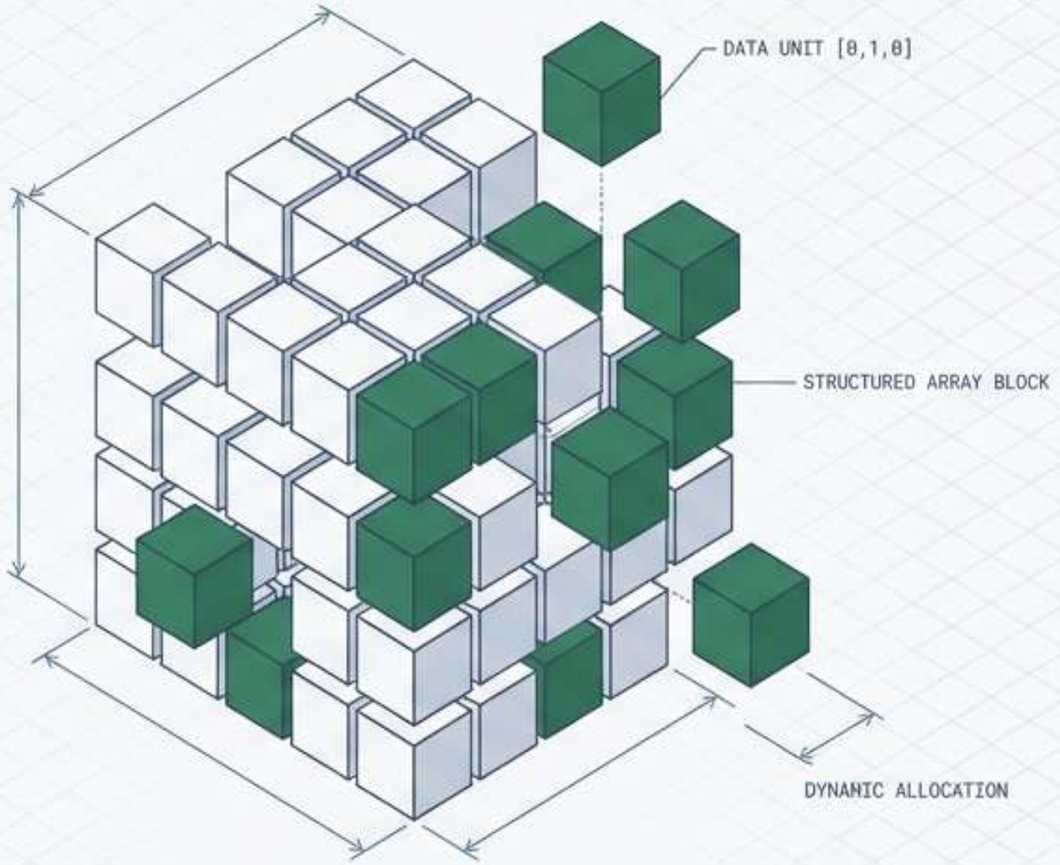
Java Arrays: The Architecture of Efficient Data

Moving from variable chaos to structured order.



Why do we need Arrays?

