Concurrency and Parallel Programming
Assignment 2

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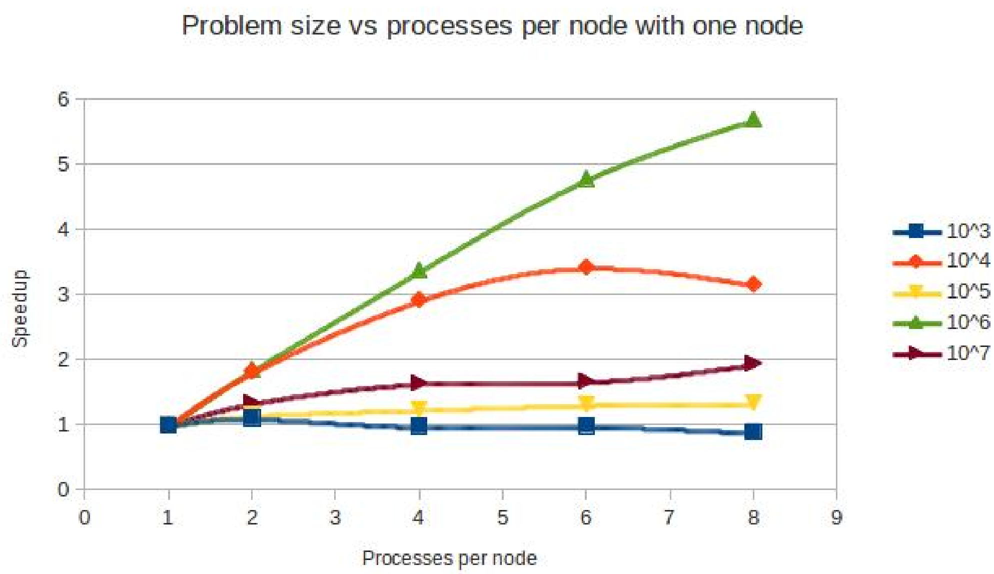
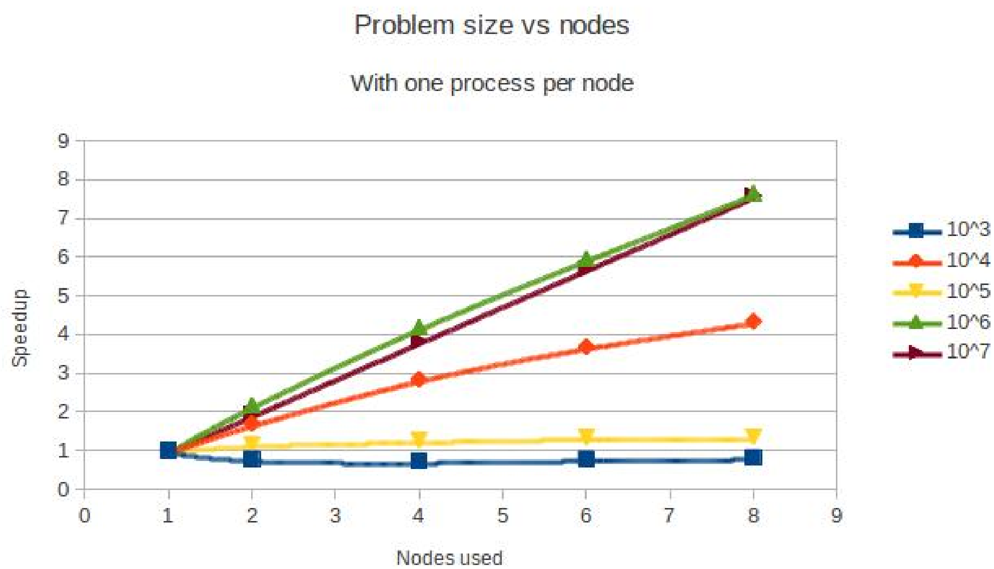
1 Notes

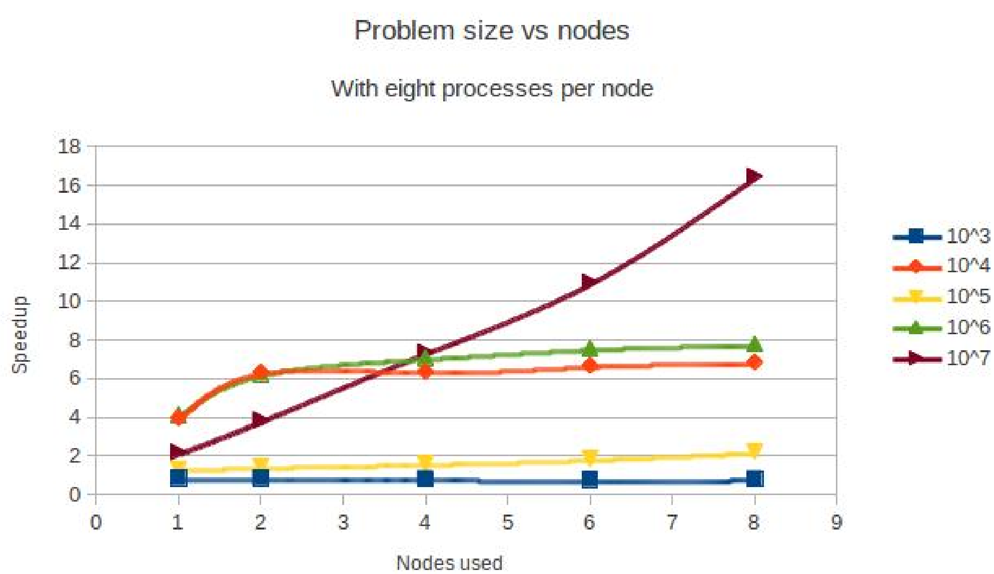
- The smallest problem size doesn't benefit from MPI in any of the cases. This was also the case with threading.
- For some reason the tests with problem size 10^5 performed abnormaly bad in all of the tests . It only benefits a bit from MPI. Way less than any of the others. (except for 10^3) Both 10^4 and 10^6 perform way better in all cases.
- With the two largest problem sizes MPI gains around the maximum theoritical speedup when running on two different nodes with one process per node. In comparisson with using threading MPI performs very well in these cases.
- As seen in the graphs, the speedup depends on the problem size. When the problem size is small, the speedup is also very small and sometimes even smaller that 1. With a large problem size, the speedup can reach almost 8. This can be explained by the fact that there can be a large communication delay with a small problem size. However, when there is a larger problem size (and thus more calculations), the communication delay will be a smaller percentage of the total executing time.

- As seen in the graphs, all problem sizes quickly reach their maximum possible speedup. Only the larges problem size doesn't stagnate yet. However, when the problem will be executed on even more cores, this problem size will probably also stagnate, but there's no way to retreive this from the current results.

2 Graphs




Problem size vs nodes
With one process per node
Speedup
Nodes used
0
1
2
3
4
5
6
7
8
9
10^3
10^4
10^5
10^6
10^7


Problem size vs nodes
With eight processes per node
Speedup
Nodes used
0
2
4
6
8
10
12
14
16
18
0
1
2
3
4
5
6
7
8
9
10^3
10^4
10^5
10^6
10^7