

Algorithm Optimization to Sort in Parallel by Decreasing the Number of the Processors in SIMD (Single Instruction Multiple Data) Systems

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Abstract : Paralleling is a mechanism to decrease the time necessary to execute the programs. Sorting is one of the important operations to be used in different systems in a way that the proper function of many algorithms and operations depend on sorted data. CRCW_SORT algorithm executes 'N' elements sorting in $O(1)$ time on SIMD (Single Instruction Multiple Data) computers with $n^{2/2}-n/2$ number of processors. In this article having presented a mechanism by dividing the input string by the hinge element into two less strings the number of the processors to be used in sorting 'N' elements in $O(1)$ time has decreased to $n^{2/8}-n/4$ in the best state; by this mechanism the best state is when the hinge element is the middle one and the worst state is when it is minimum. The findings from assessing the proposed algorithm by other methods on data collection and number of the processors indicate that the proposed algorithm uses less processors to sort during execution than other methods.

Keywords : CRCW, SIMD (Single Instruction Multiple Data) computers, parallel computers, number of the processors

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