# DYNAMIC ARRAYS

# What exactly is an array?

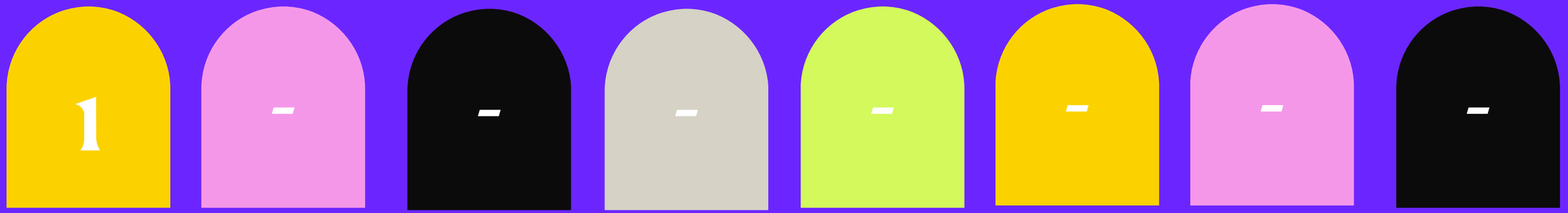
- Arrays are a **data structure** that can store a **collection of items** of the **same type.** They are often used to store lists of data, such as names, numbers, or objects.
- To access an item in an array, you can use its index.
- The size of the memory block is determined by the size of the array and the type of data that the array is storing.

# OH NO! Our array is full, but I need to add more items!

Original Array

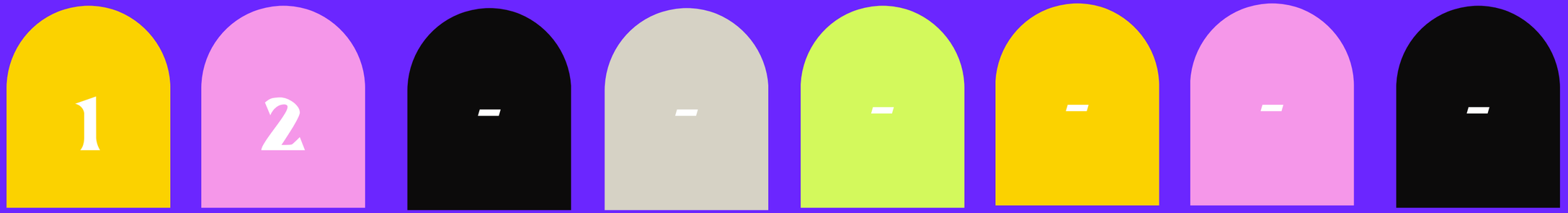
# Copy the first item from the original array to the new array:

Larger Array



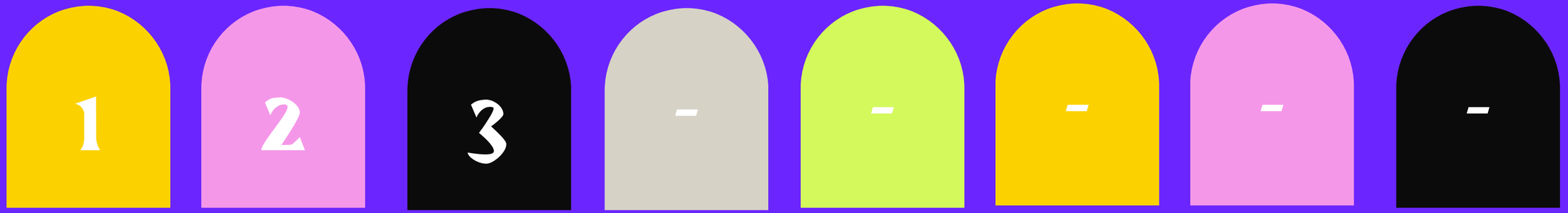
# Copy the second item from the original array to the new array:

Larger Array



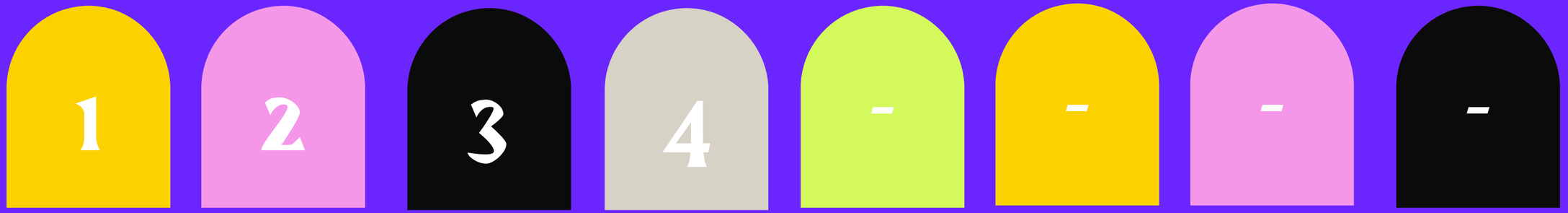
# Copy the third item from the original array to the new array:

