**Data structures and algorithms** are essential in handling large inventories because they enable efficient storage, retrieval, and manipulation of data. A well-designed data structure can reduce the time complexity of operations, making it possible to manage large inventories quickly and accurately.

**Suitable Data Structures for an inventory management system:**

* **HashMap:** A HashMap can be used to store products with their IDs as keys, allowing for fast lookup, insertion, and deletion.
* **ArrayList:** An ArrayList can be used to store products in a list, allowing for efficient insertion and deletion at specific indices.

**Analysis:**

* The time complexity of each operation in the chosen data structure (HashMap) is:
* Add: O(1) - constant time complexity
* Update: O(1) - constant time complexity
* Delete: O(1) - constant time complexity

**To optimize these operations, we can use techniques such as:**

* Caching: Store frequently accessed products in a cache to reduce the number of HashMap lookups.
* Indexing: Use an index to quickly locate products in the HashMap.
* Lazy Loading: Load products into the HashMap only when they are needed, reducing memory usage.
* By using a suitable data structure and optimizing operations, we can create an efficient inventory management system that can handle large
* inventories quickly and accurately.