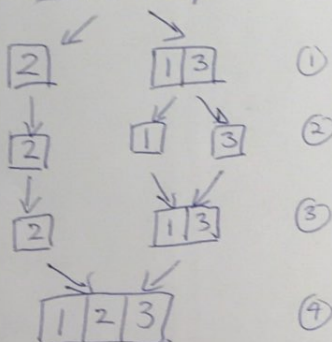
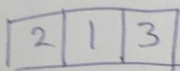


Woo Suk Lee

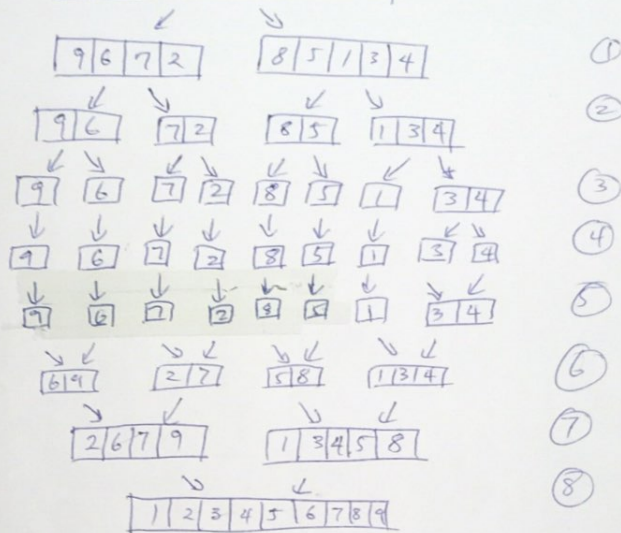
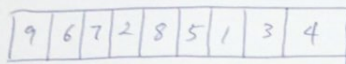
APCS 2 Pd 8

