Devesh Jaiswal

Parallel Programming

Professor Zahran

Lab 2 Report

CIMS MACHINE:

Experiment 1

Fix the number of iterations to 100. For the 2D square array, test with sizes: 10, 100, 1000, and 20000. For each one of these sizes, get the time for the sequential as well as the parallel with four threads. Calculate the speedup, for each size of the four threads version relative to the sequential version. So, you need to have a table like the following where the second row is the speedup.

10	100	1000	20000
Sequential=0.0 Parallel=0.0 **Speedup=0**	Sequential=0.01 Parallel=.03 **Speedup=.33**	Sequential=2.77 Parallel=2.85 **Speedup=.97**	Sequential=755.73 Parallel=851.17 **Speedup=.89**

1-What is the pattern that you can see from the results in the table?
The pattern that I see is that the speedup is increasing as the array size increases which makes sense since with a bigger array size there are more tasks which are broken down into the multiple parallel threads.
2-How do you interpret the results in that table?
As the number of iterations increases, parallelism from OpenMP increases. The speedup values we got are inaccurate due to many users being on the crunchy machine and when running the OpenMP version the sequential code is also computed to compare correctness. So this affected our speedup values to be lower.

Experiment 2

Fix the array dimension to 1000. The number of iterations varies as: 10, 20, 30, 40, and 50. For each one calculate the speedup of four threads version relative to sequential and fill up a table like the following where the second row is the speedup.

10	20	30	40	50
Sequential=0.18 Parallel=0.23 **Speedup=.78**	Sequential=0.38 Parallel=0.43 **Speedup=.88**	Sequential=.56 Parallel=.77 **Speedup=.73**	Sequential =.74 Parallel=1.01 **Speedup=.73**	Sequential=.93 Parallel=1.13 **Speedup=.82**

1-Is the speedup affected more with the number of iterations? or with a bigger array size?
From our experiment here the speedup stayed roughly the same in the range of .73-.88. So I think speedup is affected with bigger array size.

2-Try to justify your finding in the above question.
I believe speedup is affected more with bigger array size since that is the input of the problem which creates more tasks as it gets bigger. If the number of iterations increases this affects both the sequential and parallel program but doesn't affect the exploitation of parallelism in our parallel method. Each thread can update several points at the same time so it is affected if the array gets bigger but it still has to go through the same iterations as the sequential version.