Project3:
Parallel Sorting Using QuickSort

For project #3 your assignment is to develop a parallel quick sort algorithm. In this project you will design an application to sort 10 million numbers (sort a smaller number for debugging, but the final project report should include results for sorting at least 10 million values). The values to sort will be obtained using the following code (which you will need to parallelize in the parallel version of this project).

```
const int N=10000000 ;

double V[N] ;
for(int i=0;i<N;++i) {
  double t = double(i)/double(N) ;
  V[N] = t*t*sin(2000.0*t*t) ;
}
```

You will need to develop the parallel quick sort algorithm based on the algorithm described in section 9.4.3 of the text. The implementation will be either in OpenMP or MPI as assigned to the student in the table found at the end of this description. Please use the previous projects for guidance on generating makefiles and so on for either the MPI or OpenMP implementation.

You will be required to turn in the source code and a project report as described in the previous projects. However, you will also be required to turn in a bug tracking log as described in the class. This bug tracking log will count for 10% of this project's grade.

Please compare your results to both your own serial implementation of quicksort and to the builtin std::sort serial sorting algorithm. In your report be sure to include a description of the analysis of your algorithm, both in terms of timing and scalability. Try to confirm if your implementation performance behaves as predicted by your analysis.

Also, try different pivot selection methods and report on their effect on sorting performance. Based on measurements and analysis, make recommendations as to which pivot selection may work best.

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Peter Gilbert	MPI
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Christopher Munn	openMP
Justin Pace	MPI
Chris Robinson	openMP
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Nishant Aggarwal	openMP
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