might be because the time taken to create and manage threads, as well as to synchronize and communicate between threads and also this happens because of the waiting that cause by the shared memory, caches and input/output resources.

5. What was your Parallel Fraction, Fp? (Hint: it should be less than 1.0, but not much less.)

```
float Fp = (4./3.)*( 1. - (1./S) )
```

$$Fp = (\frac{4.}{3.}) * (1. - (\frac{1.}{3.15}))$$

$$Fp = \frac{172}{189} = \mathbf{0.91}$$