King Saud University
College of Computer and Information Sciences
Department of Computer Science
CSC453 – Parallel Processing – Tutorial No – Spring 2022

Question

1. Let's consider that we want to apply the odd-even sort algorithm on the following array:

0	1	2	3	4	5	6	7
5	3	18	12	6	10	14	4

   a. How many iterations are required to sort an array of size N. ceiling(N/2)

   b. How many steps are performed per iteration and describe every one of them.

   c. Show all changes made on the array during every ***step i*** of the algorithm in iteration 1.

   d. Which threads will be involved in every ***step i*** in case the algorithm is performed in parallel. Don't forget to specify, for every thread, the index of the cells it will process.

In Odd step: Thread Ti | i is an odd number and will process data[i], data[i+1]
In Even step: Thread Ti | i is an even number and process data[i], data[i+1]

   e. Show all changes made on the array during every ***step i*** of the algorithm in iteration 2.

b) Two steps, Odd step and Even step.
In odd step we compare the element of every odd index with the next cell, if they are out of order we swap
In even step -- -- -- --- -- -- -- -- -- -- -- -- -- -- -- -- even index --

How many iteration we need? ceiling(N/2) = ceiling(8/2) = 4 iterations

c) iteration 1: odd step { 5, 3, 18, 6, 12, 10, 14, 4 }

even step { 3, 5, 6, 18, 10, 12, 4, 14 }

e) iteration 2: odd step { 3, 5, 6, 10, 18, 4, 12, 14 }

even step { 3, 5, 6, 10, 4, 18, 12, 14 }

⋮

Continue to 4 iterations to sort the array...