After an initial look at the data one thing in particular stood out, dequeue operations were noticeably slower than the other the other functions.

Chart, line chart

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To highlight the disparity, this is a graph of excluding dequeue at a scale factor of two.Chart, line chart

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All three of these operations appear to be O(N), whereas the dequeue appears to operate at O(N2). I suspect that is block of code is the culprit:

// Shift remaining items left

    if (m\_size > 0) {

        for (unsigned int i {}; i < m\_size; ++i) {

            m\_data[i] = m\_data[i + 1];

        }

    }

The goal of this code block is to keep the queue data in the range of 0->size-1 inside the underlying C-array. After improving this section involved