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Bubble Sort:

- While there are swaps being done
 - Set swap to false
 - Iterate through the array
 - If swaps happens (swaps when $arr[n] > arr[n+1]$)
 - Set swap to true

Selection Sort:

- For each outer loop
 - Find the smallest element's index within the array
 - Swap with the respective index of the outer loop

Insertion Sort:

- Assume the first element is sorted
- Loop through $n - 1$ times (since first element is sorted)
 - While there exists a element $A[n] < A[n-1]$
 - Swap $A[n]$ and $a[n - 1]$

Merge Sort:

- Divide the array evenly into it's subpart by exploiting the mid of sub each array
- $Mid = (low + high) / 2;$
- Call low , mid
- Call mid + 1, high
- With a base case of if $low \geq high$ return
- Finally merge

The merge will consist of comparisons between two arrays sliced around the mid value

$leftArr = [low, . . . , mid]$

$rightArr = [mid + 1, . . . , high]$

Compare both arrays with each other

If $leftArr[i] < rightArr[j]$

- $resultArr[k] = leftArr[i]$, increment i, k

Else

- $resultArr[k] = rightArr[j]$. Increment j, k

If any leftovers from either left or right array them in the result arr after

Loop through left arr

- $resultArr[k] = leftArr[i]$, increment i, k

Loop through right arr

- $resultArr[k] = rightArr[j]$, increment j, k

Quick Sort:

The division here will be based on the biases of our pivot and where it ends up, it won't be even like it was for Merge Sort.

I let my pivot be the last element

Partition = partition(arr, low, high)

Call low, partition - 1

Call partition + 1, high

Here the partition function plays a crucial role

Pivot = arr[high]

Partitioning index = low

Loop through the array

 If the element is less than pivot

 Swap it with the partitioning index, increment partitioning index

Once exited the loop means that we travel to the very last element which is our pivot

By this point we should swap our pivot with the partitioning index to put it its rightful place

Return partitioning index to determine how the next division of array will take place

Resources

<https://www.programiz.com/dsa/bubble-sort>

Only used it for Merge and Quick sort understanding, all the n^2 sorts were original