Parallel Processing Lab 1: OpenMP

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Abstract: Write some words about openMP

Contents

1 Histogram

The histogram code generates an n length vector and then sorts all the data into a histogram with 500 bins. In the multi-threaded aprroach each thread is assigned a chunk of data to sort. This chunk of data is statically assigned so they sort equal sized chunks. Each thread keeps a local copy of the histogram containing the data that it sorted. Then after each thread sorts its own chunk of data it reaches a critical section in which the histogram in shared memory is incremented with the values in the local histograms. As seen in the below table peak performance is reached with 8 threads, performance is not improved with 16 threads because of the overhead associated with spawning more threads. Then an explanation in psuedo-code of how the parallel code is structured follows the table.

Threads	1 million items	10 million items	100 million items
2	1.40	1.29	1.10
4	2.33	2.35	2.44
8	3.00	4.17	4.42
16	2.50	4.15	3.56

Result: Parallel Organization of data into Histogram

initialization;

creation of threads;

for *i in amount of data in thread chunk* **do**

    localHist[array[i]]++;

end

critical section;

for *all the bins in the histogram* **do**

    sharedHist[i]+=localHist[i];

end

2 Guassian Elimination

words