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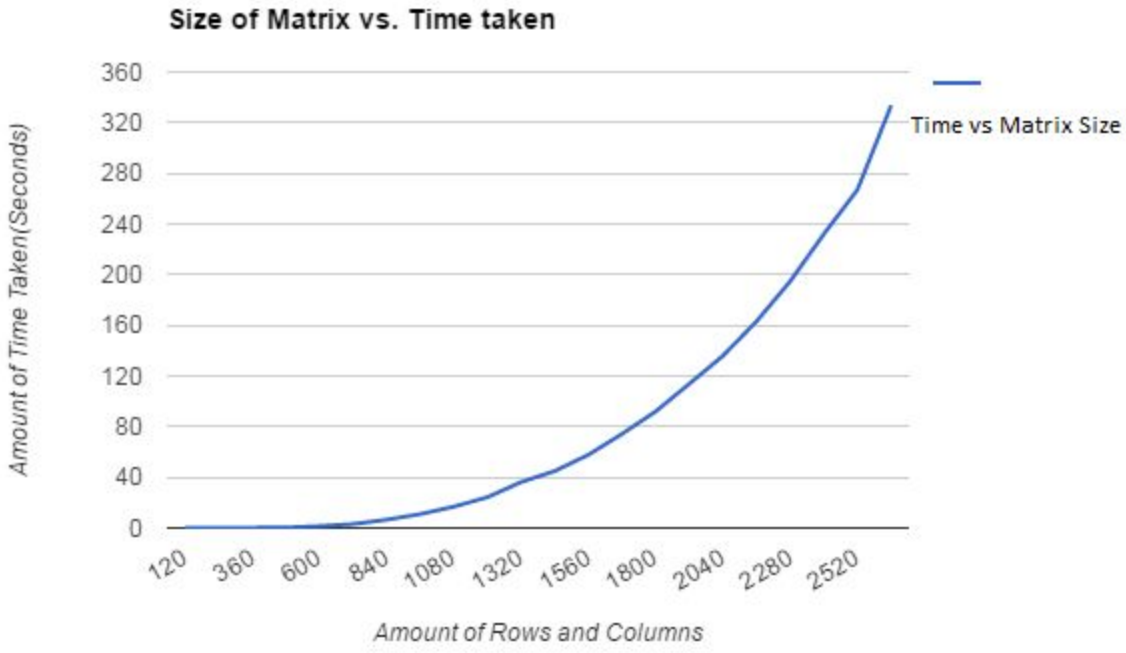
4/12/2017
CS 415
Pa04 - Matrix Multiplication

Introduction

The first part of this assignment is to write and time sequential matrix multiplication. In order to do this, I read in the size of matrix from the command line. It is important to note that only square matrices of size 120 x k, where k is any integer more than 1, was used. This is because to compare it to parallel, 120 must be used because it can be divided by any number of perfect squares. Next I allocate memory for two matrices and a third one that will hold the resulting matrix. Next is input random values between 1 and 5 into the first two matrices and 0 into the third. Finally 3 for loops are used to do the actual calculation and put into the resulting matrix. The timing for the sequential matrix multiplication starts right before the for loops and ends right after the for loops. A total of 10 trials were run and then averaged to reach the times listed below.

Amount of Rows and Columns	Average time Taken(seconds)
120	0.006490851
240	0.02870466
360	0.1757363
480	0.3131466
600	1.421064
720	3.052699
840	6.524932
960	10.95011
1080	16.82777
1200	24.304
1320	36.26744
1440	44.92931
1560	57.818
1680	74.239
1800	92.01015
1920	113.837
2040	135.938
2160	163.1867
2280	194.7875
2400	232.1
2520	267.1188
2640	333.6505

Below is a graph showing the size of the matrix against the time taken. This graph shows an exponential growth as you would expect from matrix multiplication.


Size of Matrix vs. Time taken
360
320
280
240
200
160
120
80
40
0
Amount of Time Taken(Seconds)
120
360
600
840
1080
1320
1560
1800
2040
2280
2520
Amount of Rows and Columns
Time vs Matrix Size