



Dynamic Arrays and Amortized Analysis

Graded Quiz • 30 min

Due Aug 17, 8:59 AM CEST

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Dynamic Arrays and Amortized Analysis

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1. Let's imagine we add support to our dynamic array for a new operation PopBack (which removes the last element), and that PopBack never reallocates the associated dynamically-allocated array. Calling PopBack on an empty dynamic array is an error. 1 / 1 point

If we have a sequence of 48 operations on an empty dynamic array: 24 PushBack and 24 PopBack (not necessarily in that order), we clearly end with a size of 0.

What are the minimum and maximum possible final capacities given such a sequence of 48 operations on an empty dynamic array? Assume that PushBack doubles the capacity, if necessary, as in lecture.

- ☐ minimum: 32, maximum: 32
- ☐ minimum: 1, maximum: 24
- ☐ minimum: 1, maximum: 1
- ☐ minimum: 24, maximum: 24
- ☒ minimum: 1, maximum: 32

**Correct**

The minimum is achieved when we alternate with one PushBack followed by one PopBack. The size of the array never exceeds 1, so the capacity also never exceeds 1.

The maximum is achieved when we have 24 PushBacks followed by 24 PopBacks. The maximum size is 24, so the corresponding capacity is 32 (next highest power-of-two).