Assignment 6

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# Problem 1

# Problem 2

# Problem 3

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| Run for 4 procs  Global rank= 0, Group rank= 0, recvbuf= 1  Global rank= 1, Group rank= 1, recvbuf= 1  Global rank= 2, Group rank= 0, recvbuf= 5  Global rank= 3, Group rank= 1, recvbuf= 5  -----------------------------------------  Run for 8 procs  Global rank= 0, Group rank= 0, recvbuf= 6  Global rank= 1, Group rank= 1, recvbuf= 6  Global rank= 2, Group rank= 2, recvbuf= 6  Global rank= 3, Group rank= 3, recvbuf= 6  Global rank= 4, Group rank= 0, recvbuf= 22  Global rank= 5, Group rank= 1, recvbuf= 22  Global rank= 6, Group rank= 2, recvbuf= 22  Global rank= 7, Group rank= 3, recvbuf= 22  -----------------------------------------  Run for 16 procs  Global rank= 0, Group rank= 0, recvbuf= 28  Global rank= 1, Group rank= 1, recvbuf= 28  Global rank= 2, Group rank= 2, recvbuf= 28  Global rank= 3, Group rank= 3, recvbuf= 28  Global rank= 4, Group rank= 4, recvbuf= 28  Global rank= 5, Group rank= 5, recvbuf= 28  Global rank= 6, Group rank= 6, recvbuf= 28  Global rank= 7, Group rank= 7, recvbuf= 28  Global rank= 8, Group rank= 0, recvbuf= 92  Global rank= 9, Group rank= 1, recvbuf= 92  Global rank= 10, Group rank= 2, recvbuf= 92  Global rank= 11, Group rank= 3, recvbuf= 92  Global rank= 12, Group rank= 4, recvbuf= 92  Global rank= 13, Group rank= 5, recvbuf= 92  Global rank= 14, Group rank= 6, recvbuf= 92  Global rank= 15, Group rank= 7, recvbuf= 92  -----------------------------------------  Run for 32 procs  Global rank= 0, Group rank= 0, recvbuf= 120  Global rank= 4, Group rank= 4, recvbuf= 120  Global rank= 12, Group rank= 12, recvbuf= 120  Global rank= 16, Group rank= 0, recvbuf= 376  Global rank= 20, Group rank= 4, recvbuf= 376  Global rank= 24, Group rank= 8, recvbuf= 376  Global rank= 28, Group rank= 12, recvbuf= 376  Global rank= 1, Group rank= 1, recvbuf= 120  Global rank= 2, Group rank= 2, recvbuf= 120  Global rank= 3, Group rank= 3, recvbuf= 120  Global rank= 5, Group rank= 5, recvbuf= 120  Global rank= 6, Group rank= 6, recvbuf= 120  Global rank= 7, Group rank= 7, recvbuf= 120  Global rank= 8, Group rank= 8, recvbuf= 120  Global rank= 9, Group rank= 9, recvbuf= 120  Global rank= 10, Group rank= 10, recvbuf= 120  Global rank= 11, Group rank= 11, recvbuf= 120  Global rank= 13, Group rank= 13, recvbuf= 120  Global rank= 14, Group rank= 14, recvbuf= 120  Global rank= 15, Group rank= 15, recvbuf= 120  Global rank= 19, Group rank= 3, recvbuf= 376  Global rank= 21, Group rank= 5, recvbuf= 376  Global rank= 23, Group rank= 7, recvbuf= 376  Global rank= 27, Group rank= 11, recvbuf= 376  Global rank= 29, Group rank= 13, recvbuf= 376  Global rank= 31, Group rank= 15, recvbuf= 376  Global rank= 17, Group rank= 1, recvbuf= 376  Global rank= 18, Group rank= 2, recvbuf= 376  Global rank= 22, Group rank= 6, recvbuf= 376  Global rank= 25, Group rank= 