

A vibrant, stylized tropical illustration on a solid yellow background. It features a toucan with a large orange and yellow beak and a white throat, perched on the left. In the center is a whole pineapple with a yellow body and a green crown. Below the pineapple is a slice of watermelon with a red interior, black seeds, and a green rind. The composition is filled with various tropical leaves in shades of pink, teal, blue, and yellow, along with a few small flowers. The word "BENCHMARKING" is written in large, bold, white capital letters across the middle of the illustration.

BENCHMARKING

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A decorative border at the top of the slide featuring a symmetrical arrangement of tropical leaves in various colors including purple, teal, pink, and yellow, set against a light yellow background.

DESCRIPTION

This presentation compares the amount of time it takes to add 2^i unique items for all non-negative integer values of i to a list and the amount of time it takes to remove 2^i unique items from the front of the ArrayList for all non-negative integer values of i .

Both of these calculations were made until the until the computer ran out of memory or the time exceeded ten minutes.

Figure 1

Time It Takes to Add 2^i Elements

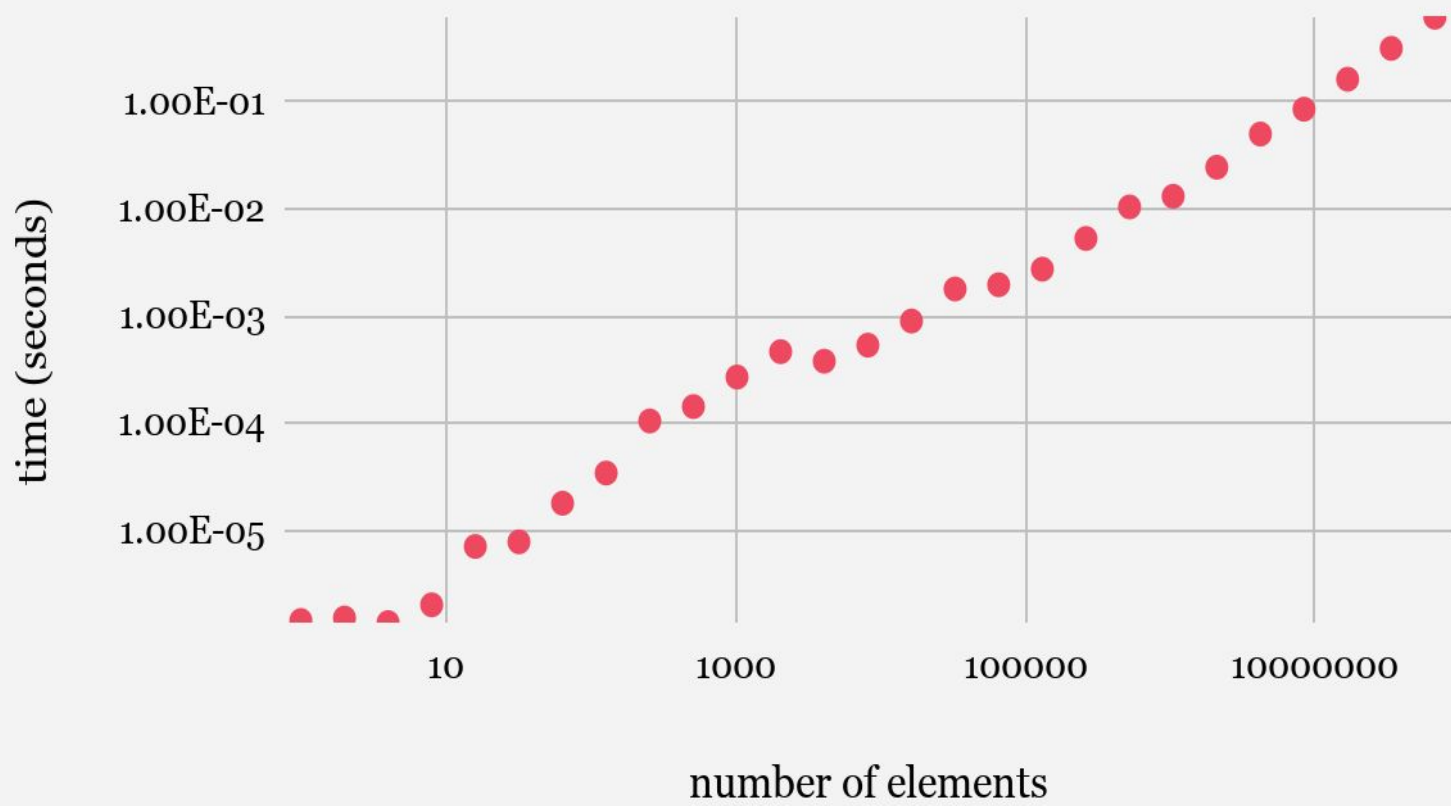


Figure 2

Time It Takes to Delete 2^i Elements

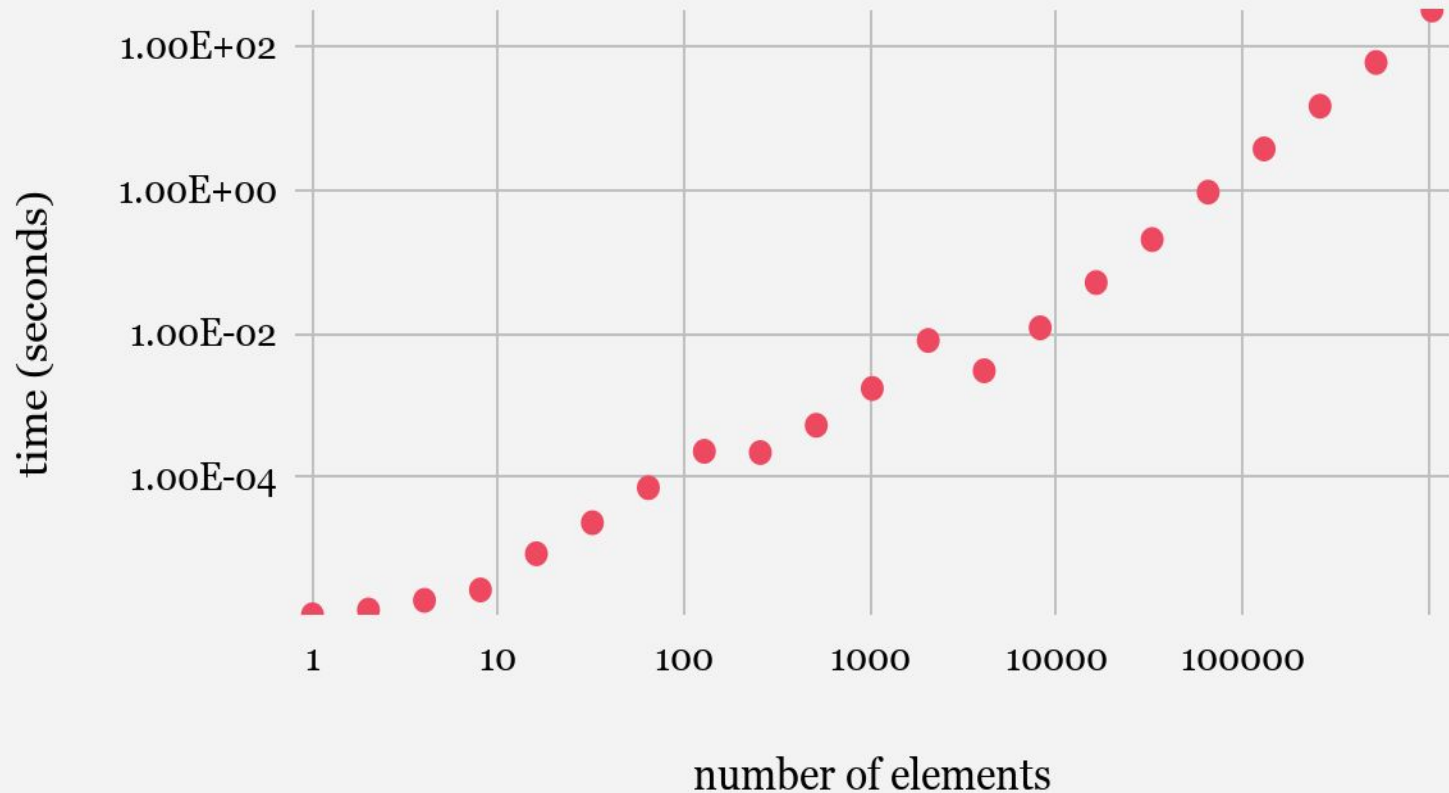


Figure 1: The Reasoning

As more and more elements were being added to the list, it took longer to make the array as shown in Figure

1. I was able to generate an array with 2^{27} elements before I ran out of memory. However, all of those arrays were generated under one second, so if I had more memory then I would have surely been able to generate many more arrays that had exponentially higher number of elements.