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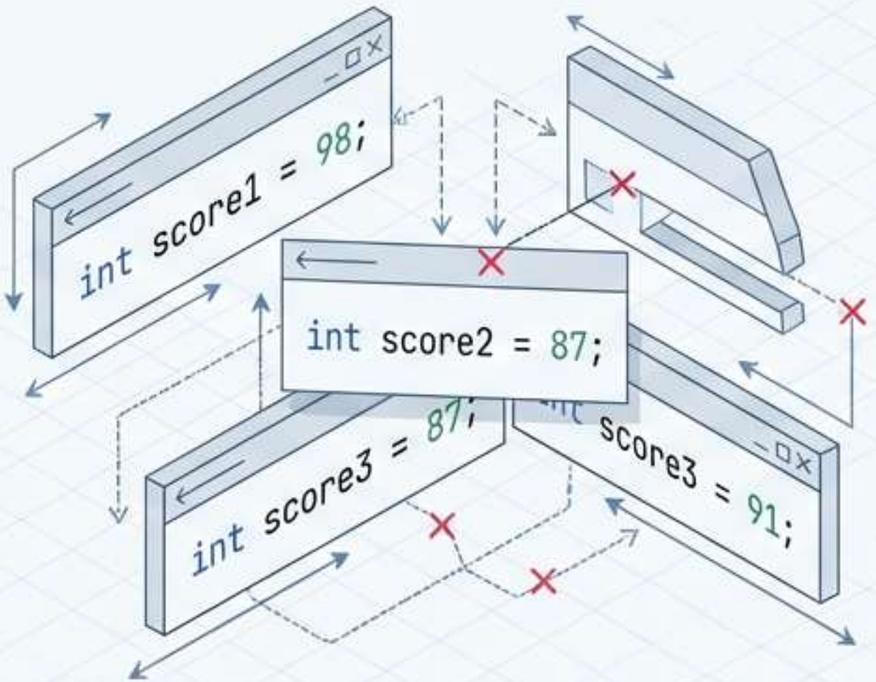
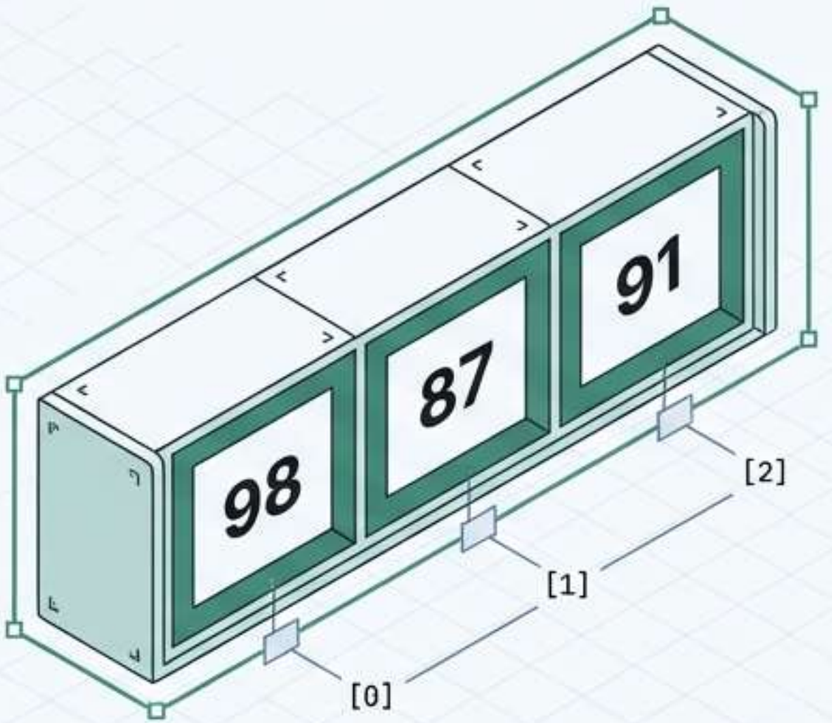
THE PROBLEM



Multiple variables for related data = Hard to Manage.

THE SOLUTION



Single variable container = Organized & Efficient.

Arrays bring order to data management, allowing you to handle collections as a single unit.

What is an Array?

