**Spike 9 – Game Data Structures Short Report**

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Approaches:

Tree

Dynamic Array (Vector)

Dictionary/Map

Linked List

**Analysis:**

1. General Tree:

Advantages –

* Hierarchical structure can create item categories easily.
* Suitable for nested categories and subcategories

Disadvantages –

* More difficult to implement initially.
* Access time can vary depending on tree depth.

2. Dynamic Array (Vector)

Advantages –

* Constant-time access for any item
* Memory efficient as items are stored contiguously.
* Easy to implement and use.

Disadvantages –

* Insertion or removal (especially in the middle) can be slow due to element shifting.
* Requires occasional resizing, which can be costly.

3. Dictionary/Map

Advantages –

* Constant-time average complexity for access, insertion, and deletion.
* Key/Value storage is very useful for inventories layout.
* Ease of implementation.

Disadvantages –

* Memory overhead due to key-value storage.

4. Linked List

Advantages –

* Efficient insertions and deletions as they involve pointer changes.
* No resizing required.

Disadvantages –

* Linear time to access an item.
* Extra memory overhead for pointers.

The data structure that I will choose to create the inventory system for Zorkish is the dictionary/map. It’s utility in its key/value storage, constant-time complexity, and personal ease of implementation make it the best choice.