Exercise1\_DSA\_Theory Solution

Understand the problem

Data structures and algorithms plays a crucial role in handling large inventories :

Efficient Data Handling:

With the large size of current data data structure and algorithms helps to maintain and deal with such huge amount of data .

Example: Using well-designed data structures for efficient storage and retrieval of inventory information.

Optimizing Memory Usage:

Data structures helps to minimize memory wastage. Efficient allocation and utilization are critical, especially when dealing with large datasets2.

Example: Storing inventory details in a compact format (e.g., using arrays) reduces memory overhead.

Search and Retrieval Efficiency:

Algorithms allow quick access to specific inventory items. For instance, binary search (an algorithm) significantly speeds up finding a specific item in a sorted list with complexity (O(logN)).

Data structures such as arrays, linked lists, or trees can be used to implement this problem.

Analysis

If we update implement list of list to implement the above time complexity will be (O(n^2)). However in my case I have taken 1d array list for example and hence the complexity is reduced to(O(n)).

Similary binary search can be implemented to further reduce complexity to (O(logN)).