

## Assessment 2: Hashing, sorting and searching

1. Discuss the advantages and disadvantages of 3 sorting algorithms.

There is a range of different sorting implementation available for use. There are three popular sorting algorithms widely in use, which are Bubble sort, Quick sort and Merge sort.

Bubble sort is one of the straightforward sorting implementation. The main advantage is its simplicity. It is intuitive to use and for its easy implementation. Bubble sort is efficient for sorting small arrays. Its disadvantage is slow running time with a runtime complexity  $O(n^2)$ , therefore not suitable for large arrays

Quick sort is also practical to sort small array and it is more efficient in practice than Bubble Sort. Being used internally by Time Sort for sorting small portions of input array for faster implementation. However, it is not practical for large array.

Merge sort scales well as the size of input of array grows due to its runtime complexity  $O(n \log_2 n)$ . However, it is not suitable for small array because of the time cost of the recursion. In this case, bubble sort and insertion sort defeat it for sorting small list such as ten-element array.

<https://realpython.com/sorting-algorithms-python/>