ICSI 520 Distributed & Parallel Computing - Fall 2019

Homework 6

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UAlbany Cluster Results:

Fixed **N**=200, varying **p**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Matrix size(N)** | **Number of processes (p)** | **Serial execution time (microseconds)** | **Parallel execution time (microseconds)** | **Speedup** |
| 200 | 2 | 24920.4 | 21705.6 | 1.14811 |
| 200 | 4 | 24920.4 | 12728.4 | 1.95786 |
| 200 | 6 | 24920.4 | 10855.0 | 2.29575 |
| 200 | 8 | 24920.4 | 8970.8 | 2.77795 |
| 200 | 10 | 24920.4 | 11242.2 | 2.21668 |
| 200 | 12 | 24920.4 | 14493.4 | 1.71943 |
| 200 | 14 | 24920.4 | 14864.2 | 1.67654 |
| 200 | 16 | 24920.4 | 16372.2 | 1.52212 |
| 200 | 20 | 24920.4 | 17644.6 | 1.41235 |

Varying **N**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Matrix size(N)** | **Number of processes (p)** | **Serial execution time (microseconds)** | **Parallel execution time (microseconds)** | **Speedup** |
| 100 | 16 | 3186.2 | 7360.0 | 0.43291 |
| 200 | 16 | 24856.4 | 18609.0 | 1.33572 |
| 500 | 16 | 388943.4 | 90749.8 | 4.28589 |
| 1000 | 16 | 3086064.2 | 419375.6 | 7.35871 |
| 2000 | 16 | 25293960.0 | 2439479.0 | 10.36859 |
| 5000 | 16 | 0 | 42079298.6 | - |

make A.csv B.csv MAT\_SIZE=N

srun -n1 -c1 Homework6\_Serial.out

salloc -n 16

mpirun -n <p> ./Homework6\_Distributed.out

(Averaging 5 runs, discarding outliers)

StarCluster Results:

Fixed **N**=200, varying **p**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Matrix size(N)** | **Number of processes (p)** | **Serial execution time (microseconds)** | **Parallel execution time (microseconds)** | **Speedup** |
| 200 | 4 | 29423.8 | 17609.8 | 1.67088 |
| 200 | 6 | 29423.8 | 18107.2 | 1.62498 |
| 200 | 8 | 29423.8 | 26662.4 | 1.10357 |
| 200 | 12 | 29423.8 | 26565.0 | 1.10762 |
| 200 | 16 | 29423.8 | 34788.6 | 0.84579 |
| 200 | 24 | 29423.8 | 50778.5‬ | 0.57945 |
| 200 | 32 | 29423.8 | 51818.7 | 0.56782 |
| 200 | 36 | 29423.8 | 79216.6 | 0.37143 |
| 200 | 80 | 29423.8 | 137814.2 | 0.21350 |

Varying **N**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Matrix size(N)** | **Number of processes (p)** | **Serial execution time (microseconds)** | **Parallel execution time (microseconds)** | **Speedup** |
| 100 | 16 | 3761.8 | 45938.0 | 0.08189 |
| 200 | 16 | 30008.0 | 36326.0 | 0.82607 |
| 500 | 16 | 468266.8 | 106185.2 | 4.40991 |
| 1000 | 16 | 3736345.6 | 408370.6 | 9.14940 |
| 2000 | 16 | 30670404.6 | 6805744.4 | 4.50655 |
| 5000 | 16 | 0 | 49300052.2 | - |

make A.csv B.csv MAT\_SIZE=N

./Homework6\_Serial.out

mpirun -n <p> ./Homework6\_Distributed.out

(Averaging 5 runs, discarding outliers)

(Run on 16 node cluster created using StarCluster)