Assignment 1
Odd – Even Sort using OpenMP

The odd even sort (or odd even transposition sort) is a relatively simple algorithm having worst and best case complexity of $O(n^2)$. You can see it's working and sample code available at https://www.geeksforgeeks.org/odd-even-sort-brick-sort.

In this assignment, you have to work with a parallel version of this sorting algorithm using OpenMP.

Instructions

1. **Skeleton File**
   You can use the following as a skeleton file (modified from geeks for geeks):

```
#include<bits/stdc++.h>
using namespace std;

void oddEvenSort(int arr[], int n)
{
     bool isSorted = false;
     while (!isSorted) {
          isSorted = true;
          for (int i=1; i<=n-2; i=i+2)  {
               if (arr[i] > arr[i+1]) {
                    swap(arr[i], arr[i+1]);
                    isSorted = false;
               }
          }
          for (int i=0; i<=n-2; i=i+2)  {
               if (arr[i] > arr[i+1]) {
                    swap(arr[i], arr[i+1]);
                    isSorted = false;
               }
          }
     }
     return;
}

int main(int argc, char *argv[])
{
     int n = atoi(argv[1]);
     int *arr = new int(n);
     populate(arr, n);     // Step 1: create this function
     // Step 2: Write code to start counting Time
     oddEvenSort(arr, n); // Step 4: Parallelize this code.
     // Step 3: Write code to end counting Time and display it
     return 0;
}
```

2. **Size of the Arr[] matrix**

   Modify the Arr[] matrix such that it is able to pick a size from the command prompt (in the first argument argv[1]). Create a populate function such that it fills this array with dummy random variables values.

3. **Measuring Speed of Execution:**
   You have to find out the execution time of only those parts of the code that are involved in thread related activities. All other activities such as printing matrices, providing input data to matrices, etc. must not be recorded. Plot the result of your code.

Deliverable

Your deliverable should contain the following:

1. Your Name (Roll Number)
2. Your Source Code (with Comments)
3. The plot generated from your code (you can use excel), or a tool called gnuplot.