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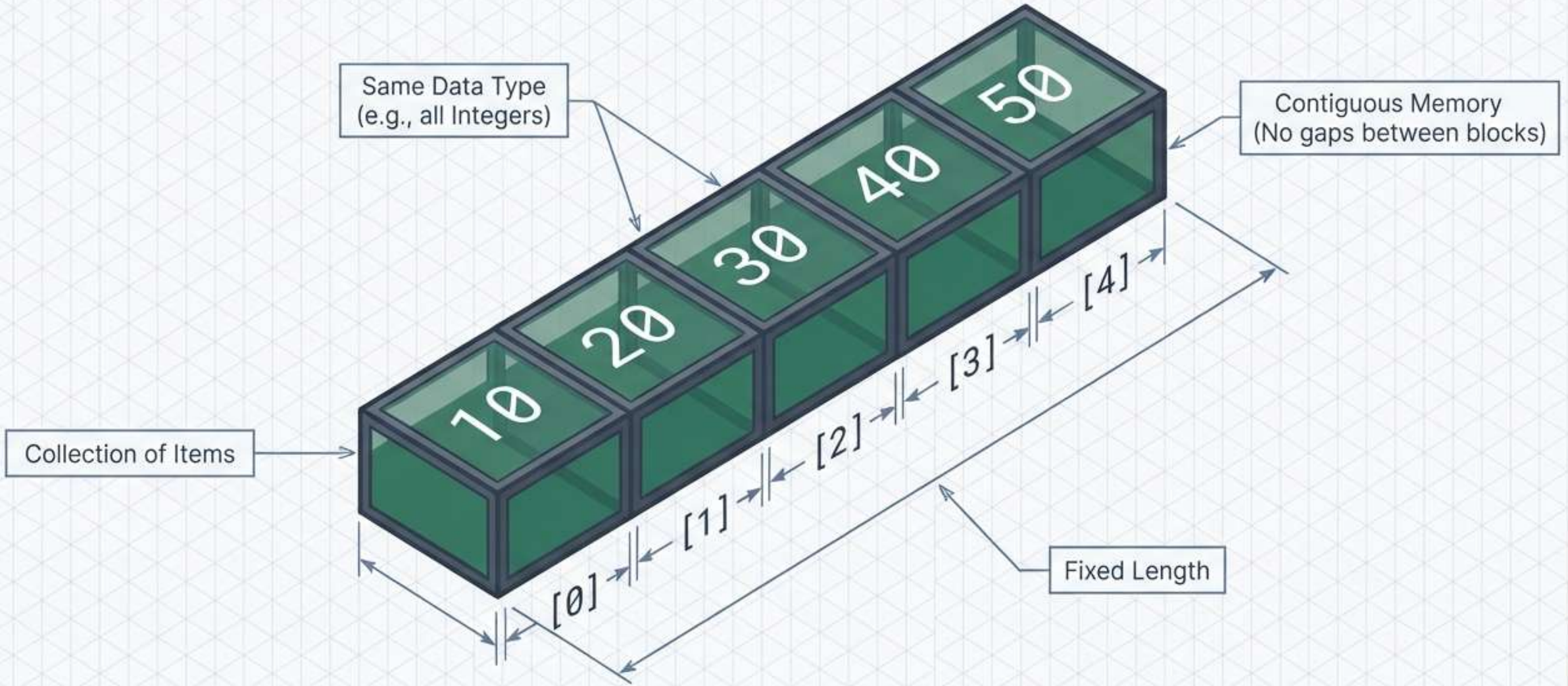