Larger Array



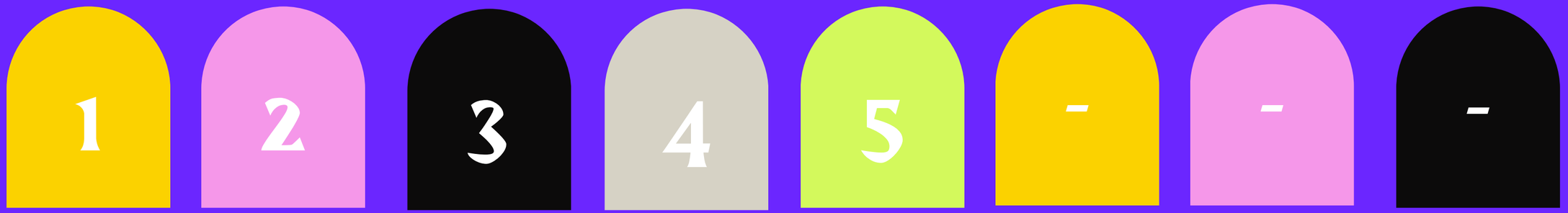
# Copy the fourth item from the original array to the new array:

Larger Array

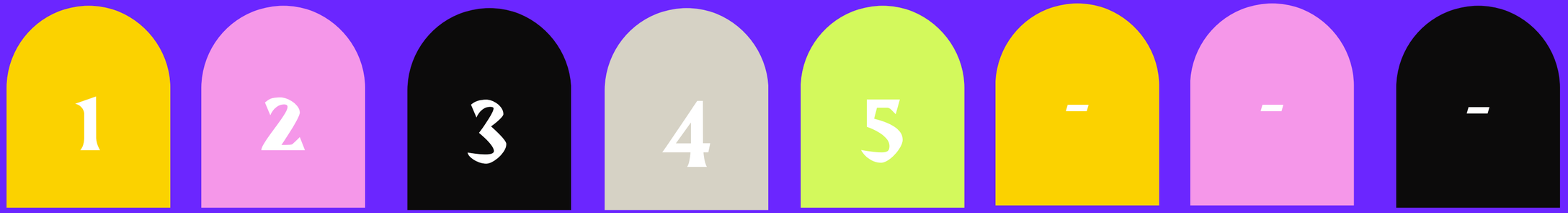


# Copy the fifth item from the original array to the new array:

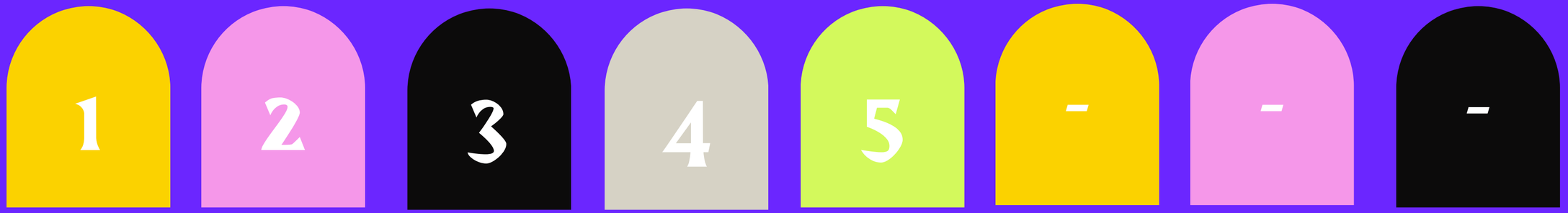
Larger Array



Once all items have been copied, the new array will contain a copy of the old array, and the old array is no longer needed.

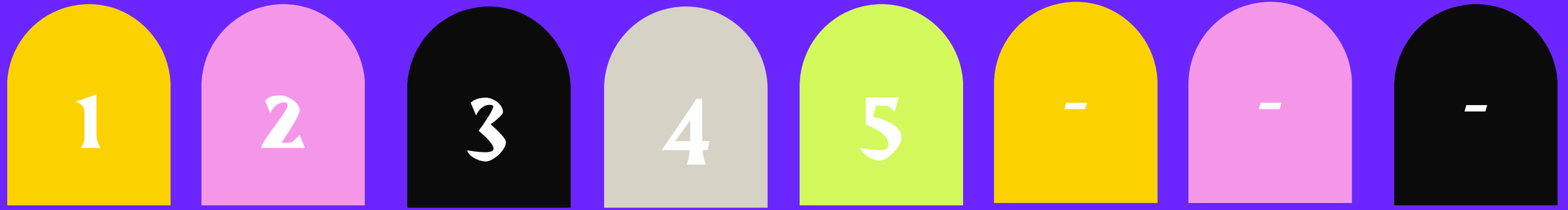


Notice: The new array has extra space at the end, but this is not a problem. The extra space can be used to store more items in the future.



# Original Array


# Larger Array



# BIG O NOTATION

- Copying anything takes time!
- Worst case, when resizing is required, it takes O(n) time.
- "Amortized Time Complexity"

# TIPS FOR USING DYNAMIC ARRAYS:

- Dynamic arrays are arrays that can grow and shrink in size as needed. This can be helpful if you are not sure how many items your array will need to hold.
- **Remember**: The size of the memory block is determined by the size of the array and the type of data that the array is storing.
- If you are no longer using an array, try to delete it or reuse it for another purpose. This will free up the memory that was allocated to the array.
- If you are concerned about memory usage, consider using a different data structure, such as a linked list or a hash table.

# Thank you