9, recvbuf= 376  Global rank= 26, Group rank= 10, recvbuf= 376  Global rank= 30, Group rank= 14, recvbuf= 376  -----------------------------------------  Run for 64 procs  Global rank= 0, Group rank= 0, recvbuf= 378  Global rank= 1, Group rank= 1, recvbuf= 378  Global rank= 2, Group rank= 2, recvbuf= 378  Global rank= 3, Group rank= 3, recvbuf= 378  Global rank= 4, Group rank= 4, recvbuf= 378  Global rank= 5, Group rank= 5, recvbuf= 378  Global rank= 6, Group rank= 6, recvbuf= 378  Global rank= 7, Group rank= 7, recvbuf= 378  Global rank= 9, Group rank= 9, recvbuf= 378  Global rank= 10, Group rank= 10, recvbuf= 378  Global rank= 11, Group rank= 11, recvbuf= 378  Global rank= 13, Group rank= 13, recvbuf= 378  Global rank= 14, Group rank= 14, recvbuf= 378  Global rank= 15, Group rank= 15, recvbuf= 378  Global rank= 16, Group rank= 16, recvbuf= 378  Global rank= 17, Group rank= 17, recvbuf= 378  Global rank= 18, Group rank= 18, recvbuf= 378  Global rank= 19, Group rank= 19, recvbuf= 378  Global rank= 20, Group rank= 20, recvbuf= 378  Global rank= 21, Group rank= 21, recvbuf= 378  Global rank= 22, Group rank= 22, recvbuf= 378  Global rank= 23, Group rank= 23, recvbuf= 378  Global rank= 24, Group rank= 24, recvbuf= 378  Global rank= 25, Group rank= 25, recvbuf= 378  Global rank= 26, Group rank= 26, recvbuf= 378  Global rank= 27, Group rank= 27, recvbuf= 378  Global rank= 8, Group rank= 8, recvbuf= 378  Global rank= 12, Group rank= 12, recvbuf= 378  Global rank= 28, Group rank= 0, recvbuf= 1162  Global rank= 29, Group rank= 1, recvbuf= 1162  Global rank= 30, Group rank= 2, recvbuf= 1162  Global rank= 31, Group rank= 3, recvbuf= 1162  Global rank= 32, Group rank= 4, recvbuf= 1162  Global rank= 33, Group rank= 5, recvbuf= 1162  Global rank= 35, Group rank= 7, recvbuf= 1162  Global rank= 38, Group rank= 10, recvbuf= 1162  Global rank= 39, Group rank= 11, recvbuf= 1162  Global rank= 40, Group rank= 12, recvbuf= 1162  Global rank= 41, Group rank= 13, recvbuf= 1162  Global rank= 42, Group rank= 14, recvbuf= 1162  Global rank= 43, Group rank= 15, recvbuf= 1162  Global rank= 44, Group rank= 16, recvbuf= 1162  Global rank= 45, Group rank= 17, recvbuf= 1162  Global rank= 46, Group rank= 18, recvbuf= 1162  Global rank= 47, Group rank= 19, recvbuf= 1162  Global rank= 48, Group rank= 20, recvbuf= 1162  Global rank= 49, Group rank= 21, recvbuf= 1162  Global rank= 50, Group rank= 22, recvbuf= 1162  Global rank= 51, Group rank= 23, recvbuf= 1162  Global rank= 52, Group rank= 24, recvbuf= 1162  Global rank= 53, Group rank= 25, recvbuf= 1162  Global rank= 54, Group rank= 26, recvbuf= 1162  Global rank= 55, Group rank= 27, recvbuf= 1162  Global rank= 34, Group rank= 6, recvbuf= 1162  Global rank= 36, Group rank= 8, recvbuf= 1162  Global rank= 37, Group rank= 9, recvbuf= 1162  ----------------------------------------- |

# Problem 4

<https://www.codeproject.com/KB/threads/Parallel_Quicksort/Parallel_Quick_sort_without_merge.pdf>