Two Blueprints for Construction

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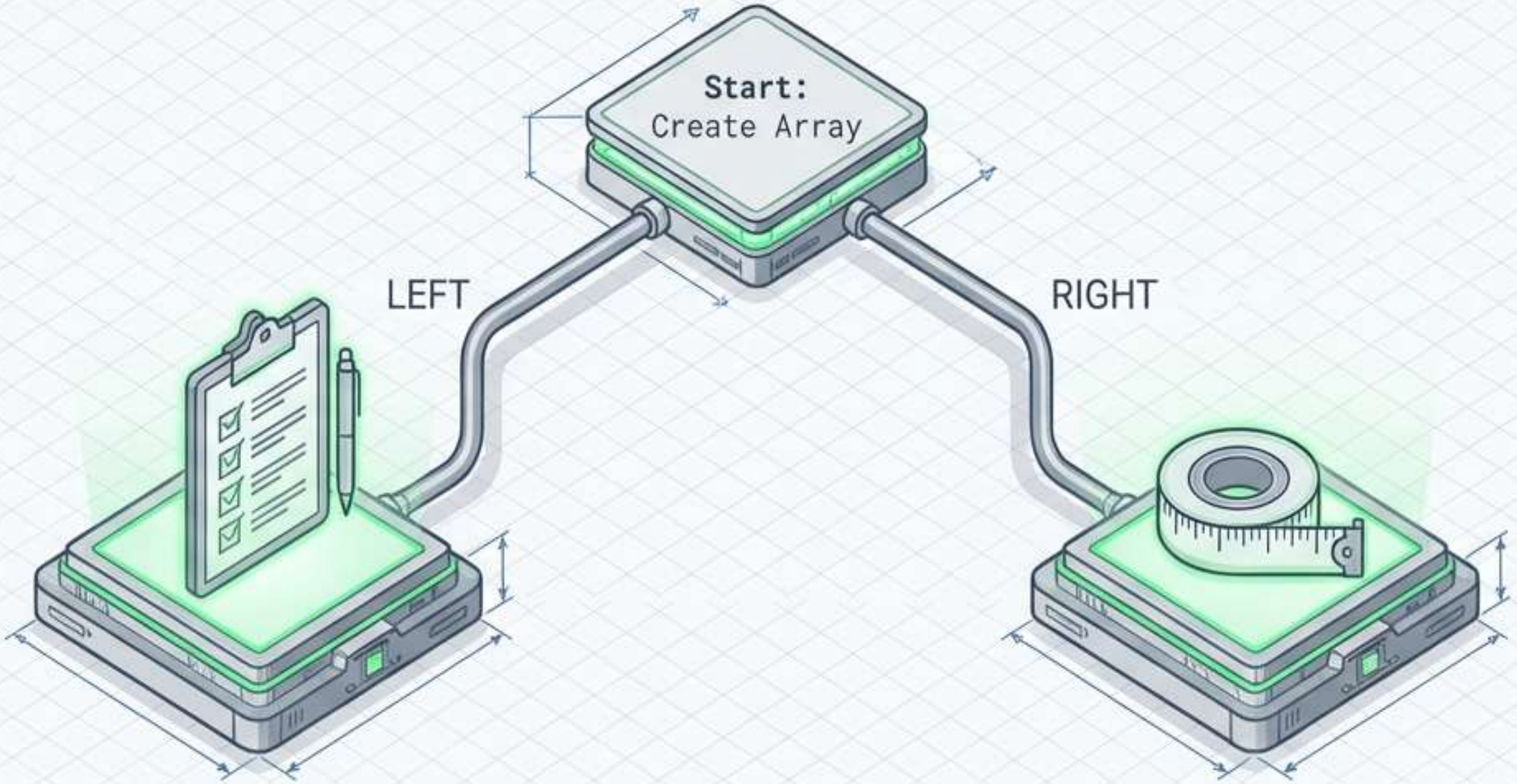
How you create an array depends on what you know at the start.



Path A: Array Literal

I already know the data values.

Path B: Instantiation

I know the size, but not the values yet.

Blueprint A: The Array Literal

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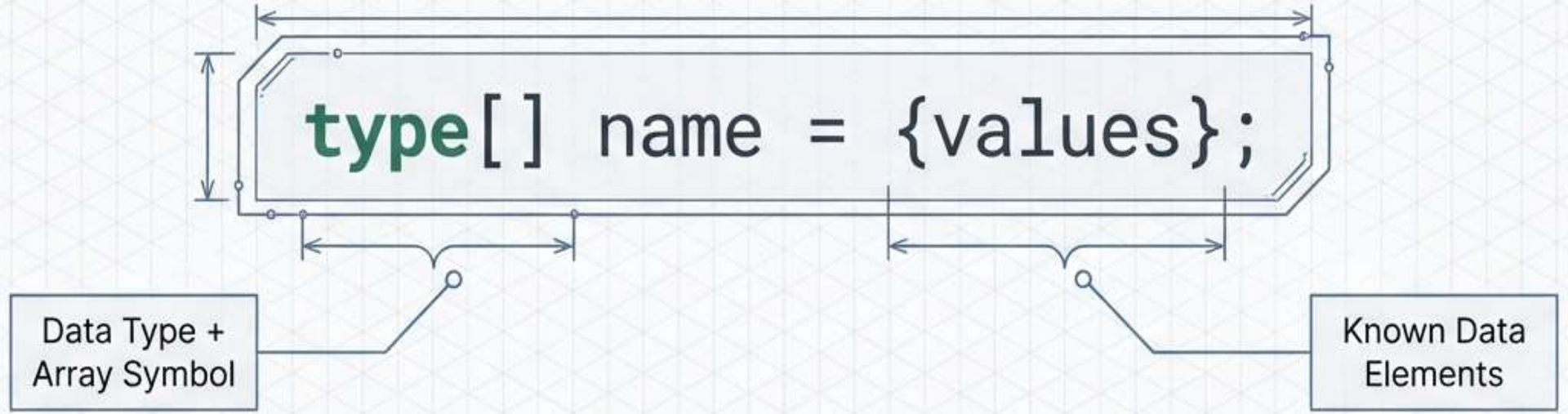
Usage: Data-Driven Construction