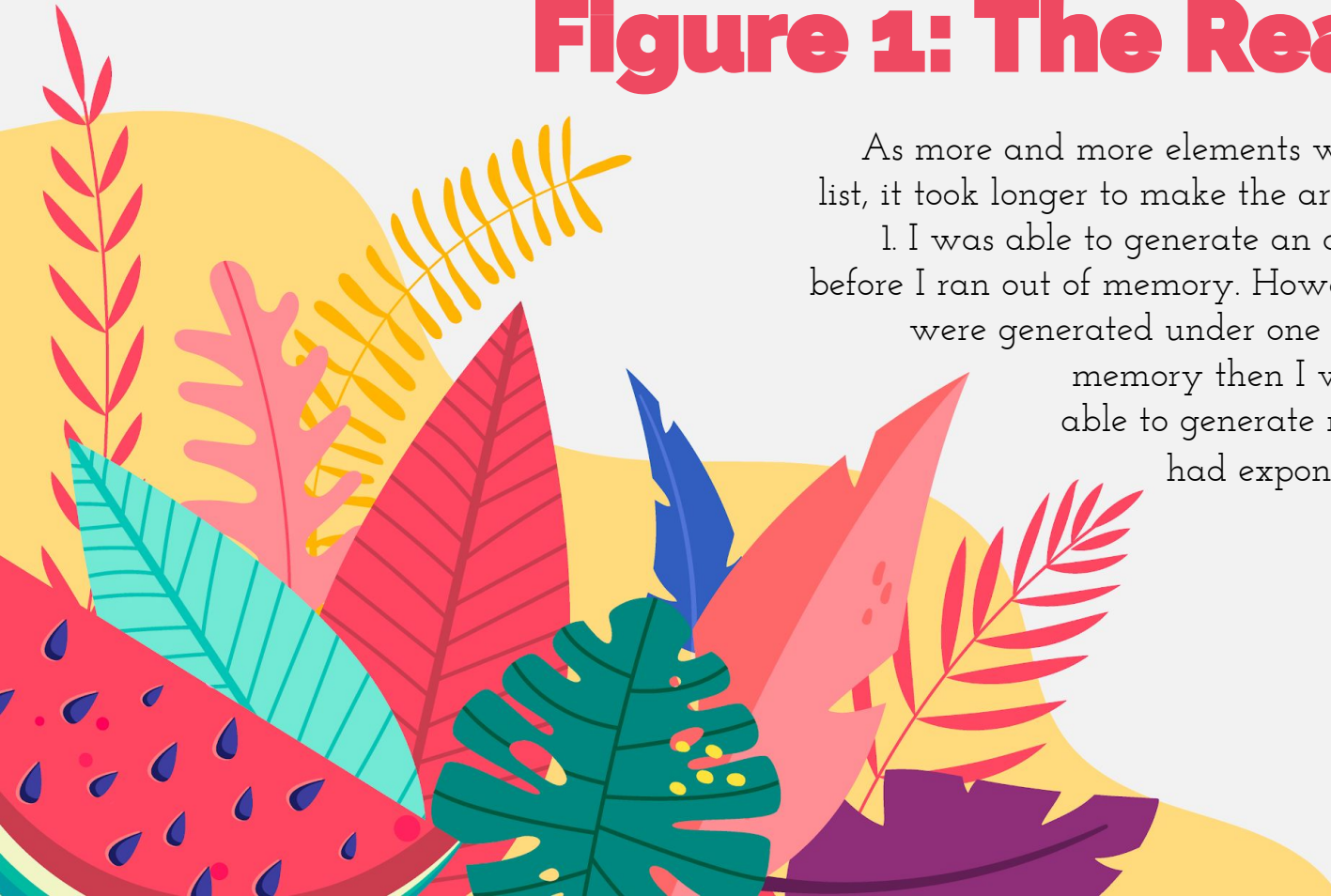
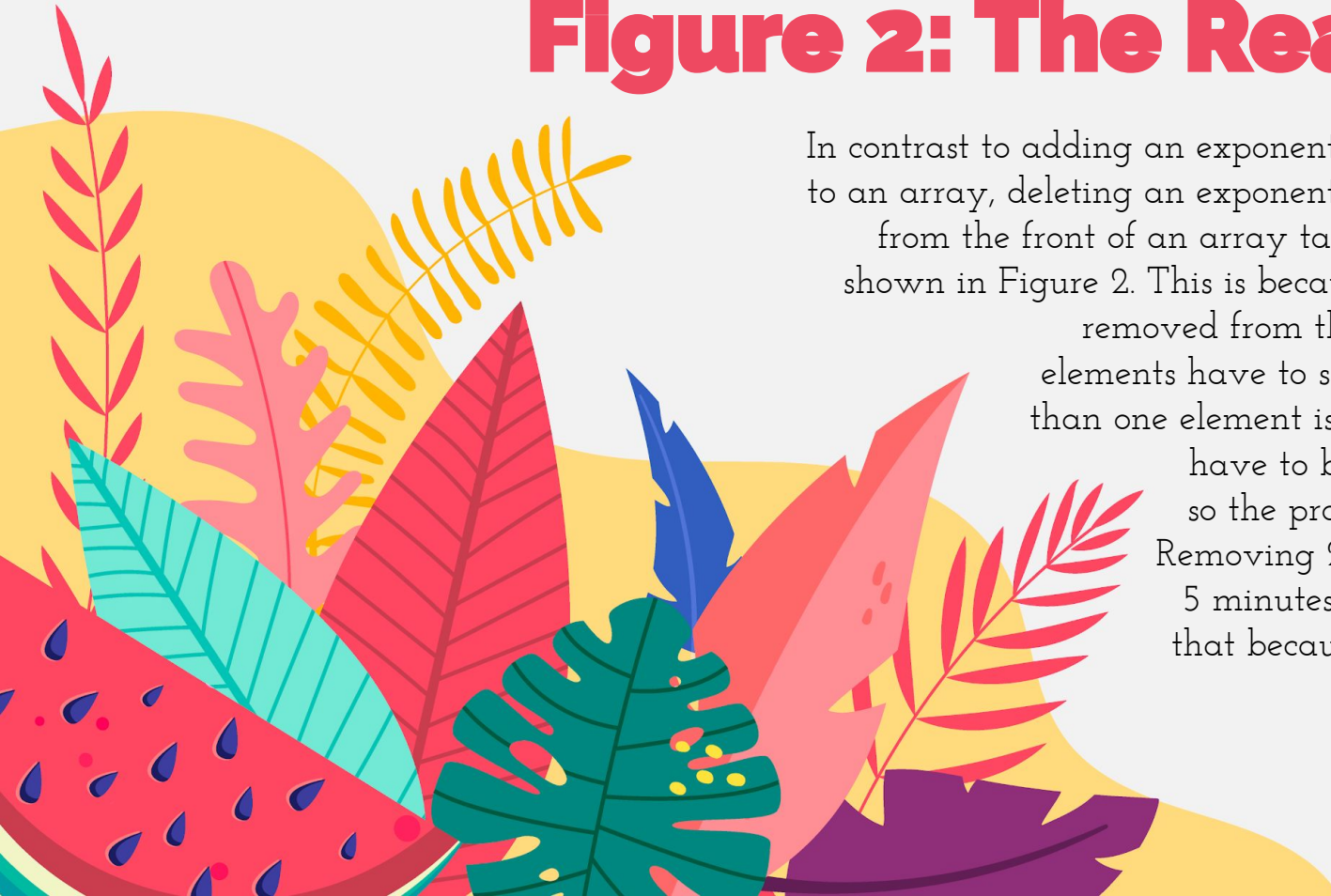


Figure 2: The Reasoning

In contrast to adding an exponential number of elements to an array, deleting an exponential number of elements from the front of an array takes much more time, as shown in Figure 2. This is because when an element is removed from the front, all of the other elements have to shift up and when more than one element is removed, the elements have to be removed one by one, so the process takes much longer. Removing 2^{20} elements took about 5 minutes and I had to stop after that because of the long length of time.



The background of the image is a dense, colorful pattern of various tropical leaves and foliage. The leaves are rendered in a flat, stylized manner with bold outlines. The color palette includes bright reds, oranges, yellows, greens, and purples. Some leaves have detailed vein patterns, while others are solid colors. The overall effect is a vibrant, summery, and tropical aesthetic.

THANKS

A decorative border of various tropical leaves in vibrant colors like red, orange, yellow, green, and purple surrounds the central white area. The leaves include Monstera, palm, and other exotic foliage styles.

CREDITS

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