|  |  |  |  |
| --- | --- | --- | --- |
| Array | Array size | Insert execution time ( .unshift ) | Append execution time (.push) |
| tinyArray | 10 | 33 μs | 75.2 μs |
| smallArray | 100 | 47 μs | 87.9 μs |
|  | 500 | 106.8 μs | 120.8 μs |
| mediumArray | 1000 | 191.2 μs | 139.9 μs |
| largeArray | 10000 | 8.8865 ms | 668.8 μs |
| extraLargeArray | 100000 | 832.1073 ms | 2.8922 ms |
|  | 1000000 | 1.35 min | 24.1909 ms |

**Runtime Analysis**

* .push adds to the end of the array and rarely needs reallocate memory+copy over.
* .unshift adds to the start of the array and always needs to reallocate memory and copy data over.
* The time complexity of push() is O(1), while that of unshift() is O(n) because in unshift(), all the existing elements in the array must be incremented.
* Complexity of O(1) is preferred over O(n).

From the results as shown above, I conclude push function performs better than unshift function.

For array sizes lesser than 500, unshift() might perform well, but for array sizes greater than 500 push() performs well and the execution time difference between them with higher array sizes is noticeably high.

---------Code.js Results:-

1.Sum Zer0:

[] false

execution-time 772.1 μs

[ 1 ] false

execution-time 662.3 μs

[ 1, 2, 3 ] false

execution-time 122.9 μs

[ 1, 2, 3, -2 ] true

execution-time 125.9 μs

2.Unique Characters:

[ 'M', 'o', 'n', 'd', 'a', 'y' ]

Monday true

execution-time 568.8 μs

[

'M', 'o', 'o',

'n', 'd', 'a',

'y'

]

Moonday false

execution-time 761.6 μs

[ 'S', 'u', 'n', 'd', 'a', 'y' ]

Sunday true

execution-time 332.8 μs

[

'E', 'n', 'c', 'r',

'y', 'p', 't', 'i',

'o', 'n'

]

Encryption false

execution-time 321.8 μs

3.Pangram Sentence:

the quick brown fox jumps over the lazy dog! true

execution-time 175 μs

i like cats, but not mice false

execution-time 146.5 μs

4.Longest Word:

[ 'hi', 'hello', 'how', 'are', 'you', 'Ananya' ]

Longest Word: Ananya ; Length: 6

execution-time 536.4 μs

[ 'This', 'vacation', 'is', 'the', 'best' ]

Longest Word: vacation ; Length: 8

execution-time 402.6 μs