Valid Syntax Variations

```
int[] scores = {98, 87};
```

Preferred Java Style

Roboto Mono

```
int scores[] = {98, 87};
```

C-Style (Valid but less common)

Roboto Mono

The Literal Blueprint in Action

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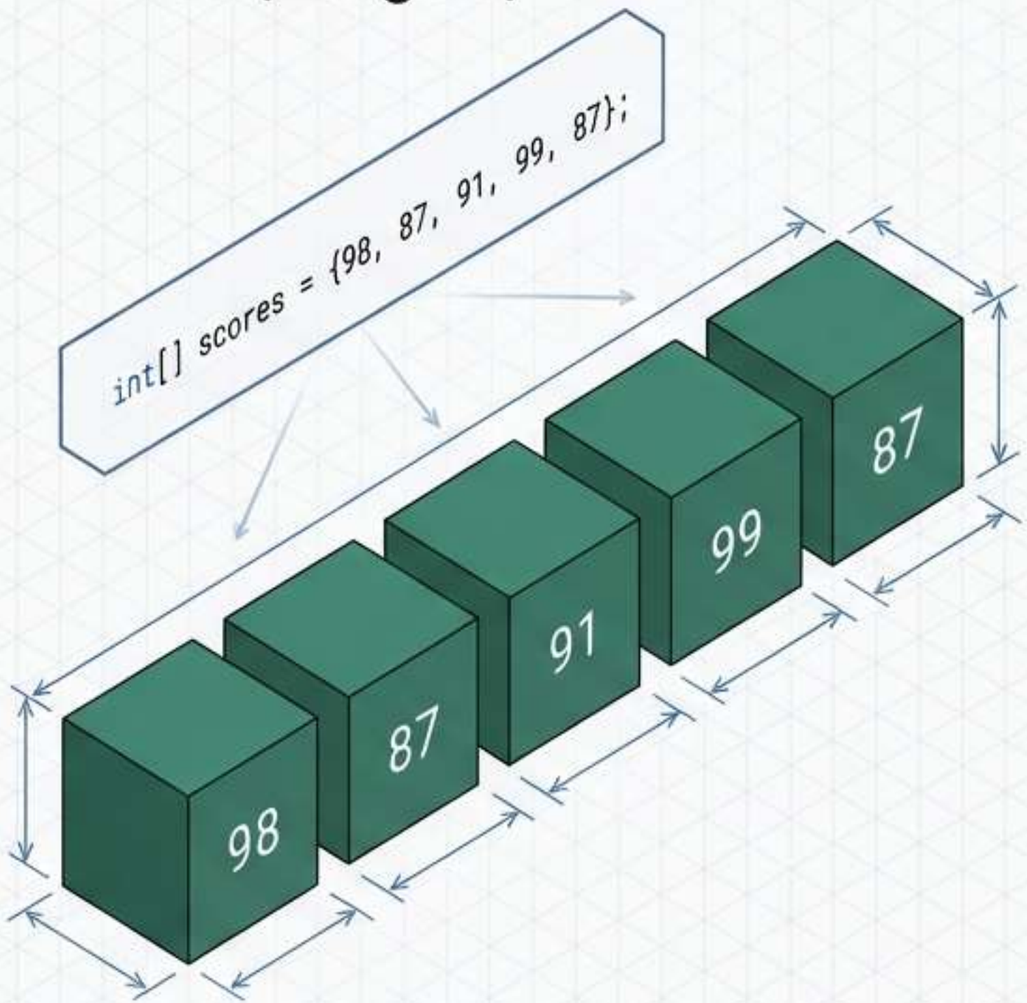
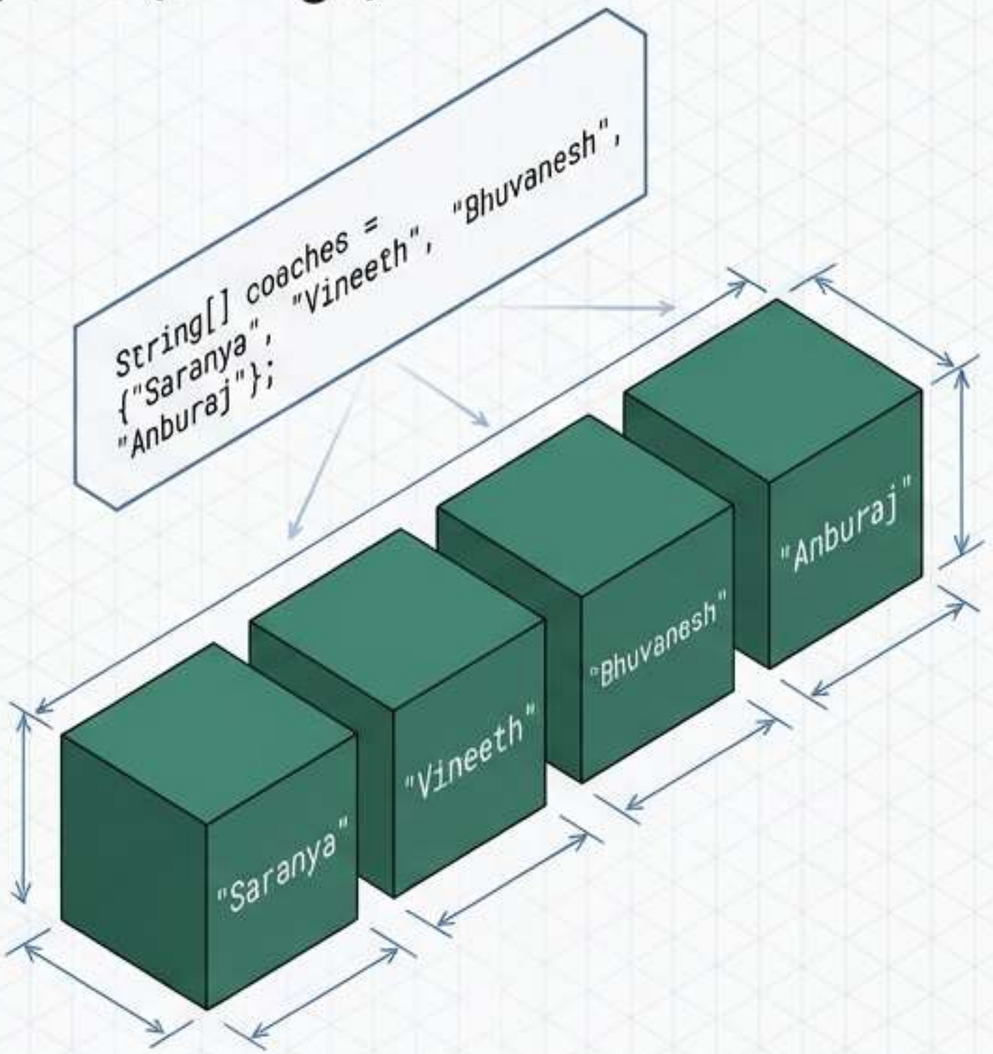
Primitives (Integers)



