Merge sort

Mergeosrt is an efficient merge-based sorting algorithm using a divide and conquer approach.

1. Divide – split the input array to half
2. Conquer – recursively sort each heal
3. Unite – merge the two sorted sublist together.

Merge can be done in time proportional to the length of the two input arrays. So, at each level of recursion, O(n) work is done. And there are O(logn) levels, so the runtime is O(nlogn)

Best: O(nlogn)

Average: O(nlogn)

Worst: O(nlogn)

Space overhead: Yes!

Stable? O(n)

One final ADT: Map

A map is an association from keys to values. The keys can be in any order and are distinct so therefore they form a set.

Domain (keys) 🡪 Range (values)

1. 1-to-1 linked list: one predecessor one successor
2. 1-to-many tree: many children, at most one parent
3. Many-to-many graph
4. Many-to-1 map: & math function