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CS 6850 - Multiple levels of Parallelism

This assignment we implemented 3 layers of parallelism: vectorization, instruction level parallelism (ILP), and multi-threading with OpenMP. The key to the assignment was the bitonic sort algorithm which utilized vectorization. It enabled us to split the merge sort work up into multiple threads while also taking advantage of 4-layer ILP.

On an array of $2^{25} = 33{,}554{,}432$ integers (32-bit), a **single threaded merge sort takes approximately $\mathbf{7.83}\ \boldsymbol{s}$ to run** (this according to Ali Bundi from class). For sorting blocks of $2^{14} = 16384$ throughout the entire array, my **code has a mean run time of $\mathbf{0.092}\ \boldsymbol{s}$**.