Objects (Strings)



Blueprint B: Instantiation

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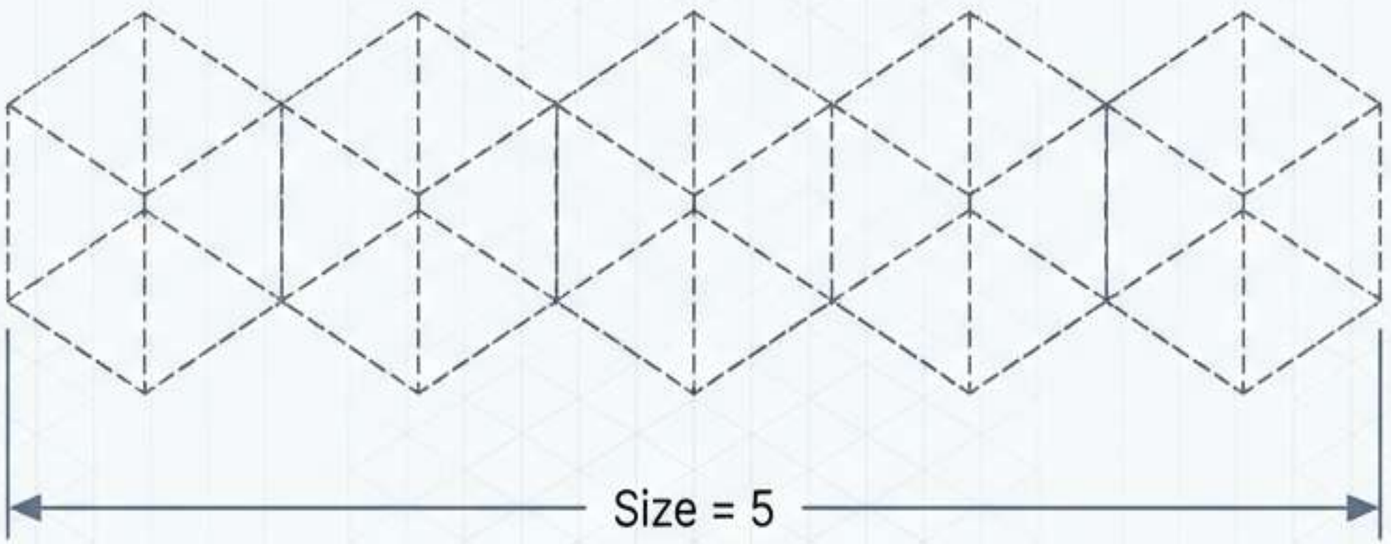
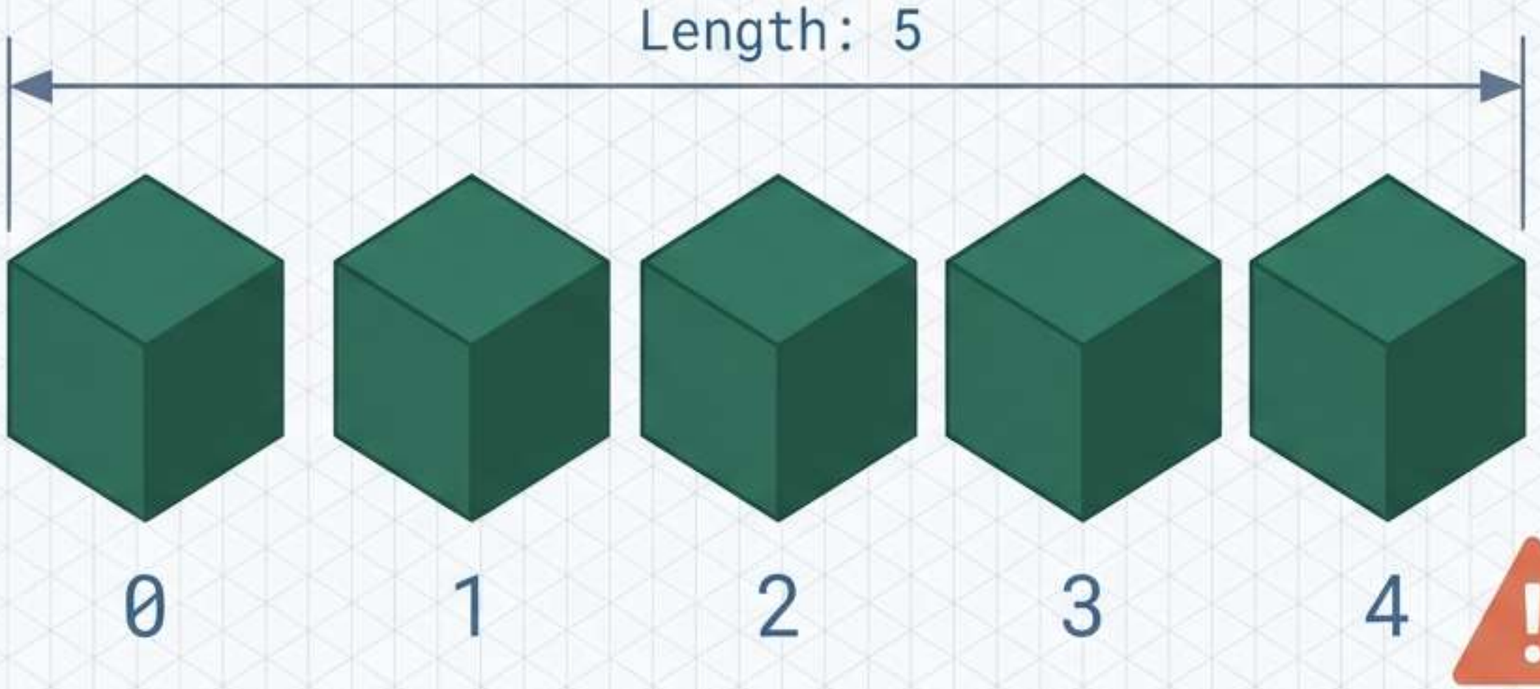
Usage: Capacity-First Construction (Size is known, Data is pending)