HW 6: How Fast Are Your Turtles?
2019-02-13

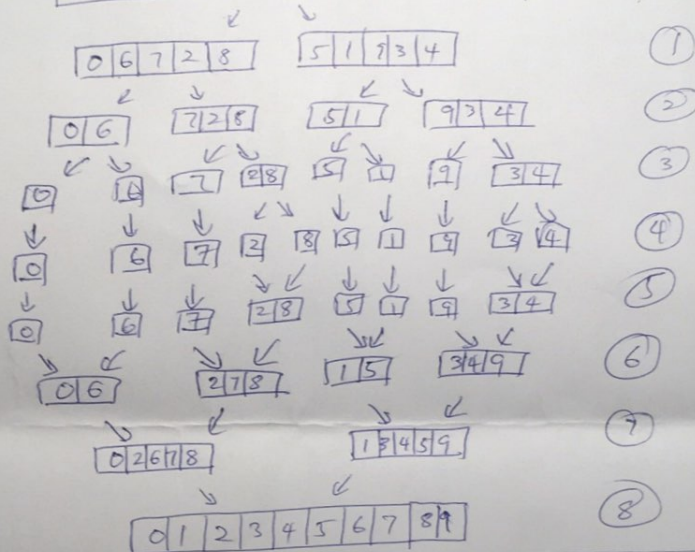
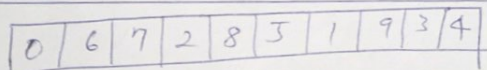
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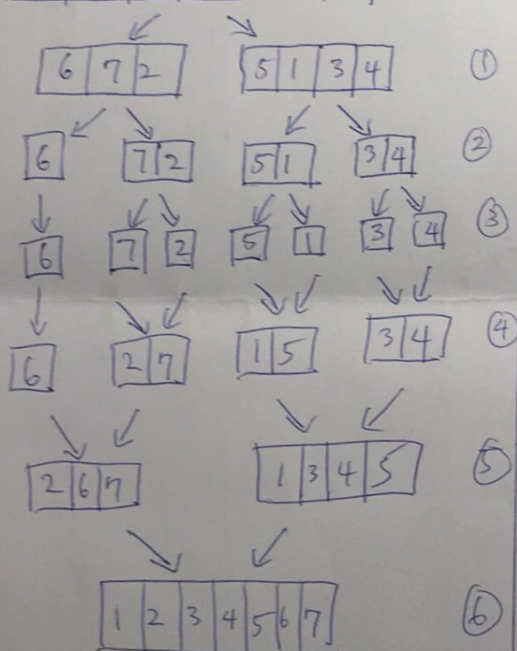
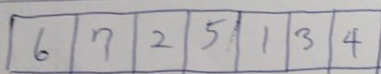
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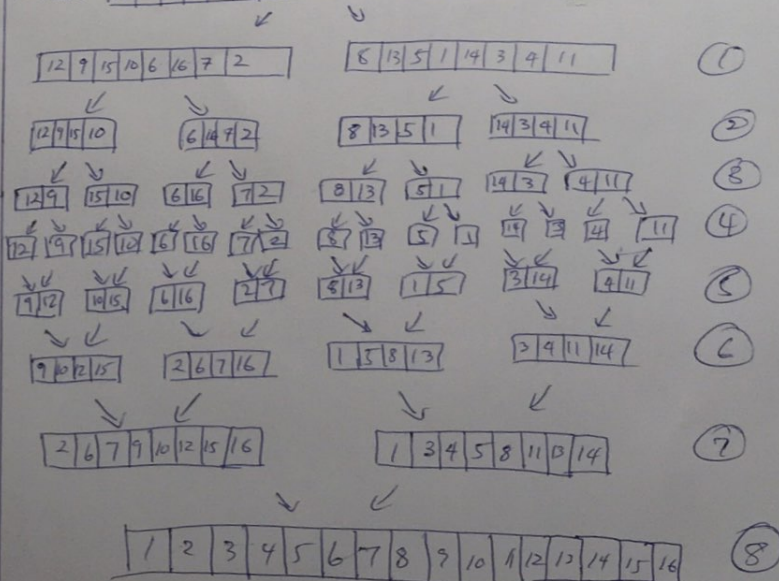
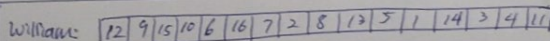
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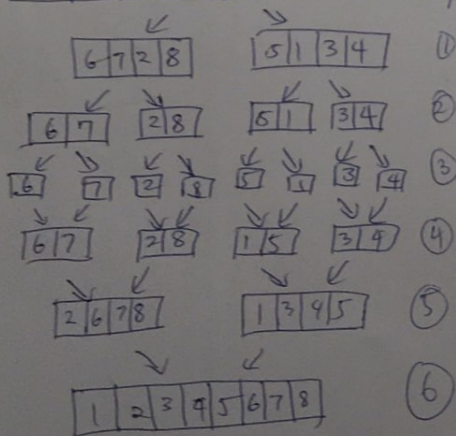
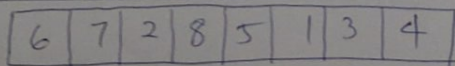
Tim:



William:



Jeremy:



Summary: The number of layers, given n elements to sort would be $2^{\lceil \log_2 n \rceil}$. This is because if n were a power of 2 (2, 4, 8, 16...), each layer would contain subarrays that have been perfectly split in half, so having one more than that number would increase the number of layers by two more (one from splitting, one from merging). The process of splitting and merging is each $\lceil \log_2 n \rceil$, so the two of them combined makes $2^{\lceil \log_2 n \rceil}$. Moreover, the runtime of both merging and splitting is $O(n)$, because one would need to parse through the entire array in order to split or merge the elements. Therefore, the total runtime is $n \times (2 \log_2 n) \rightarrow$ [Runtime n is done $2 \log_2 n$ times], which can be simplified to $O(n \log n)$.