

# #Big O Cheat Sheet:

## -Big Os-

**O(1)** Constant- no loops

**O(log N)** Logarithmic- usually searching algorithms have  $\log n$  if they are sorted (Binary Search)

**O(n)** Linear- for loops, while loops through  $n$  items

**O(n log(n))** Log Linear- usually sorting operations

**O(n<sup>2</sup>)** Quadratic- every element in a collection needs to be compared to every other element. Two nested loops

**O(2<sup>n</sup>)** Exponential- recursive algorithms that solve a problem of size  $N$

**O(n!)** Factorial- you are adding a loop for every element

**Iterating through half a collection is still O(n)**

**Two separate collections: O(a \* b)**

## -What can cause time in a function?-

Operations (+, -, \*, /)

Comparisons (<, >, ==)

Looping (for, while)

Outside Function call (function())

## -Rule Book-

**Rule 1:** Always worst Case

**Rule 2:** Remove Constants

**Rule 3:** Different inputs should have different variables.  $O(a+b)$ .  $A$  and  $B$  arrays nested would be  $O(a*b)$

+ for steps in order

\* for nested steps

**Rule 4:** Drop Non-dominant terms

## -What causes Space complexity?-

Variables

Data Structures

Function Call

Allocations

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