'new' = Allocate memory space immediately.

```
int[] scores = new int[5];
```



Mapping the Memory (Indexing)



Critical Constraint:
Max Index = Length - 1

Fixed Length: Once created, this structure cannot be resized.

Writing to the Array

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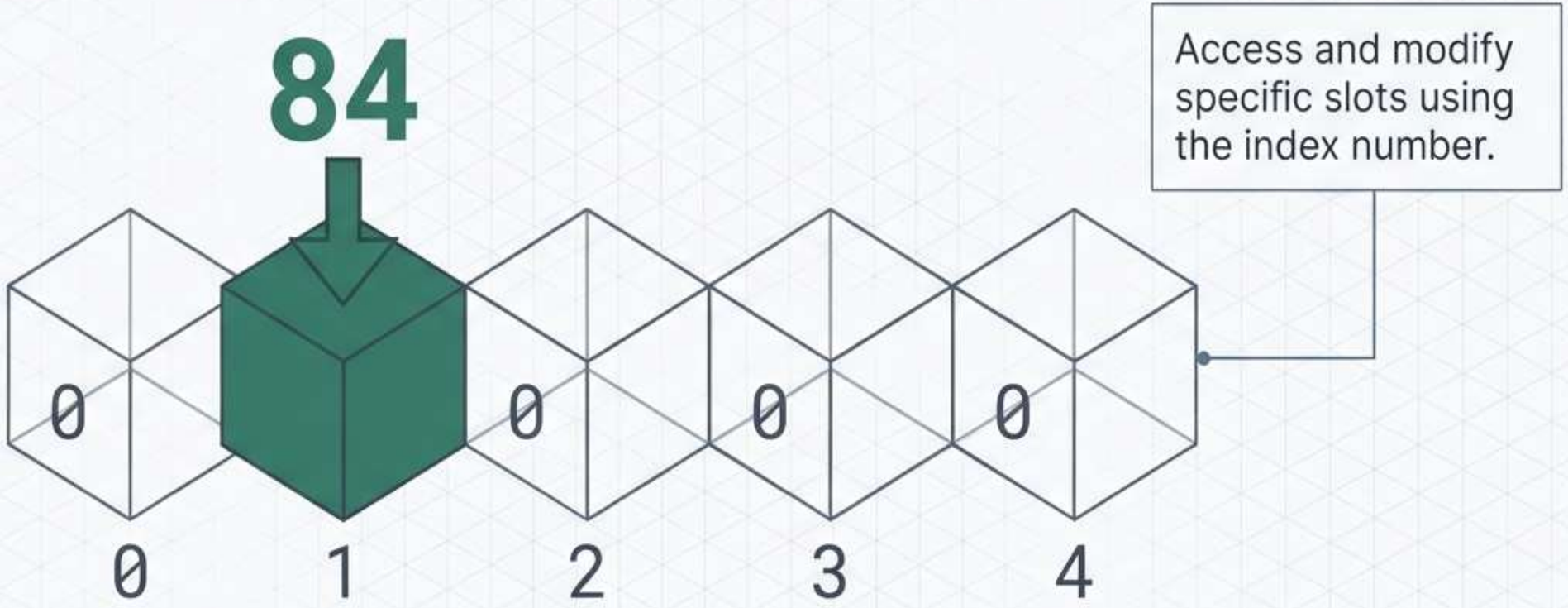
```
scores[1] = 84;
```




```
State: [0, 84, 0, 0, 0]
```