Parallel Quick Sort using Thread Pool Pattern

Abstract

Sorting algorithms, their implementations and their applications in modern computing necessitates improvements for sorting large data sets quickly and efficiently. This paper will analyze the performance of a multi-threaded quick sort implemented using the thread pool pattern. The analysis will be done by comparing the time required to sort various data sets and their memory constraints, against the native sorting implementations of the Dual Pivot Quicksort and Merge Sort using the Fork-Join framework in the Oracle Java 8 programming language. Analysis is done of the effect of different number of processor (cores) of the test machine, as well as the performance barrier due to the initial time taken to create “p” threads, p being the number of processors. This paper also analyzes the limitations of the inbuilt Java method Arrays.parallelSort() and how the proposed system overcomes this problem. Finally, it also discuss possible improvements to the proposed system to further improve its performance.
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Index Terms

Computer Science Parallel Computing

Keywords

Sorting, Multithreading, Object oriented programming, Parallel algorithms